Panasonic

Planning Instructions

MEW01740

Revision -

Fire Alarm System EBL128 V2.1.x

Author:	Jan Pettersson	Date of issue:	2014-04-29	Date of rev:	

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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 MEW01741, 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.

Product Leaflets are also available at:
http://pesn.panasonic.se (Data sheets)

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 the EBL128 **S/W version 2.1.x**. On the date of this document is x=0.

EBL128 **S/W version 2.1.x** support and some functions require the EBL128 main board 4556 with p.c.b. no. 9285-**6**A. This S/W version also support main board with p.c.b. no. <9285-6A (e.g. 9285-**5**A).

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

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 same as the type no. but sometimes a country code is 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. **4556**)
- an **article number**, often the same as the type no. but sometimes a country code is added (e.g. **4556SE**)
- a **product name** (e.g. **Main Board 255 addr.**)

[1] File name: L:\User documents\128\Doc\V2.1.x\MEW01740 (Rev -).doc

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

- a **p.c.b. number** (e.g. **9285-6A**) and can also have a configuration (e.g. **CFG: 1**) and a revision (e.g. **REV: 2**)
- sometimes is a **S/W** (software) downloaded.

S/W

A S/W has:

- a **version number** (e.g. **V2.1.0**)
- sometimes is additional information, such as **Convention** (different functions / facilities), **Language**, etc. added.

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 PESN AB

Panasonic **E**co **S**olutions **N**ordic **AB**

2.2 Alarm point

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

2.2.1 Smoke detector

One type of analog and conventional smoke detectors is available: the photo electric (optical) smoke detector.

2.2.2 Sensor

Sensor = Analog detector

2.2.3 Analog detector

Contains an A/D-converter. The **C**ontrol **U**nit pick up the digital values ("sensor values") for each detector individually. All evaluations and "decisions" are then made by alarm algorithms in the C.U. As from version 2.0.x the latest detector generation (440x) can be used in "Advanced mode", i.e. the alarm algorithms are in the detector instead. Analog detectors are addressable – an address setting tool 4414 is used for the detector's COM loop address and mode settings.

An analog detector has to be plugged in an Analog Sensor Base (**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 statuses, normal or fire alarm. The detector contains a closing contact and a series alarm resistor. Normally plugged in a conventional detector base **CDB** (see below), which is connected to a conventional zone line input. Some types are water proof and are not plugged in any base. An end-of-line device is connected in the last unit on the conventional zone line.

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 e.g. an I/O unit, intended for one or more conventional alarm points. End-of-line device 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 isolation of a segment on a COM loop (see below) in case of short circuit on the loop.

2.6 Display unit (D.U.)

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

2.7 COM loop

Loop = a cable (a twisted pair), to which all the addressable Panasonic COM loop 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 (c.i.e.) = A unit, e.g. EBL128, to which the alarm points are connected. Indicates fire alarm, fault condition, etc. on the front, i.e. on 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 Site Specific Data (SSD)

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

2.16 Software (S/W) / Firmware / System program

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

2.17 EBLWin

PC program used to create and download the SSD in EBL128 unit. Also used to download another / new software version.
Can be used during commissioning / maintenance of the EBL128 system (autogenerate COM loop SSD, acknowledge faults, etc.).

2.18 Web-server

The **Web-server** is used to get EBL128 information as well as remote control via a PC (browser) and an intranet / internet. The Web-server is configured via the PC tool **EBLWin**.

2.19 EN54-13

Fire detection and fire alarm systems; Part 13: Compatibility assessment of system components.

3 Overview

3.1 The EBL128 c.i.e.

EBL128 (type no. 4550) is a microprocessor controlled intelligent fire alarm Control and Indicating Equipment (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 255 addresses can be connected to EBL128.

EBL128 is developed and designed according to the European standard **EN54 parts 2 and 4.** The Swedish front conforms to **SS3654**.

3.1.1 Expansion boards

In the control unit (c.i.e.) it is possible to mount up to four expansion boards. The following expansion board types are available:

Product type no.	*Product name*	*Note*
4580	8 zones expansion board	
4581	8 relay outputs expansion board	
4583	In- and outputs expansion board	
4583DE	In- and outputs expansion board	

Regarding the expansion boards, see also chapter "Expansion boards 458x", page 23 and EBL128 drawings.

3.1.2 Power supply

The main power source is a built-in switched power supply (rectifier) 4557. 230 V AC, 0.6 A / 24 V DC, 1.8 A.
The second power source is a backup battery (2 x 12 V). In the c.i.e. is space for two 18 Ah batteries.
The batteries and the power supply are connected to the Main board (4556), which handles the charging of the batteries, etc. See chapter "Power supply", page 172 for more information.

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:/pesn.panasonic.se

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 **EBLWin**) and commissioning is very easy.

3.5 PC S/W

EBLWin 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.
- configure the Web-server II (1598); create and download / make a backup (upload) of the configuration data as well as download of Web-server software.

The EBLWin S/W shall have the same version number as the EBL128 S/W version number, e.g. **2.1**.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 EBLWin version before the download. If a backup is required, use the same EBLWin version as the EBL128 version.

EBLWin key 5094 is a USB unit that has to be plugged in the PC in order to log on to the c.i.e.

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 English 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). Default programmed as outputs for alarm devices. Connections and more information, see drawing 128-22.
  - One programmable relay output (R0). Default programmed as output for fire alarm routing equipment (Fire brigade tx). Connections and more information, see drawing 128-23.
  - One not programmable relay output for fault routing equipment (Fault tx). Connections and more information, see drawing 128-23.
  - One programmable input (I0). Supervised when required. 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 eight Display Units (1735 / 1736 and/or 1826 / 1828 and/or 1728). Max. one 1826 with printer. Connections and more information, see drawing 128-23.
  On the RS485 serial line can as an alternative, up to eight German Fire Brigade Control Panels (Feuerwehr-Bedienfeld) **FBF 2003**[3] and/or German Fire Brigade Indicator Panels (Feuerwehr-Anzeigetableau) **FAT 2002**[3] be connected.
- RS232 interface ("D" connector) for a PC with EBLWin. Connections and more information, see drawing 128-25.
- RS232 interface for a Web-server 1598. Connections and more information, see drawing 128-25.
- 24 V DC power supply output for a Web-server 1598. 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 holder (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 1598.
- 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 the front, i.e. the **F**ire **B**rigade **P**anel (**FBP**) and the **C**ontrol **P**anel (**CP**).

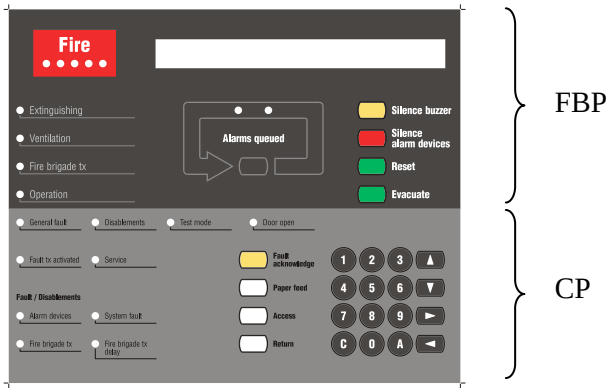

Figure 2. The EBL128 front. The look might vary depending on the country (language), configuration, etc. (e.g. English texts as in the figure). LEDs & push buttons are described in the EBL128 Operating Instructions.

[3] Manufacturer: IFAM GmbH, Erfurt, Germany. www.ifam-erfurt.de

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, convention and language.

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

Required fire brigade personnel manoeuvres are performed via the FBP in EBL128 or via an external FBP 1826 / 1828.
Instead of external FBPs 1826 / 1828, German Fire Brigade Control Panels (Feuerwehr-Bedienfeld) **FBF 2003** and/or German Fire Brigade Indicator Panels (Feuerwehr-Anzeigetableau) **FAT 2002** can be used.

The CP is used by the EBL128 owner, service personnel, etc. to "communicate" with EBL128, e.g. for monthly tests, disablements commissioning, maintenance and service. A User name and Password for different access levels are required. A keypad is used to get access to the menu tree, i.e. main and sub menus for data input / output, 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 255 COM loop units be connected (i.e. address 1-255). The exact number of units 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 167 and drawing 128-11. Each COM loop unit has a technical address (1-255) and each alarm point and zone line input has a presentation number (Zone-Address). See the EBL128 Operating Instructions for more information.

Normally the communication (and power supply) direction alternates every 22nd second. When the communication is in the COM loop A-direction, the COM loop voltage is checked when the COM loop cable returns to the control unit. The voltage has to be $\geq$ 12 V DC. If not, a fault will be generated.

4.2 Programmable voltage outputs (S0-S1)

The outputs S0-S1 are normally supervised (monitored).[4] One to five 33K resistors can be connected[5]. Connections to "J1:5-8" according to drawing 128-22. When the connections are finished, a calibration has to be performed[5]. See also the EBL128 Operating Instructions chapter "Calibration of supervised outputs (menu H5/A1)".

Each output has to be programmed (via EBLWin) regarding:

- Type (Control, Fire ventilation, Alarm device, etc.)
- Output signal period (steady, intermittent, pulse, delay, etc.)
- Supervised / Not supervised
- Logic, i.e. normally low (default) **or** normally high (24 V DC)[6].
- Control expression (containing one or more trigger conditions)

NOTE! The outputs S0-S1 are as default programmed as outputs for alarm devices.

S0: max. 500 mA (Fuse F8).

S1: max. 200 mA (Fuse F6).

See also chapter "Programmable outputs", page 71.

NOTE! For **EN54-13** compliance, only one alarm device can be used (≤ 15 mA) and one 1K end-of-line resistor. Programmed as normally low and supervised. .

4.3 Programmable relay output (R0)

Connections to "J1:17-19" according to drawing 128-23.

The output has to be programmed (via EBLWin) regarding:

- Type (Control, Fire ventilation, Alarm device, etc.)
- Output signal period (steady, intermittent, pulse, delay, etc.)
- Logic, i.e. normally open (NO) **or** normally closed (NC).[7] [8]
- Control expression (containing one or more trigger conditions).

NOTE! The output R0 is as default programmed as output for Fire alarm routing equipment (Fire brigade tx).[9] Activated output is

[4] A normally high output can not be supervised. The supervision voltage is 1.5 – 3.6 V DC (depending on the number of supervision resistors) and the polarity is reversed compared to activated output.

[5] P.c.b. no. 9285-**5A**: One to five 470 nF capacitors. The calibrated value has to be in the range 1K – 50K and 1 to 5 x 470 nF respectively.

[6] Regarding **system voltage**, see chapter "Technical data", page 143.

[7] In this case: Relay normally not activated / Relay normally activated.

[8] Relay contact ratings (COM / NO / NC): max. 2 A @ 30 V DC.

[9] A control expression is also required, i.e. Fire Brigade Tx.
Regarding "Fire brigade tx", see also chapters "Alert Annunciation", page 92 and "Fire alarm type A and Fire alarm type B", page 97.

indicated by the LED "Fire brigade tx".[10] This output can be disabled via "door open" or via menu H2/B10. This output can be tested via menu H1, see the EBL128 Operating Instructions.

See also chapter "Programmable outputs", page 71.

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

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

Not programmable relay output.[8] This output for fault routing equipment (Fault tx) is activated during normal operation and will be de-activated when a fault is generated in EBL128[11]. De-activated output is also indicated by the LED "Fault tx activated". This output can be disabled via "door open" or via menu H2/B10. This output 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 EBLWin) regarding:

- Type ("trigger condition")
- Supervised / Not supervised
- Logic, i.e. Normally open (high resistance, 3K3, when supervised) **or** Normally closed (low resistance, 680R, when supervised)
- Additional information depending on selected type

See also chapter "Programmable inputs", page 64.

4.6 24 V DC power supply outputs

The two 24 V DC[12] outputs can be used for:

- Power supply of routing equipment (fire brigade tx / fault tx). Max. 200 mA (Fuse F7).
- Power supply of external equipment, e.g. ext. FBP 1826 / 1828, AAU 1735 / 1736, EPU 1728, etc. Max. 500 mA (Fuse F9[13]).

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

4.7 RS232 interfaces

The two interfaces can be used for:

- EBLWin (PC program). (9 ways female "D" connector)

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[10] It is possible to use a programmable input with trigger condition Activated routing equipment, to turn on the LED instead.

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

[12] Regarding **system voltage**, see chapter "Technical data", page 143.

[13] Fuse F9 is also for the 24 V DC internal power supply output for Web-server 1598, see drawing 128-25.

- Web-server II 1598. (3 ways Molex connector)

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

4.8 RS485 transceiver (option)

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

On the RS485 serial line can as an alternative be connected up to eight German Fire Brigade Control Panels (Feuerwehr-Bedienfeld) **FBF 2003**[3] and/or German Fire Brigade Indicator Panels (Feuerwehr-Anzeigetableau) **FAT 2002**[3].

4.9 Power supply

Connectors for the built-in power supply units:

- Power supply (Rectifier) 230 V AC / **24 V DC** (Two tab terminals, 6.35x0.8 mm, +24V / 0V)
- Batteries[16] (2 x 12 V, 18 Ah), **24 V** (Two tab terminals, 6.35x0.8 mm, BATT + / BATT -)

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

4.10 Internal Power supply

Connector for the Web-server II 1598 power supply:

24 V DC[12] output (3 ways Molex connector).

Max. 500 mA (Fuse F9[17]).

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

[14] Max. one with printer.

[15] xxxx = type of display unit (e.g. 1826/28). For more information about each type of unit, see chapter " Other units", page 51.

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

[17] Fuse F9 is also for the 24 V DC power supply output for external equipment, see drawing 128-22.

5 Expansion boards 458x

Inside EBL128, in an optional expansion board holder **4551**, can up to **four** optional **expansion boards** of types **4580, 4581 and 4583** be mounted. 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 128-02 & -03.

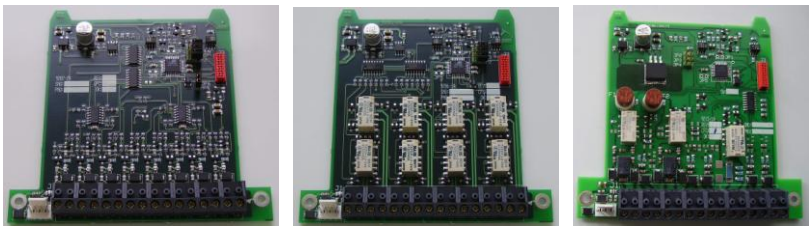


Figure 3. 8 zones expansion board 4580, 8 relays expansion board 4581 and Inputs and outputs expansion board 4583.

I/O Matrix board 4582[18] is a special type of expansion board plugged as a "piggy back" to an **Application board** (Fan, Generic or Zone). The Application board is connected to the COM loop and to 24 V DC. **Up to four** 4582 boards can always be used and **up to eight** if no expansion boards of type 4580, 4581 or 4583 are used.

Figure 4. I/O Matrix board 4582.

Each expansion board 4580-4583 has to have an expansion board address (0-7) set via jumpers on the expansion board respectively. On boards type 4580, 4581 and 4583 are the jumpers "JP2-JP4" used and on board type 4582 are the jumpers "JP1-JP3" used, see Figure 5 below.

EBLWin is used for all expansion board programming.

[18] The I/O Matrix board 4582 is mostly used on the Australian market but two Application boards are also to be found in the Panasonic product range, i.e. 4594 (for fan control) and 4596 (for LED outputs and push button inputs).

5.1 Expansion board address setting

The expansion board address is set via jumpers on the expansion board respectively.

Board address	4580, 4581, 4583 and 4583DE			4582		
	JP2	JP3	JP4	JP1	JP2	JP3
0	Open	Open	Open	Open	Open	Open
1	Shunted	Open	Open	Shunted	Open	Open
2	Open	Shunted	Open	Open	Shunted	Open
3	Shunted	Shunted	Open	Shunted	Shunted	Open
4	Open	Open	Shunted	Open	Open	Shunted
5	Shunted	Open	Shunted	Shunted	Open	Shunted
6	Open	Shunted	Shunted	Open	Shunted	Shunted
7	Shunted	Shunted	Shunted	Shunted	Shunted	Shunted

Figure 5. Expansion boards 4580 - 4583. Jumpers for expansion board address setting.

5.2 8 zones expansion board 4580

Up to four 4580 boards can be used.

Each board has to be programmed via EBLWin regarding:

- Address (set via the jumpers "JP2-JP4", see Figure 5 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, an end-of-line device has to be connected, depending on the selected "Type of zone line input", see below.

