Panasonic

Planning Instructions

MEW00508

Revision 3

Fire Alarm System EBL128
V1.0.x

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Table of contents

Drawings according to the valid table of drawings.

1 Introduction

EBL128 Planning Instructions is a document[1] with information of special interest for **planning engineers** as well as **service / commissioning engineers**.
It should be read in conjunction with the EBL128 Operating Instructions, since most of the information in one of the documents is not found in the other document and vice versa.
It should also be read in conjunction with the EBL128 drawings[2], according to the valid Table of drawings.

A Product Leaflet is also available.

When planning a fire alarm installation the national regulations have to be obeyed. A lot of detector types can be used. Detector coverage area and detector placing in the room / building, etc. are matters for the planning engineers and are not described in this document.

Due to continual development and improvement, different S/W versions are to be found. This document is valid for **S/W version 1.0.x**. On the date of this document is x=4.

EBL128 is produced for many countries, accordingly the look, the texts, the functions, etc. might vary.

Products

Products consists of one or more parts (H/W) according to a **Product Parts List**. A product has:

- a **type number** (e.g. **4550**)
- an **article number**, often = the type no. but sometimes is a country code added (e.g. **4550SE**)
- a **product name** (e.g. **EBL128 Control & Indicating Equipment, 128 addresses**)

H/W

A H/W (e.g. a **p**rinted **c**ircuit **b**oard) has:

- a **type number** (e.g. **1556**)
- an **article number**, often = the type no. but sometimes is a country code added (e.g. **1556SE**)
- a **product name** (e.g. **Main Board 128 addr.**)
- a **p.c.b. number** (e.g. **9261-3A**) and can also have a configuration (e.g. **CFG: 1**) and a revision (e.g. **REV: 2**)
- sometimes a **S/W**

[1] File name: L:\User documents\128\Doc\V1.0.x\MEW00508rev3.doc

[2] Dimensions & overviews, connection diagrams, etc.

S/W

A S/W has:

- a **version number** (e.g. **V1.0** or **V1.0.x**)
- sometimes additional information, such as **Convention** (different functions / facilities), **Language**, etc.

PC S/W

A PC S/W is a program used for programming, commissioning, etc. It has a **version number**.

2 Definitions / Explanations

Definitions / explanations / abbreviations / etc. frequently used or not explained elsewhere in the document.

2.1 PEWF&STE AB

Panasonic **E**lectric **W**orks **F**ire **&** **S**ecurity **T**echnology **E**urope **AB**

2.2 Alarm point

Unit, which can generate a fire alarm, i.e. a sensor, a conventional detector, a manual call point, etc.

2.2.1 Smoke detector

Two types of analog and conventional smoke detectors are available: photo electric (optical) and ionization.

2.2.2 Sensor

Sensor = Analog detector

2.2.3 Analog detector

Contains an A/D-converter. EBL128 pick up the digital values ("sensor values") for each detector individually. All evaluations and "decisions" are then made in EBL128. Analog detectors are addressable – an address setting tool is used. An analog detector has to be plugged in an ASB.

2.2.4 (Analog) Sensor Base (ASB)

A sensor is plugged in an ASB, which is connected to a COM loop (see below).

2.2.5 Conventional detector

Detector with two states, normal or fire alarm. The detector contains a closing contact and a series alarm resistor. Some types are plugged in a **CDB** (see below) but some types are water proof and are not plugged in any base.

(Conventional detectors are normally plugged in a **CDB** (see below) and connected to a conventional zone line with end-of-line device.)

2.2.6 Conventional Detector Base (CDB)

A conventional detector is plugged in a CDB and connected to a conventional zone line input.

2.2.7 Addressable

A unit with a built-in address device (e.g. a manual call point). Each unit is individually identified, handled and indicated in EBL128.

(The unit can consequently be an I/O unit, to which one or more conventional "alarm points" can be connected on the zone line.).

2.2.8 Old detector

Conventional detector with a closing contact (short circuit; no alarm resistor), or detector with two breaking contacts.

2.2.9 Conventional zone line

Zone line input on an I/O unit, intended for one or more conventional alarm points. End-of-line dive in the last alarm point.

2.2.10 Addressable zone interface

Unit with a zone line input, intended for one or more conventional alarm points. End-of-line device in the last alarm point.

2.3 Output unit

Addressable unit with programmable control outputs (e.g. an I/O unit). To be connected to a COM loop (see below).

2.4 Output / Control output

Defined or programmable function. Relay or (supervised / monitored) voltage output, in EBL128 or an output unit.

2.5 Short circuit isolator

Addressable unit for automatic disconnection of a part of a COM loop (see below) in case of a short circuit on the loop.

2.6 Display unit

Unit for fire alarm presentation (incl. alarm texts, if programmed). Connected to an RS485 line.

2.7 COM loop

Loop = a cable with two wires, to which all the addressable PFSTech units can be connected. It starts in EBL128 and it returns back to EBL128.

2.8 Control Unit (C.U.) / C.I.E.

Control **U**nit = **C.U.** = **C**ontrol and **I**ndicating **E**quipment = A unit, e.g. EBL128, to which the alarm points are connected. Indicates fire alarm, fault condition, etc. on the front, i.e. the Fire Brigade & Control Panel (see below).

2.9 Fire Brigade Panel (FBP)

The Fire Brigade Panel is a part of the EBL128 front, intended for fire alarm presentation, etc. for the fire brigade personnel. A separate unit; an **external FBP**, can also be connected to EBL128.

In the ext. FBP a printer can be included.

2.10 Control panel (CP)

The Control Panel is a part of the EBL128 front, intended for the building occupier, service personnel, etc. to "communicate" with EBL128 / the system.

2.11 LED

LED (**L**ight **E**mitting **D**iode) = Yellow, green or red optical indicator ("lamp").

2.12 External Indicator (LED)

A unit with an LED. Connected to an ASB, CDB or a detector with a built-in LED, for external indication. Lit when the built-in LED is lit.

2.13 Display / LCD

LCD (**L**iquid **C**rystal **D**isplay) = Display for presentation of fire alarms, fault messages, etc. Normally alphanumeric characters and backlight.

2.14 Door open / Key switch

A door / key switch, which has to be activated in order to get access to the push buttons on the front. Indicated by the LED "Door open".

2.15 SSD / Site Specific Data

This data is unique for each installation. All alarm points, presentation numbers, alarm texts, programmable outputs, etc. are programmed (configured) in the PC program **Win128** and has to be downloaded in EBL128.

2.16 S/W / Software / System program

The S/W makes EBL128 (the microprocessor) work. It is factory downloaded but a new version can be downloaded in EBL128 on site.

3 Overview

3.1 The EBL128 c.i.e.

EBL128 is a microprocessor controlled intelligent fire alarm c.i.e. intended for analog addressable smoke and heat detectors. Also conventional detectors and manual call points can be used. Programmable inputs, control outputs and I/O units are available. Up to 128 addresses can be connected to EBL128.

EBL128 is fully compliant with the European standard **EN54 parts 2 and 4** and the front is fully **SS3654** compliant.

3.2 S/W Versions

Due to continual development and improvement, different S/W versions can be found. The control unit S/W can be updated on site.

3.3 Documents

The following documents are available:

- Planning instructions
- Drawings
- Operating instructions

Information found in one document is normally not to be found in another document, i.e. the documents complement each other. Product Leaflet for EBL128 and other units are available as pdf documents on our web site: http://www.panasonic-fire-security.com

3.4 Applications

EBL128 is intended for small and medium installations. The intelligent control unit offer the system designer and end user a technically sophisticated range of facilities and functions. Programming (via PC S/W **Win128**) and commissioning is very easy.

3.5 PC S/W

Win128 is used for programming and commissioning, i.e. to:

- create / download / upload (backup) the site specific data (SSD)
- download new S/W version, language (text file), EBL128 settings (e.g. convention), etc.
- create / download the alarm texts shown in the display in EBL128, ext. FBP and/or AA units.

The Win128 S/W shall have the same version number as the EBL128 S/W version number, e.g. **1.0**.x. Only x may be different. Old SSD files can be used with a newer EBL128 S/W version. Open and save the old SSD file in the new Win128 version before the download. If a backup is required, use the same Win128 version as the EBL128 version.

4 Control & Indicating Equipment

*Figure 1. The EBL128 **C**ontrol & **I**ndicating **E**quipment (4550).*

Depending on country, convention, configuration, etc. the look, language and functions might vary. Figure 1 shows an EBL128 with a Swedish front. The metal housing consists of a wall mounted chassis on which a removable skin, incl. the door, is attached. This makes the installation and service very easy.

EBL128 is in its basic configuration equipped with:

- Main board 4556 with:
  - One COM loop (0) to which the loop units are connected. Connections and more information, see drawing 128-21.
  - Two programmable supervised voltage outputs (S0-S1). Connections and more information, see drawing 128-22.
  - One programmable relay output (R0). Default programmed as output for routing equipment (Fire brigade tx). Connections and more information, see drawing 128-23.
  - One not programmable relay output for routing equipment (Fault tx). Connections and more information, see drawing 128-23.
  - One programmable input (I0). Connections and more information, see drawing 128-22.

- Two 24 V DC power supply outputs (for routing equipment and external equipment respectively). Connections and more information, see drawing 128-22.
- A socket for an **optional** Communication module (RS485 transceiver component) 4552, which will provide an RS485 interface (serial line) for up to four display units (1735 / 1736 and/or 1826 / 1828 and/or 1728). Max. one 1826 with printer. Connections and more information, see drawing 128-23.
- RS232 interface ("D" connector) for a PC with Win128. Connections and more information, see drawing 128-25.
- RS232 interface for a Web-server 1588. Connections and more information, see drawing 128-25.

- Built-in power supply (rectifier) and space for back-up batteries. Connections and more information, see drawing 128-24.
- Space for **optional** expansion board holders (Expansion boards mounting kit 4551). Up to four expansion boards can be mounted in the holder.
- Space for routing equipment.
- DIN-rail (and space) for a Web-server.
- Cable inlets (rubber grommet / knock-outs) on the top, bottom and back sides.

The door has a Plexiglas ahead of the front, see Figure 1. A key is required to open the door to get full access to the push buttons on front, i.e. the **F**ire **B**rigade **P**anel (**FBP**) and **C**ontrol **P**anel (**CP**).

Figure 2. The EBL128 front. The look might vary depending on the country (language) configuration, etc. (shown here is a front with English texts). LEDs & push buttons are described in the EBL128 Operating Instructions.

The FBP is used by the fire brigade personnel to see which alarm point / zone having activated the fire alarm(s), silence alarm devices, reset alarms, etc. In the display (LCD, 2x40 alphanumeric characters), the information displayed on the first row is depending on how many alarm points / zones having activated fire alarm (and also convention).

On the second row is, for the activated alarm point / zone, an alarm text shown, if programmed. For more detailed information regarding the fire alarm presentation, see the EBL128 Operating instructions.

Required fire brigade personnel manoeuvres are performed via the FBP in EBL128 or via an external FBP 1826 / 1828.
The CP is used by the EBL128 owner, service personnel, etc. to "communicate" with EBL128, e.g. for commissioning, monthly tests, disablements and maintenance. Access codes for different access levels are required. A keypad is used to get access to the menu tree, i.e. the main and sub menus for data in- / outputs, manoeuvres, etc. The CP also holds several system status LEDs.

4.1 COM loop

EBL128 has one COM loop (0), to which the loop units are connected. Connections to "J1:1-4" according to drawing 128-21. On the COM loop can theoretically 127 COM loop units be connected (i.e. address 1-127). The exact number of addresses that can be used and the cable length are depending on the cable type (cable resistance) and the total COM loop unit current consumption (i.e. the type and number of loop units). See chapter "Current consumption", page 112 and drawing 128-11. Each COM loop unit has a technical address and each alarm point and zone line input has a presentation number (zone-address). See the EBL128 Operating Instructions for more information.

If one or more addressable Short Circuit Isolators (SCI 4313 / 4370) are used, the loop will be divided into "segments", i.e. the part between two isolators or between EBL128 and one isolator. In case of short-circuit on the COM loop only the affected segment will be isolated, which will minimise the number of units "disabled". See Figure 7, page 36.

Break (cut-off) or short circuit on the COM loop

Normally EBL128 communicates with the units in the A-direction only and is in the B-direction checking the COM loop voltage only, which shall be ≥ 12 V DC. There can be no one, one or up to eight addressable Short Circuit Isolators, 4313 / 4370 (SCI), connected on the COM loop.

In case of short-circuit or a break (cut-off) on the COM loop, EBL128 will in order to localize it, do the following:

- The COM loop voltage and communication will be turned off. Because of that all isolators will also be turned off, i.e. the L (SA) contact in each isolator will be "open".
- The COM loop voltage and communication will be turned on again.[3] The isolators will now be turned on one after another in the **A-direction**, until it is not possible to turn on any more

[3] Short-circuit on a COM loop with **no isolators**: The voltage and communication will **not** be turned on.

isolator, i.e. the isolator closest to a short-circuit will *not* be turned on alt. the isolator closest to (just before) a break will be turned on but the isolator after a break can of course not be turned on.

- The COM loop communication will now start in the **B-direction** also and the isolators will be turned on one after another, until it is not possible to turn on any more isolator, i.e. the isolator closest to a short-circuit will *not* be turned on alt. the isolator closest to (just before) a break will be turned on.
- In case of short-circuit on the COM loop, only the segment(s) between the now turned off isolators will be isolated.
- One or more fault messages will be shown in the EBL128 display, see below.

The fault messages will be different depending on if it is a single or double break or short-circuit on the COM loop, as well as if there is no one, one or several isolators connected on the COM loop, see following chapters.

In any case, each unit not found by EBL128 will generate a fault:

```
FAULT: No reply xx-xx
```

Press "→" to see the technical address.

```
FAULT: No reply techn. address xxx
```

Regarding Fault acknowledge, see the EBL128 Operating Instructions.

4.1.1 A single break (cut-off) on the COM loop

If not all units are found when communicating in the A-direction only, but when communicating in both directions, it must be a single break (cut-off) on the COM loop. One fault will be generated and the following fault message will be shown:

```
FAULT: Cut-off SCI n <-> SCI n
```

n = A, B, 0, 1, 2, 3, 4, 5, 6 or 7 depending on if no one, one or several isolators are used. A & B are the built-in control unit isolators in the A- and B-direction respectively.
If no isolator is used the information will be: **A<->B.**
If one isolator (no. 0) is used: **A<->0** or **0<->B**
If two isolators (no. 0 and no. 1) are used: **A<->0, 0<->1** or **1<->B**
...and so on.

The break (cut-off) is found in the specified segment, e.g. **A<->0**.

Each 10th minute a new attempt is made to communicate in the A-direction only.

When the fault is corrected (no break / cut-off) the communication automatically returns to communicate in the A-direction only.[4]

4.1.2 Several breaks (cut-offs) on the COM loop

If not all units are found when communicating in the A-direction only, and not when communicating in both directions, there must be two or more breaks on the COM loop. A "no replay fault" (see above) will be generated for each unit not found.

There will also the following fault message:

```
FAULT: Cut-off SCI n <-> SCI n
```

n = A, B, 0, 1, 2, 3, 4, 5, 6 or 7 depending on if no one, one or several isolators are used. A & B are the built-in control unit isolators in the A- and B-direction respectively.

In case of a break (cut-off) in more than one segment there will also be the following message:

```
FAULT: Several faults on COM loop
```

In case of "Several faults on COM loop": Correct the cut-off fault shown in the display and the next cut-off fault will be shown, and so on.

Each 10th minute a new attempt is made to communicate in the A-direction only.

When all faults are corrected (no breaks / cut-offs) the communication automatically returns to communicate in the A-direction only.[4]

4.1.3 Short-circuit on the COM loop

Short-circuit between the **L** (SA) and **C** (SB) wires[5] will generate a fault with the following fault message:

```
FAULT: Short-circuit SCI n <-> SCI n
```

n = A, B, 0, 1, 2, 3, 4, 5, 6 or 7 depending on if no one or several isolators are used. A & B are the built-in control unit isolators in the A- and B-direction respectively.
If no isolator is used the information will be: **A<->B.**
If one isolator (no. 0) is used: **A<->0** or **0<->B**
If two isolators (no. 0 and no. 1) are used: **A<->0, 0<->1** or **1<->B**

[4] **NOTE!** The fault has to be acknowledged and it can last up to 10 minutes before the communication returns to communicate in the A-direction only.

[5] Depending on the cable type / length and where the loop short-circuit is located, it can take up to 10 seconds before the fault is generated.

...and so on.

The short-circuit is in the specified segment, e.g. **A**<->**0**.

In case of short-circuit in more than one segment on the COM loop, the fault messages will be similar to the message shown for several breaks (cut-offs), `FAULT: Several...` (see above).

Each 10th minute a new attempt is made to communicate in the A-direction only.

When the fault is corrected (no short-circuit) the communication automatically returns to communicate in the A-direction only. [4]

4.2 Programmable voltage outputs (S0-S1)

The outputs S0-S1 are supervised (monitored)[6]. Connections to "J1:5-8" according to drawing 128-22. When the connections are finished, a calibration has to be done. See the EBL128 Operating Instructions chapter "Calibration of supervised outputs (menu H5/A3)".
Each output has to be programmed (via Win128) regarding:

- Type
- Logic, i.e. normally low (default) **or** normally high[7] (24 V DC)[8].
- Activation time and type (steady, pulse, delay, etc.)
- Control expression (with one or more trigger conditions)

S0: max. 500 mA (cont. 500 mA, during 30 ms 620 mA).
S1: max. 200 mA (cont. 200 mA, during 110 ms 240 mA).

For more information, see the Win128 help or chapter "Programmable outputs", page 50.

4.3 Programmable relay output (R0)

Connections to "J1:17-19" according to drawing 128-23.
The output has to be programmed (via Win128) regarding:

- Type
- Logic, i.e. normally open (NO) **or** normally closed (NC) contacts.[9]
- Activation time and type (steady, pulse delay, etc.)
- Control expression (with one or more trigger conditions).

NOTE! The output R0 is as default programmed for routing equipment (Fire brigade tx), i.e. it will be activated when a fire alarm is generated in EBL128.[10] In this case, activated output is indicated

[6] This is default, but via Win128 it is possible to set each output (S0-S1) individually to be not supervised.

[7] A normally high output is not supervised.

[8] See chapter "Technical data", page 120, regarding **system voltage**.

[9] Relay contacts: max. 2 A @ 30 V DC.

[10] The output can be disabled via "door open" or via menu H2/B9. Regarding "Fire brigade tx" see also chapter "Alert annunciation", page 79.

by the LED "Fire brigade tx".[11] Output for routing equipment (Fire brigade tx) can be tested via menu H1, see the EBL128 Operating Instructions.

For more information, see the Win128 help or chapter "Programmable outputs", page 50.

4.4 Relay output for routing equipment (fault tx) (R1)

Connections to "J1:20-22" according to drawing 128-23.

Not programmable relay output.[9] This output for routing equipment (Fault tx) is normally activated and will be de-activated when a fault is generated[12] in EBL128[10] and this is indicated by the LED "Fault tx activated". Output for routing equipment (Fault tx) can be tested via menu H1, see the EBL128 Operating Instructions.

4.5 Programmable input (I0)

Connections to "J1:9-10" according to drawing 128-22.

The input has to be programmed (via Win128) regarding:

- Trigger condition (Triggered by)
- Logic, i.e. normally open (NO) **or** normally closed (NC) contacts
- Additional information when required: Fault no., Zone, Address and Fault message (Error text)

For more information, see the Win128 help or chapter "Programmable inputs", page 45.

4.6 24 V DC power supply outputs

Two 24 V DC[8] outputs that can be used for:

- Power supply of routing equipment (fire brigade tx / fault tx). Max. 200 mA (cont. 200 mA, during 110 ms 240 mA).
- Power supply of external equipment, e.g. ext. FBP 1826 / 1828, AAU 1735 / 1736, EPU 1728, etc. Max. 500 mA (cont. 500 mA, during 30 ms 620 mA).

Connections to "J1:11-12 & 13-14" according to drawing 128-22.

4.7 RS232 interfaces

Two interfaces for:

- PC with Win128 installed. (9 ways female "D" connector)
- Web-server 1588. (3 ways Molex connector)

Connections to "J3" & "J5" according to drawing 128-25.

---

[11] Programmable output type 4 = Routing equipment (Fire brigade tx), will normally turn on the LED but it is possible to use a programmable input with trigger cond. 8 = Activated routing equipment, to turn on the LED instead.

[12] Also if EBL128 becomes powerless (dead) and for "Watch-dog fault.

4.8 RS485 transceiver (option)

There is a socket on the main board 4556 where an optional RS485 transceiver 4552 (comm. module) can be mounted. This transceiver provides an interface (screw connectors) for up to four display units, i.e. ext. FBP 1826[13] / 1828 and/or AAU 1735 / 1736 and/or EPU 1728 running in **S/W mode xxxx – 1587**[14]. The data rate in this mode is 9600 baud and the cable length is max. 1200 m.
Connections to "J1:15-16" according to drawing 128-23.

4.9 Power supply

Connectors for the built-in power supply units:

- Rectifier 230 V AC / **24 V DC** (Two tab terminals, 6.35x0.8 mm)
- Batteries (2 x 12 V, 16 Ah)[15], **24 V** (Two tab terminals, 6.35x0.8 mm)

Connections to "J2:1-5" according to drawing 128-24.

4.10 Internal Power supply

Connector for power supply of the Web-server 1588:

24 V DC[8] output (3 ways Molex connector). The total current consumption on this output and the output for Power supply of external equipment (see above) is max. 500 mA.

Connections to "J4" according to drawing 128-25.

[13] Max. one with printer.

[14] xxxx = type of display unit (e.g. 1826/28). For more information about each type of unit, see chapter "Other units", page 43.

[15] Batteries are not included in the c.i.e. type number. The batteries have to be ordered separately.

5 Expansion boards 458x

In EBL128 can be mounted up to four optional expansion boards, i.e. two pieces of type 4580 and two of type 4581.

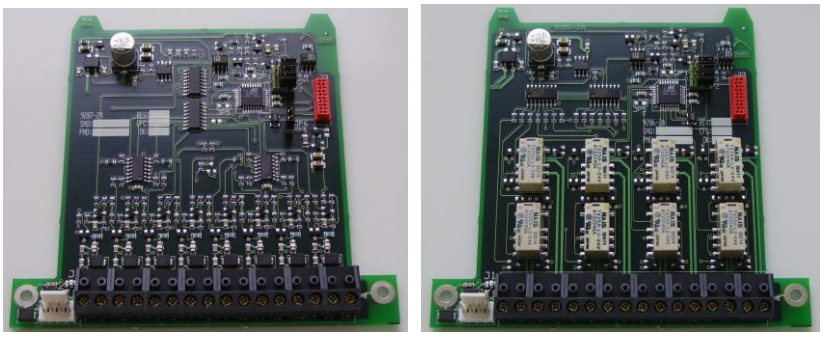


Figure 3. 8 zones expansion board 4580 and 8 relays expansion board 4581.

The expansion boards are mounted inside EBL128 in an optional expansion board holder **4551**. A supplied ribbon cable is used for the connection of the expansion board(s) to the main board. (Connector "J2" on the expansion board respectively and "J13" on the main board 4556.) See drawings 128-01 & -03.

Each expansion board has to have an expansion board number ("address") set via jumpers "JP2-JP3" on the expansion board respectively, see Figure 4 below.

Win128 is used for all expansion board programming. For more information see the Win128 help.

5.1 Expansion board number setting

The expansion board number ("address") is set via jumpers "JP2-JP3" on the expansion board respectively.

Board no. ("address")	JP2	JP3	JP4
0	Open	Open	Open
1	Shunted	Open	Open
2	Open	Shunted	Open
3	Shunted	Shunted	Open

Figure 4. Expansion boards 4580 & 4581. Jumpers JP2 and JP3 are used for expansion board no. ("address") setting. (JP4 is for future use.)

5.2 8 zones expansion board 4580

Up to **two** 4580 boards can be used.

Each board has to be programmed via Win128 regarding:

- Board no. ("address") that is set via the jumpers "JP2 and JP3", see Figure 4 above.

The 4580 board has eight conventional zone line inputs (0-7) intended for conventional detectors. In the last alarm point on each zone line has an end-of-line device to be connected, depending on the selected "input mode", see below.

Connections to "J1:1-16" and "J2" according to drawing 128-30.

Each zone line input has to be programmed via Win128 regarding:

- Input mode (see below), depending on detectors / end-of-line device (capacitor or resistor), i.e. different threshold levels etc.
- Type of detectors (i.e. if short-circuit on the line shall generate a fault or a fire alarm)
- Zone number (no address)
- Alarm text (when required)
- Alert annunciation, steady ON or ON/OFF via a time channel
- Disablement via a time channel
- Fire alarm delay
- Two-zone dependent fire alarm (two specified zones)

For more information, see the Win128 help.

The terminal block terminals support a wire size up to 1.13 mm^2 (1.2 mm).

5.2.1 Input modes

Capacitor mode **or** Ex mode can be selected.

5.2.1.1 Capacitor mode (default)

This mode shall normally be used. It has the lowest zone line current consumption since the end-of-line device is a capacitor, 470 nF (±10 %). Max. allowed cable resistance is 50 ohm. Max. allowed cable capacitance is 50 nF. Max. allowed zone line current consumption is 1.5 mA.

5.2.1.3 Ex mode

This mode shall be used when units for Hazardous (Ex) areas shall be connected, i.e. the Galvanic isolator MTL5061 (2820). The end-of-line device is a resistor, 10K (±5 %) with a body surface area > 230 mm^2 (supplied with Galvanic isolator). Max. allowed cable resistance

is 40 ohm. Max. allowed cable capacitance is 70 nF. Max. allowed zone line current consumption is 1.0 mA.

5.2.2 Input states

Each input will be in one of six different states.

5.2.2.1 Normal state

This is the normal zone line input state, i.e. no alarm, no fault, etc. and the nominal voltage is 24 V DC[16]. From this state any other state can be reached / activated.

5.2.2.2 High current state

Max. current consumption limit[17] for the zone line input is exceeded, which is indicating that e.g. too many alarm points are connected. This generates a fault condition in EBL128. From this state any other state can be reached / activated except the open circuit state.

5.2.2.3 Alarm state

An alarm point on the zone line is in alarm state and the alarm limit[17] for the zone line is exceeded, which activates fire alarm in EBL128. In this state the short-circuit, open circuit, high current and low voltage states cannot be reached / activated. After the alarm reset the zone line input will return to the normal state.

5.2.2.4 Short-circuit state

The short-circuit current limit[17] is exceeded, indicating that there is short-circuit on the zone line, which generates a fault condition in EBL128.

5.2.2.5 Open circuit state

The open circuit current limit[17] is passed, indicating no or too low zone line current consumption, i.e. the end-of-line device is not detected, which generates a fault condition in EBL128. From this state any other state can be reached / activated.

5.2.2.6 Disconnected state

Via menu H5/A2 (Disconnect / Re-connect zone line) the zone line input can be disconnected[18], i.e. there is no voltage on the zone line. From this state no other state can be reached / activated.

[16] Allowed voltage 15-28 V DC.

[17] This limit is depending on the selected input mode.

[18] This indicated in EBL128 by the LED "Disablements".

5.2.2.7 Low voltage state

The zone line low voltage limit (15 V DC) is passed without the high current state is activated, indicating some H/W fault. This generates a fault condition in EBL128. From this state any other state can be reached / activated.

5.3 8 relays expansion board 4581

Up to **two** 4581 boards can be used.

Each board has to be programmed via Win128 regarding:

- Board no. ("address") that is set via jumpers "JP2-JP3", see Figure 4, page 21.

The 4581 board has eight programmable relay outputs (0-7).

Connections to "J1:1-16" and "J2" according to drawing 128-31.

Each output has to be programmed via Win128 regarding:

- Type, i.e. output for Control, Alarm devices, etc.
- Logic, i.e. normally open (NO) **or** normally closed (NC) contacts
- Signal period (steady, pulse, delay, etc.)
- Control expression (one or more trigger conditions)

For more information, see the Win128 help and chapter "Programmable outputs", page 50.

Relay contact ratings: Max. 2A @ 30 V DC.

The terminal block terminals support a wire size up to 1.13 mm^2 (1.2 mm).