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

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

- Type of zone line input (see below), depending on detectors / end-of-line device (capacitor or resistor), i.e. different threshold levels etc.
- Alarm at short circuit / Not alarm at short circuit (i.e. if short-circuit on the zone line shall generate a fault or a fire alarm)
- Zone (Address optional)
- Fire alarm delay / No fire alarm delay
- Text (Alarm text when required)
- Alert annunciation time channel
- Disablement time channel

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

5.2.1 Type of zone line input

Not used shall be selected for a not used input.

One of the following types can be selected.

5.2.1.1 Zone line input (EOL capacitor)

This type 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.

5.2.1.2 EX zone line input (EOL resistor)

This type shall be used when units for Hazardous (Ex) areas shall be connected, i.e. via the Galvanic isolator MTL5061 (2820). The end-of-line device has to be a resistor, 10K (±5 %) with a body surface area > 230 mm^2 (supplied with the 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[19]. From this state any other state can be reached / activated.

5.2.2.2 High current state

Max. current consumption limit[20] 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[20] for the zone line is exceeded, which activates fire alarm in EBL128. In this state short-circuit, open circuit, high current and low voltage states cannot be reached / activated. After alarm reset the zone line input will return to the normal state.

5.2.2.4 Short-circuit state

Short-circuit current limit[20] is exceeded, indicating short-circuit on the zone line, which generates a fault condition in EBL128.

[19] Allowed voltage 15-28 V DC.

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

5.2.2.5 Open circuit state

Open circuit current limit[20] 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 H8/S2 (Disconnect / Re-connect zone line) the zone line input can be disconnected[21], i.e. there is no voltage on the zone line. From this state no other state can be reached / activated.

5.3 8 relays expansion board 4581

Up to four 4581 boards can be used.

Each board has to be programmed via EBLWin regarding:

- Address (set via the jumpers "JP2-JP4", see Figure 5, page 24.

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

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

Each output has to be programmed via EBLWin regarding:

- Type, i.e. output for Control, Alarm devices, etc.
- Output signal period (steady, pulse, delay, etc.)
- Logic, i.e. normally open (NO) **or** normally closed (NC) contacts[22]
- Control expression (one or more trigger conditions)

For more information, see chapter "Programmable outputs", page 71.

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

5.4 Inputs and outputs expansion board 4583

Max. two 4583/4583DE boards can be used.

Each board has to be programmed via EBLWin regarding:

- Address (set via the jumpers "JP2-JP4"), see Figure 5, page 24.

The I/O expansion board 4583 has two programmable supervised / not supervised voltage outputs (Output 0-1), one special / programmable output (Output 2) intended for German extinguishing system and five programmable supervised / not supervised inputs (Input 0-4).
Connections to "J1:1-16" and "J2" according to drawing 128-03 sheet 2/2.

Outputs 0-1 have to be programmed via EBLWin regarding:

- Type of output, i.e. output for Control, Alarm devices, etc.

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

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

- Activation time and type / output signal period (steady, pulse, delay, etc.)
- Supervised / Not supervised[23]
- Logic, i.e. normally low (default) **or** normally high (24 V DC)[24].
- Control expression (one or more trigger conditions)

One to five 33K resistors can be connected. When the connections are finished, a calibration has to be done. Calibration value has to be in the range 4K7-50K. See also the EBL128 Operating Instructions chapter "Calibration of supervised outputs (menu H5/A1)".

Voltage **Output 0** (J1:1-2): Max. 200 mA (Fuse F1).

Voltage **Output 1** (J1:5-6): Max. 200 mA (Fuse F2).

See also chapter "Programmable outputs", page 71.

Output 2 has to be programmed via EBLWin regarding:

- Type of output, i.e. output for Control, Alarm devices, etc.
- Activation time and type / output signal period (steady, pulse, delay, etc.)
- Logic, i.e. normally high resistance (default) **or** normally low.
- Control expression (one or more trigger conditions)

Output 2 (J1:11-12): Normally open or Normally closed.

See also chapter "Programmable outputs", page 71.

Inputs 0-4 have to be programmed via EBLWin regarding:

- Trigger condition (Triggered by)
- Supervised / Not supervised
- Logic, i.e. Normally open (high resistance, 3K3, when supervised) **or** Normally closed (low resistance, 680R, when supervised)
- Additional information depending on the selected type

Input 0 (J1:3-4)
Input 1 (J1:7-8)
Input 2 (J1:9-10)
Input 3 (J1:13-14)
Input 4 (J1:15-16)
See also chapter "Programmable inputs", page 64.

5.5 Inputs and outputs expansion board 4583DE

Max. two 4583/4583DE boards can be used.

This board is made for connection of the following **German** units:
- Fire alarm routing equipment

[23] A normally high output cannot be supervised. The supervision voltage is 1.5 – 3.6 V DC (depending on the number of supervision resistors) and the polarity is reverse compared to an activated output.

[24] Regarding the **system voltage**, see chapter "Technical data", page 143.

- Key cabinet
- Extinguishing equipment

Each board has to be programmed via EBLWin regarding:

- Address (set via the jumpers "JP2-JP4"), see Figure 5, page 24.

The I/O expansion board 4583 has two programmable supervised / not supervised voltage outputs (Output 0-1), one special / programmable output (Output 2) intended for German extinguishing system and five programmable supervised / not supervised inputs (Input 0-4).
Connections to "J1:1-16" and "J2" and line resistances according to **drawing 512 G3 – 35, sheet 2 and sheet 3.**

Outputs 0-1 have to be programmed via EBLWin regarding:

- Type of output, i.e. output for Control, Alarm devices, etc.
- Activation time and type / output signal period (steady, pulse, delay, etc.)
- Supervised / Not supervised
- Logic, i.e. normally low (default) **or** normally high (24 V DC)[25].
- Control expression (one or more trigger conditions)

One resistor (200-1000 ohm) can be connected. When the connections are finished, a calibration has to be done. See also the EBL128 Operating Instructions chapter "Calibration of supervised outputs (menu H5/A1)".

Voltage **Output 0** (J1:1-2): Max. 200 mA (Fuse F1). Can be used for German fire alarm routing equipment, fire alarm. *("E" Brandmeldung).* Supervision voltage 2.1 V DC, same polarity as when activated.

Voltage **Output 1** (J1:5-6): Max. 200 mA (Fuse F2). Can be used for German fire protection equipment / key cabinet. *("G" FSK öffnen).* Supervision voltage 2.1 V DC, same polarity as when activated.

See also chapter "Programmable outputs", page 71.

Output 2 has to be programmed via EBLWin regarding:

- Type of output, i.e. output for Control, Alarm devices, etc.
- Activation time and type / output signal period (steady, pulse, delay, etc.)
- Logic, i.e. normally high resistance (default) **or** normally low.
- Control expression (one or more trigger conditions)

Output 2 (J1:11-12): Normally open (high resistance, 3K3, when supervised) or Normally closed (low resistance, 680R, when supervised). Used for German extinguishing system *(Löschanlage)*.

See also chapter "Programmable outputs", page 71.

Inputs 0-4 have to be programmed via EBLWin regarding:

- Trigger condition (Triggered by)

[25] 20.4 – 24 V DC.

- Supervised / Not supervised
- Logic, i.e. Normally open (high resistance, 3K3, when supervised) **or** Normally closed (low resistance, 680R, when supervised)
- Additional information depending on the selected type

Input 0 (J1:3-4): Used for German Fire alarm routing equipment fault *(Melder quittung)*
Input 1 (J1:7-8): Used for German key cabinet *(FSK rückmeldung)*
Input 2 (J1:9-10): Used for German key cabinet *(FSK überwachung)*
Input 3 (J1:13-14): Used for German extinguishing system *(Lösch-anlage ausgelöst)*
Input 4 (J1:15-16): Used for German extinguishing system *(Lösch-anlage quittung)*
See also chapter "Programmable inputs", page 64.

5.6 I/O Matrix board 4582

A special type of expansion board that can only be used together with an **Application board** (Fan, Generic or Zone).[18]

Up to four 4582 boards can be used and up to eight if no expansion boards of type 4580, 4581 or 4583 are used.

The I/O Matrix board makes it possible for any retailer to manufacture and connect three different types of "Application boards" to EBL128 via the COM loop.

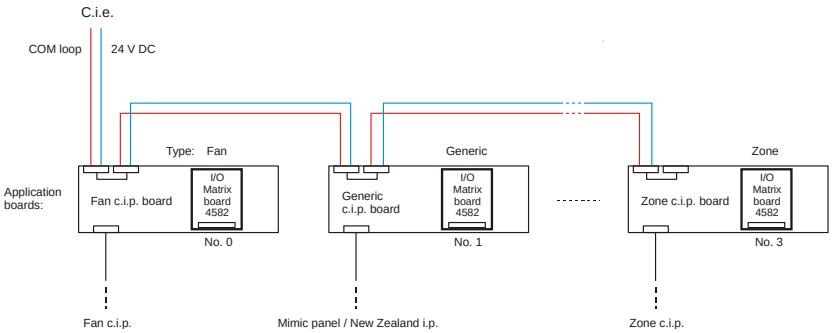


*Figure 6. I/O Matrix board 4582 application **overview**. The COM loop and 24 V DC are internally connected to the 4582 board.*

The I/O Matrix board (80 x 63 mm) is plugged ("piggy back" connection) to the Application board respectively and has 16 inputs and 48 outputs. The COM loop and 24 V DC is connected to Application board.
Three different **application board types** can be selected via jumpers (**JP4-JP5**) on the I/O Matrix board:

Generic control and indicating panel (Mimic panel alt. New Zealand indication panel), with 16 inputs (any input trigger condition can be used) and 48 outputs (any output trigger condition can be used).

Fan control and indicating panel, for four Fan control panels, each with six LED:s (On / Auto / Off / Running / Stopped / Fault) and three

push buttons (On / Auto / Off). One "Reset" switch. Can be used for a "Supply air fan" or a "Standard fan".

Zone control and indicating panel, with outputs and inputs for 16 zone LEDs (Alarm / Fault / Disabled) and 16 push buttons (Disable / Re-enable).
There is no COM loop address to be set. Instead, the **expansion board address** (0-7) is set with jumpers (**JP1-JP3**) on the I/O Matrix board respectively.

Up to four I/O Matrix boards can be used but up to eight if no expansion boards of types 4580, 4581 and 4583 are used. **Note!** Max. two I/O Matrix boards of the types Generic and Zone respectively.

In EBL128 can totally up to 200 outputs be used, including all kinds of outputs.

For more information (e.g. application board type selected via jumpers JP4-JP5), see the I/O Matrix board 4582, Technical description MEW00914.

Each I/O Matrix board has to be programmed via EBLWin regarding:

- Address, set via jumpers "JP1-JP3", see Figure 5, page 24.
- Type of board (Generic / Fan control / Zone control)
- LED test on Input 15 **or** no LED test on Input 15

The 4582 board has 48 LED outputs and 16 switch inputs (0-15). Depending on if the Application board is of the type Generic, Fan or Zone, the outputs and inputs are programmed differently.

5.6.1 Generic

Used for application board type Generic.

Each output (0-47) has to be added and programmed via EBLWin regarding:

- Output no. (0-47)
- Properties like for any programmable relay output.

Each input (0-15) has to be added and programmed via EBLWin regarding:

- Input no. (0-15)
- Type (of input)
- Properties (e.g. zone-address, alarm text) like for any programmable input.

5.6.2 Fan control

Used for Application board type **Fan control**, e.g. "Fan control application board" 4594, which has a front for control of four fans.

Fan control panel 4593 has two Fan control application boards 4594 and two Fan control fronts. See Technical Description Fan control panel 4593 (MEW01245).

Each Fan (0-3) (i.e. each Fan control) **has to be added and programmed** via EBLWin.

For each fan, also one I/O unit 3361 is required. It has to be added in EBLWin as an **I/O unit for fan control 3361** and programmed regarding e.g:

- Technical address (COM loop address 1-255)
- Name (Fan control I/O unit - normally not changed)
- Fan control information
  - I/O Matrix fan control (Fan control / fan 0-3)
  - Supervised **or** not supervised (Input In0)
  - Output latched **or** not latched
  - Enhanced fan control function **or** not.[26]
  - Fault detection time (Input In0; 30-255 seconds)
- Properties (for Re0)[26], like any programmable output.
- Normally stopped **or** Normally running

5.6.3 Zone control

Used for application board type Zone control.

Each input (0-15) has to be programmed via EBLWin regarding:

- Zone (control) no. (0-15)

[26] If Re0 is normally open, Re1 will automatically be normally closed and vice verse. If "Enhanced fan control function" is selected an Re1 tab will be available for individual programming of Re1.

6 Peripheral devices

Alarm points. **Analog** alarm points (detectors, etc.) are connected directly to a COM loop. **Conventional** alarm points (detectors, etc.) are connected to an 8 zones expansion board (4580) zone line input or a COM loop unit (e.g. 3361) zone line input. Programmable inputs can also be used for flow switches etc.

Short circuit isolators are connected to the COM loop.
I/O Matrix boards[27] are plugged ("piggy back") to an Application board (Fan, Generic or Zone), which is 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 on the COM loop. Addressable sounders (alarm devices) are connected directly on 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[28] are connected to the RS485 interface[29] in EBL128. Alternatively, German Fire Brigade Control Panels (Feuerwehr-Bedienfeld) **FBF 2003**[3] and/or German Fire Brigade Indicator Panels (Feuerwehr-Anzeigetableau) **FAT 2002**[3] 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. Regarding the Fire brigade tx, see chapter "Fire alarm type A and Fire alarm type B", page 114.

German routing equipment, key cabinet and extinguishing system are connected to programmable inputs / outputs in EBL128 and Expansion board 4583.
For more information, see the following chapters and/or the Product Leaflets on our web site: http://pesn.panasonic.se

6.1 COM loop units

The COM loop can handle up to 255 addresses (COM loop units).[30]

NOTE!
Depending on the type and number of units the total current consumption will vary. This and the cable resistance will affect the cable length.

[27] The I/O Matrix board 4582 is described in chapter "Expansion boards 458x", page 22.

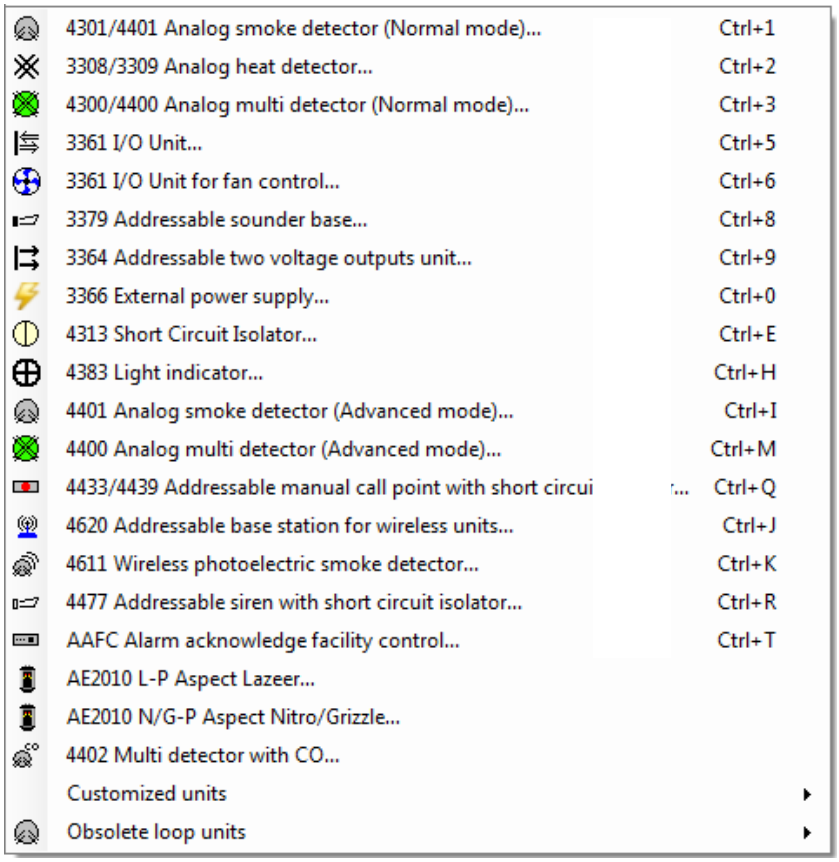
[28] External Presentation unit 1728, External Fire Brigade Panel 1826 / 1828 and Alert Annunciation unit 1735 / 1736

[29] An optional RS485 transceiver component 4552 is required.

[30] 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.

See also chapter "Current consumption", page 167 and drawing 128-11.

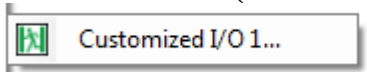
The following units can be connected to the COM loop (some units can be used in different modes):



NOTE!

4301 in NORMAL mode = **3304** in NORMAL mode.
4300 in NORMAL mode = **3316** in NORMAL mode.
3361 The **I/O Unit for Fan control** is used with the Fan control panel 4593 only.
4620 / 4611 The **Wireless units** might still be under construction.
AAFC The **Alarm Acknowledge Facility Control** is used on the Australian market only.
AE2010 L-P The **Aspect Lazeer** aspiration detector might still be under construction.
AE2010 N/G-P The **Aspect Nitro/Grizzle** aspiration detectors might still be under construction.
4402 The **Multi detector with CO** might still be under construction.

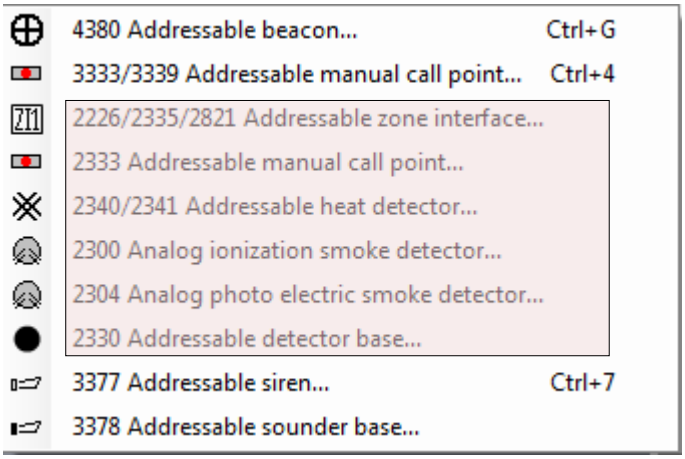
Customized units (listed below)



NOTE!

Customized I/O 1 The **Customized I/O 1** (1=Exit light.) is not found in Panasonic's product range.

Obsolete loop units (listed below) can be found in old installations and can be used in EBL128 installations as well.



NOTE!
2300 & **2304** plugged in base **2312**.
2304 = **4301** & **3304** in 2312 mode, plugged in base **3312xx**.
3333/3339 is also used for 4433/4439 when the built-in short circuit isolator shall not be used.
3377 is also used for 4477 when the built-in short circuit isolator shall not be used.

NOTE! When one or more of the shaded units above are used on a COM loop, the maximum number of loop units is 127, i.e. only technical address **1-127** can be used.

Address setting / Technical address

Each COM loop unit has to have a unique COM loop address (001-255). This address and the mode are set with the **Address Setting Tool** (3314 / **4414**). The mode to use is for each unit described in the following chapters.

6.1.1 Input units

Each COM loop input unit is added and programmed via EBLWin. Depending on type of unit, regarding:

- Technical address (001-255)
- 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)
- Quiet alarm or not
- 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)

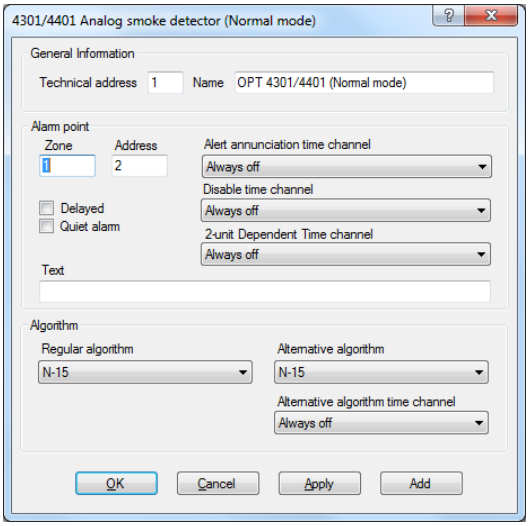


Figure 7. An example of an EBLWin dialog box is the "Analog photo electric smoke detector 4301/4401 (Normal mode)" properties dialog box.

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 / 2218. 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.

3312FL Analog Base. Like 3312 but instead of screw terminals for the COM loop and ext. LED this base has fast connectors.

3312F Analog Base. Like 3312FL but no connector for ext. LED.

4313 Analog Base with isolator. An analog detector (Sensor) is to be plugged in 4313. Terminals for ext. LED 2217 / 2218. Prepared for mechanical lock of the detector. Recess for label holder 3391. It has also a built-in short circuit isolator. The **function** is described at page 51. The isolator's technical address is set with Address setting tool 3314 / 4414. 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 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.[31] Replaced with 4433, see below. 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 Address setting tool 3314 / 4414. 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 is also used for mode setting.
NORMAL mode: Flashing or not flashing LED (see Product leaflet MEW00097) is set via EBLWin.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

4433 Addressable Manual Call Point with isolator. Replaces 3333, see above. 4433 is like the 3333 unit but it also has a built-in short circuit isolator. (The function is described at page 51.) The isolator does **not** use any COM loop address.
The Address setting tool is also used for mode setting.
NORMAL mode: The built-in short circuit isolator is **in use**. Flashing or non-flashing LED is set via EBLWin.
2330 mode: The built-in short circuit isolator is **not in use**. 4433 replaces a **3333** mcp. Flashing or non-flashing LED is set via EBLWin.
2312 mode: The built-in short circuit isolator is **not in use**. 4433 replaces a **2333** mcp. Flashing LED.

3339 Enclosed Addressable Manual Call Point.[31] Replaced with 4439, see below. Like the 3333 unit (see above) but another type of front cover and backbox. For surface mounting. For indoor use in premises where IP67 rating is required.
The Address setting tool is also used for mode setting.
NORMAL mode: Flashing or not flashing LED (see Product leaflet MEW00098) is set via EBLWin.
2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

4439 Enclosed Addressable Manual Call Point with isolator. Replaces 3339, see above. 4439 is like 3339 but it also has a built-in short circuit isolator. (The function is described at page 51.) The isolator does **not** use any COM loop address.
The Address setting tool is also used for mode setting.
NORMAL mode: The built-in short circuit isolator is **in use**. Flashing or non-flashing LED is set via EBLWin.

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

2330 mode: The built-in short circuit isolator is **not in use**. 4439 replaces a **3339** mcp. Flashing or non-flashing LED is set via EBLWin.
2312 mode: The built-in short circuit isolator is **not in use**. 4433 replaces a **2339** mcp. Flashing LED.

6.1.1.3 Analog Detectors

3308 Analog heat detector. To be plugged in a base 3312xx/3379/4313. 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 Address setting tool 3314 / 4414. The detector has an address label on which the programmed technical address is to be written.
The Address setting tool is also used for mode setting:
NORMAL mode: 3308 is in this mode via EBLWin set to one of three alarm 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: 3308 is in this mode (+ base 3312) works like the conventional heat detector 6270/6275 (+ base 2330).
2312 mode: Not used in EBL128.

3309 Analog heat detector. Enclosed (IP67)[32]. Built-in LED that is lit to indicate that the detector has generated fire alarm. Terminals for ext. LED 2217 /2218. Recess for label holder 3391. The technical address is set with Address setting tool 3314 / 4414, which is also used for mode setting:
NORMAL mode: 3309 is in this mode via EBLWin set to one of three alarm 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: 3309 is in this mode like addressable heat detector 2340.
2312 mode: Not used in EBL128.

4300 Analog multi detector. Replaced with 4400, see below. 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 a base 3312xx/3379/4313. Built-in LEDs are

[32] As from July 2013, this detector holds the ATEX classification:
Ex II 3 G Ex ic IIC T5 Gc, Ex II 3 D Ex ic IIIC T70°C Dc,
-20°C ≤ T_a ≤ 65°C.

lit to indicate that the detector[33] has generated fire alarm. Prepared for mechanical lock (screw attached).
Via EBLWin it is programmable how the detectors shall operate (in NORMAL mode):

Zone-Addr.
01-01 (smoke)
01-02 (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 another zone-address[34]. (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 set with Address setting tool 3314 / 4414, used for programming and fault presentation. Another technical address will automatically be occupied, i.e. 4300 occupies two technical/COM loop addresses.

Zone-Addr.
01-01 (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 set with Address setting tool 3314 / 4414, used for programming and fault presentation. Another technical address will automatically be occupied, i.e. 4300 occupies two technical/COM loop addresses.

It is, via EBLWin, 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.

b2) Decision algorithm:
Fire alarm will be activated if:
temperature (°C) + adjusted smoke value [35] ≥ 58.

Pre-warning will be activated if:
58 > temperature (°C) + adjusted smoke value[35] ≥ 50.

The "Decision algorithm" [36], see figure can be used to reduce so called false alarms (nuisance alarms), because at

20°C => 3.8 %/m
↓ ↓
40°C => 1.8 %/m

e. the heat detector and/or the smoke detektor.

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

[35] 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 EBLWin. The temperature can not be lower than 0°C in the algorithm / graph.

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

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.

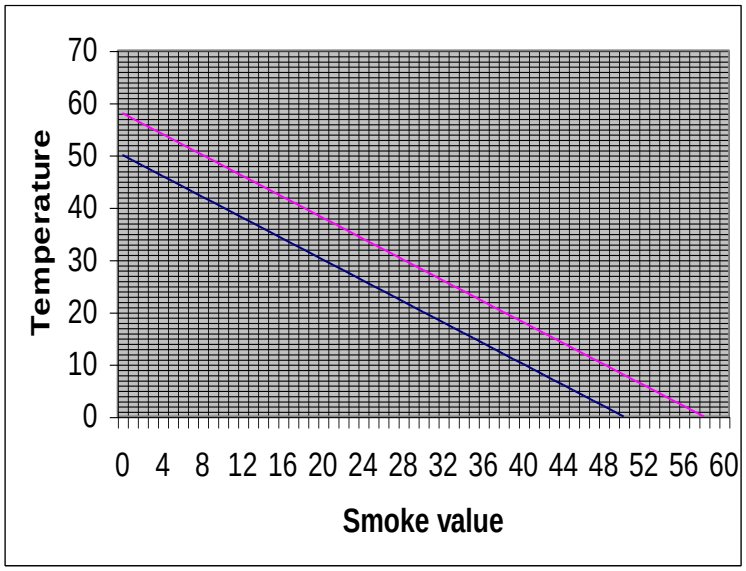


Figure 8. When the calculated value in the decision algorithm exceeds the lower graph, pre-warning will be activated. When it exceeds the upper graph, fire alarm will be activated. **Temperature = °C. Smoke value = *obscuration (%/m) x 10*.**

The technical address is set with Address setting tool 3314 / 4414. The detector has an address label on which the programmed technical address is to be written.
The Address setting tool is also used for mode setting:
NORMAL mode: 4300 in this mode is in EBLWin, for the smoke detector, set to one of six alarm algorithms H-15, H-35, L-15, L-35, **N-15** or N-35 and for the heat detector set to one of three alarm algorithms for class **A1** (static response temp. 54-65°C), A2 S (54-70°C) or B S (69-85°C).
2330 mode: 4300 in this mode (+ base 3312) works like the ionization smoke detectors 2316 / 2317 (+ base 2330).
2312 mode: Not used in EBL128.

4400 Analog multi detector. Replaces 4300, see above. 4400 is a smoke detector and a heat detector in 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.
Shall be plugged in an analog base 3312xx/3379/4313. Built-in

LEDs (red) are blinking to indicate that the detector[37] has activated a fire alarm. Prepared for mechanical lock (screw attached) – if required. 4400 has a little different design than the 4300 detector and the smoke chamber net has even smaller holes that will keep insects and particles[38] larger than smoke particles out of the chamber.

The COM loop address (Technical address) is set with the Address setting tool 3314 / **4414**. The detector has an address label on which the programmed technical address can be written.

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

Advanced mode: 4400 has to be set to Advanced mode via the Address setting tool **4414**. *Note, the Address setting tool 3314 cannot be used to set Advanced mode!* In Advanced mode this detector will use algorithms in the detector for fire alarm evaluation. It can be set to a Learning function **or** via EBLWin to one of five area alarm algorithms (Normal, Clean, Smoke/Steam, Cooking/Welding or Heater area), see chapter "Advanced mode", page 128. An alternative area alarm algorithm can be used via a time channel. 4400 has a green polling LED. Via EBLWin is set if the green polling LED shall blink when the detector is polled or never blink. Note, the LED will not be blinking if the detector is in Test mode.

In Advanced mode only one COM loop address will be occupied for the multi detector.

NORMAL mode: 4400 in this mode has to be programmed in EBLWin as a **4300** detector, i.e. the 4400 detector will work as and replace the Analog multi detector 4300 (see 4300 above) and two COM loop addresses will be occupied, see 4300 above. The smoke detector part has to be set to one of six alarm algorithms H-15, H-35, L-15, L-35, **N-15** or N-35 and the heat detector part has to be set to one of three alarm algorithms for class **A1** (static response temp. 54-65°C), A2 S (54-70°C) or B S (69-85°C). An alternative smoke and/or heat algorithm can be used via one or two time channels.

2330 mode: 4400 in this mode will work as a 2330 + 2316/17.

2312 mode: Not used in system EBL128.

4301 Analog photo electric smoke detector. Replaced with 4401, see below. Scattered light (i.e. reflection of infrared light) is used to detect smoke.

The detector has unleaded soldering.

To be plugged in base 3312xx/3379/4313. 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 Address setting tool 3314 /

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

[38] For example dust, steam, etc.

4414. The detector has an address label on which the programmed technical address is to be written.
The Address setting tool is also used for mode setting:
NORMAL mode: 4301 in this mode is in EBLWin set to one of the six alarm algorithms H-15, H-35, L-15, L-35, **N-15** or N-35.
2330 mode: 4301 in this mode (+ base 3312) works like the smoke detector 2321 (+ base 2330).
2312 mode: 4301 in this mode (+ base 3312) works like the smoke detector 2304 (+ base 2312).

4401 Analog photo electric smoke detector. Replaces 4301, see above. Scattered light (i.e. reflection of infrared light) is used to detect smoke. The detector has unleaded soldering. Shall be plugged in base 3312xx/3379/4313. Built-in LEDs (red) are blinking to indicate that the detector has activated fire alarm. Prepared for mechanical lock (screw attached) – if required. 4401 has a little different design than the 4301 detector and the smoke chamber net has even smaller holes that will keep insects and particles[38] larger than smoke particles out of the chamber.
The COM loop address (Technical address) is set with Address setting tool 3314 / **4414**. The detector has an address label on which the programmed technical address can be written. The Address setting tool is also used for **mode setting**:
Advanced mode: 4401 has to be set to Advanced mode via the Address setting tool **4414**. *Note, the Address setting tool 3314 cannot be used to set Advanced mode!* In Advanced mode this detector will use algorithms in the detector for fire alarm evaluation. It can be set to a Learning function **or** via EBLWin to one of three area alarm algorithms (Normal, Clean or Smoke/Steam area), see chapter "Advanced mode", page 128. An alternative area alarm algorithm can be used via a time channel. 4401 has a green polling LED. Via EBLWin is set if the green polling LED shall blink when the detector is polled or never blink. Note, the LED will not be blinking if the detector is in Test mode.
NORMAL mode: 4401 in this mode has to be programmed in EBLWin as a **4301** detector, i.e. the 4401 detector will work as and replace the Analog photoelectric smoke detector 4301 (see 4301 above) and has to be set to one of six alarm algorithms H-15, H-35, L-15, L-35, **N-15** or N-35. An alternative alarm algorithm can be used via a time channel.
2330 mode: 4401 in this mode will work as a 2330 + 2321.
2312 mode: 4401 in this mode will work as the obsolete Analog photo electric smoke detector 2304.

4400 Analog multi detector with CO. 4402 is a smoke, heat and CO detector in one housing. Scattered light (i.e. reflection of infrared light) is used to detect **smoke** and the **heat** sensing

element is a thermistor. The CO sensor is of chemical type, with an approx. life time of 5 years (service signal after 60 months). For a smoke density rise ≥ 2.5 %/m/min. also a rise of CO density is required for activation of fire alarm. This will secure real fire alarms and minimize the not wanted nuisance alarms, e.g. due to artificial smoke, etc. The detector has unleaded soldering.
Shall be plugged in an analog base (3312 / 3312F / 3312FL / 3379 / 4313). Built-in LEDs (red) are blinking to indicate that the detector has activated a fire alarm. 4402 also has a green polling LED. Via EBLWin is set if the green polling LED shall blink when the detector is polled or never blink. Note, the LED will not be blinking if the detector is in Test mode. Prepared for mechanical lock (screw attached) – if required. .
The Analog multi detector 4400 COM loop address (Technical address) is set with the Address setting tool (3314 / **4414**). The detector has an address label on which the programmed technical address can be written. The Address setting tool 3314 / **4414** is also used for **mode setting**:
Advanced mode: Not used in system EBL128.
NORMAL mode: 4402 in this mode can be used in system EBL128 version ≥ 2.1.x.
2330 mode: Not used in system EBL128.
2312 mode: Not used in system EBL128.