6 Peripheral devices

Alarm points (addressable) are connected to the COM loop.[19]
Short circuit isolators are connected to the COM loop.
Sounders, door release magnets, etc. are connected to the programmable outputs in EBL128 (S0-S1 and/or R0) and/or to output units connected to the COM loop. Addressable sounders (alarm devices) are connected directly to the COM loop.
Input devices as key cabinet, timer, external fault, etc. are connected to programmable inputs, i.e. to input (I0) in EBL128 and/or to input units connected to the COM loop.
Display units [20] are connected to the RS485 interface in EBL128.
Routing equipment (Fire brigade tx / Fault tx) is normally connected to the R0-R1 outputs in EBL128.

For more information, see the following chapters and the Product Leaflets on our web site: http://www.panasonic-fire-security.com

6.1 COM loop units

The COM loop can handle up to 127 addressable COM loop units.[21] Depending on the type of units and the number of units the total current consumption will vary and this will affect the cable length. See chapter "Current consumption", page 112 and drawing 128-11.

The following units (in **NORMAL** mode) can be connected to the COM loop:

- **AMD 4300**[22] Analog multi detector 4300
- **OPT 4301** Analog photoelectric smoke detector4301
- **AHD 3308** Analog heat detector 3308 / 3309
- **MCP 3333** Addressable manual call point 3333 / 3339
- **SCI 4370** Addressable short circuit isolator 4370
- **I/O 3361** Addressable multipurpose I/O unit 3361
- **ASI 3377** Addressable siren 3377
- **ASB 3378** Addressable sounder base 3378
- **ADU 3364** Addressable 2 voltage outputs unit 3364[23]
- **EPS 3366** External power supply (addressable) 3366[23]

[19] Directly (addressable) or via an input unit 3361. The programmable input I0 in EBL128 can be used as a fire alarm input (NO/NC).

[20] External Presentation unit 1728, External Fire Brigade Panel 1826 / 1828 and Alert Annunciation unit 1735 / 1736

[21] Conventional detectors can be connected to an 8 zones expansion board 4580 or to the zone line input (Z) on each addressable I/O unit 3361.

[22] Win128 shortening for the unit.

[23] This unit might be under construction.

Address setting / Technical address

Each COM loop unit has to have a unique technical address (001-127). This address and the mode (always **NORMAL** mode) are set with an Address Setting Tool 3314.

6.1.1 Input units

Each COM loop input unit is to be programmed via Win128. Depending on type of unit, regarding:

- Technical address (001-127)
- Name (normally not changed)
- Zone number and Address within the zone
- Two-units-dependent fire alarm, i.e. co-incidence alarm (if you wish / some units only)
- Alert annunciation & Time Channel (if you wish / some units only)
- Disablement & Time Channel (if you wish / some units only)
- Alarm text (if you wish)
- Regular Alarm algorithm (some units only)
- Alternative Alarm algorithm & Time Channel (if you wish / some units only)

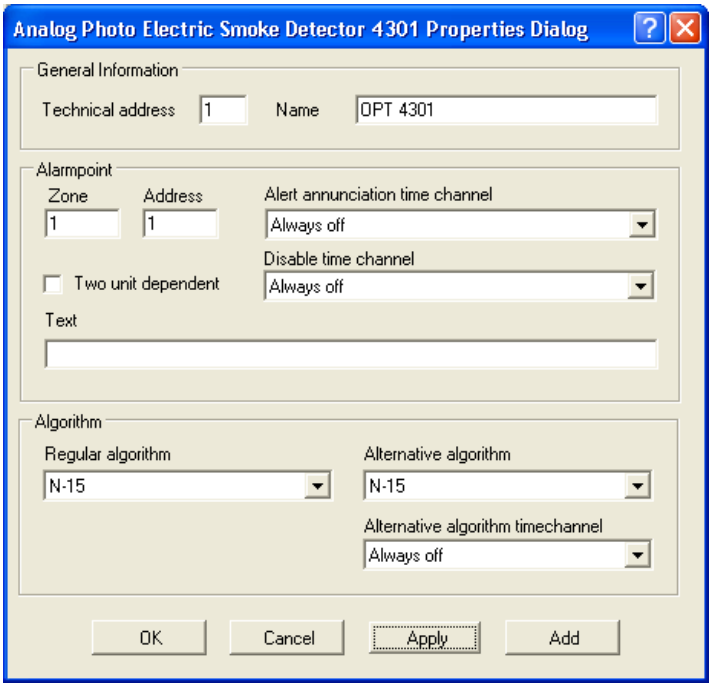


Figure 5. An example of a Win128 dialog box is the "Analog photo electric smoke detector 4301" properties dialog box.

For more information, see Win128 help.

Connections, if nothing else is specified, see drawing 128-21.

6.1.1.1 Analog Sensor Bases (ASB)

3312 Analog Base. An analog detector (Sensor) is to be plugged in 3312. Terminals for ext. LED 2217. Prepared for mechanical lock of the detector. Recess for label holder 3391. The base has an address label on which the plugged-in detector's technical address is to be written.

4313 Analog Base with isolator. An analog detector (Sensor) is to be plugged in 4313. Terminals for ext. LED 2217. Prepared for mechanical lock of the detector. Recess for label holder 3391. It has also a built-in short circuit isolator with the same **function** as the Addressable short circuit isolator 4370 (see page 35). The isolator's technical address is set with an Address setting tool (AST) 3314. The base has an address label on which both the plugged-in detector's technical address and the isolator's technical address are to be written.
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: Used for 4313 in EBL128.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

6.1.1.2 Addressable Manual Call Points

3333 Addressable Manual Call Point.[24] Conforms to EN54-11. A built-in LED will indicate that fire alarm is generated, i.e. the glass is broken. Routine testing can be performed with a supplied test key without breaking the glass. A hinged polycarbonate flap is protecting the glass. The technical address is set with an Address setting tool (AST) 3314. The call point has an address label on which the programmed technical address is to be written.
3333 is to be surface mounted in the supplied red backbox or flush mounted in a Swedish 65mm circular mounting box. For indoor use and in dry premises.
The Address setting tool 3314 is also used for mode setting.
NORMAL mode: Flashing or not flashing LED (see Product leaflet MEW00097) is set via Win128.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

3339 Enclosed Addressable Manual Call Point.[24] Like the 3333 unit but another type of front cover and backbox. For surface mounting. For indoor use in premises where IP67 rating is required.

[24] In all conventions the manual call points have a response time ≤ 5 s.

6.1.1.3 Analog Detectors

3308 Analog heat detector. To be plugged in an ASB base 3312. Built-in LED that is lit to indicate that the detector has generated fire alarm. Prepared for mechanical lock (screw attached). The technical address is set with an Address setting tool (AST) 3314. The detector has an address label on which the programmed technical address is to be written.
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: 3308 is in this mode via Win128 set to one of three algorithms (static response temp. range) for class:
A1 (54-65°C), min./**typical**/max. ambient temp. -20/+**25**/+50°C
A2 S (54-70°C), min./**typical**/max. ambient temp. -20/+**25**/+50°C
B S (69-85°C), min./**typical**/max. ambient temp. -20/+**40**/+65°C
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

3309 Analog heat detector. Enclosed (IP67)[25]. Built-in LED that is lit to indicate that the detector has generated fire alarm. Terminals for ext. LED 2217. Recess for label holder 3391. The technical address is set with an Address setting tool (AST) 3314. The Address setting tool 3314 is also used for mode setting:
NORMAL mode: 3309 is in this mode via Win128 set to one of three algorithms (static response temp. range) for class:
A1 (54-65°C), min./**typical**/max. ambient temp. -20/+**25**/+50°C
A2 S (54-70°C), min./**typical**/max. ambient temp. -20/+**25**/+50°C
B S (69-85°C), min./**typical**/max. ambient temp. -20/+**40**/+65°C
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

4300 Analog multi detector. A smoke detector and a heat detector within one housing. Scattered light (i.e. reflection of infrared light) is used to detect **smoke** and the **heat** sensing element is a thermistor.
The detector has unleaded soldering.
To be plugged in an ASB base 3312. Built-in LEDs are lit to indicate that the detector[26] has generated fire alarm. Prepared for mechanical lock (screw attached).
Via Win128 it is programmable how the detectors shall operate:

Zone-Addr.
001-01 (smoke)
001-02 (heat)
Techn. addr.
123

a) Two presentation numbers (addresses): The detector unit works as two separate detectors. The smoke detector is programmed for one zone-address and the heat detector for

[25] As from January 2005, this detector holds the ATEX classification: **Ex II 3GD EEx nA II T5 (T 70°C), -20°C ≤ T_a ≤ 65°C**.

[26] I.e. the heat detector and/or the smoke detektor.

another zone-address[27]. (Can be used to disable one of the detectors during working hours and in control expressions for programmable outputs). The detector unit has one technical address used for programming and fault presentation.

Zone-Addr.
001-01 (smoke or heat)
Techn. addr.
123

b) One presentation number (address): The detector unit works as one detector and is programmed for one zone-address. The detector unit (actually the heat detector) can detect a methylated spirits fire (EN54-9, test fire TF6; liquid fire), which normally is impossible for a photo electric smoke detector to detect. The detector unit has one technical address used for programming and fault presentation.

It is, via Win128, programmable if the detectors in alt. **b)** shall work with "OR-functionality" or with a "Decision algorithm":

b1) OR-functionality: Either the heat detector **or** the smoke detector will activate fire alarm. This alternative is recommended in most cases. The detector unit has one technical address used for programming and fault presentation.

b2) Decision algorithm:
Fire alarm will be activated if:
temperature (°C) + adjusted smoke value [28] ≥ 58.

Pre-warning will be activated if:
58 > temperature (°C) + adjusted smoke value[28] ≥ 50.

20°C => 3.8 %/m
↓ ↓
40°C => 1.8 %/m

The "Decision algorithm" [29], see figure can be used to reduce so called false alarms (nuisance alarms), because at a normal room temperature, more smoke is required to activate fire alarm than when the room temperature is high (or is rising). By a real fire, the room temperature will rise rather fast and less and less smoke is required to activate fire alarm. Very little smoke require a "high" temperature to activate fire alarm and very much smoke will activate fire alarm also at a "low" temperature.

[27] The zone number has to be the same for both detectors. **NOTE!** When counting alarm points these "two detectors" are regarded as two alarm points.

[28] Adjusted smoke value = obscuration (%/m) x 10. Default heat alarm levels (50°C / 58°C) and smoke alarm offsets (50 / 58) can be changed via Win128. The temperature can not be lower than 0°C in the algorithm / graph.

[29] The decision algorithm is a violation to the EN54-7 standard.

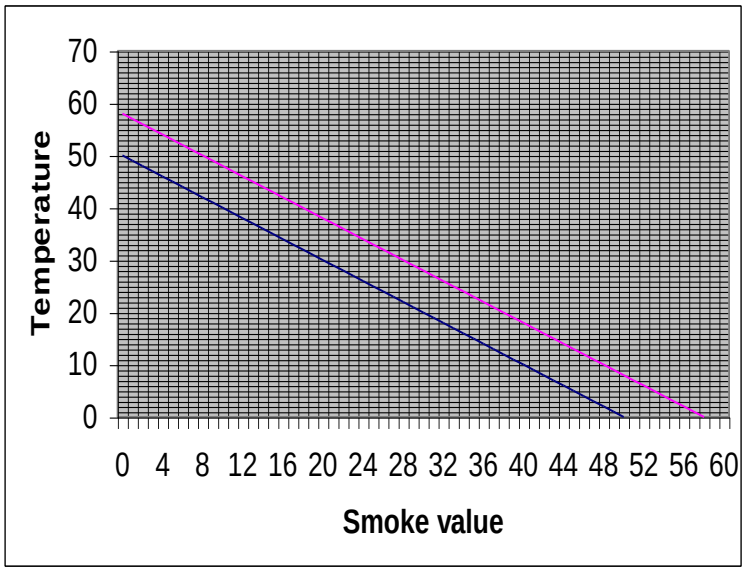


Figure 6. When the calculated value in the decision algorithm exceeds the lower graph, pre-warning will be activated. When it exceeds the upper graph, fire alarm will be activated. **Temperature = *°C*. Smoke value = *obscuration (%/m) x 10*.**

The technical address is set with an Address setting tool (AST) 3314. The detector has an address label on which the programmed technical address is to be written.
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: 4300 in this mode is in Win128, for the smoke detector, set to one of six algorithms H-15, H-35, L-15, L-35, **N-15** or N-35 and for the heat detector set to one of three algorithms for class **A1** (static response temp. 54-65°C), A2 S (54-70°C) or B S (69-85°C).
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

4301 Analog photo electric smoke detector. Scattered light (i.e. reflection of infrared light) is used to detect smoke.
The detector has unleaded soldering.
To be plugged in an ASB base 3312. Built-in LEDs are lit to indicate that the detector has generated fire alarm. Prepared for mechanical lock (screw attached).
The technical address is set with an Address setting tool (AST) 3314. The detector has an address label on which the programmed technical address is to be written.
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: 4301 in this mode is in Win128 set to one of the six algorithms H-15, H-35, L-15, L-35, **N-15** or N-35.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

6.1.1.4 Conventional Detector Bases (CDB)

2324 Base. A conventional detector is to be plugged in 2324. Built-in LED that is lit to indicate that the detector plugged in the base has generated fire alarm. Terminals for ext. LED 2217.

6.1.1.5 Conventional Detectors

2318 Combination heat detector. Rate-of-rise **and** fixed temperature, 58°C, heat detector. Will be replaced by 4318, see below.
To be plugged in a CDB 2324.

4318 Combination heat detector. Rate-of-rise **and** fixed temperature, 59°C, heat detector class **A1 R**. Static response temp. range 54-65°C, ambient temp. min./**typical**/max. -10/**+25**/+50°C.
Will replace 2318. To be plugged in a CDB 2324.

4350 Multi detector. A smoke detector and a heat detector within one housing. Scattered light (i.e. reflection of infrared light) is used to detect **smoke** and the **heat** sensing element is a thermistor. In order to secure the fire detection and to prevent false (nuisance) alarms, the AI function is used, i.e.
a: combined heat and smoke sensing
b: variable delay function
c: adaptive learning function
See also chapter "Cyber sensor functions", page 90.
The detector has unleaded soldering.
To be plugged in a CDB 2324.

4352 Photoelectric smoke detector. Scattered light (i.e. reflection of infrared light) is used to detect smoke. An advanced alarm algorithm is used to secure the smoke detection and to prevent false (nuisance) alarms, e.g. a minimum of nine consecutive readings over the fire alarm level are required, before the detector goes into alarm. (One reading per sec.)
The detector has unleaded soldering.
To be plugged in a CDB 2324.

6275 Heat detector. Fixed temperature heat detector, 60°C, latching.
To be plugged in a CDB 2324.

6276 Heat detector. Fixed temperature heat detector, 80°C, latching.
To be plugged in a CDB 2324.

6295 Heat detector: Enclosed (IP67)[30]. Fixed temperature (57°C) heat detector, class **A2 S** (static response temp. range 54-70°C),

[30] As from January 2005, this detector holds the ATEX classification: **Ex II 3GD EEx nA II T5 (T 100°C), -40°C ≤ T_a ≤ 50°C**.

latching. Min./**typical**/max. ambient temp. -40/+**25**/+50°C. Built-in LED that is lit to indicate that the detector has generated fire alarm. Terminals for ext. LED 2217.

6296 Heat detector: Enclosed (IP67)[31]. Fixed temperature (72°C) heat detector, class **B S** (static response temp. range 69-85°C), latching. Min./**typical**/max. ambient temp. -40/+**40**/+65°C. Built-in LED that is lit to indicate that the detector has generated fire alarm. Terminals for ext. LED 2217.

6297 Heat detector: Enclosed (IP67). Fixed temperature (87°C) heat detector, class **C S** (static response temp. range 84-100°C), latching. Min./**typical**/max. ambient temp. -40/+**55**/+80°C. Built-in LED that is lit to indicate that the detector has generated fire alarm. Terminals for ext. LED 2217.

6298 Heat detector: Enclosed (IP67). Fixed temperature (117°C) heat detector, class **E S** (static response temp. range 114-130°C), latching. Min./**typical**/max. ambient temp. -40/+**85**/+110°C. Terminals for ext. LED 2217 (to indicate that the detector has generated fire alarm). **NOTE!** No built-in LED.

6.1.1.6 Accessories

3314 Address setting tool. Is used to write or read the COM loop units' **technical address** (001-127). It is also used to write or read the mode, **NORMAL** or **2330** (see the unit respectively). A connection cable (with crocodile clips and tab terminals) is attached and can be used when required.
Put the ON/OFF switch in position ON and wait for a beep. Plug the detector into 3314 (SA & SB terminals) or when required, use the connection cable.[32]
How to read: Press "READ", wait for a beep and read the address and mode.
How to write: Press "WRITE" and "READ" at the same time to select the mode **and/or** write the address. Press "WRITE" and wait for a beep. ("READ" again as a check.)

3390 Label holder. To be mounted on the analog base 3312[33]. Intended for a label with "zone-address", "technical address", etc. to be read also when the detector is plugged in its base. 100 label holders per packet. Excl. labels.

[31] As from January 2005, this detector holds the ATEX classification: **Ex II 3GD EEx nA II T5 (T 100°C), -40°C ≤ T_a ≤ 65°C**.

[32] Some units have flying leads for easier connection. After use they might be disconnected and thrown away.

[33] Also in the enclosed analog heat detector 3309.

3391 Labels for 3390. Packet with self-adhesive white labels for label holder 3390. 10 A4-sheets à 132 labels for laser printer usage. The print-out is done via Win128.

6.1.2 Addressable I/O units

3361 Addressable multipurpose I/O unit. Power supplied via the COM loop. Up to 16 I/O units 3361 can be used.
The unit has two **programmable** inputs:
Monitored input
….used as zone line input (Z): End-of-line capacitor 470 nF mounted in the last unit on the line. A short circuit can activate fault or fire alarm (set via Win128). This input is intended for conventional detectors.
used as general input (In0): An input for NC or NO contacts (set via Win128).

Isolated input (In1): An optocoupler input (external 24 V DC / 8 mA is required). Normally low or high (set via Win128).

The unit has two **programmable** relay[34] outputs:
Relay output (Re0): NC or NO contacts (set via Win128).
Relay output (Re1): NC or NO contacts (set via Win128).

Connections and examples, see drawings 128-21 & -26. The unit's dimensions: (L x W x H) 90 x 70 x 32 mm. A plastic protection cover is attached. The cover's dimensions: (L x W x H) 129 x 73 x 45 mm. The unit is intended to be surface mounted and for indoor use in dry premises. When required, the unit can be mounted in a Waterproof box (IP66 / 67) 3362. The unit has an LED to indicate communication to the unit or alarm condition. For more information, see the Product Leaflet. The technical address is set with an Address setting tool (AST) 3314. The unit has an address label on which the programmed technical address is to be written.
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: Used for 3361 in EBL128.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.
NOTE! See also chapter "Limitations", page 121.

3364 Addressable 2 voltage outputs unit.[23] The unit is connected directly to the COM loop. External 24 V DC power supply is required (via a 3366 unit or EBL128).
The unit has two programmable and supervised voltage outputs (VO0-VO1), intended for alarm devices (e.g. sirens). An end-of-line capacitor (470nF) is to be mounted in the last device
alt. a capacitor (470nF) in up to five alarm devices:
The unit also has a special voltage output (VO2) intended for fire door closing only. The trigger condition "Fire door

[34] Relay contacts: max. 2 A @ 30 V DC / 125 V AC.

closing" and the controlling detectors have to be programmed. The "fire door closing function" is described on page 67 and besides that function the output VO2 will also be powerless approx. 30 sec. after:

- the "/Mains OK input" (terminal 8.) goes high, see below.
- the COM loop communication is interrupted = 3364 has no connection / communication with EBL128.

The unit also has two inputs, i.e. one for power supply (24 V DC) and one for "/Mains OK".

VO0: Normally low or high (set via Win128), 24 V DC, 1 A.[35]

VO1: Normally low or high (set via Win128), 24 V DC, 1 A.[35]

VO2: Normally high, 24 V DC, 1 A.[35] (Fire door closing function.)

24 V DC: From an external power supply (unit 3366 or EBL128)

/Mains OK: From an external power supply unit (3366) when the fire door closing function (ABDL) is to be used. Normally low = The main power source (230 V AC) in the External power supply unit is okay.

Connections and examples, see drawings 128-21 & -28. The unit's dimensions: (L x W x H) 90 x 70 x 32 mm. A plastic protection cover is attached. The cover's dimensions: (L x W x H) 129 x 73 x 45 mm. The unit is intended to be surface mounted and for indoor use in dry premises. When required, the unit can be mounted in a Waterproof box (IP66 / 67) 3362.

For more information, see the Technical Description and the Product Leaflet.

The technical address is set with an Address setting tool (AST) 3314. The unit has an address label on which the programmed technical address is to be written.

The Address setting tool 3314 is also used for mode setting:

NORMAL mode: Used for 3364 in EBL128.

2330 mode: Not used in EBL128.

2312 mode: Not used in EBL128.

NOTE! See also chapter "Limitations", page 121.

6.1.3 Alarm devices (addressable sounders)

3377 Addressable siren. The siren is connected directly to the COM loop. It is power supplied via the COM loop, i.e. the number of sirens is depending on the type and number of other units connected to the COM loop.[36] Red ABS plastic housing. Three tones and two priority levels are available. For each level an output control expression and a tone is programmed (via Win128). For more technical data, see the Product Leaflet.

The technical address is set with an Address setting tool (AST) 3314. The siren has an address label on which the programmed

[35] Cont. 1 A, during 10 ms 1.4 A.

[36] The number of 3377 + 3378 units must be ≤ 50.

technical address is to be written.
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: Used for 3377 in EBL128.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.
NOTE! See also chapter "Limitations", page 121.

3378 Addressable sounder base. 3378 consists of an analog base (3312) mounted together with a sounder. The sounder is mounted in the ceiling. Two flying leads from the base are plugged in the sounder. The base is thereafter mounted on the sounder, so that the detector can be plugged in the base. The base is connected directly to the COM loop. (Like base 3312.) It is power supplied via the COM loop, i.e. the number of sounder bases is depending on the type and number of other units connected to the COM loop[36]. Three tones and two priority levels are available. For each level an output control expression and a tone is programmed (via Win128). For more technical data, see the Product Leaflet.
The technical address is set with an Address setting tool (AST) 3314. The unit has an address label on which the programmed technical address is to be written. (The detector has its own technical address set via the Address setting tool 3314.)
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: Used for 3378 in EBL128.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.
NOTE! See also chapter "Limitations", page 121.

6.1.4 Short circuit isolators (addressable)

Each COM loop short circuit isolator is to be programmed (via Win128) regarding:

- Technical address
- Name (Normally not changed)
- Sequence Number (Serial Number in the COM loop's A-direction.)

Connections, see drawing 128-21. (See especially about the **L** wire!)

4313 Analog base with isolator. An analog base with a built-in short circuit isolator with the same **function** as the Addressable short circuit isolator 4370, see below. See also page 27.

4370 Addressable short circuit isolator. In case of a short circuit on the COM loop, the number of disabled units will be minimised. 4370 is power supplied via the COM loop. The unit's dimensions: (L x W x H) 90 x 70 x 32 mm. A plastic protection cover is attached. The cover's dimensions: (L x W x H) 128 x 72 x 45 mm. The unit is intended to be surface mounted and for indoor use in dry premises. When required, the unit can be mounted in a Waterproof box (IP66 / 67) 3362. The

unit has an input to manually open the isolator ("isolated state") and an input to manually close the isolator ("normal state"). An LED will indicate the normal and isolated state respectively. For more information, see the Product Leaflet. The technical address is set with an Address setting tool (AST) 3314. The unit has an address label on which the programmed technical address is to be written.
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: Used for 4370 in EBL128.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

According to the EN54 standard, at least one short circuit isolator is required per 32 alarm points on the COM loop.

Up to eight 4370 and/or 4313 can be used, which gives nine loop segments. Each isolator has to be given a Sequence Number, 0-7. The isolators have to be connected consecutively (Sequence Number 0-1-2-3-4-5-6-7) in the COM loop's A-direction. **NOTE!** EBL128 has one built-in isolator in the-A direction (no. "A") and one in the B-direction (no. "B").

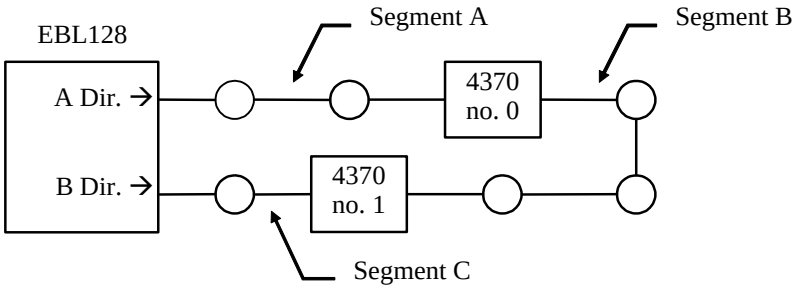


Figure 7. Two 4370 / 4313 isolators connected to the COM loop gives three loop segments, i.e. Segment A (A-0), B (0-1) and C (1-B). If one or more isolators are to be connected the sequence numbers have to be updated (via Win128), e.g. if one isolator is to be put in between no. 0 and no. 1 in the figure, the new isolator will be no. 1 and the old no. 1 will be no. 2.

Short circuit / cut-off (break) on the COM loop
See chapter "COM loop", page 15. See also chapter "Fault messages" in the EBL128 Operating Instructions.

6.1.5 Units for Hazardous (Ex) areas

In hazardous (Ex) areas, **I**ntrinsically **S**afe (IS) and approved products are required. The IS alarm points are connected to a detector interface, i.e. a Galvanic isolator, which is connected to an expansion board 4580 zone line input. See also drawings 128-32.

6.1.5.1 Galvanic isolators

MTL5061 Galvanic isolator. The isolator is used to connect the IS detectors and manual call points to an expansion board 4580

zone line input. The isolator has two zone line inputs and two outputs (Channel 1 & 2) and it is mounted in a Waterproof box (IP66/67). Four compression glands for the cable entries and an end-of-line resistor (10K) with an area >230 mm^2 are supplied. Box dimensions (L x W x H): 175 x 125 x 150 mm. BASEEFA classification: EEx ia IIC.

6.1.5.2 Intrinsically Safe mounting bases

YBN-R / 4 IS Intrinsically Safe mounting base. In the base can be plugged an intrinsically safe conventional smoke or heat detector. The base has terminals for the zone line (in/out) and for an ext. LED.

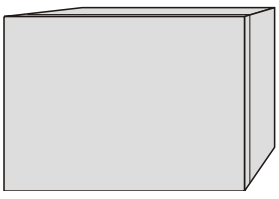
6.1.5.3 Intrinsically Safe photoelectric smoke detectors

SLR-E-IS Intrinsically Safe photoelectric smoke detector.
A conventional photoelectric (optical) smoke detector, to be plugged in the intrinsically safe mounting base. The detector has two built-in LEDs that are lit to indicate that the detector has generated fire alarm. Zone classification: 0, 1 or 2. BASEEFA classification: EEx ia IIC T5, t (amb.)=50°C. Max 20 per zone.

6.1.5.4 Intrinsically Safe heat detectors

DCD-1E-IS Intrinsically Safe heat detector. A conventional Rate of Rise heat detector, fixed temperature 60°C (class A1), to be plugged in the intrinsically safe mounting base. Two built-in LEDs that are lit to indicate that the detector has generated fire alarm. Zone classification: Category 1 (incl. lower categories). BASEEFA classification: II 1 G EEx ia IIC T5, t (amb.)=55°C. Max 20 per zone.

6.1.6 Other COM loop units



3366 External power supply. Conforms to EN54-4. The unit is connected to a COM loop, i.e. it is monitored from EBL128 and e.g. loss of the main power source will generate a fault in EBL128. It can be used as power supply for external equipment requiring 24 V DC with battery backup, e.g. the 3364 unit. It also has a "/Mains OK" output (normally low), intended to be connected to the corresponding input on the 3364 unit.

A light grey metal housing (HxWxD, 288 x 400 x 95 mm). There is **space** for two maintenance-free sealed Lead-Acid backup batteries, 2 x 12 V, 7.5 Ah as the second power source. Batteries with higher capacity (up to 60 Ah) have to be placed outside the housing. There are cable inlets on the top, bottom and back sides of the housing. Two compression glands are attached.