4611 Wireless smoke detector. The detector is plugged in a supplied base. The smoke detection chamber contains an IR LED and a photodiode. Reflection of infrared light is used to detect smoke. The smoke enters the detection chamber through an insect filter and an optical labyrinth. In order to reduce false (nuisance) alarms, fire alarm will not be activated until after three values over the alarm threshold level. The detector has sensitivity compensation for contamination. A built-in sounder with three different sound types can be activated in case of fire alarm. The detector has one external antenna. The detector has an LED for fire alarm indication. The Wireless smoke detector is power supplied by two pieces of a 3 V Lithium 1600 mAh battery (incl. connection cables). The battery life time is more than three years. Up to 16 Wireless smoke detectors can communicate with a Base station (4620). Each Wireless smoke detector takes one COM loop address. Transmission distance between a detector and its Base station is min. 40 m in open air.

4613 Wireless sniffer. As a help during planning, installation and commissioning, a Wireless sniffer, i.e. a USB device with antenna and a PC program, can be used to check if the signals between a Base station and all its wireless units are proper or not. Also the background noise can be checked. It is highly recommended to do a check on site prior to the installation.

4620 Addressable Base station for wireless units. The Base station has two built-in antennas and communicates every two minutes with up to 16 Wireless smoke detectors (4611) on a pre-set channel. The Base station takes one COM loop address and it has a built-in short circuit isolator that requires no separate COM loop address.

6.1.1.4 Addressable detectors

For the aspirating Aspect smoke detectors below the following is valid: Commissioning, service, status reading, configuration changes, etc. can be done on the unit respectively or via a smart phone app. (A secured wireless network via a Wi-Fi module in the detector cabinet).

AE2010 N-P

Addressable aspirating smoke detector Aspect NITRO. The detector consists of a cabinet with a built-in fan, filters and two chambers for smoke detection. Naturally occurring gases, particles and condensation are separated from fire gases and smoke before detection takes place. The Nitro sensor employs the electrical properties of nitrogen. The sensor monitors changes in the nitrogen on an atomic level and is unaffected by dust. Even in corrosive environments with extreme amounts of airborne dust with dimensions almost like smoke particles, smoke and fire gases can be reliably detected. The Nitro sensor is highly sensitive during fires in all types of materials, except pure PVC fires. The detector is made for two separate detection areas. Up to 2 x 100 m pipeline per area. The detector is connected on a COM loop and it takes one COM loop address. It has to be connected to 230 V AC and has a built-in backup battery. The detector is very easy to install. External mounting flanges simplify mounting on the wall, and hinged covers provide simple access to connection terminals and filters. A number of accessories are available.

The Address setting tool 3314 / **4414** is used for **address** and **mode settings**:

Advanced mode: Not used in system EBL128.

NORMAL mode: AE2010 N-P in this mode can be used in system EBL128 version ≥ 2.1.x.

2330 mode: Not used in system EBL128.

2312 mode: Not used in system EBL128.

AE2010 G-P

Addressable aspirating smoke detector Aspect GRIZZLE. The detector consists of a cabinet with a built-in fan, filters and two chambers for smoke detection. Naturally occurring gases, particles and condensation are separated from fire gases and smoke before detection takes place. The Grizzle sensor separates dust from smoke through an advanced air analysis. This provides reliable detection of visible smoke, even in corrosive environments with extreme amounts of airborne dust with dimensions almost like smoke particles. The Grizzle sensor accepts gases that normally occur in the detection zones without giving unwanted alarms. The detector is made for two separate detection areas. Up to 2 x 100 m pipeline per area.

The detector is connected on a COM loop and it takes one COM loop address. It has to be connected to 230 V AC and has a built-in backup battery. The detector is very easy to install. External mounting flanges simplify mounting on the wall, and hinged covers provide simple access to connection terminals and filters. A number of accessories are available.
The Address setting tool 3314 / **4414** is used for **address** and **mode settings**:
Advanced mode: Not used in system EBL128.
NORMAL mode: AE2010 G-P in this mode can be used in system EBL128 version ≥ 2.1.x.
2330 mode: Not used in system EBL128.
2312 mode: Not used in system EBL128.

AE2010 L-P Addressable aspirating smoke detector Aspect LAZEER. The detector consists of a cabinet with a built-in fan, filters and two chambers ("Nitro" & "Grizzle") for smoke detection. Naturally occurring gases, particles and condensation are separated from fire gases and smoke before detection takes place. The Lazeer detector has been developed for early warning in clean rooms with high demands to quick detection of smoke and fire gases. The detector is made for one detection area. Up to 2 x 100 m pipeline. The detector is connected on a COM loop and it takes one COM loop address. It has to be connected to 230 V AC and has a built-in backup battery. The detector is very easy to install. External mounting flanges simplify mounting on the wall, and hinged covers provide simple access to connection terminals and filters. A number of accessories are available.

Via EBLWin, a "Detection type" has to be programmed:
Or (default)**:** Chamber "Nitro" only **or** Chamber "Grizzle" only will activate a fire alarm.
And: Chambers "Nitro" **+** "Grizzle" will activate a fire alarm.
Nitro: Chamber **"Nitro" only** will activate a fire alarm.
Grizzle: Chamber **"Grizzle" only** will activate a fire alarm.
And with pre-warning: Chambers "Nitro" **+** "Grizzle" will activate a fire alarm. Chamber "Nitro" only in alarm **or** Chamber "Grizzle" only in alarm, will activate a pre-warning.

The Address setting tool 3314 / **4414** is used for **address** and **mode settings**:
Advanced mode: Not used in system EBL128.
NORMAL mode: AE2010 L-P in this mode can be used in system EBL128 version ≥ 2.1.x.
2330 mode: Not used in system EBL128.
2312 mode: Not used in system EBL128.

6.1.1.5 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 / 2218.

6.1.1.6 Conventional Detectors

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.
Has replaced 2318. To be plugged in a CDB 2324.

4350 Multi detector. (This detector will be deleted and not replaced.) 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 "Advanced mode", page 128.
The detector has unleaded soldering.
To be plugged in a base 2324.

4352 Photoelectric smoke detector. Replaced with 4452, see below. 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 base 2324.

4452 Photoelectric smoke detector. Replaces 4352, see above. Like 4352 but 4452 has a little different design than the 4352 detector (see 4401 above) and the smoke chamber net has even smaller holes. This will keep insects and particles[38] larger than smoke particles out of the chamber.

4375 Heat detector. Fixed temperature heat detector, 60°C, class **A2S** (static response temp. range 54-70°C), latching.
Min./**typical**/max. ambient temp. -10/+**25**/+40°C.
The detector has unleaded soldering. Has replaced 6275.
To be plugged in a base 2324.

4376 Heat detector. Fixed temperature heat detector, 80°C, class **BS** (static response temp. range 69-85°C), latching.
Min./**typical**/max. ambient temp. -10/+**40**/+60°C.
The detector has unleaded soldering. Has replaced 6276.
To be plugged in a base 2324.

6295 Heat detector: Enclosed (IP67)[39]. Fixed temperature (57°C) heat detector, class **A2 S** (static response temp. range 54-70°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 / 2218.

6296 Heat detector: Enclosed (IP67)[40]. 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 / 2218.

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 / 2218.

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 / 2218 (to indicate that the detector has generated fire alarm). **NOTE!** No built-in LED.

6.1.1.7 Accessories

3314 Address setting tool. Replaced with 4414, see below. Is used to write or read the COM loop units' **technical address** (001-255). 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.[41]
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.)

[39] As from July 2013, this detector holds the ATEX classification:
Ex II 3 G Ex ic IIC T5 Gc, Ex II 3 D Ex ic IIIC T100°C Dc,
-40°C ≤ T_a ≤ 50°C.

[40] As from July 2013, this detector holds the ATEX classification:
Ex II 3 G Ex ic IIC T5 Gc, Ex II 3 D Ex ic IIIC T100°C Dc,
-40°C ≤ T_a ≤ 65°C.

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

4414 Address setting tool. Replaces 3314. Is used to write or read the units' **COM loop address** (Technical address 001-255). It is also used to write or read the mode (Advanced[42], NORMAL, 2330 and 2312), see the COM loop unit respectively for mode information.
A connection cable with crocodile clips and tab terminals is supplied with the tool and can be used when required.
4414 (orange front) will replace 3314 (grey front) but 4414 is only required when the 4400 and 4401 detectors shall be used in Advanced mode.
Turn on the tool (On/Off/CLR button). A blinking curser and mode **M0** will be shown in the display. Plug the detector's SA & SB terminals onto the tool's SA & SB terminals or, when required, use the connection cable.[43]
How to read: Press "Read", wait for the OK, address and mode info. and a beep.
How to write: To change the mode (if required) press "Write" and "Read" at the same time, then press 0, 1, 2 or 3 for the mode respectively. Type the address (no beginning zeroes) and press "Write". Wait for the OK, address and mode info. and a beep. (Press "Read" again for a double check.) More info. on the backside of the tool.

3390 Label holder. To be mounted on the analog base 3312[44]. 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.

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 EBLWin.

6.1.2 Addressable I/O units

3361 Addressable multipurpose I/O unit.[45] Power supplied via the COM loop.
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 EBLWin). This input is intended for

[42] Address setting tool 4414 has to be used to set the detectors 4400 and 4401 in Advanced mode. (Address setting tool 3314 **cannot** be used for the Advanced mode.)

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

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

[45] The same physical unit (3361) is also used for the Australian Fan control function and has a separate dialog box in EBLWin.

conventional detectors.[46]
….used as general input (In0): An input for NC or NO contacts (set via EBLWin).

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

The unit has two **programmable** relay[47] outputs:
Relay output (Re0): NC or NO contacts (set via EBLWin).
Relay output (Re1): NC or NO contacts (set via EBLWin).

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 3314 / 4414. The unit has an address label on which the programmed technical address is to be written.
The Address setting tool 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 179.

3364 Addressable 2 voltage outputs unit. 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 closing" and the controlling detectors have to be programmed. The "fire door closing function" is described on page 97 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

[46] It is via EBLWin possible to define this input functioning like a manual call point ("Used as MCP"), i.e. it will **not** be collectively disabled via menu "Disable zone, H2/B1", can **not** be included in two-unit dependence, it can **not** use the "alarm delay" function and it can **not** be disabled via a time channel.

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

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 EBLWin), 24 V DC, 1 A.[48]

VO1: Normally low or high (set via EBLWin), 24 V DC, 1 A.[48]

VO2: Normally high, 24 V DC, 1 A.[48] (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 3314 / 4414 when the unit is powered. The unit has an address label on which the programmed technical address is to be written.

The Address setting tool 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 179.

6.1.3 Alarm devices (addressable)

3377 Addressable siren. Replaced with 4477, see below. 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.[49] Red ABS plastic housing. Three sound types (tones) and three priority levels are available. For each level an output control expression and a sound type is programmed (via EBLWin). For more technical data, see the Product Leaflet.

The technical address is set with Address setting tool 3314 / 4414. The siren has an address label on which the programmed technical address is to be written.

The Address setting tool is also used for mode setting:

NORMAL mode: Used for 3377 in EBL128.

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

[49] The number of 3377 + 3378/3379 + 4477 units must be ≤ 50.

2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.
NOTE! See also chapter "Limitations", page 179.

4477 Addressable siren. Replaces 3377, see above. 4477 is like the 3377 unit but it also has a built-in short circuit isolator. (The function is described at page 51.) The isolator does **not** use any COM loop address.
The technical address is set with Address setting tool 3314 / 4414. The siren has an address label on which the programmed technical address is to be written.
The Address setting tool is also used for mode setting:
NORMAL mode: 4477 with the built-in isolator **in use**.
2330 mode: 4477 with the built-in isolator **not in use**. 4477 replaces a **3377** unit.
2312 mode: Not used in EBL128.
NOTE! See also chapter "Limitations", page 179.

3379 Addressable sounder base.[50] 3379 consists of an analog base (3312) mounted together with a sounder. 3379 is mounted in the ceiling. An analog detector can be plugged in the base, which has screw terminals for the COM loop and an ext. LED (2218). Prepared for mechanical lock of the detector - if required. Recess for label holder (3391). 3379 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[49]. Three sound types (tones) and three priority levels are available. For each level an output control expression and a sound type is programmed (via EBLWin). For more technical data, see the Product Leaflet.
The COM loop address is set with the Address setting tool 3314 / 4414. The unit has an address label on which the programmed COM loop address can be written. (The detector has its own COM loop address set via the Address setting tool.)
The Address setting tool is also used for mode setting:
NORMAL mode: Used for 3379 in system EBL128.
2330 mode: Not used in system EBL128.
2312 mode: Not used in system EBL128.
NOTE! See also chapter "Limitations", page 179.

4380 Addressable beacon. 4380 is a visual alarm device of type A for indoor use. All electronics, the LEDs and the lens are mounted in a red ABS housing. The beacon comes with a shallow base (IP21C). A deep base (4382) is an option which gives the beacon a higher IP protection (IP33C). 4380 is power supplied via the COM loop, i.e. the number of beacons is depending on the type and number of other units connected to the COM loop but max. 10.

[50] This unit has replaced the Sounder base 3378.

The light output is 1 Cd and the flash rate is 1 Hz. For more technical data, see the Product Leaflet. **NOTE!** This unit has been removed from our product range.
The COM loop address is set with the Address setting tool 3314 / 4414. The unit has an address label on which the programmed COM loop address can be written.
The Address setting tool is also used for mode setting:
NORMAL mode: Used for 4380 in system EBL128.
2330 mode: Not used in system EBL128.
2312 mode: Not used in system EBL128.

4383 Light indicator. 4383 is a light indicator used as a complement to audible alarm devices. It is of type A for indoor use. All electronics and the eight red LEDs (visible 360°) are mounted in a transparent ABS housing. Flash rate 1 Hz. 4383 is power supplied via the COM loop, i.e. the number of indicators is depending on the type and number of other units connected to the COM loop. The light indicator is plugged in an analog detector base 3312xx (3379 / 4313) and an analog detector is plugged in the light indicator. A control expression for activation has to be programmed, like for a programmable output or alarm device. It takes one COM loop address. For more technical data, see the Product Leaflet.
The COM loop address is set with the Address setting tool 3314 / 4414. The unit has a label for the COM loop address and another label for the detector's COM loop address.
The Address setting tool is also used for mode setting:
NORMAL mode: Used for 4383 in system EBL128.
2330 mode: Not used in system EBL128.
2312 mode: Not used in system EBL128.

6.1.4 Short circuit isolators (addressable)

According to the EN54 standard, at least one short circuit isolator is required per 32 alarm points on the COM loop. In the Australian and New Zealand conventions at least one isolator per 40 alarm points. National regulations have to be followed.

Up to 64 isolators can be used per COM loop.

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

- Technical address [51]
- Name (Normally not changed)
- Sequence Number (Serial Number in the COM loop's A-direction.) 0-63. [51]

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

[51] The units 4433, 4439 and 4477 have a built-in isolator that don't occupy any COM loop address and the isolator's Sequence Number is set in the dialog box for the 4433, 4439 and 4477 unit respectively.

4313 Analog base with isolator.[52] 4313 is an analog base with a built-in short circuit isolator. In case of short circuit on the COM loop, the number of disabled units will be minimised. 4313 is power supplied via the COM loop. For more information, see the Product Leaflet. The COM loop address is set with the Address setting tool (3314 / 4414). The unit has an address label on which the programmed COM loop address is to be written.

The Address setting tool is also used for mode setting:
NORMAL mode: Used for 4313 in system EBL128.
2330 mode: Not used in system EBL128.
2312 mode: Not used in system EBL128.

Up to 64 isolators can be used, which gives 65 loop segments. Each isolator has to be given a **Sequence Number**, 00-63. The isolators have to be connected **consecutively** (Sequence Number 00-01-02-03-04-05-06-07-08-09-10-11-12-13-14-15 - - up to 63) **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").

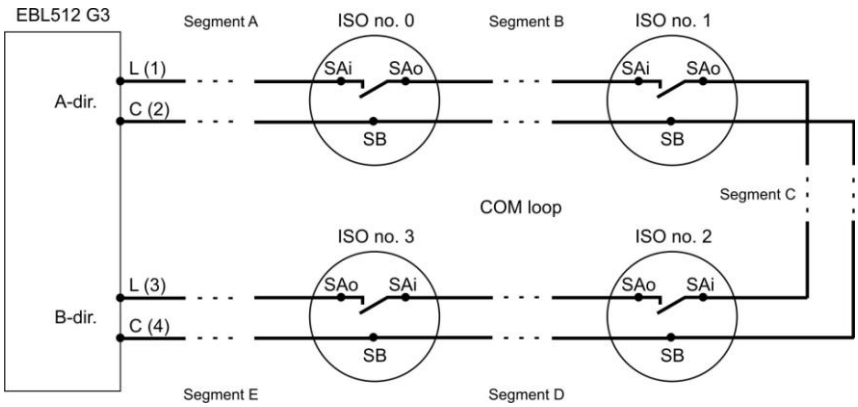


Figure 9. Four isolators connected to a COM loop gives five loop segments, i.e. Segment A (A-00), B (00-01), C (01-02), D (02-03) and E (03-B). If more isolators have to be added, the sequence numbers have to be updated (via EBLWin), e.g. if one isolator has to be put in between isolator no. 00 and no. 01 in the figure, the new isolator has to have sequence number 01 and the old no. 01 has to be changed to no. 02 and so on.

Short circuit / cut-off (break) on the COM loop

See chapter "Short circuit isolators", page 91 and also EBL128 Operating Instructions, chapter "Fault messages". Referens

6.1.5 Built-in isolators

The units 4433, 4439 and 4477 have a built-in isolator that do not require any separate COM loop address, only the Sequence Number,

[52] This unit has replaced the Addr. isolator 4370.

00-63. As an option, these units can be used without the isolator in function. If so, they have to be programmed in EBLWin as if they were 3333, 3339 and 3377 units and via the Address setting tool 4413 set to 2330 mode instead of NORMAL mode.

6.1.6 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 an interface outside the Ex area.

Normally the analog addressable units, IS smoke (2840) and heat (2841) detectors shall be used. They are connected to an IS barrier unit (2842), which is connected to a c.i.e. via a COM loop.

Conventional units (e.g. IS manual call point) are connected via a Galvanic isolator MTL 5061 (2820), which is connected to an Expansion board (4580) Ex zone line input or to an Isolated zone interface (2822), which is connected to a c.i.e. via an I/O unit (3361). See also drawings 128 – 30 and – 32.

MTL5061 Galvanic isolator (2820). The isolator is used to connect conventional IS detectors and manual call points to an expansion board 4580 zone line input (programmed in "Resistor-Ex" mode) or to an Isolated zone interface (2822). The isolator has two zone line inputs and two outputs (Channel 1 & 2) and is mounted in a Waterproof box (IP66/67), which has to be mounted outside the hazardous (Ex) area. Four compression glands for the cable entries and two end-of-line resistors (10K) with an area >230 mm^2 are supplied. Box dimensions (L x W x H): 175 x 125 x 150 mm. BASEEFA / ATEX classification: EEx ia IIC T_{amb}=60°C.

2822 Isolated zone interface. The Isolated zone interface (2822) contains of a waterproof box (IP66/67) that is supplied with four compression glands for the cable entries, an Isolated zone interface board (2823) mounted on a DIN rail, a DIN rail interface intended for an I/O unit (3361) and one 8K2 e-o-l resistor. The box has to be mounted outside the hazardous (Ex) area

A Galvanic isolator 2820 is to be connected to the Isolated zone interface 2822 (i.e. to the Isolated zone interface board 2823), which is connected to a COM loop via an Addressable multipurpose I/O unit 3361 that can be mounted inside the waterproof box. (2820 and 3361 have to be ordered separately.) Ext. power supply 24 V DC (30 mA) is required. Box dimensions (L x W x H): 175 x 175 x 75 mm.

2842 Intrinsically safe (IS) barrier unit. The barrier unit is used to connect analog addressable IS detectors to a COM loop. The unit has connectors for COM loop in / out, external power supply (24 V DC, 60 mA) and one IS COM line for connection of up to 20 IS detectors 2840 and 2841. It is mounted in a

Waterproof box (IP66/67). Five compression glands for the cable entries are supplied. Box dimensions (L x W x H): 280 x 280 x 133 mm. DEKRA: II (1) G [Ex ia Ga] IIC.

6.1.6.1 Intrinsically Safe (IS) mounting bases

YBN-R / 4 IS Intrinsically Safe mounting base (2812). In the base can be plugged a conventional intrinsically safe smoke (2810) or heat (2811) detector. The base has terminals for the zone line (in/out) and for an ext. LED. The zone line is connected to a Galvanic isolator (2820)

6.1.6.2 Intrinsically Safe photoelectric smoke detectors

SLR-E-IS Intrinsically Safe photoelectric smoke detector (2810). A conventional intrinsically safe photoelectric (optical) smoke detector, shall be plugged in the intrinsically safe mounting base (2812). The detector has two built-in LEDs that are lit to indicate that the detector has generated fire alarm. Zone classification: Cat. 1, 2 or 3. BASEEFA / ATEX classification: EEx ia IIC T5, T_{amb}= 50°C. Max 20 per zone.

2840 Analog IS smoke detector. An analog / addressable photo-electric smoke detector. The detector can be used with a back-box 2843 for higher IP rating. Three cable glands are supplied with the back-box. The detector has one built-in LED to indicate that the detector has generated fire alarm. The detector is in EBLWin programmed as an analog photoelectric smoke detector 4401 (in NORMAL mode) but it has to be connected to a COM loop via an IS barrier unit 2842. DEKRA: Ex II 1 G Ex ia IIC T5 Ga. (2842 and 2843 have to be ordered separately.)

6.1.6.3 Intrinsically Safe heat detectors

DCD-1E-IS Intrinsically Safe heat detector (2811). A conventional intrinsically safe Rate of Rise heat detector, fixed temperature 60°C (class A1), shall be plugged in the intrinsically safe mounting base (2812). Two built-in LEDs that are lit to indicate that the detector has generated fire alarm. Zone classification: Cat. 1, 2 or 3. BASEEFA / ATEX classification: II 1 G EEx ia IIC T5, T_a= -20 to +55°C. Max 20 per zone.

2841 Analog IS heat detector. An analog / addressable heat detector. The detector can be used with a back-box 2843 for higher IP rating. Three cable glands are supplied with the back-box. The detector has one built-in LED to indicate that the detector has generated fire alarm. The detector is in EBLWin programmed as an analog heat detector 3308 (in NORMAL mode) but it has to be connected to a COM loop via an IS barrier unit 2842. DEKRA: Ex II 1 G Ex ia IIC T5 Ga. (2842 and 2843 have to be ordered separately.)

6.1.6.4 Intrinsically Safe manual call points

MCP 1A-R470SGIS Intrinsically Safe manual call point (2814). A conventional outdoor manual call point (NO contact and alarm resistor 470 ohms). The call point is connected to a Galvanic isolator (2820). The call point shall be surface mounted with the supplied back-box (IP67) and has two compression glands for the cable entries. BASEEFA / ATEX classification: II 1 G EEx ia IIC T4, T_a= -30 to +70°C. Max 20 per zone.

6.1.7 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. a 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**[53] **power supply output** for external equipment with up to **2.1 A** or **0.85 A** continuous current consumption, at the same time as the battery charging is in progress.[54] 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 Product Leaflet. The COM loop address is set with an Address setting tool 3314 / 4414 (when 3366 is powered). The unit has an address label on which the programmed technical address is to be written.

The Address setting tool is also used for mode setting:

NORMAL mode: Used for 3366 in EBL128.

---

[53] 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.

[54] A current consumption of **0.85-2.1 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**.

2330 mode: Not used in EBL128.
2312 mode: Not used in EBL128.

AAFC Alarm Acknowledgement Facility Control.[55] The **AAFC** is a box with an alarm indication LED and a non-latching switch "Press to acknowledge false alarm". One AAFC per AAFC zone and up to 50 AAFC zones can be used. The COM loop address is set with an Address setting tool 3314 / 4414. See also chapter "Alarm Acknowledgement Facility", page 140.

6.1.8 Obsolete units

Obsolete units that can be used with EBL128, V2.1.x:
See chapter "COM loop units", page 32.

NOTE 1! Only address 1-127 can be used for any unit set in 23xx mode.
NOTE 2! When 'old' units (e.g. 22xx & 23xx units) are used the following is valid:
The "Autogenerate" function cannot be used. (Via EBLWin)
The "Check loop" function cannot be used. (Via EBLWin)

6.2 Units connected to the RS485 interface

Up to eight Ext. FBPs (1826 / 1828) and/or Alert Annunciation Units (1735 / 1736) and/or Ext. Presentation Units (1728) can be connected to the RS485 interface[56] (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[57]. Follow the Address setting instructions in the Technical Description for the unit respectively.

Via EBLWin 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.

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

[55] This unit is available on the Australian market only.

[56] The RS485 transceiver 4552 is an option.

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

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 18. **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.[58] 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 cannot 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, 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.

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

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 110.

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[59], 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.[58] It can be silenced. Any disablement in the system will be presented as "General disablement in system".[58]
A built-in buzzer will sound like in EBL128. The buzzer can be silenced but the alarm devices in the installation cannot be silenced via this unit. New software versions can be 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

[59] Two zone / address dependence.

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.

6.2.4 German Fire Brigade Panels

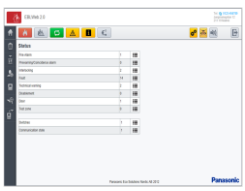
A **Communication module** (RS485 transceiver component) **4552** is required, see page 18.

FBF 2003 German Fire Brigade Control Panel (Feuerwehr-Bedienfeld). A grey metal housing (HxWxD, 185 x 255 x 58 mm) with a door. A key is required to open the door, which has a Plexiglas ahead of the front. It has cable inlets on the top, bottom and back sides and is intended to be wall mounted.
The function, LED indicators and push buttons on the front are in accordance with DIN 14661. **The front's designation texts are in German.** Serial RS485 interface for IHD protocol.
The unit is power supplied from EBL128 (or an ext. power supply). Up to 1200 m cable can be used.
NOTE! Switch 1 on the DIP switch shall be set to "on".

FAT 2002 German Fire Brigade Indicator Panel (Feuerwehr-Anzeigetableau). A grey metal housing (HxWxD, 185 x 255 x 58 mm) with a door. A key is required to open the door, which has a Plexiglas ahead of the front. It has cable inlets on the top, bottom and back sides and is intended to be wall mounted.
The function, Display information, LED indicators and push buttons on the front are in accordance with DIN 14662. **The front's designation texts are in German.** Serial RS485 interface for IHD protocol.
The unit is power supplied from EBL128 (or an ext. power supply). Up to 1200 m cable can be used.

6.3 Units connected to the RS232 interface J5

6.3.1 Web-servers



1598 Web-server II. This unit can be used:
a) for presentation of 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, test mode alarm and/or service signal.
b) for remote control via two-way communication. Up to 10 User names with an individual Password and three different access types / levels.
c) as a gateway to other PC systems etc.:
c1) EBL Talk is an open protocol, used to transmit and present fire alarm information in a separate PC / system. (RS232 or TCP/IP)

c2) Tateco, used to transmit and present fire alarm information in an Ascom Tateco paging system. (RS232)
c3) SIA, used to transmit and present fire alarm information in a separate PC application. (RS232)
c4) MODBUS (RS232) used to transmit and present fire alarm information in a separate PC application.

d) EBLnet. (TCP/IP) EBLnet **S**oftware **D**evelopment **K**it is used to develop your own Security Management System.

The tool for the Web-server configuration is a part of the PC program EBLWin. The Web-server configuration is downloaded to the web-server via TCP/IP.

The Web-server II consists of a light grey plastic cabinet (90x25x69.5 mm), which shall be vertically mounted on the symmetric 35 mm DIN rail inside the EBL128 c.i.e.

Web-server II 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 a PC with the PC program EBLWin to an EBL128 c.i.e. EBLWin is used for download / backup of the Site Specific Data (SSD), new software (firmware) download, the Web-server configuration, 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 (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.
J2:1 (+5 to +35 V DC) for conventional detectors / bases
J2:2 (+; $\leq$ 25 mA) for analog detectors / bases
J2:3 (0 V)

To be wall mounted (87 x 87 x 30 mm). 2218 has replaced 2217.

6.5.3 Alarm devices (sounders, etc.)

Regarding addressable alarm devices, see page 49.
In the Panasonic product range are no conventional (not addressable) alarm devices, 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 49.

6.5.4 Door release magnets

In the Panasonic product range are no Door release magnets. Door release magnets shall always be provided with a "suppresion 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 2 voltage outputs unit 3364

7 Programmable inputs

EBL128 has one programmable input (I0). In EBL128 can also be mounted the Inputs and Outputs expansion board 4583, with five programmable inputs (Input 0-4) that can be supervised or not supervised. See chapter "Expansion boards 458x", page 23.

On the COM loop can addressable multipurpose I/O units 3361 be connected. Each 3361 unit has two programmable inputs (In0/Z and In1), not supervised.

The different inputs have a bit different dialog boxes for programming via EBLWin. Information that shall be programmed:

- Name (Normally not changed, but used as Interlocking input it is recommended to add some identification information)
- Type ("Trigger condition")
- Supervised **or** not supervised. (Not valid for 3361.)
- Logic, Normally open (high resistance, 3K3, when supervised) **or** Normally closed (low resistance, 680R, when supervised)
- Ext. Fault (Text; only for trigger cond. "External fault")
- Ext. time channel Name (only for trigger cond. "External time channel")
- Technical warnings (text).
- Activate output (Technical address and Output)
- 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" – 3361 In 0).
- Disablement time channel (only for trigger cond. "Zone line input" – 3361 In 0).

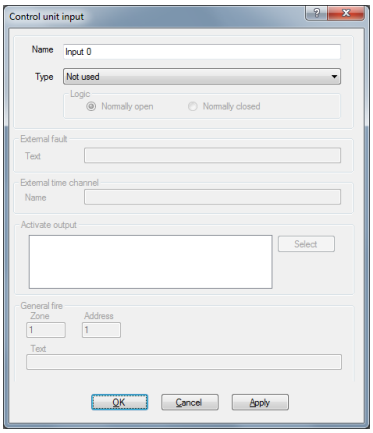


Figure 10. The EBLWin "Control unit input" dialog box. The different trigger conditions ("Type") require different additional information.

7.1 Control unit Input I0 & Inputs and Outputs exp. board 4583 and 4583DE, Input 0-4

7.1.1 Not supervised

Normally open (R > 20K)
or
Normally closed (R < 500ohm)

Activation time: >1 sec.

Connections, see drawing 128-22.

7.1.2 Supervised

Each supervised input can be in different states.

Depending on the selected logic, Normally open (high resistance) **or** Normally closed (low resistance), the following table is valid.

Control unit Input I0 & 4583:

Line resistance **R**	Normally open (high resistance)	Normally closed (low resistance)
R > 6K8	Fault; Open circuit (cut-off)	Fault; Open circuit (cut-off)
6K8 ≥ R > 2K (nom. 3K3)	Not activated	Activated
2K ≥ R > 70 (nom. 680)	Activated	Not activated
R ≤ 70	Short-circuit	Short-circuit

Connections, see drawing 128-22 and 128-33.

4583DE:

Line resistance **R**	Normally open (high resistance)	Normally closed (low resistance)
R > 4K	Fault; Open circuit (cut-off)	Fault; Open circuit (cut-off)
4K ≥ R > 3K (nom. 3K3)	Not activated	Activated
3K ≥ R > 2K	Fault; Not allowed	Fault; Not allowed
2K ≥ R > 70 (nom. 680)	Activated	Not activated
R ≤ 70	Fault; Short-circuit	Fault; Short-circuit

Connections, see drawing 128-33.

7.1.2.1 Input line fault

If open circuit (cut-off) or short-circuit is detected on a supervised input, a fault will be generated in EBL128 and the following fault message will be displayed:

```
FAULT: Programmable input
```

alternatively

```
FAULT: Programmable input x exp. board x
```

7.2 3361 unit Inputs In0 / Z & In1

Connections, see drawing 128-26.

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

8 Input programming

Input programming is done via EBLWin. Each input has to have an individual Trigger condition ("Type") and Logic. Each input can be supervised or not supervised.