The unit has a **24 V DC**[37] **power supply output** for external equipment with up to **2.2 A** or **0.85 A** continuous current consumption, at the same time as the battery charging is in progress.[38] In case of no battery charging, the continuous current consumption can be up to **4 A**.
It has a number of security functions, e.g. against to high current output and to low battery voltage etc. For more information, see the Technical Description and the Product Leaflet.
The technical address is set with an Address setting tool (AST) 3314. The unit has an address label on which the programmed technical address is to be written.
The Address setting tool 3314 is also used for mode setting:
NORMAL mode: Used for 3366 in EBL128.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

6.2 Units connected to the RS485 interface

Up to four Ext. FBPs (1826 / 1828) and/or Alert Annunciation Units (1735 / 1736) and/or Ext. Presentation Units (1728) can be connected to the RS485 interface[39] (J1:15-16) in EBL128. Max one 1826 with printer. (Power supply at J1:13-14.)

Address and S/W mode settings

The display and the push buttons (in the unit respectively) are used to set the address, which also can be changed via EBL128. The S/W mode shall be set to **xxxx – 1587** (**xxxx** = type number). See the Technical Description for the unit respectively.

The first unit shall have the address 00, the second unit address 01 and so on[40]. Follow the Address setting instructions in the Technical Description for the unit respectively.

Via Win128 can "Selective alarm presentation" be programmed, i.e. you can select which alarms that shall be presented in each unit, see the Technical Description for the unit respectively.

---

[37] The rated output voltage for the main power source (rectifier) is 24 V ± 1%. Max. ripple 500 mVp-p. The rated output voltage for the second power source (the backup battery) is 18 – 28 V DC. **NOTE!** The voltage will, however, decrease to approx. 15 V when the output will be switched off in order not to damage the battery.

[38] A current consumption of **0.85-2.2 A** allows only the **"low current charging mode"**, i.e. the battery capacity can be **up to 27 Ah**.

A current consumption ≤ **0.85 A** allows the **"high current charging mode"**, i.e. the battery capacity can be **up to 60 Ah**.

[39] The RS485 transceiver 4552 is an option.

[40] The connection order on the line is not dependent of the address.

6.2.1 External Fire Brigade Panels

1826 External Fire Brigade Panel (ext. FBP). A light grey metal housing (HxWxD, 288 x 400 x 95 mm) with a door. A key is required to open the door, which has a Plexiglas ahead of the FBP front. It has cable inlets on the top, bottom and back sides and is intended to be wall mounted. Two compression glands are attached.

LED indicators and push buttons on the front are like the EBL128 FBP (upper black part of the front), see Figure 2, page 14. **The front's designation texts are in Swedish.** A neutral front is available, where the **designation texts, in any language**, are made separately and by production put into a transparent "text slot" for the LED and push button respectively. All or selected alarms will be presented in a display (alphanumeric LCD, 2x40 characters), with back-light. An alarm text will also be presented together with each alarm, if programmed in EBL128. Furthermore, at least 617 texts for selected fire alarms can be stored in the unit and will in such a case be shown, instead of the texts sent from EBL128 for these alarms. These text messages will be downloaded to the unit via EBL128. A built-in buzzer will sound like in EBL128. The buzzer can be silenced and the alarm devices in the installation can be silenced. They will re-sound for a new alarm. When there are queued alarms in the system, you can scroll amongst them and they can be reset. Any fault in the system will be presented as "General fault in system" and the buzzer will sound.[41] A **Printer 1835** can be mounted in ext. FBP 1826. It will print all the alarms, including the alarm texts. New S/W versions can be downloaded directly in the unit. The unit is power supplied from EBL128 or an ext. power supply.

The unit shall run in **S/W mode 1826/28 – 1587**, which has the highest performance with regard to functionality, response time, ability to store fire alarms, etc. Up to 1200 m cable can be used. For more information, see Technical description MEW00249.

1828 External Fire Brigade Panel (FBP). A compact size enclosure (HxWxD, 145 x 220 x 50 mm) made of grey high impact ABS. Fitted with a supplementary "O" ring gasket, it will comply with IP61, in respect of dust and moisture. The unit has no door, i.e. the front is accessed directly but a key is required to get access to the push buttons. They are disabled until they are supposed to be used. The unit shall be wall mounted. Two compression glands are attached. In all other respects it is like 1826, except that a printer can not be mounted in 1828.

The unit shall run in **S/W mode 1826/28 – 1587**, which has the highest performance with regard to functionality, response time,

[41] Not valid for the Swedish convention (SBF).

ability to store fire alarms, etc. Up to 1200 m cable can be used. For more information, see Technical description MEW00249.

1835 Printer. Can be mounted in the External Fire Brigade Panel **1826**. It will print all the alarms, including the alarm texts.

6.2.2 Alert Annunciation Units

When the **A**lert **A**nnunciation (**AA**) function shall be used in system EBL128, a unit is required for the related manoeuvres, i.e. to acknowledge / reset the **AA** alarms. For a detailed description of the Alert Annunciation function, see chapter "Alert annunciation", page 79.

1735 Alert Annunciation Unit (AAU). A compact size enclosure (HxWxD, 145 x 220 x 50 mm) made of grey high impact ABS. Fitted with a supplementary "O" ring gasket, it will comply with IP61, in respect of dust and moisture. The unit has no door, i.e. the front is accessed directly but the push buttons are disabled until they are supposed to be used. The unit shall be wall mounted. Two compression glands are attached. **The front's designation texts are in Swedish.**
All or selected fire alarms will be presented in a display (alphanumeric LCD, 2x40 characters), with back-light. An alarm text will also be presented together with each alarm, if programmed in EBL128. Furthermore, at least 617 texts can for selected fire alarms be stored in the unit and will in such a case be shown, instead of the texts sent out from EBL128 for these alarms. These text messages will be downloaded to the unit via EBL128. A built-in buzzer will sound to indicate a not acknowledged **AA** alarm.
New software versions can be downloaded directly in the unit. The unit is power supplied from EBL128 or an external power supply.

The unit has the following LEDs:

Fire and **Alarms queued**, indicating fire / **AA** alarm.

Operation, indicating that the unit is in operation, i.e. the **AA** function is enabled in the system. A time channel can be used to enable the **AA** function.

Fire brigade alerted, indicating that the "Fire brigade tx" output is activated in EBL128 because:
- the activated fire alarm is not an **AA** alarm
- the **AA** function has been ended, e.g. the acknowledge or investigation time respectively has run out, etc.

Acknowledge, indicating that the **AA** alarm has been acknowledged.

The unit has the following push buttons:

Alarms queued, used to scroll amongst the alarms.

Acknowledge, used to acknowledge an **AA** alarm and hereby also silence the buzzer.

Reset, used to reset an **AA** alarm.

The unit shall run in **S/W mode 1735 – 1587**, which has the highest performance with regard to functionality, response time, ability to store alarms, etc. Up to 1200 m cable can be used. For more information, see Technical description MEW00224.

1736 Alert Annunciation Unit (AAU). This unit is like 1735, except it has a neutral front, where the **designation texts, in any language**, are made separately and by production put into a transparent "text slot" for the LED and push button respectively. (This front also holds one extra LED & two extra push buttons.).
The unit shall run in **S/W mode 1736 – 1587**, which has the highest performance with regard to functionality, response time, ability to store alarms, etc. Up to 1200 m cable can be used. For more information, see Technical description MEW00224.

6.2.3 External Presentation Units

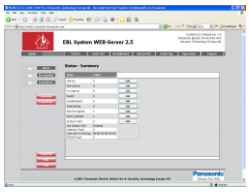
1728 External Presentation unit (EPU). A compact size enclosure (HxWxD, 145 x 220 x 50 mm) made of grey high impact ABS. Fitted with a supplementary "O" ring gasket, it will comply with IP61, in respect of dust and moisture. The unit has no door, i.e. the front is accessed directly, when required. The push buttons are disabled until they are supposed to be used. The unit shall be wall mounted. Two compression glands are attached. **The front's designation texts are in Swedish.** This unit is intended for pre-warning, co-incidence[42], fire (and heavy smoke / heat) alarm presentation. If there are two or more alarms in the system, you can scroll amongst them but the fire alarms cannot be reset via this unit.
All or selected alarms will be presented in a display (alpha-numeric LCD, 2x40 characters), with back-light. An alarm text will also be presented together with each alarm, if programmed in EBL128. Furthermore, at least 617 texts can for selected fire alarms be stored in the unit and will in such a case be shown, instead of the texts sent out from EBL128 for these alarms. These text messages will be downloaded to the unit via EBL128.
Any fault in the system will be presented as "General fault in system". The buzzer will sound.[41] It can be silenced. Any disablement in the system will be presented as "General disablement in system".[41]
A built-in buzzer will sound like in EBL128. The buzzer can be silenced but the alarm devices in the installation can not be silenced via this unit. New software versions can be

[42] Two zone / address dependence.

downloaded directly in the unit. The unit is power supplied from EBL128 or an external power supply. The unit shall run in **S/W mode 1728 – 1587**, which has the highest performance with regard to functionality, response time, ability to store fire alarms, etc.
The number of units that can be power supplied via EBL128 (or an external power supply) is depending on all other units connected to the same c.i.e. / external power supply. Up to 1200 m cable can be used. For more information, see Technical description MEW00290.

6.3 Units connected to the RS232 interface J5

6.3.1 Web-servers



1598 Web-server. This unit can be used:
a) to present the actual c.i.e. status in a PC using the web browser Microsoft Internet Explorer. It can also send e-mails in case of pre-warning, fire alarm, fault, disablement / re-enablement, test mode alarm and/or service signal.
b) as a gateway to other PC systems etc. Two alternatives are available today:

b1) EBL Talk is an open protocol, used to transmit and present fire alarm information in a separate PC / system.
b2) Tateco, used to transmit and present fire alarm information in an Ascom Tateco paging system.

A PC tool, **Web128 Config tool** is used for the configuration, which is downloaded to the web-server via TCP/IP.

The web-server consists of a plastic cabinet (90x25x69.5 mm), which shall be vertically mounted on a symmetric 35 mm DIN rail. It has the following interfaces:
RS232 to connect the web-server to J5 in the EBL128 c.i.e.
RS232 to connect the web-server to other PC / system
RJ45 (10 BASE-T) to connect the web-server to Internet / an intranet (LAN)
Molex 3.5 to connect the web-server to a power supply (24 V DC, max. 65 mA), e.g. to J4 in the EBL128 c.i.e.

6.4 Units connected to the RS232 interface J3

J3 is a 9 ways female "D" connector. This interface is used only for connection of EBL128 to a PC with the PC program Win128, which is used for download / backup of Site Specific Data (SSD), etc.

6.5 Other units

6.5.1 Alert Annunciation Controllers

1740 Alert Annunciation Controller (AAC). This unit has no display, i.e. it has to be mounted close to EBL128 (or an ext. FBP) where the fire alarms will be presented.

The compact size enclosure enclosure (HxWxD, 145 x 220 x 50 mm) is made of grey high impact ABS. Fitted with a supplementary "O" ring gasket, it will comply with IP61, in respect of dust and moisture. The unit has no door, i.e. the front is accessed directly but the push buttons are disabled until they are supposed to be used. **The front's designation texts are in Swedish.**
The unit shall be wall mounted. The LED "Acknowledge" can be turned on by the push button "Acknowledge" or by an input, i.e. a programmable output. This is set via a jumper "JP1" in the unit. The unit is power supplied from EBL128 or an external power supply. One supplementary compression gland can be used for cable entry.

The unit has the following LEDs:

Fire, indicating fire / **AA** alarm.

Operation, indicating that the unit is in operation, i.e. the **AA** function is enabled in the system. A time channel can be used to enable this function.

Fire brigade alerted, indicating that the "Fire brigade tx" output is activated in EBL128 because:
- the activated fire alarm is not an **AA** alarm
- the **AA** function has been ended, e.g. the acknowledge or investigation time has run out, etc.

Acknowledge, indicating that the **AA** alarm has been acknowledged.

The unit has the following push buttons:

Acknowledge, used to acknowledge an **AA** alarm.

Reset, used to reset an **AA** alarm.

Connections and more details are to be found in the Technical Description MEW00283.

6.5.2 External LEDs

2218 Ext. LED (ext. indicator). Used when a detector is placed out of view or hidden. The LED is lit at the same time as the LED in the detector / base it is connected to. It has a "Burning house" symbol instead of any text. 2218 can be connected to all types of Panasonic detectors / bases. The input is polarised. JP1:1 (+5 to +35 V DC for conv.), JP1:2 (+ for analog) & JP1:3 (0 V). To be wall mounted with the attached frame (87 x 87 x 30 mm) or flush mounted, e.g. with a Swedish 65mm circular mounting box.

6.5.3 Alarm devices (sounders, etc.)

Regarding addressable alarm devices, see page 35.
In the Panasonic product range are no alarm device intended for a

supervised (monitored) voltage output (e.g. S0 or S1 in EBL128). Connections of alarm devices according to drawing 128-22.

(For addressable sounders, see page 35.

6.5.4 Door release magnets

In PFSTech's product range is no Door release magnet. Door release magnets shall always be provided with a "protective diode" (e.g. 1N4004) in parallel with the coil, like in the alarm devices, see drawing 128-22.

6.5.5 Boxes

3362 Waterproof box (IP66 / 67). A grey polycarbonate box with ingress protection rating IP66 / 67. Four compression glands are included for the cable entries. Dimensions (L x W x H): 175 x 125 x 75 mm. 3362 can be used for:

Addressable multipurpose I/O unit 3361
Addressable short circuit isolator 4370
Addressable 2 voltage outputs unit 3364

7 Programmable inputs

EBL128 has one programmable input (I0). On the COM loop can be connected up to 16 addressable multi purpose I/O units 3361[43]. Each 3361 unit has two programmable inputs (In0/Z – In1).

Each input is programmed (via Win128) regarding:

- Name (Normally not changed, but used as Interlocking input it is recommended to add some identification information)
- Logic (NO or NC)
- Type ("Trigger condition")
- Ext. Fault (Text; only for trigger cond. "External fault")
- Ext. time channel Name (only for trigger cond. "External time channel")
- Zone, Address and Text (only for trigger cond. "General fire", "Pre-warning" and "Zone line input").
- Alert Annunciation time channel (only for trigger cond. "Zone line input").
- Disablement time channel (only for trigger cond. "Zone line input").

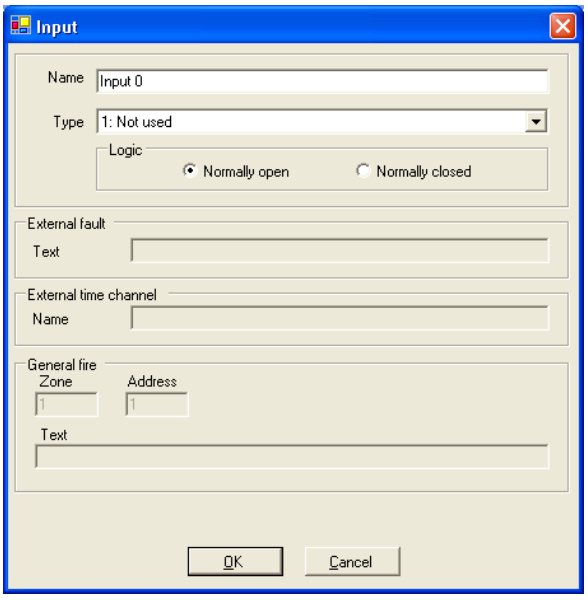


Figure 8. The Win128 dialog box "Input". The different trigger conditions might require additional information.

7.1 Control unit Input I0

NO or NC. (Open circuit = R > 50K. Closed circuit = R < 5K.)

Connections, see drawing 128-22.

[43] Units type 3361 + 3364 = max. 16.

7.2 The 3361 unit Inputs In0 / Z & In1

Connections, see drawing 128-26.

NOTE! The monitored input can be used as a general input (In0) **or** as a zone line input (Z) requiring an end-of-line capacitor of 470 nF.

8 Input programming

Input programming is done via Win128. For more information see the Win128 help. Each input has to have an individual Trigger condition ("Type") and Logic. It is not allowed to let two or more inputs have the same trigger condition.

Max. number of available inputs are 33 (i.e. two on each 3361 unit and one in the c.i.e.).

8.1 Trigger conditions

The following trigger conditions are available:

1. **Not used**
2. **Alarm Key Cabinet** (one input)
3. **Alert Annunciation Acknowledge**
4. **Alert Annunciation Reset**
5. **Fault Signal External Power Supply** (one input)
6. **Fault Signal External Fuses** (one input)
7. **External Time Channel 5 - 12** (one input per time channel)
8. **General Fire** (max. 127)
9. **Activated Routing Equipment** (one input)
10. **External Fault**
11. **Interlocking input** (max. 32 inputs)
12. **Loss of main power source to external power supply** (one input)
13. **Loss of battery charger to external power supply** (one input)
14. **Door Closing Test Input**
15. **Pre-warning Input**
16. **Activated fault routing equipment** (one input)
17. **Zone Line Input** [44]

[44] Only valid for the Addressable multipurpose I/O unit 3361 input "In0", used as zone line input (Z).

Comments to the trigger conditions:

1. Default. The input does not work.
2. Key cabinet, where the fire brigade store a key to the building. Will activate a Key cabinet alarm. See the EBL128 Operating Instructions for more information.
3. Alert annunciation, see the EBL128 Operating Instructions for more information.
4. Like 2.
5. Ext. power supply equipment fault output will activate a fault in EBL128. The following fault message will be shown:

```
FAULT: External power supply
```

6. Ext. fuses (for the ext. power supply equipment) fault output will activate a fault in EBL128. The following fault message will be shown:

```
FAULT: External fuses
```

7. External clock, timer, key switch, switch, etc. can disable / re-enable alarm points. The function Alert annunciation can be set on / off by a time channel. Control outputs can be turned on (activated) / off (de-activated) by a time channel.
8. A special detector, push button, etc. can activate a fire alarm in EBL128. Zone no. and Address (+ user definable text).
9. "Activated Fire brigade tx" signal (feed-back) to EBL128 will light up the LED "Fire brigade tx" on the front. (Normally the LED will be lit when a corresponding output is activated[45].)
10. Ext. fault will activate a fault in EBL128. A user definable fault message ("text") with up to 40 characters will be shown.
11. A feed-back from the equipment activated by the corresponding interlocking output. Activated input is shown in menu H9/C1. See also chapter "Interlocking function", page 63.
12. Fault output "Loss of main power source to external power supply equipment" will activate a fault in EBL128. It will have the same time delay, as set for the Loss of main power source fault for EBL128. The following fault message will be shown:

```
FAULT: Mains, ext. power supply
```

13. Fault output "Loss of the battery charger to external power supply equipment" will activate a fault in EBL128. It will have the same time delay, as set for the "Loss of main power source" fault for EBL128. The following fault message will be shown:

[45] Type of output = Routing equipment (Fire brigade tx).

```
FAULT: Charging ext. power supply
```

14. "Fire door closing" outputs will be activated for 20 seconds by this trigger condition. **NOTE!** Only valid for inputs and outputs connected to the same c.i.e.
15. Pre-warning, e.g. from a High Sensitive Smoke Detector's pre-warning output. Zone no. and Address set to the same as the corresponding fire alarm (from the same detector).
16. For future use.
17. The Addressable multipurpose I/O unit 3361 monitored input "In0" used as zone line input (Z) for conventional detectors.

8.2 Logic

The logic has to be set. [46]

(•) Normally open Normally open contact / normally low optocoupler input.

( ) Normally closed Normally closed contact / normally high optocoupler input.

[46] In the Win128 dialog box "Input".

9 Programmable outputs

EBL128 has two programmable voltage outputs (S0-S1) and one programmable relay output (R0). One or two 8 relay outputs expansion boards 4581 can be mounted in EBL128. On the COM loop can be connected Addressable Multi purpose I/O unit 3361 with two programmable relay outputs (Re0-Re1) per unit and Addressable 2 voltage outputs unit 3364 with two programmable voltage outputs (VO0-VO1) per unit. Addressable siren 3377 and Addressable sounder base 3378 can also be connected on the COM loop, i.e. these units have no physical output, only the siren and sounder respectively.

NOTE! Units type 3361 + 3364 = max. 16. Units type 3377 + 3378 = max. 50.

Each output is programmed (via Win128), when applicable, regarding:

- Name (Normally not changed)
- Type
- Signal period (continuous, pulse, delay, etc.)
- Logic (NO / normally low or NC / normally high)
- Supervised / Not Supervised (The voltage outputs in EBL128 and in the Addressable 2 voltage outputs unit 3364)
- Control expression (with one or more trigger conditions)

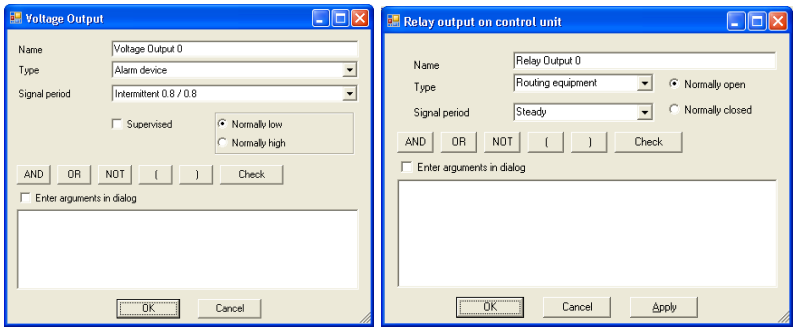


Figure 9. The Win128 dialog boxes "Voltage" & "Relay Output" respectively.

Each 3377 and 3378 unit is programmed (Win128) regarding:

- Technical address
- Name (Normally not changed)
- Priority level (High / Low)
  - Sound type (Steady/continuous, Intermittent/pulsed or Alternating/two-tone)
  - Output type (Normally "Alarm device")
  - Activation (Steady/continuous, Steady delayed activation or Steady delayed de-activation)
  - Control expression (with one or more trigger conditions)

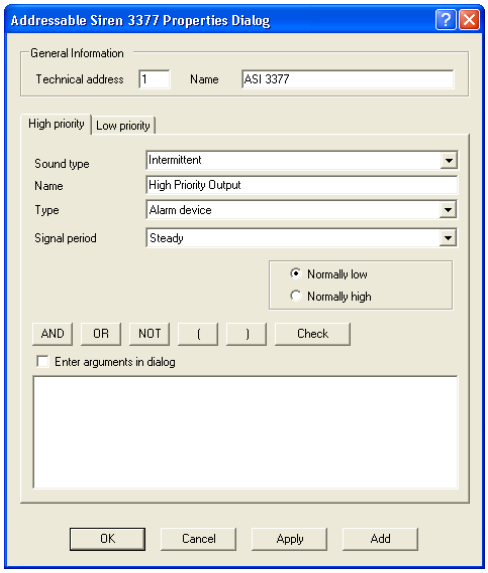


Figure 10. The Win128 dialog box "Addressable siren 3377" (The dialog box "Addressable sounder base 3378" is similar).

9.1 Control unit outputs S0 – S1

EBL128 has two programmable, supervised (monitored)[47] voltage outputs:

S0 Supervised (monitored) voltage output, 24V DC[48], max. 500 mA (cont. 500 mA, during 30 ms 620 mA).

S1 Supervised (monitored) voltage output, 24V DC[48], max. 200 mA (cont. 200 mA, during 110 ms 240 mA).

Set to "alarm device" outputs as default.

Connections and more information, see drawing 128-22

9.2 Control unit output R0

EBL128 has one programmable relay output:

R0 Relay output, NO or NC contacts[49] programmable.

Set to "routing equipment" (fire brigade tx) output as default.

Connections and more information, see drawing 128-23

[47] This is default but via Win128 it is possible to set each output individually as not supervised (not monitored).
NOTE! A normally high output can not be supervised.
Supervised outputs have to be calibrated via menu H5/**A3**, see the EBL128 Operating Instructions. The valid calibrated value range is 470 nF to 5 x 470 nF. A fault will be generated for a value outside this range. A normally high output will be low for a few seconds during restart of EBL128.

[48] See chapter "Technical data", page 120, regarding **system voltage**.

[49] Relay contacts: max. 1 A @ 30 V DC.

9.3 8 relay outputs expansion board 4581 Output 0 – Output 7

Each 4581 board has eight programmable relay outputs:

Output 0 Relay output, NO or NC contacts programmable
Output 1 Relay output, NO or NC contacts programmable
Output 2 Relay output, NO or NC contacts programmable
Output 3 Relay output, NO or NC contacts programmable
Output 4 Relay output, NO or NC contacts programmable
Output 5 Relay output, NO or NC contacts programmable
Output 6 Relay output, NO or NC contacts programmable
Output 7 Relay output, NO or NC contacts programmable

Relay contact ratings: Max. 2A @ 30 V DC.

Connections and more information, see dwg. 128-30.

9.4 The 3361 unit outputs Re0 – Re1

Each 3361 unit has two programmable relay outputs:

Re0 Relay output, NO or NC contacts programmable

Re1 Relay output, NO or NC contacts programmable

Relay contacts: max. 2 A @ 30 V DC / 125 V AC (60W).
Connections and more information, see drawings 128-21 & -26.

9.5 The 3364 unit outputs VO0, VO1 & VO2

Each 3364 unit has two programmable, supervised (monitored)[47] voltage outputs:

VO0 Supervised (monitored) voltage output, 24V DC, max. 1A[50]

VO1 Supervised (monitored) voltage output, 24V DC, max. 1A[50]

VO2 is a voltage output, 24V DC, max. 1A[50], intended for fire door closing. Normally high. For more information see the Technical Description MEW00529.

24 V DC from an external power supply unit (e.g. 3366).

Connections, see drawing 128-21 & -28.

9.6 The 3377 unit output (siren)

Each 3377 unit has one programmable output:

Output Siren, with two priority levels and three types of tones.

Connections and more information, see drawing 128-21.

9.7 The 3378 unit output (sounder)

Each 3378 unit has one programmable output:

Output Sounder, with two priority levels and three types of tones.

Connections and more information, see drawing 128-21.

[50] Cont. 1 A, during 10 ms 1.4 A.

10 Output programming

Output programming is done via Win128. See the Win128 dialog box respectively. For more information see also Win128 help.

10.1 Type of output

The following types are available (see also comments below):

0. **Control**
1. **Fire Ventilation**
2. **Extinguishing**
3. **Alarm Device**
4. **Routing Equipment (Fire brigade tx)**
5. **Control, neutral**
6. **Interlocking Output**

Comments to the types:

0. Default. General (normal) control output[51]
1. Used to activate fire ventilation equipment[52]
2. Used to activate extinguishing equipment[53]
3. Used for sounders, etc.[54]
4. Used for fire alarm tx[55]
5. No collective disablement and no LED indication.
6. Output used together with a corresponding interlocking input. See chapter "Interlocking function", page 63. Activated outputs are shown in menu H9/C1.

[51] Collectively disabled via menu H2/B4 (all control outputs). Re-enabled via menu H2/B8.

[52] Collectively disabled via menu H2/B4 (all ventilation outputs). Re-enabled via menu H2/B8. LED "Ventilation" is indicating activated output.

[53] Collectively disabled via menu H2/B4 (all extinguishing outputs). Re-enabled via menu H2/B8. LED "Extinguishing" is indicating activated output.

[54] Collectively disabled via menu H2/B4 (all alarm device outputs). Re-enabled via menu H2/B8. Push button "Silence alarm devices" also controls these outputs. Fault on / disabled output is indicated by LED "**Fault / Disablements** Alarm devices" blinking (fault) / continuous (disablement).

[55] Disabled / Re-enabled via menu H2/B9 (Fire and/or fault outputs). Controlled via open door (if programmed so). Used together with trigger condition no. 36 (Fire brigade tx). LED "Fire brigade tx" is indicating activated output. (Fire brigade tx feedback via a programmable input can light up the LED instead). Fault on / disabled output is indicated by LED "**Fault / Disablements** Fire brigade tx" blinking (fault) / continuous (disablement).

10.2 Logic

The logic is set in the Win128 dialog box "Voltage or Relay Output".

(•) Normally open / low Normally open relay contact or normally low voltage output.

( ) Normally closed / high Normally closed relay contact or normally high voltage output (24V DC).