8.1 Type (trigger conditions)

The following trigger conditions are available (numbers only for the paragraph "Comments to the trigger conditions"):

1. **Activate output**
2. **Activated fault routing equipment** (one input)
3. **Activated fire ventilation** (one input)
4. **Activated key cabinet** (one input)
5. **Activated Routing Equipment** (one input)
6. **Alarm Key Cabinet** (one input)
7. **Alert Annunciation Acknowledge**
8. **Alert Annunciation Reset**
9. **Door Closing Test Input**
10. **Evacuate** (one input)
11. **External Fault** (up to 50)
12. **External Time Channel** (one input per time channel)
13. **Extinguishing alarm**
14. **Extinguishing start**
15. **Extinguishing stop**
16. **Extinguishing system fault** (one input)
17. **Extinguishing system released** (one input)
18. **Fault Signal External Fuses** (one input)
19. **Fault Signal External Power Supply** (one input)
20. **Fault warning routing equipment fault** (one input)
21. **General Fire** (max. 100)
22. **Interlocking** (max. 100)
23. **Loss of battery charger to external power supply** (one input)
24. **Loss of main power source to external power supply** (one input)
25. **Not used**
26. **NZ Silence switch** (one input)
27. **Pre-warning**
28. **Technical warning** (up to 50)
29. **Zone Line Input** [60]

Comments to the trigger conditions:

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

1. Activated input will activate an output (Technical address / output.)
2. "Activated Fault routing equipment" signal (feed-back) to EBL128 will light up the LED "Fault tx activated" on the front. Output with trigger condition "Indication Fault tx Activated" will be activated.
3. Activated Ventilation equipment feedback to the EBL128 control unit to light up the LED "Ventilation".
4. Output with trigger condition "Activated Key cabinet" will be activated.
5. "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[61].) Output with trigger condition "Indication Fire Brigade tx Activated" will be activated.
6. 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.
7. Alert annunciation, see the EBL128 Operating Instructions for more information.
8. Like 7.
9. "Fire door closing" outputs will be activated for 20 seconds by this trigger condition.
10. Activated input will activate all programmable outputs of type "Alarm devices" steady (continuous).
11. Ext. fault will activate a fault in EBL128. A user definable fault message ("text") with up to 40 characters will be shown.
12. 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.
13. Activated input will activate a fire alarm in EBL128 (Zone no.) from an extinguishing system.
14. Used to start a new "countdown", see 15 below.
    Push button: NO, momentary action. One or more push buttons can be used.
15. Output for Extinguishing equipment (type of output = 2) has to have a delayed activation programmed (a "countdown"). This "countdown" will be stopped when an input with trigger condition 15 is activated. To start a new "countdown", see 14 above.
    Push button info: NO, latching action. One or more push buttons can be used. Manual reset of push button(s).

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

16. Activated input will generate a fault in EBL128. Output with trigger condition "Extinguishing system fault" will be activated. The following fault message will be shown:

```
FAULT: Extinguishing system fault
```

17. Activated input will light up the LED "Extinguishing" on the front. (Normally the LED will be lit when a corresponding output is activated.) Output with trigger condition "Extinguishing system released" will be activated.
18. 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
```

19. Ext. power supply equipment fault output will activate a fault in EBL128.
    The following fault message will be shown:

```
FAULT: External power supply
```

20. Activated input will generate a fault in EBL128.
    The following fault message will be shown:

```
FAULT: Fault warning routing equipment
```

21. A special detector, push button, etc. can activate a fire alarm in EBL128. Zone no. and Address (+ user definable text).
22. 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 93.
23. 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:

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

24. 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
```

25. Default. The input does not work.

26. Used for the "outside switch" (i.e. the New Zealand FB Silence switch).
27. 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).
28. A technical warning is neither an alarm nor a fault. It is activated as long as the input is activated, which is indicated by a blinking [i] in the display. Identified via menu H4/U6. Output with trigger condition "Technical warning (+name)" will be activated.
29. 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 (in the EBLWin dialog box "Input Properties").

8.2.1 Not supervised (default)

(•) Normally open (low) Normally open contact / normally low optocoupler input (3361).

( ) Normally closed (high) Normally closed contact / normally high optocoupler input (3361).

8.2.2 Supervised

Valid for the c.i.e. programmable input I0 and the Inputs and Outputs expansion board 4583 programmable inputs (Input 0-4).

(•) Normally open (high resistance)

( ) Normally closed (low resistance)

Depending on the selected logic, Normally open (high resistance, 3K3) **or** Normally closed (low resistance, 680R), the function will be according to the table on page 65.

9 Programmable outputs

EBL128 has two programmable voltage outputs (S0 and S1) and one programmable relay output (R0). 8 relay outputs expansion board 4581 can be mounted in EBL128. Input and Output expansion board 4583 with three programmable outputs (Output 0-2) can be mounted in EBL128. See chapter "Expansion boards 458x", page 23.

On the COM loop can be connected Addressable Multipurpose I/O unit 3361 with two programmable relay outputs (Re0 and Re1) per unit and Addressable 2 voltage outputs unit 3364 with two programmable voltage outputs (VO0 and VO1) per unit. Addressable siren 3377 / 4477, Addressable sounder base 3379, Addressable beacon 4380 and Addressable Light indicator 4383 can also be connected on the COM loop, i.e. these units have no physical output, only a siren, sounder, beacon, etc. Also the Wireless smoke detector (4620) has a sounder.

NOTE!
Units type 3377 + 3378 + 3379 + 4477 = max. 50.
Units type 4380 = max. 10.

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

- Name (Normally not changed)
- Type
- Output signal period (continuous, pulse, delay, etc.)
- Logic (NO / normally low **or** NC / normally high)
- Supervised / Not Supervised (The EBL128 voltage outputs, the Input and Output expansion board 4583 voltage outputs (Output 0-1) and Addressable 2 voltage outputs unit 3364.)
- Control expression (with one or more trigger conditions).
  If **Enter arguments in dialog** is selected a separate dialog box will open for easier entering of the required data (e.g. zone, address, etc.). **SSD size** indicates how big the control expression is. It must be ≤ 80.

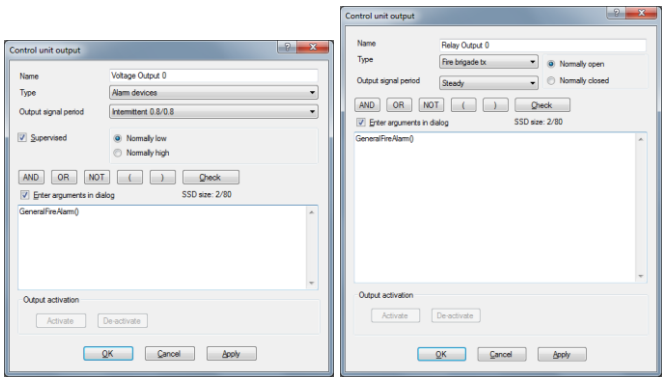


Figure 11. The EBLWin dialog boxes for the control unit outputs.

Each 3377, 4477, 3378 and 3379 unit is programmed (EBLWin) regarding:

- Technical address
- Name (Normally not changed)
- Priority level (High / Medium / Low)

  For each priority level:
  - Sound type (different for each priority level)
  - Name
  - Type (Normally "Alarm device")
  - Output signal period (Normally "Steady")
  - Control expression (with one or more trigger conditions)
    If **Enter arguments in dialog** is selected a separate dialog box is opened for easier entering of the required data (e.g. zone, address, etc.). **SSD size** indicates how big the control expression is. It must be ≤ 80.

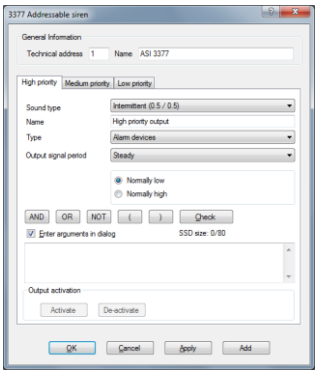


Figure 12. The EBLWin dialog box "Addressable siren 3377" (The dialog box for 3378 / 3379 is similar). For "Addressable siren with isolator 4477" also a Sequence number.

Test of outputs

When a PC is connected to a control unit, EBLWin open and you are logged on, each output can be activated / de-activated.

9.1 Control unit outputs S0 – S1

EBL128 has two programmable, supervised (monitored)[62] voltage outputs:

[62] Supervised as default but via EBLWin it is possible to set each output individually as not supervised (not monitored). A normally high output can not be supervised.
Supervised outputs have to be calibrated via menu H5/**A1**, see the EBL128 Operating Instructions. 1-5 supervision resistors 33K can be used. The

S0 Supervised (monitored) voltage output, 24V DC[63], max. 500 mA (Fuse F8).

S1 Supervised (monitored) voltage output, 24V DC[63], max. 200 mA (Fuse F6).

As default S0-S1 are set to type "Alarm device", "Intermittent 0.8 / 0.8, normally low, supervised and trigger condition "General fire".

NOTE! For **EN54-13** compliance, only one alarm device can be used (≤ 15 mA) and one 1K end-of-line resistor. Programmed as normally low and supervised.

Connections and more information, see drawing 128-22.
See also chapter "Programmable voltage outputs (S0-S1)", page 20.

9.2 Control unit output R0

EBL128 has one programmable relay output:

R0 Relay output, NO or NC contacts[64] programmable.

As default R0 is set to type "Routing equipment" (Fire brigade tx), Steady (cont.), normally open and trigger condition "Fire brigade tx".

Connections and more information, see drawing 128-23.

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 Inputs and Outputs expansion board 4583 Output 0 – 1

Expansion board 4583 has two programmable, supervised (monitored)[62] voltage outputs:

Output 0 Supervised (monitored) voltage output, 24V DC[63], max. 200 mA (Fuse F1).

---

calibrated value has to be in the range 4K7-50K. 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.

[63] See chapter "Technical data", page 143, regarding **system voltage**.

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

Output 1 Supervised (monitored) voltage output, 24V DC[63], max. 200 mA (Fuse F2).

Connections and more information, see drawing 128-33.

See also chapter "Inputs and outputs expansion board 4583", page 26.

9.5 Inputs and Outputs expansion board 4583DE Output 0 & Output 1

Expansion board 4583 has two programmable, supervised (monitored)[65] voltage outputs:

Output 0 Supervised (monitored) voltage output, 24V DC[66], max. 200 mA (Fuse F1). This output is intended for German fire alarm routing equipment.

Output 1 Supervised (monitored) voltage output, 24V DC[66], max. 200 mA (Fuse F2). This output is intended for German key cabinet.

Connections and more information, see drawing 128-33.

See also chapter "Inputs and outputs expansion board 4583DE", page 27.

NOTE! 24 V DC is the nominal voltage when the main power supply is used. When the second power supply (back-up battery) is used the voltage can be 21.6-28 V DC on board 4583DE.

9.6 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.

9.7 The 3364 unit outputs VO0, VO1 & VO2

Each 3364 unit has two programmable, supervised (monitored)[62] voltage outputs:

VO0 Supervised (monitored) voltage output, 24V DC, max. 1A[67]

VO1 Supervised (monitored) voltage output, 24V DC, max. 1A[67]

VO2 is a voltage output, 24V DC, max. 1A[67], intended for fire door closing. Normally high. For more information see the Technical Description MEW00529.

---

[65] This is default, but via EBLWin it is possible to set each output individually as not supervised (not monitored). A normally high output is not supervised. See also chapter "**Error! Reference source not found.**", page 112.

[66] See chapter "**Error! Reference source not found.**", page 168, regarding **system voltage**.

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

24 V DC required from an external power supply unit (e.g. 3366).
Connections, see drawing 128-21 & -28.

9.8 The 3377 / 4477 unit output (siren)

Each unit has one programmable output:
Output Siren, with three priority levels and three sound types.
Connections and more information, see drawing 128-21.

9.9 The 3378 unit output (sounder)

Each 3378 unit has one programmable output:
Output Sounder, with three priority levels and three sound types.
Connections and more information, see drawing 128-21.

9.10 The 3379 unit output (sounder)

Each 3379 unit has one programmable output:
Output Sounder, with three priority levels and three sound types.
Connections and more information, see drawing 128-21.

9.11 The 4380 unit output (beacon)

Each 4380 unit has one programmable output:
Output Beacon
Connections and more information, see drawing 128-21.

9.12 The 4383 unit output (Light indicator)

Each 4383 unit has one programmable output:
Output Light indicator
Connections and more information, see drawing 128-21.

10 Output programming

Output programming is done via EBLWin. See the EBLWin dialog box respectively.

10.1 Type

The following output 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[68]
1. Used to activate fire ventilation equipment[69]
2. Used to activate extinguishing equipment[70]
3. Used for sounders, etc.[71]
4. Used for fire alarm tx[72]
5. General (normal) control output. No collective disablement and no LED indication.
6. Output used together with a corresponding interlocking input. See chapter "Interlocking function", page 93. Activated outputs are shown in menu H9/C1.

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

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

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

[71] Collectively disabled / re-enabled via menu H2/B9 (all alarm device outputs). Controlled by push button "Silence alarm devices". Fault on / disabled output is indicated by LED "**Fault / Disablements** Alarm devices" blinking (fault) / continuous (disablement).

[72] Disabled / re-enabled via menu H2/B10 (Fire and/or fault outputs). Controlled via open door (if programmed so). Used together with trigger condition 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 EBLWin dialog box "Voltage or Relay Output".

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

( ) Normally closed / high Normally closed relay contacts / 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 is not supervised.

See also chapter "Programmable voltage outputs (S0-S1)", page 20.

10.4 Output signal period

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

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

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

The following types are available:

- Steady (continuous)
- Intermittent
- One pulse
- Steady Delayed Activation
- Intermittent Delayed Activation
- One pulse Delayed Activation
- 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 152.

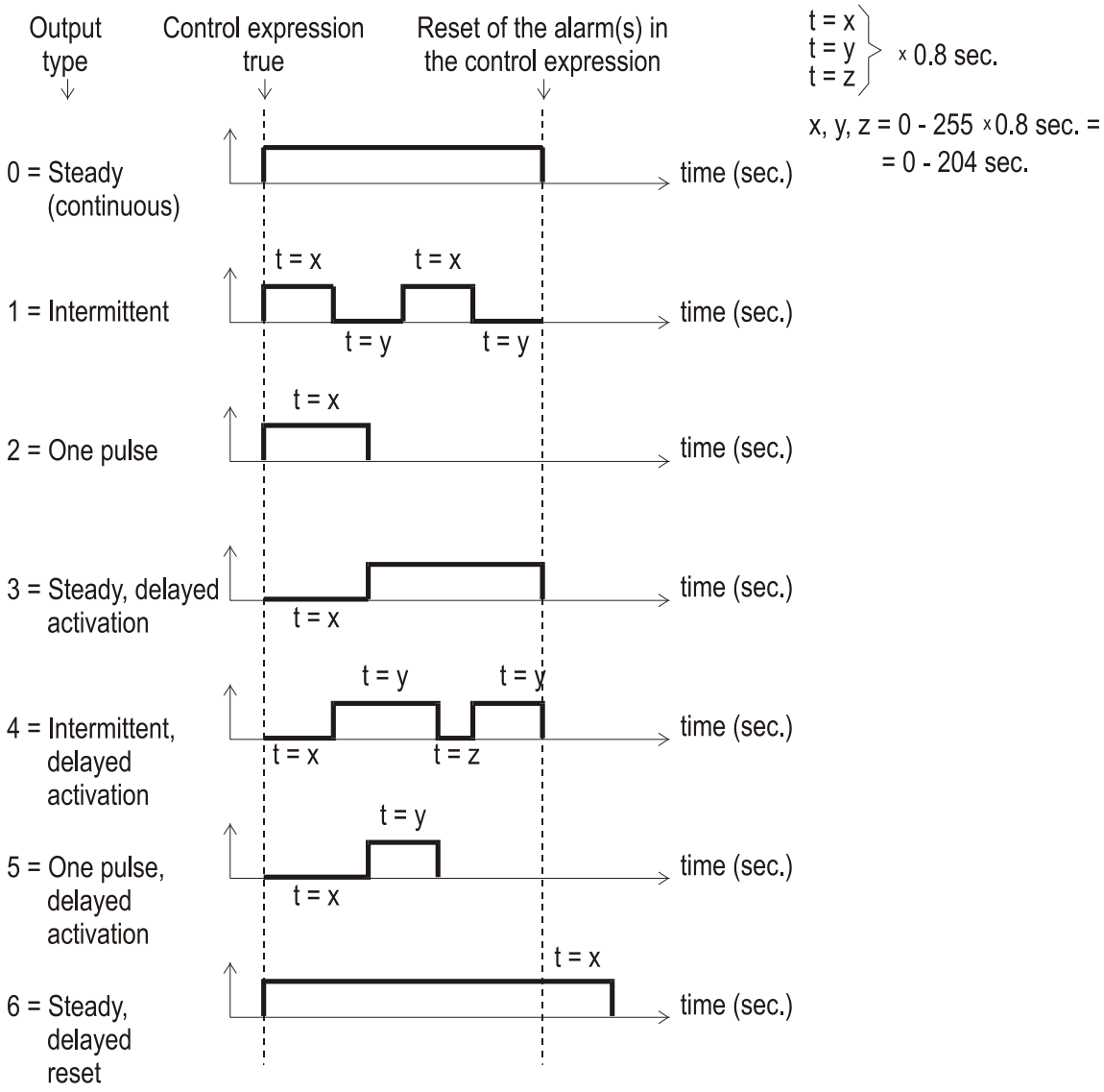


Figure 13. Delay time, Pulse length, Pulse off and/or De-Activation, have to be set for the "Signal period" respectively. For types 1 & 4 the x and y times must be equal and max. 5.6s. For types 2 & 5 the x time must be max. 5.6s.

NOTE! There are limitations according to the following table:

	In EBL128				COM loop units				
Output / Type	S0-S1	R0	4581 board	4583 board	I/O unit 3361	Unit 3364	Siren, S/B & Beacon & Light ind. 3377, 3378, 3379, 4380 & 4383	4582 board	Inter locking
0 Steady (continuous)	X	X	X	X	X	X	X	X	X
1 Intermittent	X	X	XXX	--	--	XX	--	--	--
2 One pulse	X	X	XXX	--	--	--	--	--	--
3 Steady (continuous), delayed activation	X	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 (continuous), delayed de-activation	X	X	X	X	X	X	X	X	--

Figure 14. The types that can be used in the "Output 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. It is created by so called Boolean algebra.

Trigger conditions (see "Available functions"), logical "Operators" (**AND**, **OR, NOT**) and parentheses are used to make a "control expression" containing up to 40 trigger conditions. See also chapter "Control expression examples" page 87.

A programmable output will be activated as long as its control expression is true.

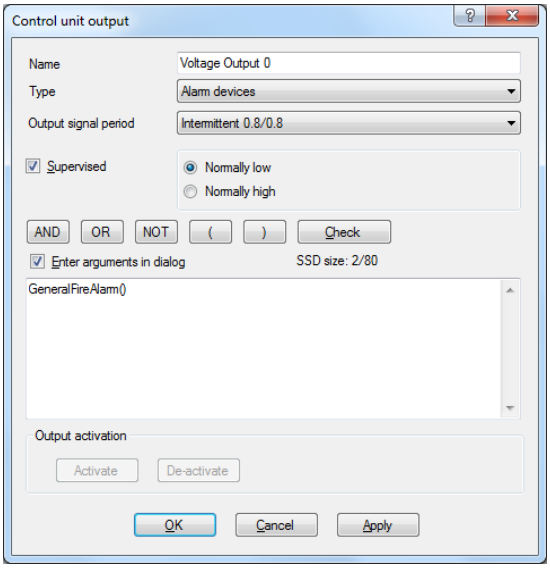


*Figure 15. In any output dialog box, click the right mouse button in the large white field. Select **Alarm**, **Interlocking**, **Disablement** or **Other** to open a "Trigger conditions list". Depending on the selected trigger condition, different arguments / data have to be entered. In the figure is the trigger condition "General Fire Alarm" selected.*

10.5.1 Trigger conditions

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

The trigger conditions are divided into four groups as follows:

Alarm
Interlocking
Disablement
Other

The numbering of the trigger conditions is only for "the comments to the trigger conditions" below:

10.5.1.1 Alarm

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 **Two Zone Dependent Fire Alarm** (+Zone no.)
15 **Multiple Detector Alarm**
16 **One Detector Alarm**
17 **Key Cabinet Alarm**
18 **AAF Zone Alarm** (+AAF Zone no.)
19 **Quiet Alarm Zone** (+Zone no.)
20 **Quiet Alarm Zone Address** (+ Zone no. +Address)
21 **General Fire Alarm Reset**
22 **Delayed Alarm Zone Address** (+Zone no. +Address)
23 **Delayed Alarm Zone** (+Zone no.)
24 **General Delayed Alarm**
25 **First Zone In Alarm Control Unit** (+Zone no. +Control Unit no.)

10.5.1.2 Interlocking

26 **Interlocking Input Area Activated** (+Area no.)
27 **Interlocking Input Area Point Activated** (+Area no. +Point)
28 **General Interlocking Input Activated**
29 **Consecutive Interlocking Input Activated** (sequence) (+start Area no. and point +stop Area no. and point +Quantity)

10.5.1.3 Disablement

30 **Fire Brigade Tx Disabled**
31 **Zone Disabled** (+Zone no.)
32 **Zone Address Disabled** (+Zone no. +Address)
33 **General Zone Address Disabled**

34 **All Control Disabled**
35 **All Alarm Devices Disabled**
36 **Control Disabled Control Unit** (+Control unit)
37 **Alarm Device Disabled Control Unit** (+Control unit)
38 **General Disablement**

10.5.1.4 Other

39 **Indication Fire Brigade Tx Activated**
40 **Indication Fault Tx Activated**
41 **General Fault**
42 **General Mains Fault**
43 **Reset Pulse Zone Address** (+Zone no. +Address) [73]
44 **Time Channel Activated** (+Time channel name / no.)
45 **Alert Annunciation Activated**
46 **Alert Annunciation Acknowledged**
47 **Door Open**
48 **Fire Door Closing** (+Zone no. +Address)
49 **General Service Signal**
50 **Fire brigade Tx**
51 **Door Open Control Unit** (+Control unit)
52 **Extinguishing System Fault**
53 **Extinguishing System Released**
54 **Activated Key Cabinet**
55 **Fault Control Unit** (+Control unit)
56 **Consecutive Fault Control Unit** (+start Control unit and stop Control unit)
57 **Zone Fault** (+Zone no.)
58 **External Fault** (+ext. fault)
59 **Technical Warning** (+techn. warning)
60 **General Technical Warning**

Comments to the trigger conditions (functions):

Alarm

1 Fire alarm. For more information regarding **fire alarm**, see EBL128 Operating Instructions MEW01741. Output is activated when the specified Zone is in alarm.
2 See 1. Output is activated when the specified alarm point is in alarm.
3 See 1. Output is activated when any alarm point or Zone is in alarm.
4 See 1. Quantity (1-10): "1" means one unit in alarm is required, "2" means two units in alarm are required to activate the output and so on.
5 Pre-warning.[74] For more information regarding **pre-warning**, see EBL128 Operating Instructions

[73] Not valid for the 3364 outputs (VO0-VO2).

MEW01741. Output is activated when the specified Zone is over the pre-warning level.

6 See 5. Output is activated when the specified alarm point is over the pre-warning level.

7 See 5. Output is activated when any alarm point or Zone is over the pre-warning level.

8 See 5. See also 4 above regarding "Quantity".

9 Heavy smoke / heat alarm. For more information regarding **heavy smoke / heat alarm**, see EBL128 Operating Instructions MEW01741. Output is activated when the specified Zone is over the heavy smoke / heat level.

10 See 9. Output is activated when the specified alarm point is over the heavy smoke / heat level.

11 See 9. Output is activated when any alarm point is over the heavy smoke / heat level.

12 See 9. See also 4 above regarding "Quantity".

13 Output is activated when only one address (in two-address dependence) is in fire alarm state. For more information, see EBL128 Operating Instructions MEW01741.

14 Output is activated when only one zone (in two-zone dependence) is in fire alarm state. For more information, see EBL128 Operating Instructions MEW01741.

15 Output activated when "Multiple detector alarm" is true, i.e. fire alarm type A.[75]

16 Output activated when "One detector alarm" is true, i.e. fire alarm type B[75].

17 General Key cabinet alarm activated. For more information, see EBL128 Operating Instructions MEW01741.

18 **A**larm **A**cknowledgement **F**acility. Australian facility (require special hardware). "Alarm" is activated in the specified AAF zone.

19 Output activated for any "Quiet alarm" in the specified zone. Used e.g. for the fan control function.

20 Output activated for one specified "Quiet alarm" in the specified zone-address. Used e.g. for the fan control function.

21 This control expression is true (i.e. output activated) for 15 seconds after the last alarm is reset.

[74] 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 even if the option pre-warning detection is disabled (via EBLWin).

[75] See chapter "Fire alarm type A and Fire alarm type B", page 106.

22 Output is activated during the delay of the specified Zone-Address. (Delay time set in EBLWin, System Properties.)

23 Output is activated during the delay of the specified Zone. (Delay time set in EBLWin, System Properties.)

24 Output is activated during the delay of any Zone or Zone-Address in the system. (Delay time set in EBLWin, System Properties.)

25 Output is activated only if the first alarm is an alarm in the specified Zone in the specified Control Unit.
NOTE! This is not valid for manual call points.

Interlocking

26 Output activated when one or more interlocking inputs, in the specified interlocking area, are activated.

27 Output activated when the interlocking input, in the specified interlocking area/point, is activated.

28 Output activated when any interlocking input is activated.

29 Output activated when interlocking inputs, in the specified range, are activated (from interlocking area no. / point to interlocking area no. / point). See also 4 above regarding "Quantity".

Disablement

30 Output activated when any Routing equipment output (Fire brigade tx) is disabled.[76]

31 Output activated when the specified zone is disabled.[77]

32 Output activated when the specified alarm point (zone-address) is disabled.[77]

33 Output activated when any alarm point (zone-address) or zone is disabled. [77]

34 The control expression is true (output activated) when all control outputs of the types **Control**, **Fire ventilation** and **Extinguishing** are disabled via menu H2/B4[77]. This output shall be type Control – neutral.

35 The control expression is true (output activated) when all control outputs of type **Alarm** device are disabled via menu H2/B9[78]. This output shall be type Control – neutral.

36 The control expression is true (output activated) when all control outputs of the types **Control**, **Fire ventilation** and **Extinguishing** are disabled via menu H2/B4.[77] This output shall be type Control – neutral.

[76] Which is indicated by LED **Fault / Disablements** "Fire brigade tx".

[77] Which is indicated by LED **Fault / Disablements** "General Disablements".

[78] Which is indicated by LED **Fault / Disablements** "Alarm devices".

37 The control expression is true (output activated) when all control outputs of type **Alarm device** are disabled via menu H2/B9). This output shall be type Control – neutral.

38 The control expression is true (output activated) when any disablement exists in the system.[77]

Other

39 The control expression is true (output activated) when LED "Fire brigade tx" is lit, i.e. when any "Fire brigade tx" output is activated (default) or when a programmable input with trigger cond. "Activated Routing Equipment" is activated.[79] Used for example when an ext. LED "Fire brigade tx" is required.

40 The control expression is true (output activated) when LED "Fault tx activated" is lit, i.e. when the routing equipment output (Fault tx) is activated.[80]

41 Output activated when one or more faults are generated in the system.[81]

42 Output activated for loss of mains (in the c.i.e. or external power supply 3366). **NOTE!** The output(s) will be activated immediately but the corresponding fault is normally delayed (set via EBLWin).

43 The control expression is true (output activated) for 5 seconds, whenever a reset pulse is sent to the specified Zone-Address.

44 Output activated when the specified time channel is activated.

45 Output activated when Alert annunciation alarm is activated (by any alarm point set to activate this function).[82] For more information, see EBL128 Operating Instructions MEW01741.

46 Output activated when Alert annunciation alarm is activated (by any alarm point set to activate this function)[82] and acknowledged. For more information, see EBL128 Operating Instructions MEW01741.

[79] This output will also be activated when the routing equipment test is performed via menu H1. This trigger condition **must not** be used for type of output "Routing equipment (Fire brigade tx)".

[80] Which is indicated by LED **Routing equipment** "Fault tx activated". This output will also be activated when the routing equipment test is performed via menu H1.

[81] Which is indicated by LED **Fault / Disablements** "General fault" and/or LED **Routing equipment** "Fault tx activated".

[82] Valid until the AA alarm is reset or becomes a normal fire alarm.

47 Output activated for Door open in the control unit or in any Ext. Fire Brigade Panel in the system.[83]

48 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".[84] Output activated, see chapter "Fire Door Closing function", page 97.

49 Output activated when Service signal is activated (by any sensor).[85]

50 The control expression is true (output activated) when the control unit standard output "Fire brigade tx" is activated. **NOTE!** Normally used with output type *Routing equipment (Fire brigade tx)*.

51 Output activated for Door open in the control unit.[83]

52 Output activated when input trigger condition "Extinguishing system fault" is true.

53 Output activated when input trigger condition "Extinguishing system released" is true.

54 Output activated when input trigger condition "Activated key cabinet" is true.

55 Output activated when one or more faults are generated in the control unit.[81]

56 Output activated when one or more faults are generated in the control unit.[81]

57 Output activated when one or more faults are generated in the specified Zone.[81]

58 Output activated when the specified external fault is generated.[81]

59 Output activated when the specified technical warning is generated.[86]

60 Output activated when one or more technical warnings are generated.

10.6 Logical operators

The logical operators available in EBLWin are in priority order:

( ) **parentheses**, changes priority order

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

AND **and**-function, is written **AND** in EBLWin

OR **or**-function, is written **OR** in EBLWin

[83] Which is indicated by the LED "Door open" in the c.i.e.

[84] In Danish convention (DBI), must only the c.i.e. outputs R0 and S0-S1 be used (or COM loop unit 3364) and the type has to be "control neutral".

[85] Indicated by the LED "Service" in the c.i.e.

[86] Indicated by a blinking [i] in the c.i.e. display.

10.6.1 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.

10.6.1.1 AND

a ***AND*** b ***AND*** c=y

y is true (=1) when all 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

10.6.1.2 OR

a ***OR*** b ***OR*** 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

10.6.1.3 NOT

Inverts a condition, e.g. ***NOT*** b=***NOT*** 0=1.

A ***OR NOT*** b ***AND*** 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

10.6.1.4 Parentheses

Changes priority order.

a ***OR NOT (***b ***AND*** c***)***=y (This is same as the previous but parentheses are added, which makes a differance.)

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

10.6.1.5 Control expressions

The ***AND*** operator has priority, i.e. a ***AND*** b ***OR*** c = ***(***a ***AND*** b***) OR*** c. This is perhaps more obvious if you write it: a · b + c.
NOTE! a ***AND*** b ***OR*** c ≠ a ***AND (***b ***OR*** c***)***.

Here follows some examples (and explanations) to show how to build a control expression with trigger 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 ***AND NOT*** Door Open

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

Example 3

Output: Voltage output **VO0**

Control expression: Fire Alarm Zone (23) ***AND*** Fire Alarm Zone (24) ***AND NOT*** General Fault

Explanation: Fire alarm activated in zone 23 and zone 24 will activate the output VO0 only if there are **no** faults in the system at the same time.

Example 4

Output: Voltage output **S1**

Control expression: Consecutive Fire Alarm (10,10,10,19,**1**) ***OR*** Consecutive Fire Alarm (10,21,10,40,**1**)

Explanation: Fire alarm activated by **one** of the alarm points in zone 10 addresses 10-19 or by **one** of the alarm points in zone 10 addresses 21-40 will activate the output S1 (i.e. the alarm point in zone 10 address 20 will not activate the output S1).

11 Short circuit isolators

A break or short circuit on the COM loop has to generate a fault in the control unit within 60-100 seconds (EN54-2 requirement).

If one or more short circuit isolators are used[87], the loop will be divided into "segments" (i.e. the part between two short circuit isolators or between the control unit and one short circuit isolator). Only the affected segment will be isolated, which will minimise the number of units disabled by a short circuit.
The fault messages will also show between which isolators the short circuit is situated.

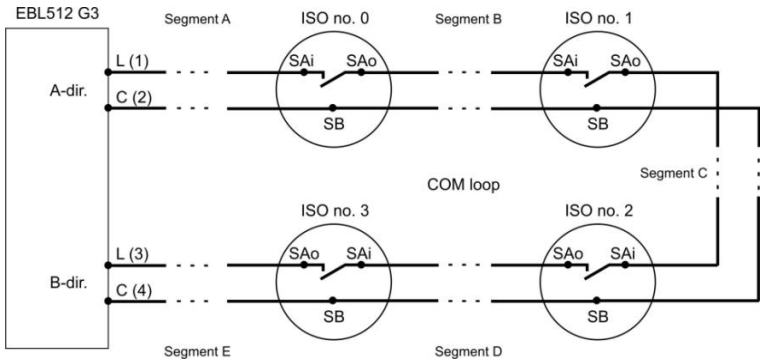


Figure 16. The first isolator (ISO) in the A-direction has to have the sequence no. 0 (ISO no. 0), the next sequence no. 1 and so on. The sequence no. is programmed via EBLWin.