10.3 Supervised

A voltage output is normally supervised (default). By un-marking this checkbox the voltage output will be not supervised.
NOTE! A normally high output can not be supervised.

10.4 Output signal period

Each output uses an "Output signal period", which controls the output's activation. The following are available:

0. Steady (continuous)
1. Intermittent 0.8s/0.8s
2. User defined 1
3. User defined 2
4. User defined 3
5. User defined 4
6. User defined 5
7. User defined 6
8. User defined 7
9. User defined 8

User defined 1-8 can be built up with type and time.

The following types are available:

0. Steady (continuous)
1. Intermittent
2. One pulse
3. Steady Delayed Activation
4. Intermittent Delayed Activation
5. One pulse Delayed Activation
6. Steady Delayed De-Activation

The following times are available:

- Delay time (when required)
- Pulse length time (when required)
- Pulse off time (when required)
- De-activation time (when required)

See also chapter "Output Signal Periods", page 104.

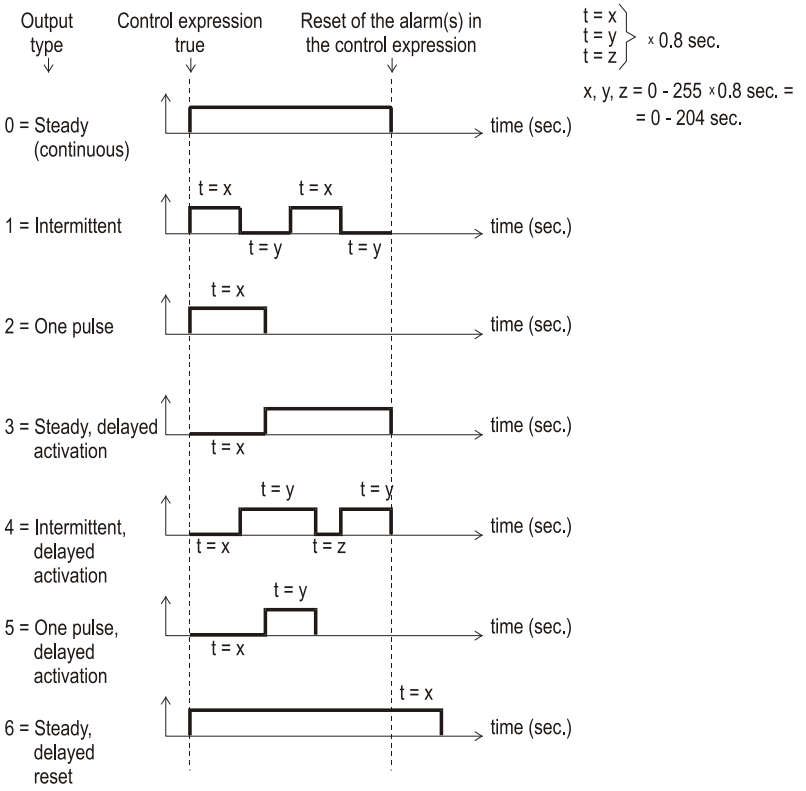


Figure 11. Delay time, Pulse length, Pulse off and/or De-Activation, have to be set for the "Signal period" respectively. For types 1 & 4 the x and y times must be equal and max. 5.6s. For types 2 & 5 the x time must be max. 5.6s.

NOTE! There are limitations according to the following table:

	In EBL128			COM loop units				
Output / Type	S0-S1	R0	4581 board	I/O unit 33	Unit 33	Siren 33	S/B 78	Interlocking
0 Steady (continuous)	X	X	X	X	X	X	X	X
1 Intermittent	X	X	XXX	--	XX	--	--	--
2 One pulse	X	X	XXX	--	--	--	--	--
3 Steady, delayed activation	X	X	X	X	X	X	X	X
4 Intermittent, delayed activation	X	X	XXX	--	XX	--	--	--
5 One pulse, delayed activation	X	X	XXX	--	--	--	--	--
6 Steady, delayed de-activation	X	X	X	X	X	X	X	--

Figure 12. The types that can be used in the "Signal period" for the programmable output respectively
***X** = Output type can be used. **XX** = Output type can be used but only 0.8s/0.8s. **XXX** = Output type can be used but max. 5.6s/5.6s and the pulse max. 5.6s respectively.*

10.5 Control expression

Each programmable output has to be given a control expression (with one or more trigger conditions), made by so called Boolean algebra.

Trigger conditions (displayed a list by clicking the right mouse button), logical "Operators" (**AND**, **OR, NOT**) and parentheses are used to build up a "control expression" containing up to 40 trigger conditions. See also chapter "Control expression examples" page 59 and the Win128 help.

10.5.1 Trigger conditions

Some trigger conditions require additional information, see information within parentheses (nnnnn) after the trigger condition respectively.

Consecutive trigger conditions includes a "Quantity" that shows the number of alarm points within the sequence that have to be activated to fulfil the trigger condition. (Quantity = 1-10. "1" is normal.)

The following trigger conditions are available:

1 **Fire Alarm Zone** (+Zone no.)
2 **Fire Alarm Zone Address** (+Zone no.+Address)
3 **General Fire Alarm**
4 **Consecutive Fire Alarm** (sequence) (+start Zone no. and address +stop Zone no. and address +Quantity)
5 **Pre Warning Zone** (+Zone no.)
6 **Pre Warning Zone Address** (+Zone no.+Address)
7 **General Pre Warning**
8 **Consecutive Pre Warning** (+start Zone no. and address +stop Zone no. and address +Quantity)
9 **Heavy Smoke Alarm Zone** (+Zone no.)
10 **Heavy Smoke Alarm Zone Address** (+Zone no.+Address)
11 **General Heavy Smoke Alarm**
12 **Consecutive Heavy Smoke Alarm** (sequence) (+start Zone no. and address +stop Zone no. and address +Quantity)
13 **Two Address Dependent Fire Alarm** (+Zone no. +Address)
14 **Interlocking Input Area Activated** (+Area no.)
15 **Interlocking Input Area Point Activated** (+Area no. +Point)
16 **General Interlocking Input Activated**

17 **Consecutive Interlocking Input Activated** (sequence) (+start Area no. and point +stop Area no. and point +Quantity)
18 **Fire Brigade Tx Activated**
19 **Fault Tx Activated**
20 **Fire Brigade Tx Disabled**
21 **Zone Disabled** (+Zone no.)
22 **Zone Address Disabled** (+Zone no. +Address)
23 **General Zone Address Disabled**
24 **General Fault**
25 **General Charge Fault**
26 **Reset Pulse Zone Address** (+Zone no. +Address) [56]
27 **Time Channel Activated** (+Time channel no.)
28 **Alert Annunciation Activated**
29 **Alert Annunciation Acknowledged**
30 **General Door Open**
31 **Key Cabinet Open**
32 **General Control Disabled**
33 **General Alarm Device Disabled**
34 **Fire Door Closing** (+Zone no. +Address)
35 **General Service Signal**
36 **Fire brigade tx**

Comments to the trigger conditions (functions):

1 Fire alarm. For more information, see EBL128 Operating Instructions.
2 See 1.
3 See 1.
4 See 1.
5 Pre-warning.[57] For more information, see EBL128 Operating Instructions.
6 See 5.
7 See 5.
8 See 5.
9 Heavy smoke / heat alarm. For more information, see EBL128 Operating Instructions.
10 See 9.
11 See 9.
12 See 9.
13 Only one address (in two-unit-dependence) is in fire alarm state. For more information, see EBL128 Operating Instructions.
14 One or more interlocking inputs, in the specified interlocking area, are activated.

[56] Only valid for EBL128 outputs (S0-S1 and R0), 4581 outputs and 3361 outputs (i.e. not 3364 outputs).

[57] The trigger condition is true as long as the pre-warning level is exceeded. It is also true as long as the fire alarm level is exceeded.

15 The interlocking input, in the specified interlocking area/point, is activated.
16 One or more interlocking inputs are activated.
17 One or more interlocking inputs, in the specified range, are activated (from interlocking area no./point to interlocking area no./point).
18 Routing equipment output (Fire brigade tx) is activated.[58]
19 Routing equipment output (Fault tx) is activated.[59]
20 Routing equipment output (Fire brigade tx) is disabled.[60]
21 The specified zone is disabled.
22 The specified alarm point (zone/address) is disabled.
23 One or more alarm points (zone/address) are disabled. [61]
24 One or more faults are generated in the system.[62]
25 Loss of mains (in a c.i.e.). **NOTE!** The output(s) will be activated immediately but the corresponding fault is normally delayed.
26 This control expression is true for 5 seconds, whenever a reset pulse is sent to the specified zone/address.
27 The programmed time channel (1-12) is activated.
28 Alert annunciation activated (by any alarm point set to activate this function). For more information, see EBL128 Operating Instructions.
29 Alert annunciation activated (by any alarm point set to activate this function) and acknowledged. For more information, see EBL128 Operating Instructions.
30 Door open in EBL128 / ext. FBP.[63]
31 Key cabinet alarm. For more information, see EBL128 Operating Instructions.
32 General control disabled (via menu H2/B7). [61]
33 General alarm device disabled (via menu H2/B8[64] or via "Silence alarm devices).
34 This trigger condition plus the OR operator shall be used for each detector (zone-address) controlling a fire door (normally ≥ two detectors). Type of output is normally "Control, neutral".[65] See also chapter "Fire Door Closing function", page 67.

[58] Indicated by LED "Fire brigade tx". Output can be tested via menu H1.

[59] Indicated by LED "Fault tx activated". Output can be tested via menu H1.

[60] Indicated by LED "**Fault/Disablements** Fire brigade tx".

[61] Indicated by LED "Disablements".

[62] Indicated by LED "General fault" and/or LED "Fault tx activated".

[63] Or ext FBPs connected to the control unit(s).
Indicated by LED "Door open".

[64] Indicated by LED "**Fault / Disablements** Alarm devices".

[65] In Danish convention (DBI), must only EBL128 outputs R0, S0-S1 and the COM loop unit 3364 be used. The type has to be "control neutral".

35 Service signal is activated (by any sensor).[66]

36 Used for routing equipment (Fire brigade tx) output only. Has to be type 4 = Routing Equipment (Fire brigade tx). NOTE! The **A**lert **A**nnunciation function is working with this trigger cond. (If this function shall not be used, use trigger cond. "General fire alarm" instead.)

10.5.2 Logical operators

The logical operators available in Win128 are in priority order:

( ) **parentheses**, changes priority order

NOT **not**-function (inverts), is written **!** in Win128

AND **and**-function, is written **&&** in Win128

OR **or**-function, is written **| |** in Win128

10.5.3 Control expression examples

In order to understand the possibilities to create control expressions, here follow some AND, OR, NOT and ( ) examples and also some control expression examples.

10.5.3.1 AND

a**&&**b**&&**c=y

y is true (=1) when <u>all</u> the conditions **a**, **b**, **c** are true, i.e. a=1 and b=1 and c=1 makes y=1. All other combinations makes y=0.
This is also shown in the following table:

a	**b**	**c**	**y**
0	0	0	0
0	0	1	0
0	1	0	0
0	1	1	0
1	0	0	0
1	0	1	0
1	1	0	0
1	1	1	1

[66] Indicated by LED "Service".

10.5.3.2 OR

a| |b| |c=y

y is true if at least one of the conditions **a**, **b**, **c** is true, i.e. a=1 or b=1 or c=1 makes y=1.

This is also shown in the following table:

a	**b**	**c**	**y**
0	0	0	0
0	0	1	1
0	1	0	1
0	1	1	1
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

10.5.3.3 NOT

Inverts a condition, e.g. !b=!0=1.

a| |**!**b**&&**c=y

This is shown in the following table:

a	**b**	**c**	**y**
0	0	0	0
0	0	1	1
0	1	0	0
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

10.5.3.4 Parentheses

Changes priority order.

a| **|!(**b**&&**c**)**=y (This is same as the previous but completed with parentheses.)

This is shown in the following table:

a	**b**	**c**	**y**
0	0	0	1
0	0	1	1
0	1	0	1
0	1	1	0
1	0	0	1
1	0	1	1
1	1	0	1
1	1	1	1

10.5.3.5 Control expressions

The AND operator has priority, i.e. a && b || c = (a && b) || c. This is perhaps more obvious if you write it: a · b + c.
This means that: a && b || c ≠ a && (b || c).

Here follows some examples (and explanations) to show the principles how to build a control expression with "conditions" and logical operators.):

Example 1

Output: Voltage output **S0**

Control expression: Pre Warning Zone (10)

Explanation: Pre-warning activated in zone no. 10 will activate the output S0.

Example 2

Output: Relay output **R0**

Control expression: General Control disabled **&& !**Door Open

Explanation: Controls disabled via menu H2/B7 will activate the output R0 when the door in EBL128 is not open (i.e. closed).

Example 3

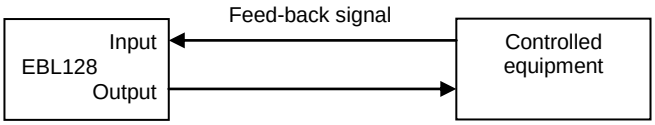
Output:	Voltage output **VO0**
Control expression:	Fire Alarm Zone (23) **&&** Fire Alarm Zone (24) **&&** General Fault
Explanation:	Fire alarm activated in zone 23 and zone 24 will activate the output VO0 when there are one ore more faults in the system at the same time.

Example 4

Output:	Voltage output **S1**
Control expression:	Consecutive Fire Alarm (10,10,10,19,**1**) **||** Consecutive Fire Alarm (10,21,10,40,**1**)
Explanation:	Fire alarm activated by **one** of the alarm points in zone 10 address 10-19 or by **one** of the alarm points in zone 10 address 21-40 will activate the output S1 (i.e. the alarm point in zone 10 address 20 will not activate the output S1).

11 Interlocking function

The interlocking function is used to verify that an output really is activated, i.e. by "combining" an output with an input (feed-back from the equipment controlled by the corresponding interlocking output).



11.1 Interlocking programming

Win128 is used for the programming. Up to 32 Interlocking Combinations can be used.
NOTE! Each interlocking input and each interlocking output can only be used in one interlocking combination.

11.1.1 Interlocking output

The "Voltage Output" / "Relay Output" dialog boxes are to be used.
Type: "Interlocking" is to be selected.
Signal period: Steady (continuous) or Steady, delayed activation is to be selected.
Control Expression is to be programmed for the output, i.e. for the equipment to be controlled.
Activated output will be indicated in menu H9/C1.
Name: It is recommended to add information, e.g. the interlocking combination's presentation number (Area-Point).

11.1.2 Interlocking input

The "Input" dialog box is to be used.
Triggered by: "Interlocking Input" is to be selected.
Activated input will be indicated in menu H9/C1.
Name: It is recommended to add information, e.g. the interlocking combination's presentation number (Area-Point).

11.1.3 Interlocking combination

One interlocking output and one interlocking input are programmed in one interlocking combination to get the interlocking functions.

NOTE!
The interlocking outputs and inputs have to be programmed before the programming of an interlocking combination is possible to do.[67]

An interlocking combination can have only an output or only an input programmed, e.g. when a text shall indicate an activated output or input.

[67] In the "Interlocking Combination" dialog box are listed all the outputs and inputs previous programmed for interlocking, see Figure 13.

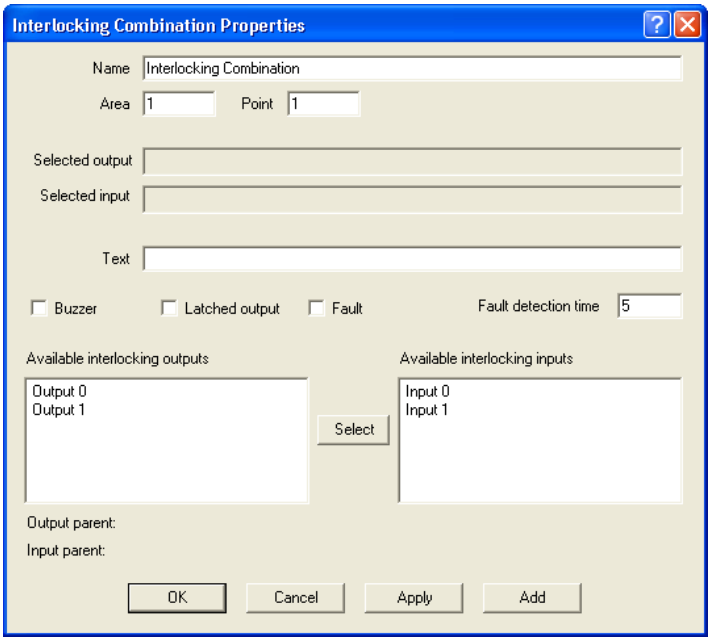


Figure 13. The Win128 dialog box "Interlocking Combination".

Logical Name: Displayed in the Win128 Tree and List views. Default is "Interlocking Combination" that can be changed when wanted / required.

Area and **Point**: Each "Interlocking Combination" is presented as Area-Point (compare with Zone-Address). Area numbers 1-31 are possible to use and Point numbers 1-63 are possible to use.

The **Available interlocking outputs** list displays all the previous programmed outputs, Type = "Interlocking Output".
The **Available interlocking inputs** list displays all the previous programmed inputs with the Triggered by alternative (trigger condition) 10 = "Interlocking Input".

Select one **Output** and one **Input**. Press **Select** and the selected output and input will be shown in the **Selected output** and **Selected input** field respectively.

Text = Interlocking text to be shown in the menu H9/C1. Can be written in this field or in the "Texts" dialog box, see chapter "Creating the alarm texts via Win128", page 84.

Buzzer checked = activated interlocking input will turn on the EBL128 buzzer (0.8 / 0.8 sec.)[68]. The buzzer can be silenced. It will be automatically turned on again, if a new interlocking input is activated.
Latched output checked = Output reset has to be performed via menu H9/C3. (Automatically output reset will not take place when the control expression becomes false.).

Fault checked = Fault detection ON.

[68] Priority order: Fire alarm – Pre-warning - Interlocking - Fault.

Fault Detection Time: If the input is not activated within 5-255 seconds after the output is activated[69], a fault will be generated:

```
FAULT: Interlocking input AA/PP
Date: MM-DD   Time: HH:MM
```

11.2 Interlocking indications

One or more activated Interlocking Combinations (interlocking output and/or input) are indicated in the display in EBL128[70]:

```
Interlocking input/output activated
See menu H9/C1
```

Disabled interlocking output is indicated by the LED "Disablements".

11.3 Information of interlocking combinations (H9)

Menu H9 has the following sub menus.

11.3.1 Display interlocking information (H9/C1)

See also chapter "Interlocking indications", page 65.
In menu H9/C1 information will be shown as follows:

```
Output AA/PP activated at HH:MM
Interlocking text.. .. ..
```

or

```
Output AA/PP act HH:MM, input act HH:MM
Interlocking text.. .. ..
```

or

```
Input AA/PP activated at HH:MM
Interlocking text.. .. ..
```

AA = Interlocking combination Area
PP = Interlocking combination Point within the Area
HH = Hours
MM = Minutes

Use "↑" "↓" to scroll between several interlocking combinations.

11.3.2 Activate interlocking output (H9/C2)

Even if the control expression for an interlocking output is not fulfilled (true), the output can be manually activated via this menu.
The "Interlocking Combination" (Area / Point) is to be entered to activate the output. The corresponding interlocking input will be "monitored" in the same way as if the output was activated by its

[69] After the end of the delay time (if used).

[70] This indication has the lowest priority and will only be shown if the display was empty.

control expression.
Reset has to be performed via menu H9/C3.

11.3.3 Reset interlocking output (H9/C3)

Activated interlocking outputs are listed here. Use "↑" "↓" to scroll between the "Interlocking Combinations" (Area / Point).

Interlocking output activated via its control expression and latching output selected: The output has to be reset via this menu.
Interlocking output activated via its control expression and latching output not selected: The output can be reset via this menu.
Interlocking output activated via menu H9/C2: The output has to be reset via this menu.

11.3.4 Disable interlocking output (H9/C4)

Interlocking outputs (i.e. Output Type = Interlocking) can be disabled via menu H9/C4. A disabled output will stay in (or return to) the normal condition for the output respectively. The "Interlocking Combination" (i.e. Area / Point) is to be entered to disable the output.
If "00/00" is entered, all interlocking outputs will be disabled.

11.3.5 Re-enable interlocking output (H9/C5)

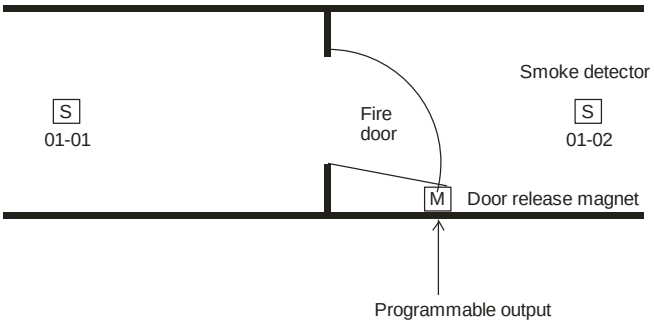
Interlocking outputs (i.e. Output Type = Interlocking) can be re-enabled via menu H9/C5.
Disabled interlocking outputs are listed in menu H9/C5. Use "↑" "↓" to scroll between the "Interlocking Combinations" (i.e. Area / Point) or type it via the key-pad.
If "00/00" is entered, all interlocking outputs, disabled via menu H9/C4 and "00/00", will be re-enabled.

11.4 Interlocking control expressions

A programmable output control expression can contain "interlocking" trigger conditions ("Functions") numbers 14-17 (see chapter "Control expression", page 56), i.e. one or more outputs can be activated when one or more interlocking inputs are activated.

12 Fire Door Closing function

Programmable outputs[71] can be used for fire door closing. A special trigger condition is available (no. 34 = Fire Door Closing). Type of output shall normally be "Control, neutral". One or more alarm points can control the output, e.g. the detectors on both sides of the fire door.



Fire Door Closing function (ABDL)

In case of one of the following events, the output will be "activated" (i.e. powerless) and the fire door will close:

- Fire alarm (any of the programmed detectors)
- Fire alarm in "Test mode" (any of the programmed detectors)
- Fault (i.e. "no answer" from any of the programmed detectors[72])
- Disablement (any of the programmed detectors, the involved zone(s) or the COM loop).
- A definite time every day, if programmed via Win128. (The output will be activated for 20 seconds.)
- Via a programmable input (trigger condition no. 17 = Door Closing Test Input). (The output will be activated for 20 seconds.)

NOTE!
For safety reasons should an I/O unit 3361 output not be used.[71] If there is a short-circuit or a double break on the COM loop, the I/O unit can not be "ordered" to activate the output, i.e. the door will not be closed.

If a magnet contact is available, it is possible to get a "closed fire door verification" via the Interlocking function. In this case, Type of in-/output has to be "Interlocking in-/output". See also chapter "Interlocking function", page 63.

[71] In the DBI (Danish) convention, must only EBL128 outputs R0 and S0-S1 as well as the 3364 unit be used and "Type of output" has to be "Control neutral".

[72] E.g. a faulty detector, two breaks or short-circuit on the COM loop.

13 Functions / Services / Features

Some Functions / Services / Features require programming via Win128, see chapter "PC S/W", page 12. For more information see also the EBL128 Operating Instructions and Win128 help.

How to connect the PC and more information, see the EBL128 Operating Instructions chapter "SSD programming and download" and "Software (S/W) download".

13.1 Analog smoke detectors

13.1.1 Sensor value

The basic working principle and some expressions are described below. Regarding the analog smoke detectors **430x in NORMAL mode**, see chapter "Alarm algorithms for smoke detectors / Detection levels / Offsets", page 69.

An analog smoke detector is like a "sensor". It detects its environment at all times. The detected analog values are, in the detector, converted to digital values, "**sensor values**", which are for each detector individually continuously (each 3.4th sec.) picked up and evaluated by EBL128. In Figure 14 the (digital) sensor values are represented by the graph "**Working level**".

13.1.2 Week average sensor value

Each hour, one sensor value is stored (in EBL128) and each week are these stored sensor values used to calculate a "**week average sensor value**".[73] This is done for each analog smoke detector individually. In Figure 14 the (digital) week average sensor values are represented by the graph "**Week average**".

Each analog smoke detector has a default sensor value = 1 (i.e. the "Working level" at Time = 0). A "**fire alarm offset**" (value) is added to get each detector's "**Fire alarm level**", i.e. the fire alarm level will be adjusted in relation to each new week average sensor value in order to keep the detector's fire alarm sensitivity constant. The fire alarm level is in Figure 14 represented by the graph "**Fire alarm level**" (being parallel with the graph "**Week average**").

Service signal will be given when the week average sensor value for a detector has reached a fixed level, see "**Service level**" in Figure 14.

[73] The very first week average sensor value will be calculated within 2 minutes after any restart, i.e. also after SSD download. During this "2 min. period" all analog smoke detector fire alarms are suppressed.

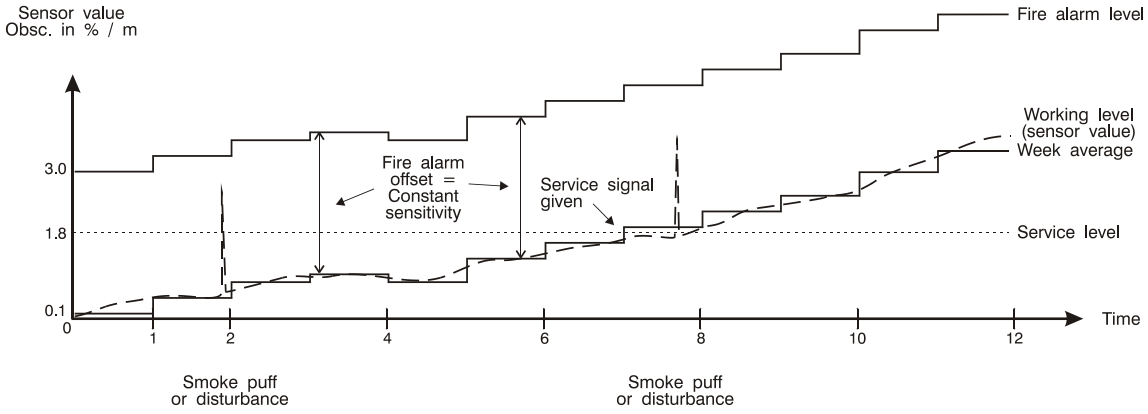


*Figure 14. The basic working **principle** for one analog smoke detector ("sensor"). Sensor value, working level, week average sensor value, fire alarm offset / level and service level.*

"Sensor Information" is available via menu H4/U3. Via Win128 and a PC connected to EBL128 you can get "Sensor Information" for all analog detectors on the COM loop or an individual detector. For an individual detector you can also get continuous information. For the smoke detectors the sensor values are presented as obscuration in % per meter (%/m) and for heat detectors as °C. See also Win128 help.

The following is valid for the analog smoke detector types **430x in NORMAL mode**.

In order to secure real alarms and reduce nuisance alarms, advanced algorithms are used and a decision value is calculated, see below.

13.1.3 Decision value

The decision value is used to decide if it is normal state, pre-warning, fire alarm or heavy smoke alarm. It is also used in the smouldering smoke algorithm (see page 73). The decision value is calculated, see chapter "Filtering algorithm, page 71.

13.1.4 Alarm algorithms for smoke detectors / Detection levels / Offsets

Each detector uses an alarm algorithm and each detector has three different detection levels for:

1. **fire alarm**[74]

[74] The fire alarm level for each analog detector (sensor) = the current week average sensor value + a fixed fire alarm offset (value), i.e. when the current week average sensor value is re-calculated (and adjusted) the fire alarm level will also be adjusted. The detector sensitivity is accordingly constant.

2. **pre-warning** will be activated at a lower level (smaller offset) than for fire alarm, i.e. pre-warning will be activated before fire alarm will be activated.
3. **heavy smoke alarm** will be activated at a higher level (bigger offset) than for fire alarm, i.e. heavy smoke alarm will be activated after fire alarm has been activated. Heavy smoke alarm will be saved in the event log.[75]

The pre-warning offset and the heavy smoke alarm level can, for all detectors, be set in Win128, see chapter "Alarm Algorithms", page 100. See also Win128 help.

The fire alarm offset can, for all detectors, be set in Win128, see chapter "Alarm Algorithms", page 100. See also Win128 help.

NOTE! Changing these parameters will affect the sensitivity and detection time and should be done by authorised personnel only!!!!! In addition, a special password is required to change the fire alarm parameters.

"Pre-warning", "Fire Alarm" and "Heavy Smoke Alarm" can activate programmable outputs respectively, see chapter "Control expression", page 56. See also the EBL128 Operating Instructions.

13.1.5 Alarm algorithm / Alternative alarm algorithm

Alarm algorithm

In order to secure real alarms and reduce nuisance alarms[76], six different alarm algorithms are available. See Figure 15., page 72.
The alarm algorithms are based on:

- Normal, high or low sensitivity
- Normal (15 sec.) or slow (35 sec.) detection time (alarm delay)

Normal sensitivity. **3.0** % smoke obscuration per meter is required to activate **fire alarm** (i.e. fire alarm offset=30). This is default in the N-15 algorithm and should normally not be changed.

High sensitivity. **2.4** % smoke obscuration per meter is required to activate fire alarm, i.e. less fire alarm offset than for normal sensitivity. High sensitivity can be used when an "early" fire alarm is wanted.

Low sensitivity. **3.6** % smoke obscuration per meter is required to activate fire alarm, i.e. a higher fire alarm offset than for normal sensitivity. Low sensitivity can be used to get an extra delay time in order to reduce nuisance alarms[76] but might not fulfil the EN54-7 specifications.

Normal detection time (15 sec.) If it was possible to completely fill up a detector with smoke within 1 sec. there will nevertheless be 15

[75] No other heavy smoke alarm information if not an ext. FBP with printer is available. If so, the heavy smoke alarm information will also be printed out.

[76] So called false / unnecessary alarms.

seconds alarm delay. This alarm delay is a "filter" to reduce nuisance alarms.

Slow detection time (35 sec.). If it was possible to completely fill up a detector with smoke within 1 sec. there will nevertheless be 35 seconds alarm delay. This alarm delay is an "extra filter" to reduce the nuisance alarms[76] but might not fulfil the EN54-7 specifications.

Alternative alarm algorithm

Each analog smoke detector can have two alarm algorithms programmed (via Win128). One **alarm algorithm** that is normally used (**N-15** is default) and one **alternative alarm algorithm** that will be used when a time channel (internal or external) is activated. Normal sensitivity can for example be used during the night-time and low sensitivity can be used during the daytime, i.e. the alternative alarm algorithm can be used to reduce nuisance alarms[76] during working hours. The actual (current) alarm algorithm is shown in menu H4/U3.

The alarm algorithm parameters can, for all detectors, be set in Win128, see chapter "Alarm Algorithms", page 100. See also Win128 help.

13.1.6 Filtering algorithm

In order to secure a fast detection of real fire alarms and to reduce nuisance alarms to a minimum, the filtering algorithm is used.

The filtering algorithm uses the sensor value to calculate a decision value depending on which alarm algorithm that is selected.

The decision value starts at zero. Each time a new sensor value is picked up (sampled) from an analog smoke detector, this new sensor value is compared with the actual decision value, which will be adjusted, see below.

If the difference, between the new sensor value and the actual decision value is ≤ "**X**", the decision value is set equal to the new sensor value.

If the difference, between the new sensor value and the actual decision value is > "**X**", the decision value is increased (or decreased) by "X".

The decision value will consequently not be increased / decreased with a value exceeding the "X" value even if a sensor value is much higher / lower, see Figure 16.

"**X**" = The **Step Value**, is depending on which alarm algorithm that is used, see Figure 15.

Analog detector	Normal detection time (15sec.)			Slow detection time (35sec.)		
	H-15 (High sensitivity, 2.4%)	**N-15** (Normal sensitivity, 3%)	**L-15** (Low sensitivity, 3.6%)	**H-35** (High sensitivity, 2.4%)	**N-35** (Normal sensitivity, 3%)	**L-35** (Low sensitivity, 3.6%)
4301	X=4	X=5	X=6	X=2	X=2	X=2
4300	X=8	X=10	X=12	X=4	X=4	X=4

*Figure 15. The six alarm algorithms. Default is alarm algorithm N-15, i.e. normal detection time (15 sec.) and normal sensitivity (3%). "X" is the step value. (**NOTE!** The L-15, H-35, N-35 and L-35 algorithms might not fulfil the EN54-7 specifications.)*

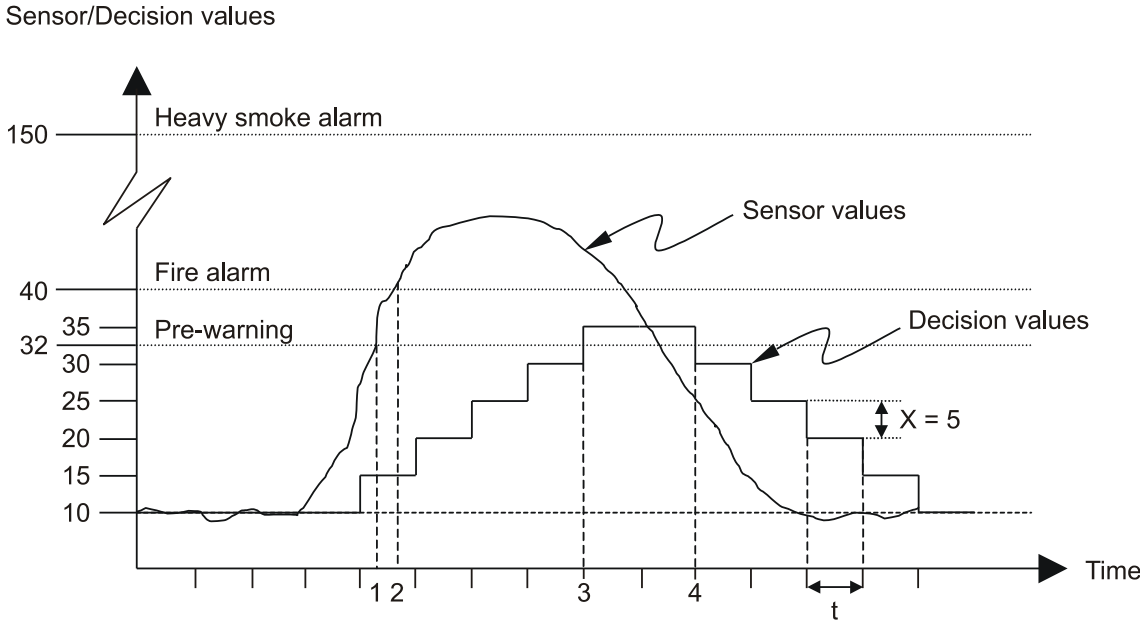


*Figure 16. An example showing the alarm algorithm "N-15", i.e. the step value X = 5. The detector polling time **t** ≈ 3.4 sec.*

Explanations to the figure:
One analog smoke detector 430x using alarm algorithm "N-15", i.e. normal detection time (15sec.) and normal sensitivity (3.0 %/m). This gives X = 5. The week average sensor value has earlier been adjusted (due to contamination) and is now "10"[77], i.e. the pre-warning level is 10+offset 22=32 and the fire alarm level is 10+offset 30=40, which is the same as 4.0 %/m.

[77] "10" = 1.0 %/m. A new / clean detector has approx. 0.1 %/m, i.e. this detector is probably mounted in a very "dirty" environment. A detector mounted in a normal office would after 8-10 years have approx. 0.3 %/m.

The sensor values and decision values are approx. equal ("10"), until the polling when the sensor value increases to approx. "27". Since 27-10 > 5 (X=5), the decision value is increased by "5" to "15" (10+5). Next polling the sensor value is approx. "45". 45-15 > 5, i.e. the decision value "15" is increased by 5 to "20", and so on.

In this example the sensor value starts to decrease before the decision value reaches the fire alarm level. When the sensor value has decreased to approx. "25" the decision value is set to "30", because 35-25=10 > 5, i.e. the decision value "35" is decreased by 5 to "30", and so on.

1. The sensor value has reached the pre-warning level but nothing will happen since the decision value has not yet reached the pre-warning level.
2. The sensor value has reached the fire alarm level but nothing will happen since the decision value has not yet reached the fire alarm level.
3. The decision value has reached / passed the pre-warning level and pre-warning is activated.
4. The sensor values have started to decrease and the decision value is now below the pre-warning level and the pre-warning is automatically reset.

NOTE! In case of a real fire, the sensor values would have stayed at a "high" value ($\geq$ 40) for a long time and consequently the decision value would have increased and reached / passed the fire alarm level approx. 15 sec. after the sensor value reached the fire alarm level.

13.1.7 Smouldering smoke algorithm

The smoke from a smouldering fire brings the sensor value to rise very slowly. This might last for hours and sometimes days. To be able to detect such a smouldering fire at an "early" stage, a smouldering smoke algorithm is used.

The smouldering smoke algorithm is depending on and is always working parallel with the selected alarm algorithm, i.e. the smouldering smoke algorithm will affect the pre-warning and fire alarm levels, see below.

If the decision value has been over the smouldering level (1) for **7 minutes**, the pre-warning and fire alarm levels will be lowered (2):
- The pre-warning level will be lowered to a level right between the original pre-warning level and the smouldering level.
- The fire alarm level will be lowered to a level right between the original fire alarm level and the pre-warning level.

If the decision value has reached the pre-warning level (3), but not the fire alarm level, after **additional 90 minutes**, the pre-warning and fire alarm levels will be lowered again (4):
- The pre-warning level will be lowered to the original smouldering

level.
- The fire alarm level will be lowered to the original pre-warning level.

The smouldering smoke algorithm will be aborted and the pre-warning and fire alarm levels restored to their original values if:

- The decision value becomes lower than the smouldering level.
- The decision value, after the **90 minutes**, has not reached the pre-warning level.
- The decision value, after the **90 minutes** and **additional 120 minutes**, has not reached the fire alarm level.

The smouldering offset can be set in Win128, see chapter "Alarm Algorithms", page 100.

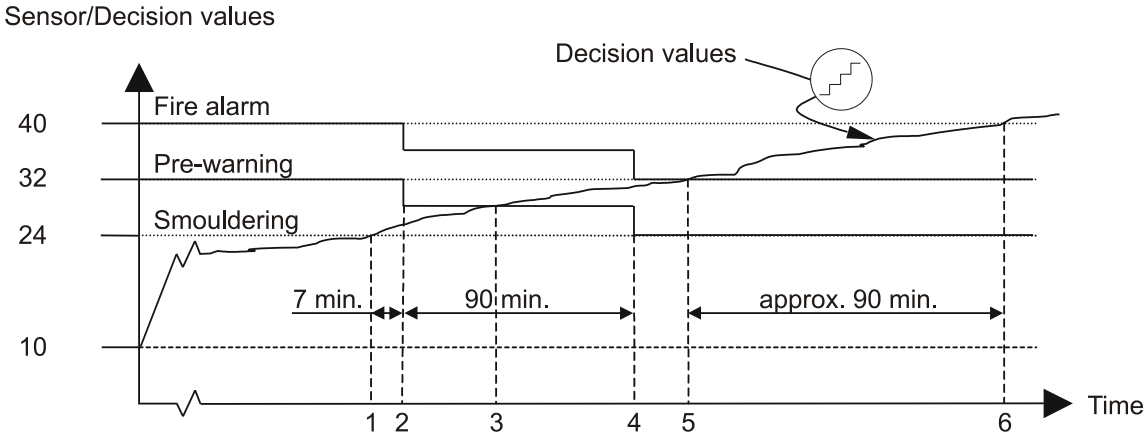


Figure 17. An example with the smouldering smoke algorithm.

Explanations to the figure:
Analog smoke detector 430x. The week average sensor value has earlier been adjusted and is now "10"[77], i.e. the smouldering level is 10+offset 14=24, the pre-warning level is 10+offset 22=32 and the fire alarm level is 10+offset 30=40.

When a smouldering fire starts, the sensor values and the decision values will increase very slowly from "10" and upwards.

1. The decision value has reached the smouldering level. A 7 minutes timer is started.
2. After the 7 minutes the decision value is still over the smouldering level. The pre-warning level and the fire alarm level are therefore lowered. A 90 minutes timer is started.
3. The decision value has reached the pre-warning level and pre-warning is activated.
4. After the 90 minutes the decision value is still over the pre-warning level but has not reached the fire alarm level. The pre-warning level and the fire alarm level are therefore lowered again. A 120 minutes timer is started.

5. The decision value has reached the fire alarm level and fire alarm is activated.
6. The decision value has reached the original fire alarm level "40". This happens approx. 90 minutes after the fire alarm has been activated by the smouldering algorithm!!

13.1.8 Performance factor

To find out the environment conditions where an analog smoke detector 430x is mounted, the **Performance factor** (Pf) can be studied via menu H4/U3 or via Win128.

$$\frac{\sum_{m=0}^{25412} |X_m - X_{wa}|}{25412} = Pf$$

X_m = momentary sensor values for 24 hours.
X_{wa} = weak average sensor value

The performance factor is calculated for each detector individually. Each momentary sensor value is compared with the week average sensor value. The absolute difference is saved and each twenty-four hour (at midnight) an "average value" is calculated, i.e. the performance factor. (25412 = samples per 24 hours.)

If the detector is mounted in a very "stable" environment (like an office) the performance factor will be low (min. 0 %/m).
If the detector is mounted in a very "unstable" environment (like a factory) the performance factor might be high (max. 2.55 %/m).

An "unstable" environment where the sensor values vary a lot can cause nuisance alarms (unnecessary alarms). Perhaps should another type of detector be used, another alarm algorithm[78] or other actions be taken, e.g. alert annunciation or two-unit-dependence (co-incidence alarm).

The performance factor is shown in menu H4/U3 or via Win128 together with the min. and max. sensor values. These values should be studied together. (E.g. one or two high sensor values will not result in a high performance factor, like many high sensor values will.)

13.2 Analog heat detectors

The following is valid for the analog heat detector types **330x in NORMAL mode**.

The detectors conforms to a class (see EN54-5:2000, clause 4.2) according to the requirements of the tests specified in EN54-5:2000, clause 5. Each analog heat detector can have two alarm algorithms programmed (via Win128).

One **alarm algorithm** that is normally used (default) and one **alternative alarm algorithm** that will be used when a time channel (internal or external) is activated. E.g. class A1 can be used during night-time and class B can be used during daytime. The alternative alarm algorithm can be used to reduce nuisance alarms during working hours. The actual algorithm is shown in menu H4/U3.

[78] E.g. an alternative alarm algorithm during working hours.

When EBL128 has picked up a sensor value above the **fire alarm** level for a detector, the next two values from the same detector also have to be above the fire alarm level to activate fire alarm in EBL128. (This results in approx. 7 seconds alarm delay).

The same is valid for **pre-warning** only it is a lower level than for fire alarm.

The same is valid for **heavy heat alarm** only it is a higher level than for fire alarm. Heavy heat alarm will be saved in the event log.[79]

The fire alarm, pre-warning and heavy heat alarm level respectively can be set via Win128, see chapter "Alarm Algorithms", page 100. "Pre-warning", "Fire Alarm" and "Heavy Smoke Alarm" can activate programmable outputs respectively, see chapter "Control expression", page 56. See also the EBL128 Operating Instructions for more information.

13.2.1 Class A1 algorithm

Conforms to Class **A1**.
Typical / max. application temperature 25 / 50° C.
Max. / min. static response temperature 54 / 65° C.

The algorithm is as follows:

For a rate-of-rise ≤ 4° C per minute:
Fire alarm level is 56° C.
Pre-warning level is 46° C.
Heavy heat alarm level is 90° C.

For a rate-of-rise > 4° C per minute:
Fire alarm level is 46° C.
Pre-warning level is 36° C.
Heavy heat alarm level is 90° C.

The biggest difference between the class A1 and A2 algorithms is that the class A1 algorithm will detect a fast temperature rise (rate-of-rise > 4° C per minute) faster than the class A2 algorithm.

13.2.2 Class A2 S algorithm

Conforms to Class **A2** S.
Typical / max. application temperature 25 / 50° C.
Max. / min. static response temperature 54 / 70° C.

The algorithm is as follows:

Fire alarm level is 60° C.
Pre-warning level is 50° C.
Heavy heat alarm level is 90° C.

[79] No other heavy heat alarm information if not an ext. FBP with printer is available. If so, the heavy heat alarm information will also be printed out.

13.2.3 Class B S algorithm

Conforms to Class **B** S.
Typical / max. application temperature 40 / 50° C.
Max. / min. static response temperature 69 / 85° C.

The algorithm is as follows:

Fire alarm level is 74° C.
Pre-warning level is 64° C.
Heavy heat alarm level is 90° C.

The class B S algorithm shall be used when the typical application temperature is "high" compared with the class A1 and A2 algorithms.

13.3 Self verification

The analog detectors **in NORMAL mode** have a built-in self verification function. The detector's H/W is always supervised by the detector's S/W and CPU. Every minute, each detector will receive a question from EBL128. If the self verification function has detected any fault it will be reported back to EBL128. A fault will be activated in EBL128 and the following fault message will be shown:

```
FAULT: Detector xx-xx                →
```

```
FAULT: Detector techn. address nnn   ←
```

13.4 Minimum / Maximum sensor values

To find out how the environment is, where an analog detector **in NORMAL mode** is mounted, the **minimum and maximum sensor values** can be studied. The sensor values are continuously picked up and evaluated by EBL128 for each detector individually. Every value is checked if it is a new minimum or maximum value for that detector and if so, the value will be stored. At midnight every day a memory will be updated and the new minimum and maximum sensor values[80] can be read in menu H4/U3 or via Win128.

For analog smoke detectors the minimum and maximum sensor values are shown as XX.X % (obscuration) per meter.

For analog heat detectors the values are shown as XX°C.

13.5 Two-unit dependence (co-incidence alarm)

In some premises two-unit-dependent fire alarm (co-incidence alarm) can be used to avoid unwanted false alarms (nuisance alarms).

Each analog or addressable detector (alarm point) and addressable multi purpose I/O unit (3361) monitored input (Z)[81] can be

[80] I.e. the min. / max. sensor values are from the previous day.

[81] In this case only one alarm point is recommended on the zone line.

programmed for two-unit-dependent fire alarm activation. (Heat detectors should not and manual call points must not be 2-unit dependent).

Function: Two or more two-unit-dependent alarm points in the same zone have to be in "fire alarm state"[82] at the same time to activate fire alarm in EBL128. If only one such alarm point is in "fire alarm state" it is indicated in EBL128 as a **co-incidence alarm**:

- LEDs "Fire" (blinking).
- The buzzer sounds 0.8 sec. each 5th sec. (like pre-warning).
- In the display is the following text shown:

```
Co-incidence alarm detector ZZ/AA
```

Programmable outputs can be activated by the trigger condition "Two Address Dependent Fire Alarm" but no other outputs will be activated.

13.6 Two-zone dependence (co-incidence alarm)

This function is valid only for the 4580 board zone line inputs. Two specified zones must be in fire alarm state at the same time to activate fire alarm in EBL128.

In some premises two-zone-dependent fire alarm (co-incidence alarm) can be used to avoid unwanted false alarms (nuisance alarms).

NOTE! It is **not** recommended to use heat detectors and/or manual call points in a zone with this function.

If only one two-zone-dependent zone is in "fire alarm state" it is indicated in EBL128 as a **co-incidence alarm**:

- LEDs "Fire" (blinking).
- The buzzer sounds 0.8 sec. each 5th sec. (like pre-warning).
- In the display is the following text shown:

```
Co-incidence alarm zone ZZ
```

Programmable outputs can be activated by the trigger condition "Two Zone Dependent Fire Alarm" but no other outputs will be activated.

13.7 Delayed alarm

In some premises delayed fire alarm activation can be used to avoid unwanted false alarms (nuisance alarms). Note, that this function is a violation to the EN54-2 standard.

This function is valid only for the 4580 board zone line inputs.

NOTE! It is **not** recommended to use heat detectors and/or manual call points in a zone with this function.

[82] A not two-unit dependent alarm point in this state would have activated a fire alarm in EBL128.

The delay time can via Win128 be set to 30 or 60 seconds. (One time is valid for all zones.)

Function: A zone in "fire alarm state"[83] will be recorded in EBL128 but a fire alarm will not be activated. When the delay time has run out the zone will be automatically reset. If now the zone still is in "fire alarm state", a fire alarm will be activated in EBL128, else nothing will happen until the next time the zone is in "fire alarm state" and a new time delay will start.

13.8 Alert annunciation

In some installations the **A**lert **A**nnunciation function can be used to avoid unwanted false alarms (nuisance alarms) to the fire brigade. Trained personnel on site are required to locate the fire (i.e. the "alarming" detector) and take the correct actions depending on if there is a real fire or not.

Normally analog or addressable smoke detectors and zones with smoke detectors only, should come in question for the **AA** function. Heat detectors and manual call points should normally not come in question for the **AA** function. A manual call point can only activate the **AA** function if there are no other fire alarms activated, i.e. the second fire alarm will turn OFF the **AA** function and the "Fire brigade tx" output will be activated.

The **AA** function is normally ON (enabled) during daytime only (i.e. working hours). The time channels 2-4 or the external time channels 5-12 are used to turn ON / OFF (enable / disable) the **AA** function.[84]

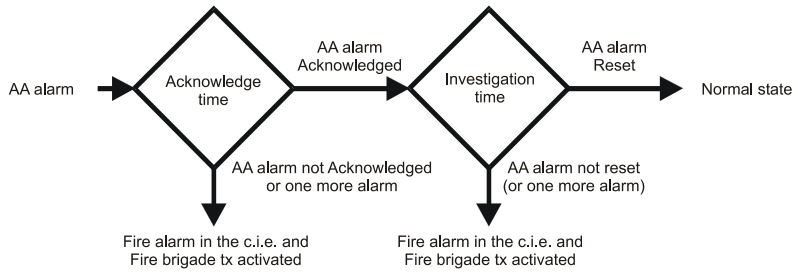


*Figure 18. **A**lert **A**nnunciation function.*

[83] A not delayed zone in this state would have activated a fire alarm in EBL128.

[84] The alert annunciation function ON (enabled) is indicated by the LED "Fire brigade tx delay". Normally is only one time channel used for this function but two or more channels can be used. The **AA** function can, as an alternative, be continuously "on". **NOTE!** The **AA** function can be de-activated (disabled) via menu H2/B10 and will stay so until re-activated (re-enabled) again via menu H2/B10.

AA Function: Indications, actions, etc. as for a normal fire alarm **except that the output for routing equipment (Fire brigade tx)** [85] **will not be activated directly.**

The AA alarm has to be acknowledged within an acknowledge time and the AA alarm has to be reset within an investigation time, otherwise the output for routing equipment (Fire brigade tx) will be activated.

During the acknowledge & investigation times the output for routing equipment (Fire brigade tx) will be activated if:

- fire alarm is activated by another detector not programmed for alert annunciation
- fire alarm is activated in another zone
- fire alarm is activated by a manual call point
- AA alarm is activated by a second detector within the same zone programmed for alert annunciation and "Multiple alarms allowed within same zone" is not selected[86] via Win128.

Acknowledge and Reset is done on the Alert annunciation unit 1735 / 1736 (or Alert annunciation controller 1740). Programmable output ("Alert Announcement Activated" for indication and programmable inputs ("Alert Announcement Acknowledge" and "Alert Announcement Reset") can also be used.

The Acknowledge time can be set to **5-60** seconds.

The Investigation time can be set to **1-9** minutes.

NOTE! According to EN54-2, the total delay of fire alarm routing equipment must not exceed 10 minutes (i.e. Acknowledge time + Investigation time $\leq$ 10 min.).

13.9 Disable zones, alarm points, outputs, etc.

Temporary disablements are made via the menu H2 sub menus B1-B3 & B7-B9. For more information see the EBL128 Operating Instructions, chapter "Disable or re-enable (H2)".

Regular disablements are made via time channels, see chapter "Time Channels", page 98.

Disabled alarm points and outputs are indicated by LED "Disablements" and listed in menu H4/U1.

Fire alarm, pre-warning and fault signal can not be activated by a disabled alarm point / zone.

[85] **NOTE!** As default it is the relay output "R0" in EBL128. If another output shall be used it has to be programmed as type 4 = Routing Equipment (Fire brigade tx) and the trigger condition has to be no. 36 = Fire brigade tx.

[86] Default the Check box is un-marked = Multiple alarms are not allowed within same zone.

13.9.1 Disable zone

A whole zone (all addressable alarm points within one zone, including the manual call points) can be disabled via menu H2/B1. This menu is also used to disable a conventional zone, i.e. a 3361 unit's zone line input (Z) and expansion board 4580 zone line inputs.
Re-enable via menu H2/B4 or automatic re-enabling at a specified time.
A time channel can instead be used to disable and re-enable automatically.

13.9.2 Disconnect / Re-connect zone line

Disconnect a zone line (on a 4580 board) via menu H5/A2. Disconnected zone line will stay disconnected until re-connected.
Re-connect via menu H5/A2.

For more information see EBL128 Operating Instructions.

13.9.3 Disable zone / address

Individual alarm points can be disabled via menu H2/B2.
Re-enable via menu H2/B5 or automatic re-enabling at a specified time.
A time channel can instead be used to disable and re-enable automatically.

13.9.4 Disable control output

Individual control outputs can be disabled via menu H2/B3. Disabled output will stay in (or return to) the normal condition for the output respectively until re-enabled.
Re-enable via menu H2/B6.

13.9.5 Disable / Re-enable all control, exting. and ventilation outputs

The control outputs of type "Control (general)", "Fire ventilation" and "Extinguishing system" can be collective disabled via menu H2/B7. Disabled outputs will stay in (or return to) the normal condition for the output respectively until re-enabled.
Re-enable via menu H2/B7.

13.9.6 Disable / Re-enable alarm devices

The control outputs of type "Alarm device (sounder)" can be collective disabled via menu H2/B8. Disabled outputs will stay in (or return to) the normal condition for the output respectively until re-enabled.
Re-enable via menu H2/B8.

13.9.7 Disable outputs for routing equipment

The control outputs of type "Routing equipment (Fire brigade tx and Fault tx)" can be collective disabled via menu H2/B9. Disabled outputs will stay in (or return to) the normal condition for the output

respectively until re-enabled.
Re-enable via menu H2/B9.

13.9.8 Disable interlocking output

The control outputs of type "Interlocking output" can be disabled via menu H9/C4, see chapter "Disable interlocking output (H9/C4)", page 66.
Re-enable via menu H9/C5.

13.9.9 Disconnect / Re-connect COM loop

Disconnect the COM loop via menu H5/A1. Disconnected COM loop will stay disconnected until re-connected.
Re-connect via menu H5/A1.

For more information see EBL128 Operating Instructions.

13.10 Test mode

Up to four zones can be set in Test mode at the same time.[87] Alarm points / zones can be tested during the Monthly test (via menu H1) or separately (via menu H7). For more information see the EBL128 Operating Instructions. The LED "Test mode" indicates one or more zones in Test mode. Zones in Test mode are also simultaneously shown in the EBL128 display.[88] In order to shorten the testing time, any time delay for the detectors / zones in test mode will be "disabled", i.e. fire alarm will be activated faster than normally.

13.11 Test alarm devices

The programmable outputs type "Alarm device" can be collectively activated via menu H8/S3, which make it possible to test the alarm devices. (The test can not be started if a fire alarm already is activated.) When the test starts the alarm devices will be turned "ON" for 5 seconds (±1s), "off" for 25 seconds (±1s), "on" for 5 seconds and so on.[89]
NOTE! Also disabled (and silenced) alarm devices will be tested.

The test will continue for one hour if it is not stopped via menu H8/S3 or if a fire alarm is activated in the system.

13.12 Test of routing equipment

Via menu H1 it is possible to test the fault and fire alarm outputs for routing equipment (Fault tx & Fire brigade tx).

---

[87] In DBI (Danish) convention, one zone only.

[88] Disablements, faults and fire alarms have higher priority, i.e. the presentation of zones in Test mode will be suppressed during such a condition.

[89] The output activation will be continuously (steady). For the alarm devices 3377 and 3378, the tone with the highest priority level (and type "alarm device") will be automatically selected.

In menu H1, press "Accept" to start the test. The fault output will be activated[90], indicated by LED "Fault tx activated". After 30 seconds will also the fire output be activated, indicated by LED "Fire brigade tx". After additional 30 seconds will the test be ended and the outputs and LEDs will go back to "normal" status.

13.13 Calibration of supervised outputs

The supervised (monitored) voltage outputs have to be calibrated after the installation is finished. This is done in EBL128 via menu H5/A3. A value outside the calibration range 470 nF to 5x470 nF will generate a fault as well as an actual value that differs from the calibrated value ± a small tolerance.

13.14 Service signal

A smoke detector becomes contaminated no matter what environment it is mounted in. In some environments it goes faster than in others.

Conventional smoke detector: The sensitivity will normally increase in most environments. This can result in unwanted false alarms (nuisance alarms) since all conventional smoke detectors (except 4350, see page 95) have a fixed fire alarm level. Conventional smoke detectors have no service signal output.

Analog smoke detector: The sensitivity will automatically be constant[91] up to a fixed **service level** when **Service signal** will be activated. Service signal will be generated for 4300 / 4301 (in NORMAL mode) when the week average sensor value is $\geq$ 1.8 %/m.

See also the EBL128 Operating Instructions chapter "Sensors activating SERVICE signal (H4/U4)" and "Acknowledge SERVICE signal (H8/S1)".

13.15 Fault signal (fault condition)

Fault signal, fault messages, fault acknowledge, etc. are described in EBL128 Operating Instructions, chapter "Fault".

Programmable inputs can be used to activate fault signal in EBL128, see chapter "Programmable inputs", page 45.

13.16 Alarm texts

The alarm texts are shown in case of a fire alarm.
The display in EBL128: On the first row will be shown the **presentation number** for an alarm point and on the second row will

[90] **NOTE!** The Fault tx output is activated in "normal" state, i.e. it will in this test be de-activated.

[91] The detector is supervised at all times and adapts its fire alarm level in relation to the contamination of the detector, see chapter "Analog smoke detectors", page 68.

be shown a user definable **alarm text** for this alarm point, if programmed via Win128.

An example of fire alarm information:

```
001 ZONE-ADDR 12-45  LAST ZONE 12  No.01
User definable alarm text for 12-45
```

The display Ext. FBPs 1826[92] & 1828, the Alert Annunciation units 1735 & 1736 and the Ext. Presentation unit 1728: The same information as in EBL128 will be shown, if no other alarm text has been programmed, see below.

Presentation number
When an alarm point is activated, both the zone number and the address (**ZZ-AA**) will be shown.
When a zone line input (e.g. on a 4580 board) is activated, only the zone number (**ZZ**) will be shown.

See also EBL128 Operating Instructions, chapter "Fire alarm".

Alarm text
User definable alarm texts with up to 40 alphanumeric characters are created and downloaded via Win128.
Each addressable alarm point and each zone can have an individual alarm text shown in EBL128 and the same or another alarm texts shown in each Ext. FBP 1826 / 1828, Alert Annunciation unit 1735 / 1736 and Ext. Presentation unit 1728, since specific texts can be downloaded in each unit individually.[93] See also Win128 help.

13.16.1 Creating the alarm texts via Win128

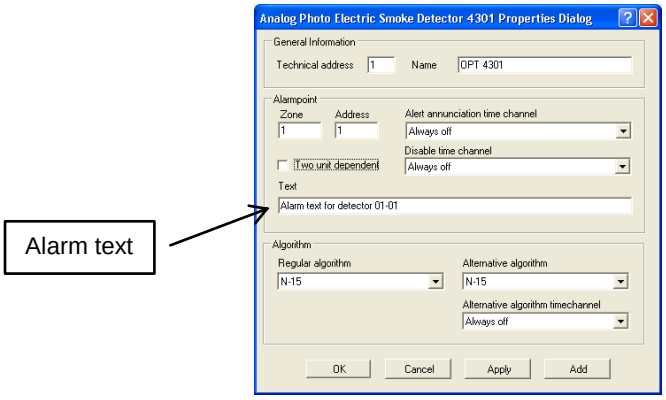
Information is also available via Win128 help.

In the dialog box for an alarm point (e.g. a detector)[94], there is a "Text" field where the alarm text for the alarm point can be typed (or edited). This is the text that will be shown in the display in EBL128 when this alarm point has activated a fire alarm.

[92] The information will also be printed if a printer is available in the ext. FBP 1826.

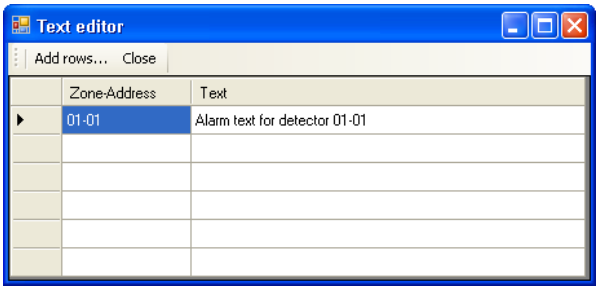
[93] For maximum number of texts, see chapter "Limitations", page 121.

[94] In Win128.



The alarm text can as an alternative be typed (or edited) in the Win128 "Text editor" (menu Tools | Edit Alarm Texts…).

No matter where the text is typed, it will be shown on both places.



Explanations:

Zone-Address column

Shows the already programmed alarm points (e.g. 01-01, 01-02, 02-01 etc.). Only the texts have to be typed / edited in the "Text" column.

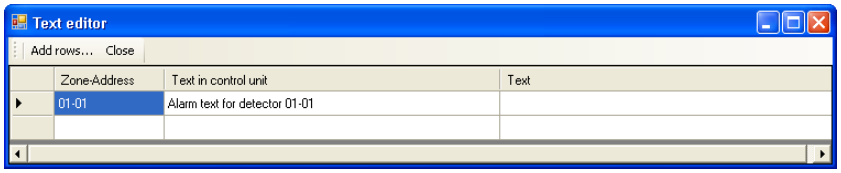
Shows the already programmed zones, i.e. MIO unit 3361 zone line inputs programmed with address "00" (i.e. ZZ – **00)** and 8 zones expansion board 4580 zone line inputs.
Only the texts have to be typed / edited in the "Text" column.

Text column

Shows already programmed alarm point / zone texts. Texts can be typed / edited.

NOTE! If any alarm point shall have a different alarm text in one or more of the "display units" 1826, 1828, 1735, 1736 or 1728[95], the text has to be typed in the Win128 "Text editor", **for the "display unit" respectively** (Properties | Edit texts…):

[95] Regarding text priority order etc. see Technical Description (chapt. "User definable text messages") for the "display unit" respectively.



Explanations (Text editor for **one** specific "display unit"):

Zone-Address column

Shows the already programmed alarm points (e.g. 01-01, 01-02, 02-01 etc.).

Shows the already programmed zones, i.e. MIO unit 3361 zone line inputs programmed with address "00" (i.e. as ZZ – **00)** and 8 zones expansion board 4580 zone line inputs.

Text in control unit column (only information that can not be edited)

Shows the already programmed texts for each alarm point / zone. These texts will be displayed in the control unit and all "display units" 1826, 1828, 1735, 1736 and 1728 if there are no other texts programmed.

Text column

The text to be shown in this "display unit" for the alarm point / zone respectively, has to be typed (edited) here. **NOTE!** In this "display unit" the text in the "Text" column will now be shown instead of the text in the "Text in control unit" column, for the alarm point / zone respectively.

13.16.2 Downloading texts to the EPU 1728, AAUs 1735 / 1736 and ext. FBPs 1826 / 1828

The "display units" have to be connected to EBL128 and the address and mode[96] have to be set in the "display units".
The texts will then be downloaded at the same time as the EBL128 site specific data (SSD) is downloaded via Win128.[97]

The texts can as an alternative be downloaded in one "display unit" at a time but the PC (with Win128) has nevertheless to be connected to EBL128.

13.17 Real time clock (RTC)

EBL128 has a built-in RTC that is used for date and time presentation in conjunction with fire alarms, faults, log events, etc. It also controls the time channels 2-4. The RTC has no backup battery, i.e. the date,

[96] S/W mode xxxx – **1587**. (xxxx = e.g. 1826/28)

[97] In the "Download SSD to Control Unit" dialog box the "Download to FBP / AAU / EPU" check box has to be selected. (As an alternative the "Modified FBP / AAU / EPU only" check box can be selected.)

time, etc. has to be set (via menu H3) after loss of the power supply (no mains and no battery backup).

13.18 Time channels 1-4

Time channels **2-4** are controlled by the EBL128 RTC (real time clock). One time on, one time off, one time on and one time off can be set for each time channel 2-4.
For time channel **1** can no times be set. Default is "Always off" and "Always on" can be selected.

The time channels 1-4 can be used to:

- disable and re-enable alarm points / zones
- turn ON (enable) / OFF the Alert Annunciation function
- activate programmable control outputs
- turn ON (enable) / OFF the alternative alarm algorithm for analog detectors

The properties for each **Time channel** (2-4) and each **Day** (Monday – Sunday + National Holiday) have to be set, see chapter "Time Channels", page 98.

13.19 Time channels 5-12

Time channels 5-12 are controlled by some external device via a programmable input.[98] Time channels 5-12 can be used to:

- disable and re-enable alarm points / zones
- turn ON (enable) / OFF the Alert Annunciation function
- activate programmable control outputs
- turn ON (enable) / OFF the alternative alarm algorithm for analog detectors

One programmable input ("Time Channel N") can control one time channel. The input has to be controlled by some external device, e.g. another time system, a key switch, a timer, etc. with a normally open or a normally closed contact.[99] When the input is "activated" the time channel is turned ON.

NOTE! Do not use more than one input per time channel.

13.20 Event log

150 events will be stored in a circular log, i.e. the log re-starts when it is "full". The log shows the 150 latest events.

The event log can be shown via menu H4/U5 or shown / printed via Win128.

Date & Time are stored together with every event.

[98] One programmable input per time channel.

[99] Normally low or a normally high for an optocoupler input.

13.21 Loss of main power source

The delay time for the fault "Loss of main power source" can be set via Win128 to 1-300 minutes (default is 30 minutes).
(A delay time >30 minutes is a violation to the EN54-2 standard.)

13.22 Win128 Tools menu

The Win128 "Tools" menu is mostly used when the PC is to be connected to EBL128 for download / backup etc.

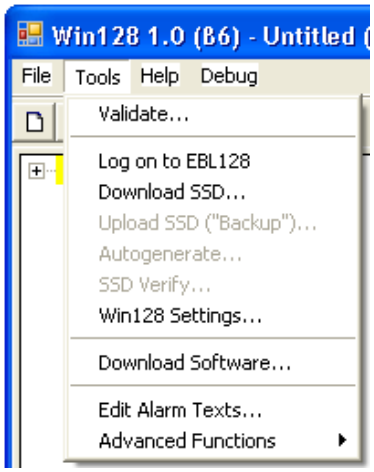


Figure 19 . Win128 "Tools" menu. Some commands might be disabled since they require the PC/Win128 to be connected and logged on to EBL128.

Validate..: The SSD can at any be validated, i.e. checked for system errors, warnings and EN54 violations. (A validation is automatically done before the download of SSD to EBL128.)

Log on to EBL128: Log on / Log off to EBL128.[100]

Download SSD…: Opens a dialog box for download of SSD to EBL128 and the "Display Units".[101]

Upload SSD ("Backup")…: Opens a dialog box for upload ("backup") of SSD from EBL128 and the "Display Units".[101]

Autogenerate…: The units connected to EBL128 (i.e. COM loop units and "Display Units") will be identified by Win128 and an installation with default settings will be auto generated in Win128. The installation can then be edited, saved and the SSD can be downloaded to EBL128.

SSD Verify…: The installation (SSD) shown in Win128 will be compared with what is actually connected to EBL128. Any differences will be listed.[101]

[100] Log on require the PC to be physically connected to EBL128 and a password is required.

[101] The PC has to be connected and logged on to EBL128.

Win128 settings…: Opens a dialog box for the required Win128 settings (e.g. com port, convention, etc.).

Download Software…: Opens a dialog box for download of a EBL128 S/W file (xxx.bin) and/or a Text file (.sst) to an EBL128.[102]

Edit Alarm Texts…: Opens the "Text editor" for the alarm texts to be shown in EBL128.

Advanced Functions:
No "Level" selected (default) = Alarm algorithm parameters can not be changed.
"Level 1" selected = Alarm algorithm parameters, except the fire alarm parameters can be changed.
"Level 2" selected (a password is required) = Also the fire alarm algorithm parameters can be changed. Convention and language will be possible to change in "Win128 settings…".

[102] The PC has to be connected but not logged on to EBL128.

14 Cyber sensor functions

The latest generation of detectors are the "Cyber sensors".

The Cyber sensor "family" consists of the following detectors:

- Conventional photoelectric smoke detector 4352
- Conventional multi detector 4350
- Analog photoelectric smoke detector 4301
- Analog multi detector 4300

NOTE! NOTE! NOTE! NOTE! NOTE! NOTE! NOTE!

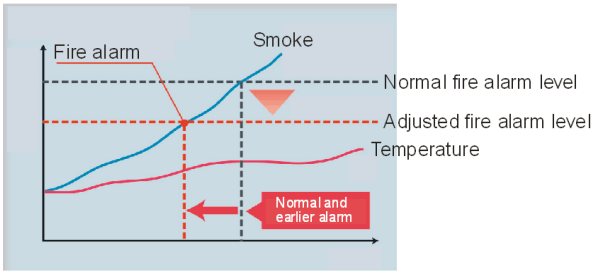
The analog detectors **4301** and **4300** can via the address setting tool 3314 be set in different modes but **in EBL128** can only **NORMAL mode** be used. The detector functions are described in chapters "COM loop units", page 25 and "Functions / Services / Features", page 68.

The conventional detectors **4352** and **4350** uses some of the cyber sensor functions. See the function respectively below.

The **AI function**[103] is used to secure the real fire alarms but also to reduce the false (nuisance) alarms with up to 46 %. The AI function is depending on if the detector is a photoelectric smoke detector only or a multi (smoke and heat) detector:

Combined heat and smoke sensing will guarantee reliable and accurate fire alarm detection, e.g. by shortening the delay time and/or adjust the sensitivity (lower alarm threshold level).

Fire alarm activation in conjunction with temperature rise.

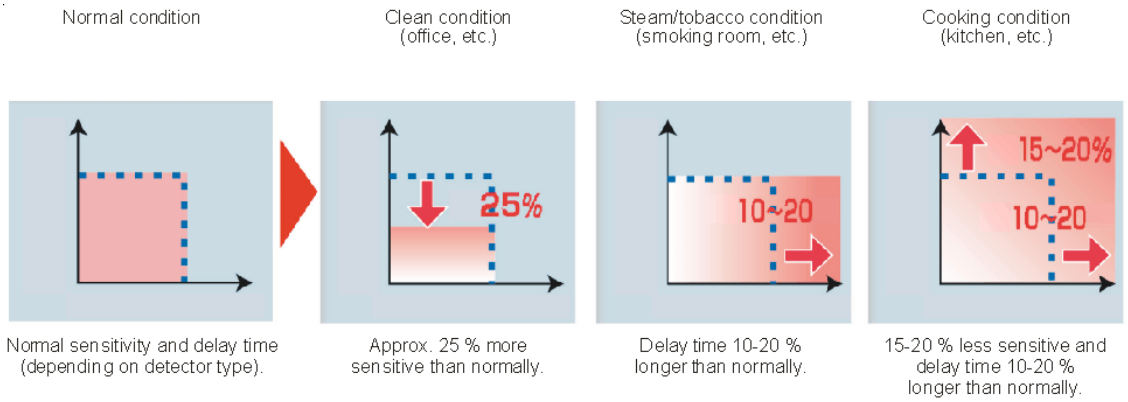


By combined smoke and heat sensing a lower fire alarm level can be used.

Variable delay time. The delay time is influenced by the temporary temperature and/or smoke obscuration changes just before and after the alarm threshold level was passed. The delay time before a fire alarm is activated can be shortened up to 50 % (e.g. from 20 to 10 sec.), or the delay time can be extended in order to reduce false (nuisance) alarms.

[103] **A**rtificial **I**ntelligence.

Learning function / conditions. The detector will adapt a learning condition depending on the long-time influence of smoke and/or the temperature, where the detector is located.



14.1 Pulse up – down counter

The detector have a "pulse up – down counter", **starting at "0" and can not be negative**.

14.1.1 Pulse up – down counter for smoke

When the smoke obscuration **S** (%/m) ≥ the alarm threshold level, "1" is added to the counter (every second).

When **S** < the alarm threshold level, "2" is subtracted from the counter (every second).

14.1.2 Pulse up – down counter for temperature

When the temperature **T** (°C) ≥ the alarm threshold level, "3" is added to the counter (every second).

When the temperature rise **deltaT** (°C/168sec.) ≥ the alarm threshold level, "3" is added to the counter (every second).

When **T** or **deltaT** < the alarm threshold level, "2" is subtracted from the counter (every second).

14.1.3 Pulse up – down counter for smoke & temperature

When **2S+deltaT** ≥ the alarm threshold level, "1" is added to the counter (every second).

When **2S+deltaT** < the alarm threshold level, "2" is subtracted from the counter (every second).

14.2 Fire judgement

The fire judgement is depending on the different functions for the different detector types and if the cause of alarm is smoke **S**, temperature **T** or **deltaT** or a combination of smoke and temperature **2S+deltaT**.

When the counter shows "9" (i.e. at the earliest after nine seconds in case of **S** or **2S+deltaT** and after three seconds in case of **T** or **deltaT**) the following will happen:

4352: Fire alarm is activated.
4350: Depending on the AI function (learning condition, temperature condition, etc.) a delay time has to run out before fire alarm is activated.

14.3 Alarm threshold levels

Depending on the detector type, mode and learning condition there are alarm threshold levels (**S**, **T**, **deltaT** and **2S+deltaT**) for pre-warning, fire alarm and heavy smoke / heat alarm.

The following fire alarm threshold levels are valid for the different type of detectors:

4352:

Learning condition	S[%/m]
	Fire alarm
Normal	4

4350:

Learning condition	S[%/m]	T[deg.]	deltaT [deg./168sec]	2S+deltaT #2
	Fire alarm	Fire alarm	Fire alarm	Fire alarm
Normal	5	57	18	12
Steam/tobacco	5	57	18	12
Clean	3.7	57	18	10
Heating	5	57	no use	12
Cooking	5	57	18	14

#2 NOTE! **S** ≥ **2.5** (%/m) and **deltaT** ≥ **3** (°C/168 seconds).

14.4 Learning function / Learning conditions

Depending on the local temperature changes and the local occurrence of smoke where the detector is situated, each detector can after a **learning period**, adapt a more appropriate alarm algorithm than the normal one, i.e. a **learning condition**. See also page 91.

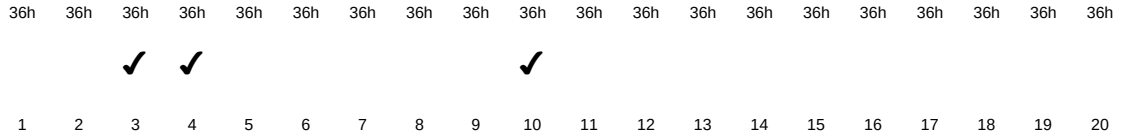
14.4.1 Learning conditions

Each detector starts in the Normal condition. There are four **learning conditions** that can be adapted:

- Steam / tobacco condition, depending on the occurrence of smoke, i.e. **level 1** = **S** [%/m] ≥ half the fire alarm threshold level (S).
- Heating condition, depending on rise of temperature, i.e. **level 2** = **deltaT** [°C/168 sec.] ≥ 12 (approx. 4.3°C/min.).
- Cooking condition, depending on the occurrence of smoke together with rise of temperature, i.e. **level 3** = **2S+deltaT** ≥ 10. **NOTE!** S has to be ≥ 2.5 and deltaT has to be ≥ 3.
- Clean condition, the most sensitive condition requiring very clean and stable environment, i.e. the values for all the other conditions (level 1, 2 and 3) must not be exceeded.

14.4.1.1 Steam / tobacco condition, level 1

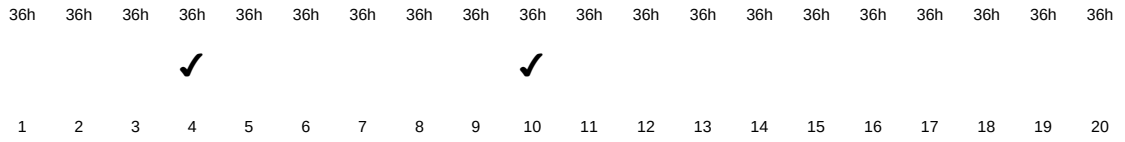
In a **learning period** there are twenty **36h-periods** (i.e. 20 x 36h = 720h = 30 days = one month).



During each **36h-period** it is recorded if **level 1** is exceeded at least one time. If so, the **36h-period** will get a check-mark (see example).

If <u>three or more of the **36h-periods** during the **learning period** have a check-mark</u>, the Steam / tobacco condition will be adapted. In the example this happens in the **36h-period** no. 10 (i.e. after 10 x 36h = 360h = 15 days).

After the **36h period** no. 20, the next **learning period** starts again in the **36h period** no. 1. The check-marks are inherited from the previous **learning period**. Depending on if **level 1** is exceeded during the **36h period** respectively or not, there will be a check-mark or no check-mark.



In the example, the Steam / tobacco condition will be ended after the **36h period** no. 3, since there are left only two **36h periods** with check-marks in the **learning period** now. (If later, one or more **36h periods** will get a check-mark, the Steam / tobacco condition will be adapted again as long as three or more of the **36h-periods** during the learning period have a check-mark.)

14.4.1.2 Heating condition, level 2

The learning function is the same as for the Steam / tobacco condition, **level 1**.

14.4.1.3 Cooking mode, level 3

The learning function is the same as for the Steam / tobacco condition, **level 1**.

14.4.1.4 Clean condition, level 1, 2 & 3

For this learning condition to be adapted there <u>must be **no** check-mark</u> for **level 1**, **level 2** and **level 3** respectively during the **learning period**, i.e. <u>no</u> check-mark what so ever.

The **Clean condition** will be ended directly if any **36h period** for **level 1**, **level 2** and **level 3** respectively gets a check-mark, i.e. <u>any</u> check-mark what so ever.

14.4.1.5 Learning condition summary

A detector can adapt the following **learning conditions**, depending on if and when **level 1**, **level 2** and **level 3** are exceeded or not:

Normal condition (default)

or

Clean condition

or

Steam / tobacco condition and/or **Heating condition** and/or **Cooking condition**

The following is valid for the different type of detectors:

4352: This detector uses not the Learning function.
4350: This detector uses the Learning function (for different alarm threshold levels and alarm delay times, depending on smoke & temp.).

14.5 Alarm delay time

Depending on the detector type, mode and learning condition the delay times before fire alarm is activated, are for the different type of detectors:

4352: Normally 9 seconds.

4350:

The cause of alarm / Learning condition	Delay time[sec]				
	S		T	deltaT	2S+deltaT
	data1[%/m]				
Normal	< 0.6	39	15	15	data2'/2 #3
	0.6 <=, < 0.8	30			
	0.8 <=, < 2.5	18			
	2.5 <=	9			
Steam/tobacco	< 0.6	39+data2/2 #3	15	15	data2'/2 #3
	0.6 <=, < 0.8	30+data2/2 #3			
	0.8 <=, < 2.5	18+data2/2 #3			
	2.5 <=	9+data2/2 #3			
Clean	< 0.3	39	15	15	data2'/2 #3
	0.3 <=, < 0.4	30			
	0.4 <=, < 1.3	18			
	1.3 <=	9			
Heating	< 0.6	39	15	no use	data2'/2 #3
	0.6 <=, < 0.8	30			
	0.8 <=, < 2.5	18			
	2.5 <=	9			
Cooking	< 0.6	39	15	15	data2' #3
	0.6 <=, < 0.8	30			
	0.8 <=, < 2.5	18			
	2.5 <=	9			

#3 **NOTE!** Max. alarm delay time is 60 seconds.

data1 = The average smoke obscuration value (S) for 60 seconds before the alarm threshold level was passed.

data2 = The sum of the difference between the smoke obscuration value (S) and the alarm threshold level every second for nine seconds after the counter shows "9".

data2' = The sum of the difference between the 2S+deltaT value and alarm threshold level every second for nine seconds after the counter shows "9".

14.6 Analog data output

The smoke obscuration value (%/m) and the temperature (°C) can be shown via EBL128. A new value is calculated every second but the displayed smoke obscuration value is an average value for the last four seconds.)

The following is valid for the different type of detectors:

4352: This detector has no analog output.
4350: This detector has no analog output.
4301: This detector has a smoke obscuration value output in the NORMAL mode.
4300: This detector has a smoke obscuration value output and a temperature value output in the NORMAL mode.

14.7 Sensitivity compensation

In order to maintain a constant sensitivity regardless of the contamination of the detector, a **C**ontamination **C**ompensation **F**actor (CCF) is calculated during a 36 hours period as follows:

During 13 minutes, all smoke obscuration values are saved and an average value is calculated. The CCF will be changed if it is lower than the actual CCF, else no change.

After 18 hours, the CCF will be changed if it is lower or higher than the actual CCF. (It will normally be higher by contamination.)

After 18 hours more (totally 36 hours) the CCF will be changed if it is lower or higher than the actual CCF and it will be saved in the detector's EEPROM, so it can be used e.g. after the detector has been without power supply. A new 36 hours period starts.

Max. compensation is 2 %/m. A service signal will then be activated and shown in EBL128.

The following is valid for the different type of detectors:

4352: This detector has no sensitivity compensation.
4350: This detector has sensitivity compensation (but no service signal output).
4301: This detector has not this sensitivity compensation in the NORMAL mode. See chapter "Service signal", page 83 and "Analog smoke detectors", page 68.
4300: This detector has not this sensitivity compensation in the NORMAL mode. See chapter "Service signal", page 83 and "Analog smoke detectors", page 68.

14.8 Self diagnosis of internal devices

The detectors perform an internal check of some vital functions and components (e.g. the IR-LED). In some modes a separate fault message will be shown in EBL128.

The following is valid for the different type of detectors:

4352: This detector has no self diagnosis of internal devices.
4350: This detector has self diagnosis of internal devices (but no separate fault output).
4301: This detector has self diagnosis of internal devices.
4300: This detector has self diagnosis of internal devices.

14.9 Address setting check

The indication LED in the detectors **4301** and **4300** (in all modes) will blink every second when the detector is powered up and if the detector address is not set with the Address setting tool 3314, i.e. as long as the address is "000". Normally the address should be set in the interval 001-127.

15 Control unit properties (settings)

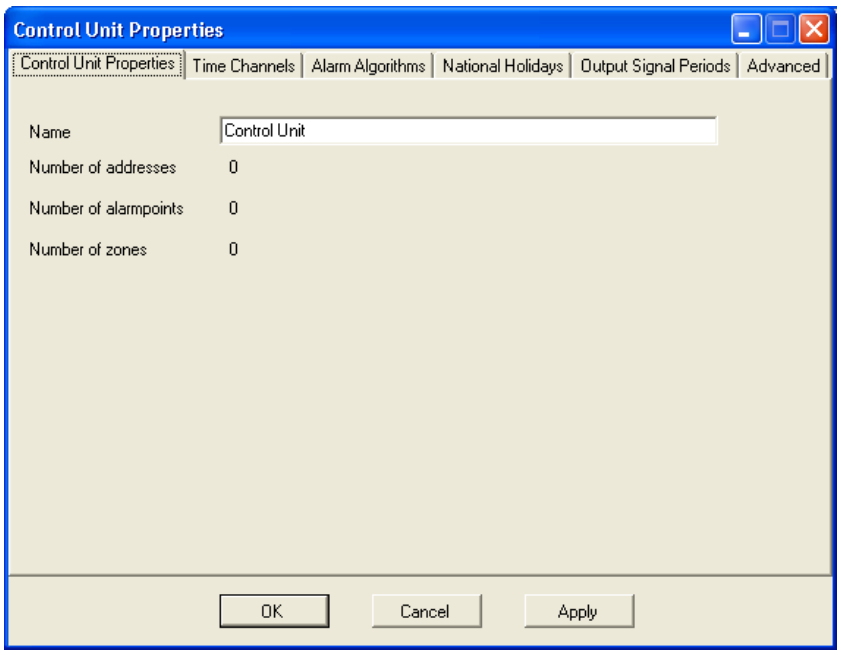


Figure 20. The Win128 tab page "Control Unit Properties" with the tab "Control Unit Properties" open.

NOTE! The default settings in the different tabs / dialog boxes might vary depending on the convention.

15.1 Control Unit Properties

Name: Normally not changed (but can be changed when necessary).

The following is **read** only information that will be automatically updated when the SSD is edited.

Number of addresses
The number of units (addresses) added to the COM loop so far is shown here.

Number of alarm points
The number of alarm points added to the COM loop and zone lines so far is shown here.

Number of zones
The number of programmed zones and conventional zones so far is shown here.

15.2 Time Channels

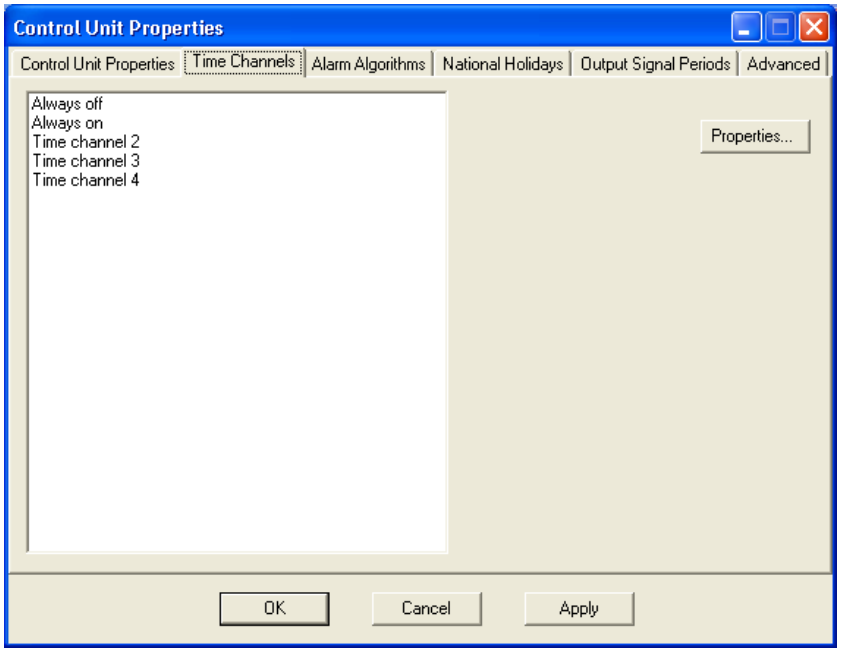


Figure 21. The Win128 tab page "Control Unit Properties" with the tab "Time Channels" open.

Regarding time channels, see chapter "Time channels 1-4", page 87.

For Time channel "**1**" can no times be programmed. Default it is "Always off" and "Always on" can be selected.

For time channel **2-4** programming, select a time channel in the list (to the left) and click "Properties.

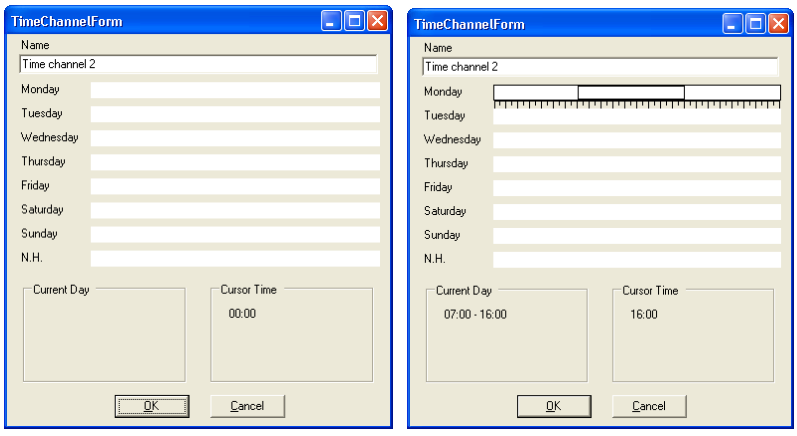
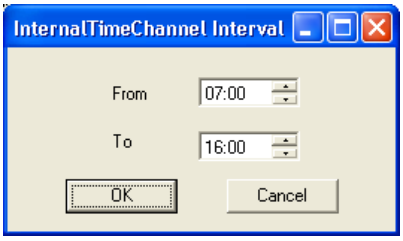


*Figure 22. **Left:** The "Time channel 2" dialog box without any programming done. **Right:** One time interval is programmed for the Monday (time channel 2 is "on" 07:00 – 16:00).*

Name: "Time channel n" is default. Normally not changed but an informative text can be added.

Monday: Place the cursor (the "arrow") in the white day field (e.g. Monday). In the "Cursor Time" area (down to the right) is the actual cursor time displayed. Move the cursor in the day field. In the "Cursor Time" area will the corresponding time be displayed. In the correct time position (e.g. 07:00) click the left mouse button and drag the cursor to the right (or left) to the next time position (e.g. 16:00) and drop the cursor. There will now be a box in the day field indicating the time interval when the time channel is "on". The time interval (e.g. 07:00 – 16:00) is also displayed in the "Current Day" area (down to the left).
For each day, two time intervals can be programmed. A time interval can be edited by dragging the whole interval (or the left / right side of it) to the left or right in the day field. Alternatively, double click the time interval box in the day field to open a dialog box:



A time interval can be copied in one day field and pasted into another day field.

Tuesday: Programmed the same way as the Monday.

Wednesday: Programmed the same way as the Monday.

Thursday: Programmed the same way as the Monday.

Friday: Programmed the same way as the Monday.

Saturday: Programmed the same way as the Monday.

Sunday: Programmed the same way as the Monday.

N.H.: Programmed the same way as the Monday. See also chapter "National Holidays", page 102.

Time channels 3 and 4 are programmed the same way as time channel 2.

Current day: The programmed time intervals (when the time channel is "on") for the selected day, are shown here.

Cursor time: The cursor position (time) in the day field respectively, is shown here.

15.3 Alarm Algorithms

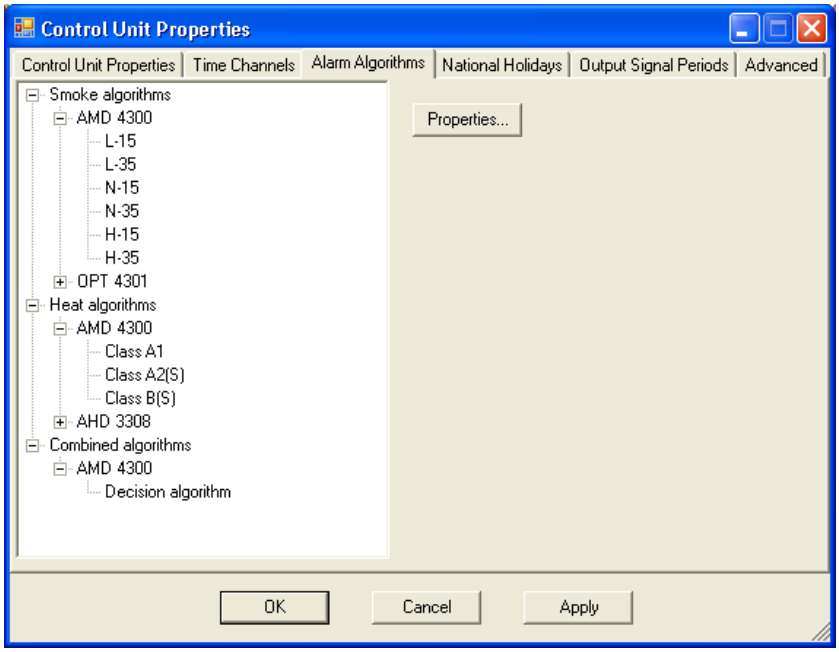


Figure 23. The Win128 tab page "Control Unit Properties" with the tab "Alarm Algorithms" open.

All the different algorithms for the different detector types are shown in the tree view to the left. Click "+" to expand and "-" collapse the tree view.
Select one algorithm and click "Properties…" and a dialog box displays depending on the selected algorithm:

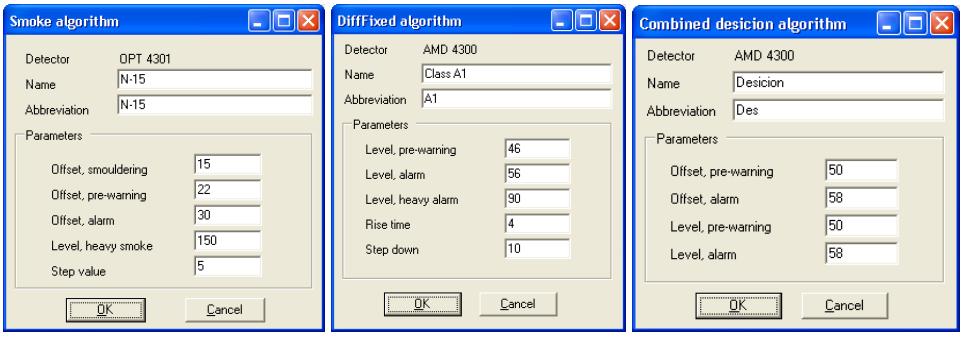


*Figure 24. Smoke algorithm **N-15**, Heat algorithm **Class A1** and Combined **Decision** algorithm **Dec** respectively.*

Detector: Shortening and Type number (e.g. **OPT 4301** = Analog photoelectric (**opt**ical) smoke detector and **AMD 4300** = **A**nalog **M**ulti **D**etector).

Name: Name of the algorithm (e.g. N-15, Class A1 & Decision). Normally not changed.

Abbrevation: The algorithm abbreviation (≤ six characters) as shown in the EBL128 display, menu H4/U3 (e.g. N-15, A1 & Des). Normally not changed.

15.3.1 Parameters for smoke algorithms

Offset is a fixed value added to the week average sensor value to get the "alarm" level respectively, e.g. 1 + offset 30 = 31 = the fire alarm level (equivalent to 3.1 *% obscuration per meter*).[104]
The step value gives the alarm delay time to the algorithm respectively, see chapter "Functions / Services / Features", page 68.

Offset, smouldering: Offset value, default 15 (1.5%/m).

Offset, pre-warning: Offset value, default 22 (2.2%/m).

Offset, alarm: Offset value, default 30 (3.0%/m).

Level, heavy smoke: Heavy smoke level, default 150 (15%/m).

Step value: Default 5.

NOTE! Changing these parameters will affect the sensitivity and detection time and should be done by authorised personnel only!!!!! In addition, a special password is required to change the parameters for fire alarm.

15.3.2 Parameters for heat algorithms

The "alarm" levels are fixed, i.e. there are no offset values. The rise time and step down gives a rate-of-rise function (used in the A1 algorithm only). See also chapter "Analog heat detectors", page 75.

Level, pre-warning: Level, default 46 (°C).

Level, alarm: Level, default 56 (°C).

Level, heavy alarm: Level, default 90 (°C).

Rise time: Default 4.

Step down: Default 10.

NOTE! Changing these parameters will affect the sensitivity and detection time and should be done by authorised personnel only!!!!! In addition, a special password is required to change the fire alarm parameters.

15.3.3 Parameters for combined decision algorithm

Offset, see "Parameters for smoke algorithms" above. Level, see "Parameters for heat algorithms" above. See also "4300", page 28.

Offset, pre-warning: Offset value, default 50 (5.0%/m).

Offset, alarm: Offset value, default 58 (5.8%/m).

Level, pre-warning: Level, default 50 (°C)

Level, alarm: Level, default 58 (°C).

---

[104] The week average value starts at "1" for a new (clean) detector. The very first average value will be calculated within two minutes (after SSD download & restart) and thereafter every week. The fire alarm level will be adjusted or not adjusted every week, depending on if the latest calculated week average value is the same as the previous, if it has increased or if it has decreased. The week average value will normally increase very slowly in a long-time period.

NOTE! Changing these parameters will affect the sensitivity and detection time and should be done by authorised personnel only!!!!! In addition, a special password is required to change the fire alarm parameters.

15.4 National Holidays

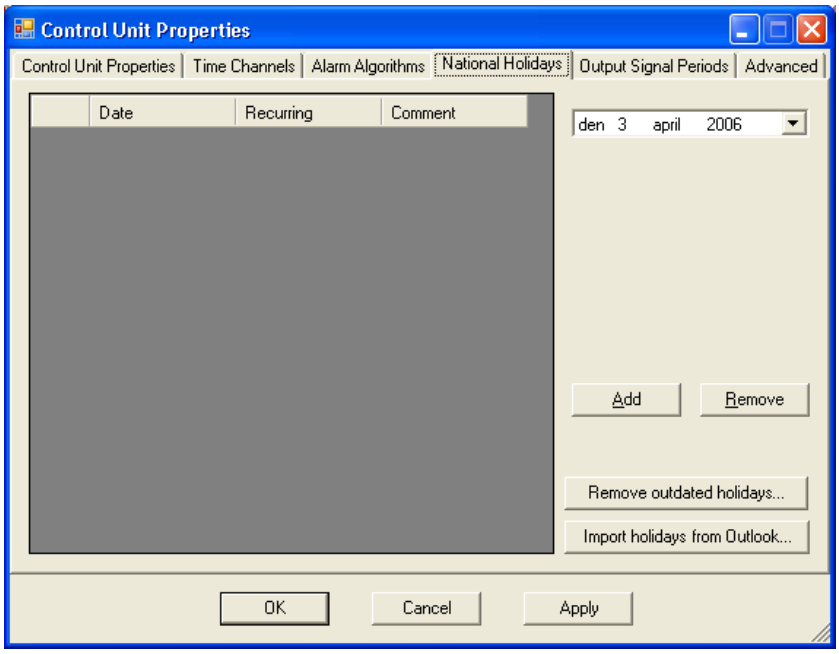


Figure 25. The Win128 tab page "Control Unit Properties" with the tab "National Holidays" open.

Up to twenty national holidays can be downloaded to EBL128.

Each national holiday can be added one by one, i.e. by selecting a date in the drop-down list (up to the right) and click "**Add**" to add a row with the date to the list (to the left).

If Microsoft® Outlook® is installed on you PC the national holidays can be automatically added in the list by clicking "**Import holidays from Outlook…**".[105]

The holidays not valid any longer can be removed from the list, i.e. click "**Remove outdated holidays…**". Click "OK" to delete all the outdated holidays in the list.

Mark the checkbox "**Recurring**" if a holiday recur the same date every year, e.g. Christmas Day, Boxing Day, etc.

A comment can be added for every date.

If a row (date) in the valid list shall be removed, select the row in the list (i.e. click in the column to the left) and click "**Remove**" to delete it from the list. (A selected row or cell is blue marked.)

[105] National holidays will be imported, starting as from the year when Microsoft® Outlook® was installed and approx. three years ahead. The number and dates of national holidays varies between different countries.

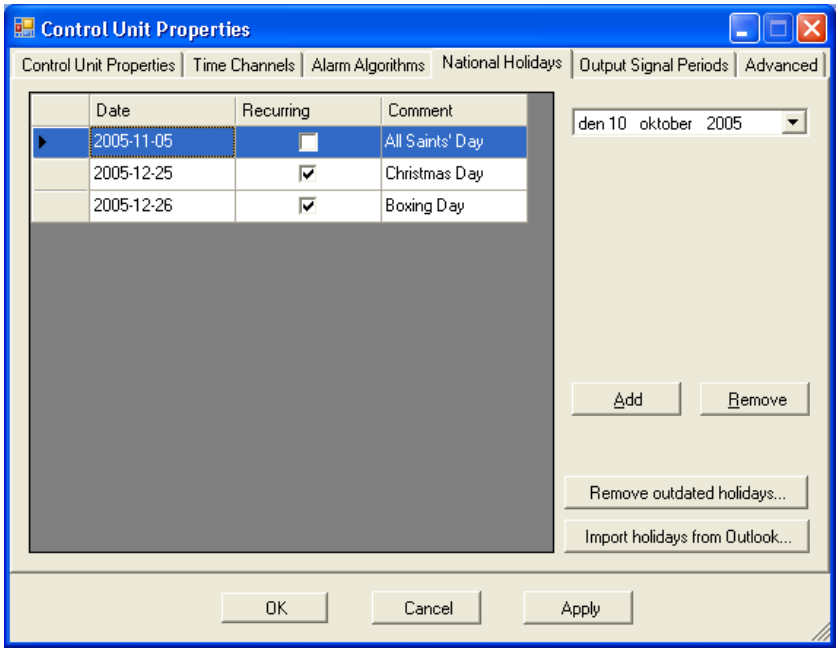


Figure 26. In this example the first row is selected (blue marked). Two "National Holidays" are marked to recur the same date every year.

National holiday function: When a time channel is programmed, all (52) weeks of a year will have the same settings. When a National Holiday (N.H.) appears, e.g. in the middle of a week, it has higher priority than any other day, i.e. the "on" / "off" times set for the N.H. will be valid instead of the normal times for this day.

The N.H. "on" / "off" times have to be programmed separately for each time channel 2-4, see chapter "Time Channels", page 98.

NOTE! The National Holidays list has to be updated when the last date in the list is passed.

15.5 Output Signal Periods

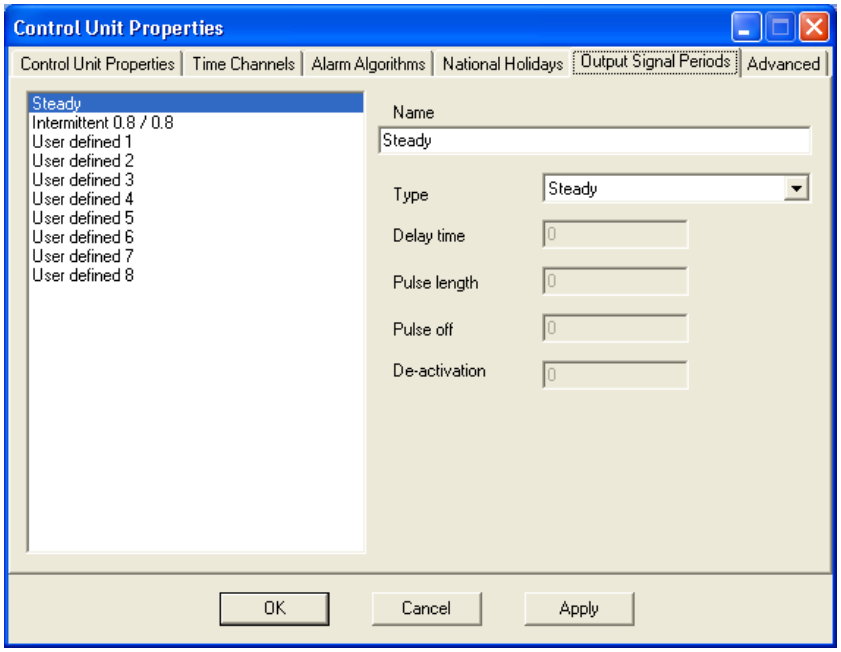


Figure 27. The Win128 tab page "Control Unit Properties" with the tab "Output Signal Periods" open.

See also chapter "Output signal period", page 54.

In the list (to the left), **Steady** (continuously) and **Intermittent 0.8 / 0.8** s are already defined since these alternatives are often used. It is however, possible to define them to something else.

User defined 1-8 have to be defined individually:

Name: Normally changed to something that describes the output signal (e.g. "Steady") or what it is meant for (e.g. "Alarm devices").

Type: Steady / continuous (default)
Intermittent[106]
Pulse
Steady, delayed activation
Intermittent, delayed activation[106]
Pulse, delayed activation
Steady, delayed de-activation.

Depending on the selected type, one or more of the following fields might have to be filled-in.

Delay time: Can be set to 0-255 sec.

Pulse length: Can be set to 0-255 sec.[106]

Pulse off: Can be set to 0-255 sec.[106]

De-activation: Can be set to 0-255 sec.

[106] NOTE! The **Pulse length** and the **Pulse off** times both have to be the same, e.g. 0.8 and 0.8 sec.

15.6 Advanced

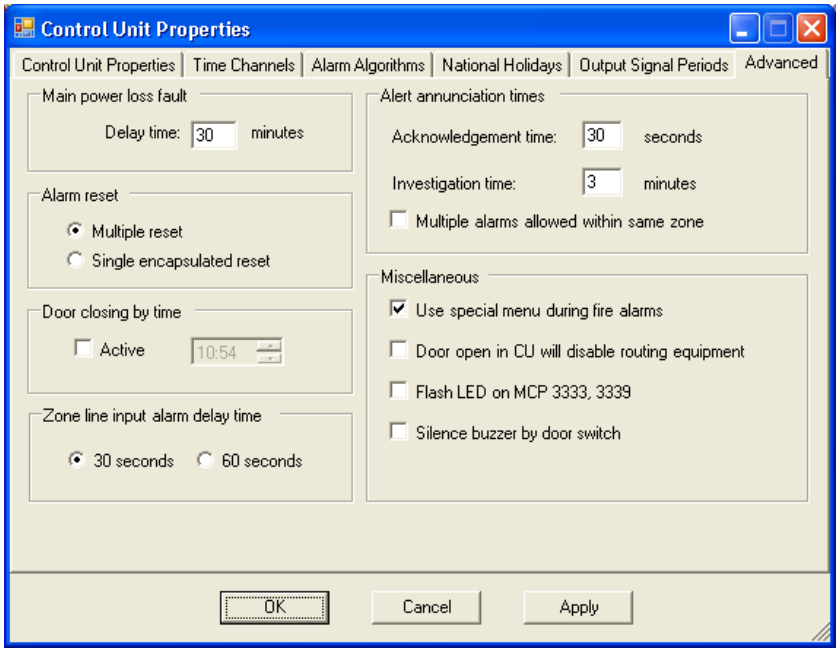


Figure 28. The Win128 tab page "Control Unit Properties" with the tab "Advanced" open.

15.6.1 Main power loss fault

Delay time: A fault will be activated 0 – 300 minutes after loss of mains (230 V AC). Default is 30 minutes.
NOTE! More than 30 min. is a violation to the EN54-2 standard.

15.6.2 Alarm reset

One of the following alternatives shall be selected.

- ⊙ **Multiple reset** (default): Fire alarms will be reset all at the same time by pressing the "Reset" button.
- ○ **Single encapsulated reset**: Fire alarms will be reset one by one by pressing the "Reset" button. The fire alarm shown on the first row to the left in the EBL128 display will be reset. This function is a violation to the EN54-2 standard.
  Encapsulation function: If an alarm point is reset while still in alarm state (e.g. an activated manual call point), this unit will be automatically disabled[107] and will be so until re-enabled via menu H2/B5. Before re-enabled, no fire alarm can be activated by this alarm point. This function is a violation to the EN54-2 standard.

15.6.3 Door closing by time

Can be selected / set when the "Fire door closing" function (ABDL) is used, see chapter "Fire Door Closing function", page 67.

[107] Indicated by LED "Disablements".

☐ **Active**: This checkbox shall be marked if the fire doors shall be closed at a definite time (HH:MM) every day.
Hour: 00 – 23 **Minute**: 00 - 59

15.6.4 Zone line alarm delay time

One of the following alternatives can be selected. It is then valid only for the zone line inputs with the option "Delayed alarm" selected in its Win128 dialog box.

NOTE! This delay starts when the alarm normally should have been activated.

⊙ **30 seconds** (default)

○ **60 seconds**

15.6.5 Alert annunciation times

See also chapter "Alert annunciation", page 79.

Acknowledgement time: **30 sec.**
30 is default. 5, 10, 15, - -60 seconds (= 1 min.) is possible to set.

Investigation time: 3 **min.**
3 is default. 1-9 minutes is possible to set.

NOTE! According to EN54-2, the total delay of fire alarm routing equipment must not exceed 10 minutes, i.e. Acknowledge time + Investigation time ≤ 10 minutes.

☐ **Multiple alarms allowed within same zone**
Checkbox unmarked (default): Alert annunciation alarm activated by only one alarm point within the same zone is allowed.[108]
Checkbox marked: Alert annunciation alarm activated by two or more alarm points within the same zone is allowed.

15.6.6 Miscellaneous

☒ **Use special menu during fire alarms**: This special menu (X1-X9) can be used during fire alarm to see all the fire alarms but first of all it can be used to display faults and disablements in the system. Alarm points, zones, control outputs and alarm devices can also be disabled / re-enabled via this menu. . If this menu is not selected, it is a violation to the EN54-2 standard. See also EBL128 Operating instructions, chapter "Fire alarm menu X1-X9".

☐ **Door open in CU will disable routing equipment**: If the "Fire brigade tx" and "Fault tx" outputs in EBL128 shall be disabled when the door is opened, this checkbox shall be marked. Disabled routing equipment is a violation to the EN54-2 standard.
Door open in EBL128 or in an ext. FBP is indicated by LED "Door open" in the C.U.

[108] Alarm from two or more alarm points within the same zone will activate normal fire alarm, i.e. the "Fire brigade tx" output will be activated.

Disabled outputs for routing equipment are indicated by the LED "Disablements" (L8) and "**Fault / Disablements** Fire brigade tx" (L15) and listed in menu H4/U1.
In the display is shown:

```
Fire alarm routing disabled
(by open door in CU)
```

- **Flash LED on MCP 3333, 3339**: If the manual call point's built-in LED shall flash each time EBL128 communicates with the call point, this checkbox shall be marked. If this checkbox is unmarked, the LED will not be turned on until the call point is operated.
- **Silence buzzer by door switch**: If the buzzer in the c.i.e. shall be silenced when the door is opened this checkbox shall be marked, but this is a violation to the EN54-2 standard.

16 Cable types

A fire alarm installation is a safety installation and it is important that the cables used are correct types and according to national regulations. Fire alarm cables should, when possible be installed away from other cables, in order to avoid disturbances caused by these.

16.1 COM loop cables

Loop topology is used for highest safety, i.e. the cable connected in EBL128, returns back to EBL128. See drawing 128-21. In case of a single break on the loop the communication starts in both directions and a fault is generated (and a message is displayed).
The cable length is depending on the number of and type of loop units, the type of cable, etc. See chapter "COM loop cable length", page 109 and drawing 128-11.
ELQYB 2 x 1 mm (0.75 mm^2) or equivalent (twisted pair).

ELQYB 10 x 2 x 1 mm or equivalent when feeder line is required.

NOTE! If screened cable is used, the screen shall be connected as close as possible to each loop unit and only incoming (or outgoing) cable screen to the EBL128 earth point, see drawing 128-01.

16.2 Ext. FBP / EPU / AAU cables

RS-485. See drawing 128-23. Cable length $\leq$ 1200 m to the furthest situated ext. FBP / EPU / AAU.

2 x ELQYB 2 x 1 mm (0.75 mm^2) or equivalent (twisted pairs).

16.3 Conventional zone line cables

See drawings 128-26 & -30.
Multipurpose I/O unit 3361 and expansion board 4580 respectively.

ELQRB 2 x 0.6 mm (0.3 mm^2) or equivalent. Max. 50 ohm cable resistance. For the 4580 zone line inputs with end-of-line capacitor 470 nF, max. 50 nF cable capacitance.

16.4 Alarm device cables

See drawings 128-22 and -28.
ELQRB 2 x 0.6 mm (0.3 mm^2) or equivalent.

ELQRB 10 x 2 x 1 mm (0.75 mm^2) or equivalent when feeder line is required.

NOTE! Addressable Alarm devices (sounders, etc.) are connected directly on the COM loop.

16.5 Other equipment cables

Ex equipment (**I**ntrinsically **S**afe) for hazardous areas, see drawing 128-32.
External indicator (LED), door release magnets, etc.:
ELQRB 2 x 0.6 mm (0.3 mm^2) or equivalent.

17 COM loop cable length

On the COM loop can theoretically 127 COM loop units be connected (i.e. address 1-127). The cable length is depending on the cable type (data) and the total COM loop unit current consumption (i.e. the type and number of loop units).
Figure 29 and Figure 30, page 110 and 111 respectively, shows the relation between the current consumption and conductor resistance / cable length respectively.
One of the graphs has to be used depending on which type of units that are connected to the COM loop. Graph 1 is not used for EBL128.
Start checking the terms below for Graph 2 and then Graph 3.

~~**1. Graph with square dots**~~. Normally not to be used for EBL128. Used only if "old" conventional smoke detectors requiring ≥ 15 V are used, i.e. detectors of type 231x/2321 connected to 3361.

2. Graph with circular dots. Used when no "old" conventional smoke detectors of type 231x/2321 (requiring ≥ 15 V) are used.
Has to be used when at least one 3361 unit with the monitored input used as a zone line input (Z) is used with conventional detectors (e.g. 2324 + 4350 / 4352) and an end-of-line capacitor.

3. Graph with no dots (red line). Used when only "new" units (requiring ≥ 12 V) are used.
Can be used when only the following units are used:

4370
3312 + (3308, 4300 or 4301)
3309
3333 / 3339
3361 when the monitored input is not used as a zone line input (Z)
3364
3366
3377 / 3378 + (3308, 4300 or 4301)

Here follow two figures, showing graphs for maximum conductor (wire) resistance and maximum cable length respectively.

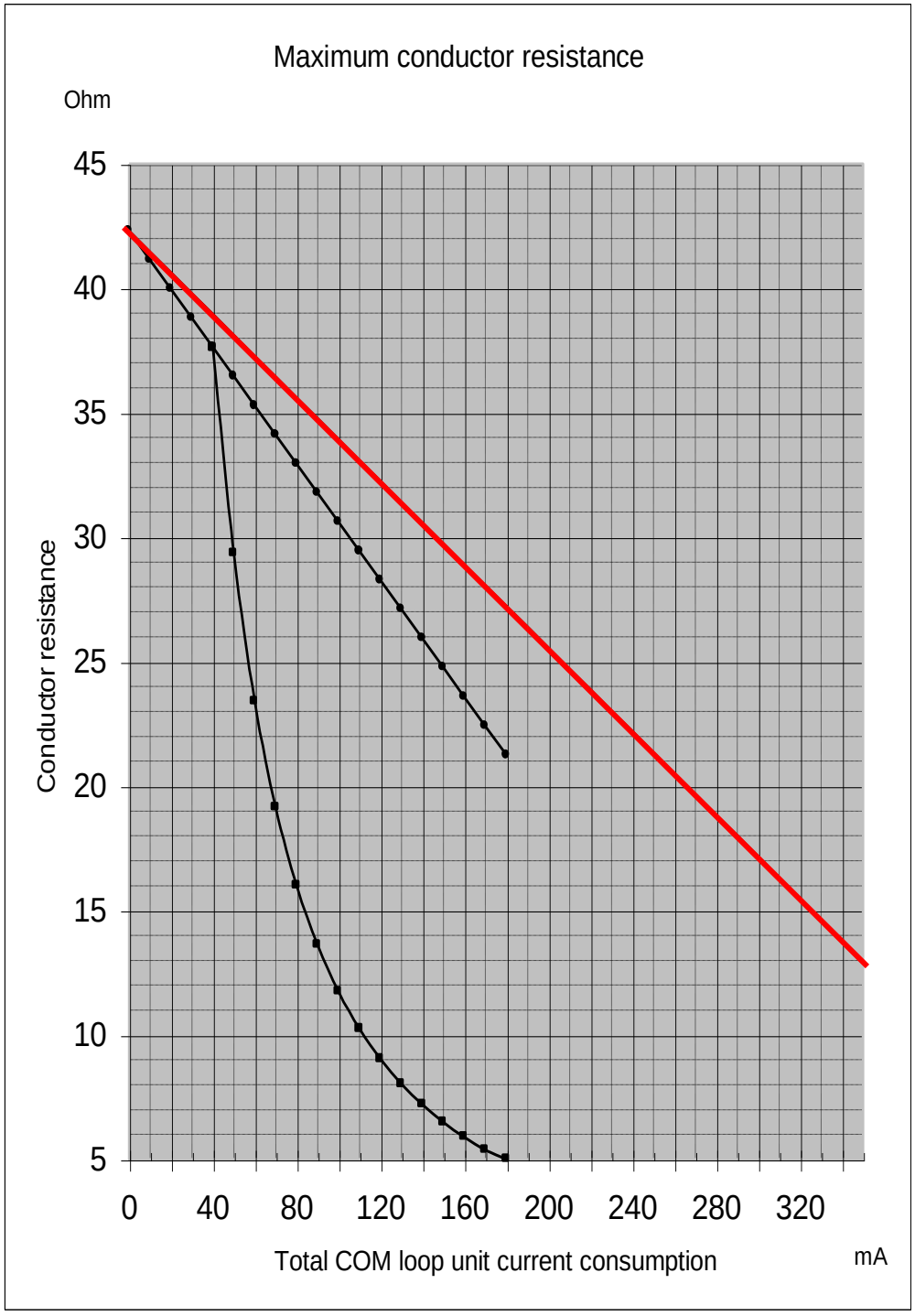


Figure 29. Graphs showing the total conductor resistance in relation to the COM loop units' total current consumption. ***NOTE!*** *The graphs start at "0 mA" and 42.3 ohm respectively but graph 1 and 2 ends at "180 mA" and graph 3 ends at "350 mA". End of graph = max. allowed loop current. (42.3 ohm = 863 m cable length.)*

NOTE! The graphs are valid for the recommended cable type ELQYB 2 x 1 mm (0.75mm^2) with the conductor resistance 24.5 ohm / km. The total conductor resistance (ohm) = conductor "L" (ohm) + conductor "C" (ohm).

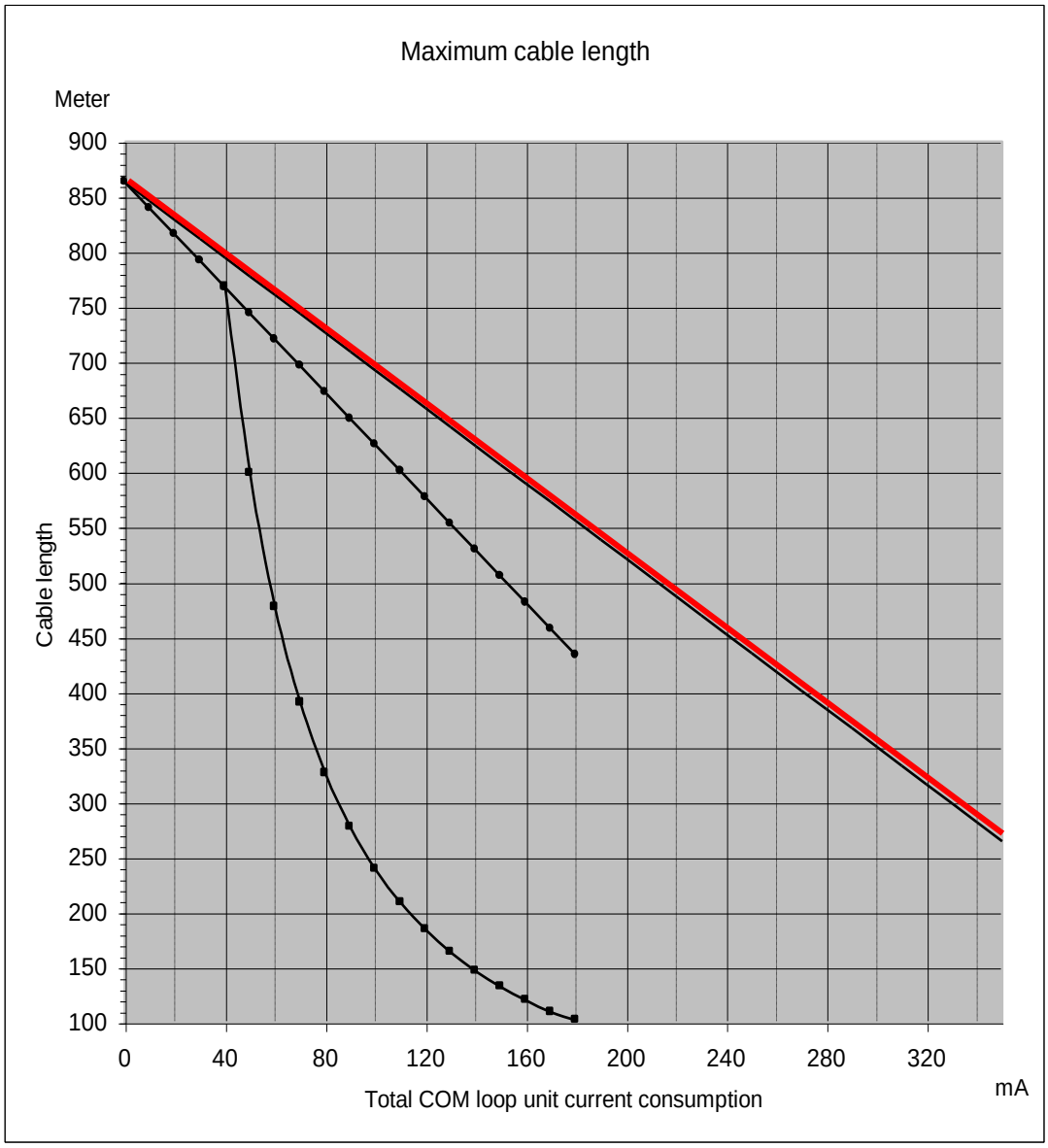


Figure 30. Graphs showing the cable length in relation to the COM loop units' total current consumption. ***NOTE!*** *The graphs start at "0 mA" and 863 m cable length respectively but graph 1 and 2 ends at "180 mA" and graph 3 ends at "350 mA". End of graph = max. allowed loop current. (42.3 ohm = 863 m cable length.)*

NOTE! The graphs are valid for the recommended cable type ELQYB 2 x 1 mm (0.75mm^2) with the conductor resistance 24.5 ohm / km. The total conductor resistance (ohm) = conductor "L" (ohm) + conductor "C" (ohm).

18 Current consumption

The different loop units have different current consumption. Note that some units have much higher current consumption in "active state" than in normal state. The tables below can be used:

- To get a total current consumption overview.
- To check the current consumption on the COM loop in relation to the cable lengths, etc. See also drawing 128-11 and chapter "COM loop cable length", page 109.
- To check if the battery capacity is enough.

The current consumption is normally shown at nominal voltage (24 V DC) in **Normal state** (quiescent) and in **Alarm state** (active). By battery back-up (i.e. no mains) the rated voltage is 21[109] – 30 V DC.

See also chapter "Power supply", page 114.

C.i.e.	**Normal state** (quiescent) (mA)	**Alarm state** (active) (mA)
Control unit 4550 (backlight off/on) [110]	51/109	67/125
8 zones expansion board 4580 [111]	22.2 + (see footnote)	22.2 + (see footnote)
8 relays expansion board 4581	15	15
RS485 transceiver (comm. module for display units) 4552	14	14
Web-server 1588	60	65

COM loop units (input units)	**Normal state** (mA)	**Alarm state** (activated) (mA)
Analog heat detector 3308 + analog base 3312/4313 [112]	0.3	0.3 + 2 (int. LED)
Analog heat detector, enclosed 3309 [112]	0.2	0.2 + 1.5 (int. LED)
Analog multi detector 4300 + analog base 3312/4313 [112]	0.3	0.3 + 2 (int. LED)
Analog smoke detector 4301 + analog base 3312/4313 [112]	0.3	0.3 + 2 (int. LED)
Addressable manual call point 3333 / 3339	2	2 + 3 (int. LED)

NOTE! Regarding the COM loop units: Max. 5 internal LEDs will be turned on even if more alarm points are activated. (I.e. also max. 5 external LEDs will be turned on.)

[109] There will, however, be voltage in the system down to a battery voltage of approx. 15 V when it will be switched off in order not to damage the battery.

[110] Control unit electronics only, i.e. the COM loop units' current consumption and other connected external equipment's current consumption are not included.

[111] Add 3.5 mA (quiescent) and 12 mA (activated) respectively, for each zone line input used.

[112] Extern LED current consumption. **2217**: 1 mA.

COM loop units (output units / other units)	**Normal state** (quiescent) (mA)	**Alarm state** (activated) (mA)
Addressable siren 3377	1	max. 13
Addressable sounder base 3378 (low/high)	2	max. 6 / 12
Addressable multipurpose I/O unit 3361	2.2	max. 12
Addressable 2 voltage outputs unit 3364 [113, 114]	≤ 6	≤ 6
Analog base with isolator 4113 [115]	≤ 1.3	≤ 1.3
Addressable short circuit isolator 4370	2.2	2.2
(Addressable) External power supply 3366	≤ 15	≤ 15

Other units	**Normal state** (quiescent) (mA)	**Alarm state** (activated) (mA)
Routing equipment (Fire brigade tx / Fault tx)	Acc. to the producer	Acc. to the producer
Alert Annunciation Unit (AAU) 1735 / 1736 [116]	**26**@24 V / 48@12 V	**42**@24 V / 79@12 V
External Fire Brigade Panel (FBP) 1826 / 1828 [116]	**26**@24 V / 48@12 V	**49**@24 V / 88@12 V
Printer 1835 (for ext. FBP 1826)	**4**@24 V / 7@12 V	**161**@24 V / 345@12 V
External Presentation Unit (EPU) 1728 [116]	**26**@24 V / 48@12 V	**42**@24 V / 88@12 V
Alarm devices (sounders, etc.)	0	Acc. to the producer
Door release magnets	Acc. to the producer	0
Alert annunciation controller (AAC) 1740	10	40

[113] External 24 V DC power supply also required (via a 3366 unit or EBL128).

[114] This unit might be under construction.

[115] Detector not included.

[116] Totally up to **four** 1735, 1736, 1826 and/or 1828 units might be used. Max. one 1826 with printer.

19 Power supply

Main power source
Normally the EBL128 control unit is powered by a built-in Switching Power Supply (rectifier), 230 V AC / 24 V DC ±1%, 1.8 A).

Second power source
By loss of 230 V AC, etc. EBL128 is powered by built-in back-up batteries, i.e. two Sealed Lead-Acid batteries, 12 V, 16-18 Ah.[117]

The batteries and the rectifier are connected to the Main board (4556), which also handles the charging of the batteries.

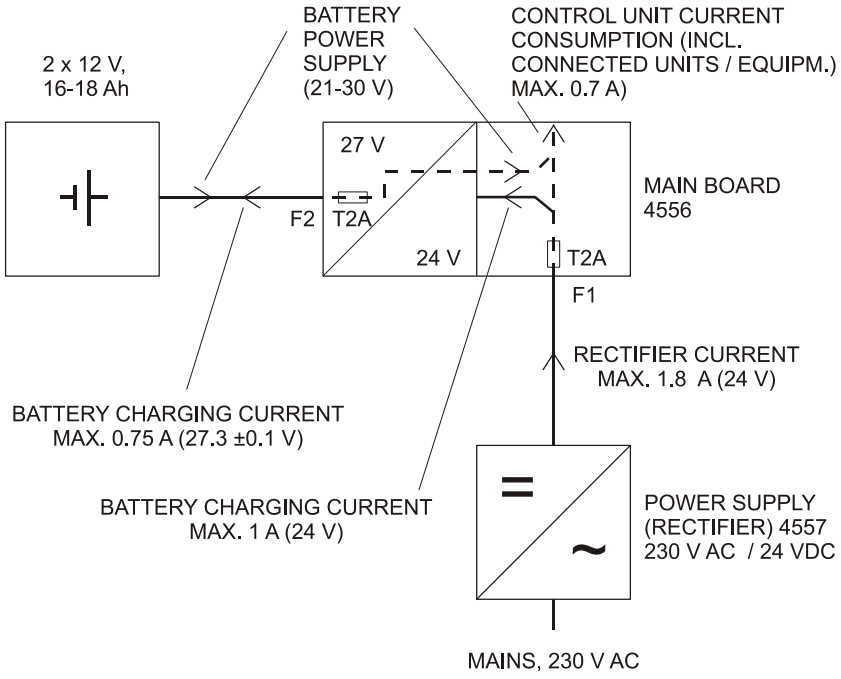


Figure 31. EBL128 power supply block diagram. Fuse F2: Ceramic. (One ceramic 2 A fuse is connected, in series, between the two batteries.)

EBL128 is a very flexible system. The number of and types of loop units, the number of and types of ext. FBPs, ext. equipment, etc. can vary from one control unit to another.

19.1 Charger functions

According to EN 54-4, section 5.3.1 b) *The charger shall be designed and rated so that a battery discharged to its final voltage can be recharged to at least 80% of its rated capacity within 24 hours and to its rated capacity within another 48 hours.*

[117] 16 or 18 Ah is depending on manufacturer. Specified "Final voltage" must be 10.5 V. **NOTE!** There is no battery incl. in the control unit article no. 4550xx., i.e. it has to be ordered separately.

If this section is to be fulfilled, max. 18Ah batteries can be used since 0.7A x 24h ÷ 0.80 = 21Ah[118]. For $\mathbf{I^{TN}}$ in relation to the **back-up time**, see the table in chapter "Second power source (Battery)", page 117.

19.1.1 Battery charging functions:

Battery charging is performed in two steps:

1. **Constant charging current.** The charging current is constant (fixed)[119] until the battery / charging voltage is 29 V.
2. **Constant charging voltage.** The charging voltage is reduced to something between 27 and 27.6 V (depending on the battery type, shape, temp. etc.) and will be constant (fixed) at this level until the batteries are fully charged.

The stand-by "charging current" is 0-0.5 A.

The charging voltage will stay constant (fixed) at the "step 2" level until the batteries have been discharged and have to be charged again. A new cycle will start with "step 1". The "step 1" and "step 2" times are depending on the battery shape when the charging started.

19.1.2 Security functions:

- The battery charging will be turned off if the current from the Rectifier 4557 to the Main board 4556 exceeds 1.8 A, i.e. the EBL128 current consumption exceeds 0.8 A. The battery charging will remain turned off as long as the EBL128 current consumption exceeds 0.75 A. The following fault message will be shown:

```
FAULT: High current consumption in CU
Date: MM-DD   Time: HH:MM
```

- In order not to damage the battery, it will be switched off at a battery voltage of approx. 15 V. This only happens in case of no main power source (230 V AC), i.e. when the backup batteries are used as the only power source.

- If the battery voltage is below 10 V (5 V per battery), the battery charging will be turned off. (The batteries are most certainly damaged and have to be changed.) The following fault message will be shown:

```
FAULT: Battery
Date: MM-DD   Time: HH:MM
```

[118] 21 Ah batteries with the required physical size are normally not found on the market.

[119] The charging current is **0.7** A (typical). (Very close to the end of the charging cycle it will lower.)

19.2 Current consumption calculations

In order not to overload the rectifier and to check / calculate the required back-up battery capacity, the total EBL128 current consumption (excl. battery charging current) has to be calculated.

NOTE! There is no battery charging when fire alarm is activated in EBL128.

Use the values in chapter "Current consumption", page 112, to calculate the following current consumptions:

- $\mathbf{I^{CN}}$ = the current consumption for EBL128[120] in normal state.
- $\mathbf{I^{RN}}$ = the current consumption for all other equipment[121] in normal state.
- $\mathbf{I^{CA}}$ = the current consumption for EBL128[120] in alarm state.
- $\mathbf{I^{RA}}$ = the current consumption for all other equipment[122] in alarm state.

The total EBL128 current consumption in **Normal** (quiescent) **state**: $\mathbf{I^{TN} = I^{CN} + I^{RN}}$

The total EBL128 current consumption in **Alarm** (activated) **state**: $\mathbf{I^{TA} = I^{CA} + I^{RA}}$

Comments regarding ($\mathbf{I^{TN}}$):

$\mathbf{I^{TN}}$ has to be $\leq$ **0.7 A**.

$\mathbf{I^{TN}}$ shall be $\leq$ **0.5 A** if the built-in batteries are 16 Ah, because this results (theoretically) in a battery back-up time of 30 hours.

$\mathbf{I^{TN}}$ shall be $\leq$ **0.6 A** if the built-in batteries are 18 Ah, because this results (theoretically) in a battery back-up time of 30 hours.

Comments regarding ($\mathbf{I^{TA}}$):

$\mathbf{I^{TA}}$ has to be $\leq$ **1.8 A**. See Figure 31, page 114.
For the total EBL128 current consumption in relation to **back-up time**, see the table in chapter "Second power source (Battery)", page 117.

19.3 Main power source (Power Supply)

The main power source is a Switching Power Supply (rectifier). The technical data are 230 V AC / 24 V DC, 1.8 A, i.e. **the total current consumption incl. max. battery charging current must not at any**

[120] Including the COM loop units but excl. the battery charging current.

[121] External equipment connected to the control unit (e.g. ext. FBPs, door release magnets, relays, routing equipment, etc.).

[122] External equipment connected to the control unit (e.g. ext. FBPs, sounders, relays, routing equipment, etc.).

time exceed 1.8 A. Allowed input voltage is 176-264 V AC. The output voltage is 24 V with a tolerance of ±1%. [123]

19.4 Second power source (Battery)

The second power source are two 12 V batteries. Only batteries with a specified "Final voltage" of 10.5 V must be used.

Find out the required battery back-up time[124], both in normal state and in alarm state.

Calculate the battery capacity required in normal state ($\mathbf{Q^N}$) and the battery capacity required in alarm state ($\mathbf{Q^N}$) respectively.

- $\mathbf{Q^N}$ (Ah) = $\mathbf{I^{TN}}$ (A) x battery backup time in normal state (h)
- $\mathbf{Q^A}$ (Ah) = $\mathbf{I^{TA}}$ (A) x battery backup time in alarm state (h)

The total battery capacity $\mathbf{Q} = \mathbf{Q^N} + \mathbf{Q^A}$ (Ah)

Normally you shall round up the calculated capacity and add 10% to be on the safe side, because the battery voltage at the end of a discharging period is not the same as at the start.

The following table is showing the relation between the total current consumption in normal state $\mathbf{I^{TN}}$ and the back-up time for a **16 / 18 Ah** battery.

$\mathbf{I^{TN}}$ (A)	**Back-up time** (hours)
0.7	22 ¾ / 25 ¾
0.6	26 ½ / 30
0.5	32 / 36
0.4	40 / 45
0.2	80 / 90

NOTE! The values are calculated and give only **a rough idea of the back-up time**.

19.5 Form / Table of current consumption

Some national regulations require different forms / tables regarding current consumption, to be filled in. In such cases, an ampere meter shall be used instead of calculating the current consumption.

A tip: Disconnect the mains and use a "clamp current meter" to read the current consumption from the battery, i.e. the total control unit consumption.

[123] The output voltage is factory set to 24 V. On the rectifier is a potentiometer for output voltage adjustment (±10%) available. **Do not use this potentiometer** unless the output voltage is not 24 V.

[124] According to national regulations, customer demands, etc.

20 S/W versions

Due to continual development and improvement, different S/W versions can be found.

Different S/W versions can be found on different markets.

The S/W versions listed below were valid when this document was written (the date of this document or date of revision).

S/W for:	**Latest version**[125]	**Required version**[126]
4550; EBL128	1.0.4	1.0.4
4580; 8 zones expansion board P.c.b. no. 9287-**2B**	1.0.5	1.0.2
4580; 8 zones expansion board P.c.b. no. 9287-**3A**	2.0.4	2.0.0
4580A; 8 zones expansion board P.c.b. no. 9216-**1A**	1.0.4	1.0.2
4581; 8 relays expansion board	1.0.2	1.0.0
1728; Ext. Presentation Unit (EPU)	1.2	1.1
1735 / 1736; Alert Annunciation unit (AAU)	1.2	1.1
1826 / 1828; Ext. Fire Brigade Panel (FBP)	1.2	1.1
Win128	1.0.4[125]	1.0.4
1588; Web-server	1.0.3	1.0.3
1598; Web-server	1.1.0	1.1.0

New S/W can be downloaded "on site" except for the 4580 and 4581 boards.

[125] The latest version can vary depending on the market / country.

[126] Sometimes the latest version is not **required**. It is possible to use an earlier version but check the difference between the versions before use.

21 Technical data

Voltage

Primary (V AC): **230** (176-264)
System (V DC): 24[127]

Current consumption

Quiescent / active: See chapter "Current consumption", page 112

Ambient temperature (°C)

Operating: -5 to +40
Storage: -40 to +75

Ambient humidity (%RH)

max. 95, non condensing

Ingress protection rating

IP 32 (estimated)

Size H x W x D (mm)

511 x 416 x 123. See also drawing 128-01

Weight (kg)

12.2 (excl. batteries)

Colour

Metal cabinet: Aluminium & light grey (NCS S 1500-N / PMS Cool Gray 2)

Approvals

EBL128 is fully compliant with the European standard **EN54 parts 2 and 4** and the front is fully **SS3654** compliant.

[127] The rated output voltage is 24 V DC ± 1% for the main power source (rectifier). Max. ripple 300 mVp-p. The rated output voltage is 21-30 V DC for the second power source (back-up battery). **NOTE!** There will, however, be voltage in the system down to a battery voltage of approx. 15 V when it will be switched off in order not to damage the battery.

22 Limitations

22.1 C.i.e.

Max. number of "items":

Item	Max. no.
Fire alarms (presented in the EBL128 display as ZONE and/or ZONE-ADDRESS) [128]	128
Faults	200
Trigger conditions (in all the control expressions)	Approx. 1000
Interlocking Combinations	32
3361 units + 3364 units	16
3377 units + 3378 units	50
Total number of detectors and/or manual call points	512[129]

[128] Max. 128 ZONEs and/or ZONE-ADDRESSes can be programmed but only the zone numbers 01-32 can be used.

[129] If more than 12 conventional zone line inputs are used, care must be taken in order not to exceed 512 detectors and/or manual call points connected to the c.i.e.

23 National regulations / requirements

When planning a fire alarm installation, national regulations, customer demands, etc. have to be followed.

EBL128 is very flexible with the many built-in functions & facilities in the S/W and the PC program Win128. When downloading the S/W and/or the SSD, different settings, conventions, languages, etc. can be selected to fulfil the national regulations / requirements.[130]

23.1 Conventions

In accordance with the section above, a convention is selected the very first time Win128 is opened after the installation. Normally the same convention shall be used in all installations thereafter. It is, however, possible to change the convention in the Win128 dialog box "Win128 settings". The conventions that can be selected are listed in the valid Win128 version (menu Tools | Win128 Settings).

23.2 Language

The language for the text shown in the EBL128 display (alarms, faults, menus, etc.) is depending on which text file has been downloaded (normally in conjunction with the S/W download).

The text file for the selected language / convention shall be downloaded.

[130] Some of the SSD settings might then be a violation to the EN54-2 standard and if so a "Warning" will be displayed.

24 Drawings / connection diagrams

All dimensions quoted are approximate only and subject to change without notice, as are other technical features and data, resulting from continual development and improvement.

25 Revision history

Revisions are when possible written in red font colour.

Revision 1

Added information in paragraph 8.1.
Added information in paragraph 10.1 (footnotes).
Added information in paragraph 10.5.1 ("36").
Added information in paragraph 13.8 (footnote).
Added information in paragraph 17 ("1").
Revised information in paragraph 20.
Former paragraph 22.1 is deleted.
Added information in the "new" paragraph 22.1 (former 22.2).

Revision 2

Figure 1 updated in paragraph 4
Information added in paragraph 4.2
Information added in paragraph 4.6
Information revised in paragraph 5.2.1.1
Information added in paragraph 6.1.1.1 (4313)
Information added in paragraph 6.1.1.5 (4318)
Footnote added in paragraph 6.1.2 (3364)
Information added in paragraph 6.1.4 (4313)
Information & footnote added in paragraph 6.2.1 (1826)
Information added in paragraph 6.2.3 (1728)
Information deleted in paragraph 6.3.1 (1588; dark green)
Information added in paragraph 9.1
Footnote added in paragraph 9.5
Figure updated in paragraph 12
Information added in paragraph 16.3
Information added in paragraph 18 (1588)
Information revised in paragraph 20

Revision 3

Information updated in paragraphs 4.1, 4.1.1, 4.1.2 & 4.1.3
Information updated in paragraph 5
Information updated in paragraph 6.1.1.1, 4313
Information revised in paragraph 6.1.1.5, 4318
Information revised in paragraph 6.1.2, 3361
Information revised in paragraph 6.1.2, 3364
Information added in paragraph 6.1.4
Information revised in paragraph 6.1.4, 4370
Information revised in paragraph 6.5.2, 2218
Information updated and footnote added in paragraph 7
Information added in paragraph 8
Information revised in paragraph 8.1

Information added in paragraph 9
Information revised in paragraph 11.1.3
Information added in paragraph 11.1.6
Information added in paragraph 13.1.6
Information added in paragraph 13.1.7
Information and footnote added in paragraph 18
Information revised in paragraph 20

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