If no short circuit isolators are used, the whole COM loop will be disabled in case of short circuit on the loop.

As from version 2.1.x, the communication (and power supply) direction will alternate every 22nd second.

COM loop end-point voltage[88] <12 V DC or **COM loop short circuit** or **COM loop break(s)**:

This will start a "cycle" as follows.

- The whole loop will be disabled, i.e. no voltage on the loop which means that all isolator relays will be powerless (= all isolators disabled), i.e. there will be a “break” on the L (SA) wire in each isolator.

- A control unit algorithm will now try to re-enable the first isolator in the A-direction (ISO no. 0 / sequence no. 0). If this is possible, the next isolator in the A-direction (ISO no. 1 / sequence no. 1) will be re-

[87] One short circuit isolator per 32 alarm points is required according to EN54-2.

[88] When communicating in the A-direction.

enabled, if this is possible. And so on. The isolator just before a short circuit cannot be re-enabled.

- The control unit algorithm will now try to re-enable the first isolator in the B-direction (ISO no. 3 / sequence no. 3 in Figure 16). If this is possible, the next isolator in the B-direction, and so on.

- Finally all isolators will be re-enabled except the isolator on each side of a short circuit and any isolator(s) between two or more breaks on the loop.

- Communication will be in both directions for 10 minutes. Then a new "cycle" starts.

- If the "fault(s)" are not corrected, the communication will be in both directions for another 10 minutes when a new "cycle" starts, and so on.

- If the "fault(s)" are corrected, the communication will return to be in the A-direction only.

Depending on if it is too low voltage on the loop, short circuit, one break or two or more breaks, the fault messages will be different.

- **FAULT: Cut-off SCI nn <-> SCI nn**
  NOTE! nn = A, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15 - - up to 63 or B.
- **FAULT: Short circuit SCI nn <-> SCI nn**
  NOTE! nn = A, 00, 01, 02, 03, 04, 05, 06, 07, 08, 09, 10, 11, 12, 13, 14, 15 - - up to 63or B.

If there are multiple loop faults, i.e. one or more short circuits and/or one or more Cut-offs, there will be a "multiple COM loop fault" message.

- **FAULT: Several faults on COM-loop**

The first fault message will show the first fault in the A-direction.

There will always be a "no reply" message for all units not found in spite of communication in both directions.

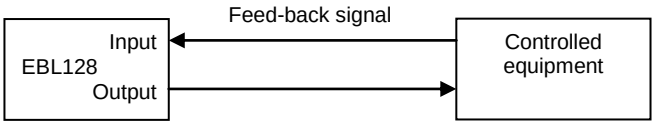
- **FAULT: No reply xx-xx**
- **FAULT: No reply techn address xxx**

Regarding Fault acknowledge, see the EBL128 Operating Instructions MEW01741.

NOTE! After the faults are acknowledged it can take up to 10 minutes before the faults will disappear from the fault list, since the check ("cycle") starts every 10^{th} minute.

12 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).



12.1 Interlocking programming

EBLWin is used for the programming. Up to 100 Interlocking Combinations can be used.
NOTE! Each interlocking input and each interlocking output can only be used in one interlocking combination.

12.1.1 Interlocking output

The "Voltage Output" / "Relay Output" dialog boxes are to be used.
Type: "Interlocking" is to be selected.
Output 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).

12.1.2 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).

12.1.3 Interlocking combination

One interlocking output plus 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.[89]

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

[89] In the "Interlocking Combination" dialog box are listed all the outputs and inputs previously programmed for interlocking, see Figure 17.

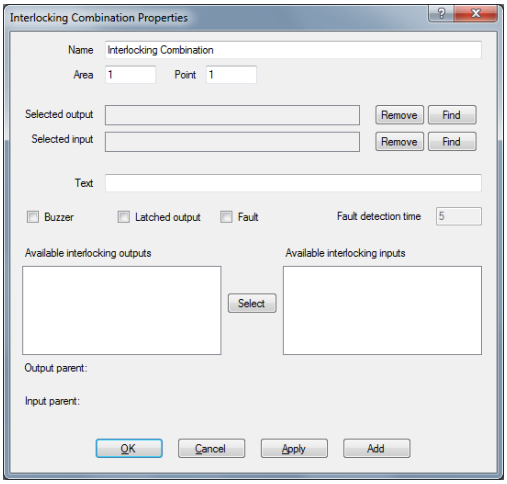


Figure 17. The EBLWin dialog box "Interlocking Combination".

Logical Name: Displayed in the EBLWin Tree and List views. Default name can be changed when wanted / required.

Area and **Point**: Each "Interlocking Combination" is presented as Area-Point (compare with Zone-Address). Area numbers 1-99 are possible to use and Point numbers 1-99 are possible to use.

Available interlocking outputs list displays all the previous programmed outputs, Type = "Interlocking Output".

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 in the list respectively.[90] 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 EBLWin", page 119.

Buzzer checked = activated interlocking input will turn on the EBL128 buzzer (0.8 / 0.8 sec.)[91]. 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.

[90] Output / Input parent will then show in which unit the output / input respectively is situated.

[91] 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[92], a fault will be generated:

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

12.2 Interlocking indications

One or more activated Interlocking Combinations (interlocking output and/or input) are indicated in the display in EBL128[93]:

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

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

12.3 Information of interlocking combinations (H9)

Menu H9 has the following sub menus.

12.3.1 Display interlocking information (H9/C1)

See also chapter "Interlocking indications", page 95.
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.

12.3.2 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

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

[93] This indication has low priority and will only be shown in the display if there are no fire alarms, faults, disablements, etc.

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

12.3.3 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.

12.3.4 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.
All interlocking outputs can be disabled collectively via menu H2/B4.

12.3.5 Re-enable interlocking output (H9/C5)

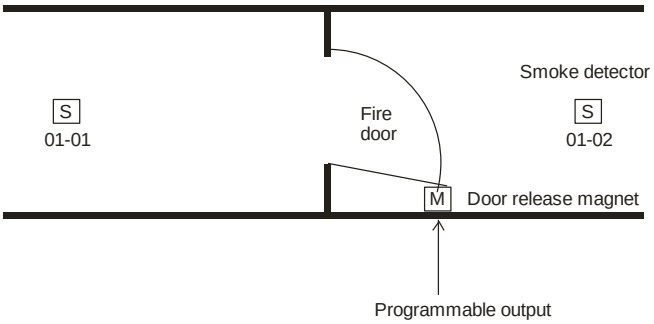
Interlocking outputs (i.e. Output Type = Interlocking) can be re-enabled via menu H9/C5.
Disabled interlocking outputs are listed in menu H9/C5. Use "↑" "↓" to scroll between the "Interlocking Combinations" (i.e. Area / Point) or type it via the key-pad.
All interlocking outputs, disabled via menu H2/B4, can be re-enabled via menu H2/B8.

12.4 Interlocking control expressions

A programmable output control expression can contain "interlocking" trigger conditions ("Functions") numbers 14-17 (see chapter "Control expression", page 80), i.e. one or more outputs can be activated when one or more interlocking inputs are activated.

13 Fire Door Closing function

Programmable outputs[94] can be used for fire door closing. A special trigger condition is available (no. 44 = 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 (from any of the programmed detectors)
- "Test mode" (the zone involved set in test mode)
- Fault (i.e. "no answer" from any of the programmed detectors[95])
- Disablement (any of the programmed detectors or the involved zone(s)).
- A definite time every day, if programmed via EBLWin. (The output will be activated for 20 seconds.)
- Via a programmable input (trigger condition no. 9 = 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.[94] If there is short-circuit or a double break on the COM loop, the I/O unit cannot 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 93.

[94] It is recommended but in the DBI (Danish) convention, must only EBL128 outputs R0 and S0-S1 as well as the COM loop unit 3364 be used and "Type of output" has to be "Control neutral".

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

14 Functions / Services / Features

Some Functions / Services / Features require programming in EBLWin, see chapter "PC S/W", page 16.
How to connect the PC and for more information, see chapters "Download SSD", page 158 and "New system program (S/W) version download", page 161.

The information in the following chapters 14.1 - 14.7 is valid for the **analog smoke detectors 430x / 440x in NORMAL mode.**
Chapter 14.5 is valid for the **analog heat detectors 3308 / 3309 in NORMAL mode**.
For the analog detectors 440x in **Advanced mode**, see chapter "Advanced mode", page 128.

14.1 Sensor value

An analog smoke detector is like a "sensor". It detects its environment at all times. Each detected analog value is, in the detector, converted to a digital "**sensor value**", which for each individual detector, is continuously picked up and evaluated by EBL128. In Figure 18 the (digital) sensor values (during a certain time) are represented by the graph "**Working level**".

14.2 Week average sensor value

Each hour, one sensor value is stored in a special memory (in EBL128) and each week, these stored sensor values are used for a "**week average sensor value**" calculation.[96] This is done for each analog smoke detector individually. In Figure 18 the (digital) week average sensor values (during a certain time) are represented by the graph "**Week average sensor value**" (B).

Each analog smoke detector has a default sensor value = 0.1 %/m and a week average sensor value = 0.1 %/m (i.e. at Time = 0).
A "**fire alarm offset**" (value) is added to the week average sensor value 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 18 represented by the graph "**Fire alarm level**" (C) - parallel with the graph "**Week average sensor value**" (B).

In Figure 18 (at Time = 0):
The week average sensor value (B) is 0.1 %/m and the fire alarm offset is 3 %/m, i.e. the fire alarm level (C) is 0.1+3=3.1 %/m.

Service signal will be given when the week average sensor value for a detector has reached the service signal level (1.8 %/m), i.e. the

[96] The first week average sensor value will be calculated within 2½ minutes after any restart, i.e. also after SSD download. During these 2½ minutes all analog smoke detector fire alarms are suppressed.

detector is "dirty" and has to be replaced. See "**Service level**" (D) in Figure 18. The week average sensor value will now stay on 1.8 %/m, i.e. the detector will be more sensitive until it is replaced with a new one.

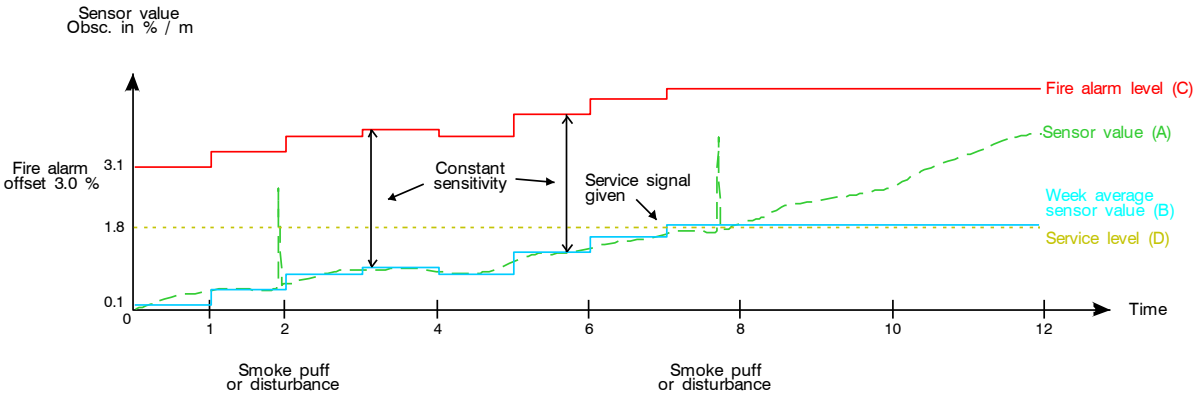


*Figure 18. The basic working **principle** for an analog smoke detector ("sensor"). Sensor value (A), Week average sensor value (B), Fire alarm offset (3 %/m), Fire alarm level (C) and Service level (D).*

"Sensor Information" is available via menu H4/U4. Via EBLWin and a PC connected to EBL128 you can also get continuous "Sensor Information" for one or several detectors.

Also via the Web-server II 1598 you can get "Sensor Information" for one or several analog detectors on a COM loop.
The smoke detector sensor values are presented as obscuration in % per meter (%/m). (Heat detector values as °C.)

14.3 Decision value

In order to secure real fire alarms and reduce the nuisance alarms, a decision value is calculated. The decision value is used to decide if it is normal state, pre-warning, fire alarm or heavy smoke alarm and also in the smouldering smoke algorithm (see page 103). The decision value is calculated, see chapter "Filtering algorithm, page 101.

14.4 Alarm algorithms for smoke detectors / Detection levels / Offsets

Each alarm algorithm has three detection levels:

1. **fire alarm** (fire alarm level = the week average sensor value + the fire alarm offset)
2. **pre-warning** will be activated (if selected in EBLWin – Control unit Properties) at a lower level (smaller offset) than for fire alarm, i.e. pre-warning will be activated before the fire alarm from the same alarm point.

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 later than the fire alarm from the same alarm point.

The pre-warning offset and the heavy smoke alarm level can, for the whole system, be set in EBLWin, see chapter "**Alarm algorithms**", page **149**.

The fire alarm offset can, for the whole system, be set in EBLWin, see chapter "**Alarm algorithms**", page **149**. **NOTE!** This is not a normal action and a special password is required.

"Pre-warning", "Fire Alarm" and "Heavy Smoke Alarm" can activate programmable outputs respectively, see chapter "Control expression", page 80. See also EBL128 Operating Instructions MEW01741.

14.4.1 Alarm algorithm / Alternative alarm algorithm

In order to reduce the nuisance alarms[97] and ensure that the real fire alarms will be activated, six different alarm algorithms are available. See Figure 19., page 101. They are based on:

- Normal (N), High (H) or Low (L) sensitivity
- Normal (15 sec.) or slow (35 sec.) detection time

Normal sensitivity (Default) Fire alarm offset is **3.0 %** smoke obscuration per meter.

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

Low sensitivity Fire alarm offset is **3.6 %** smoke obscuration per meter, i.e. more than for normal sensitivity. Can be used to reduce nuisance alarms[97].

Normal detection time - 15 sec. (Default) There will always be min. 15 seconds alarm delay[98]. This is a "normal filter" to reduce nuisance alarms.

Slow detection time - 35 sec.. There will always be min. 35 seconds alarm delay[98]. This is an "extra filter" to reduce nuisance alarms[97].

Each analog smoke detector can have two alarm algorithms programmed (via EBLWin). One **Regular alarm algorithm** that is normally used (**N-15** is default) and one **Alternative alarm algorithm** that is turned on/off via a time channel (internal or external). E.g. normal sensitivity can be used during night-time and low sensitivity during daytime (i.e. the alternative alarm algorithm is used to reduce nuisance alarms[97] during working hours).
The alarm algorithm in use can be read in menu H4/U3.

[97] So called false / unnecessary alarms.

[98] After the fire alarm level is reached / passed, it will take min. 15 alt. 35 seconds until fire alarm will be activated in the c.i.e.

14.4.2 Filtering algorithm

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

The filtering algorithm uses the sensor values to calculate a decision value depending on which alarm algorithm that is in use. The decision value is zero from the beginning. Each time a new sensor value is picked up (sampled) from an analog smoke detector 430x / 440x, this new sensor value is compared with the actual decision value and the decision value will be adjusted or not adjusted as follows:

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 is > "**X**", the decision value is increased or reduced by "X".

"**X**" = The Step Value. It is different depending on the sensitivity and detection time, i.e. it is depending on the selected alarm algorithm, see Figure 19.

The decision value can consequently not be increased / decreased with a value exceeding the "X" value even if the sensor values are much higher / lower.

Analog detector	Normal detection time (15sec.)			Slow detection time (35sec.)		
	H-15 2.4%, High sensitivity	**N-15** 3.0%, Normal sensitivity	**L-15** 3.6%, Low sensitivity	**H-35** 2.4%, High sensitivity	**N-35** 3.0%, Normal sensitivity	**L-35** 3.6%, Low sensitivity
4300 / 4301 4400 / 4401	X=8	X=10	X=12	X=4	X=5	X=6

*Figure 19. The six alarm algorithms for the detectors 430x and 440x in NORMAL mode. Default is alarm algorithm **N-15**, i.e. normal detection time (15 sec.) and normal sensitivity (3%). X=The step value.*

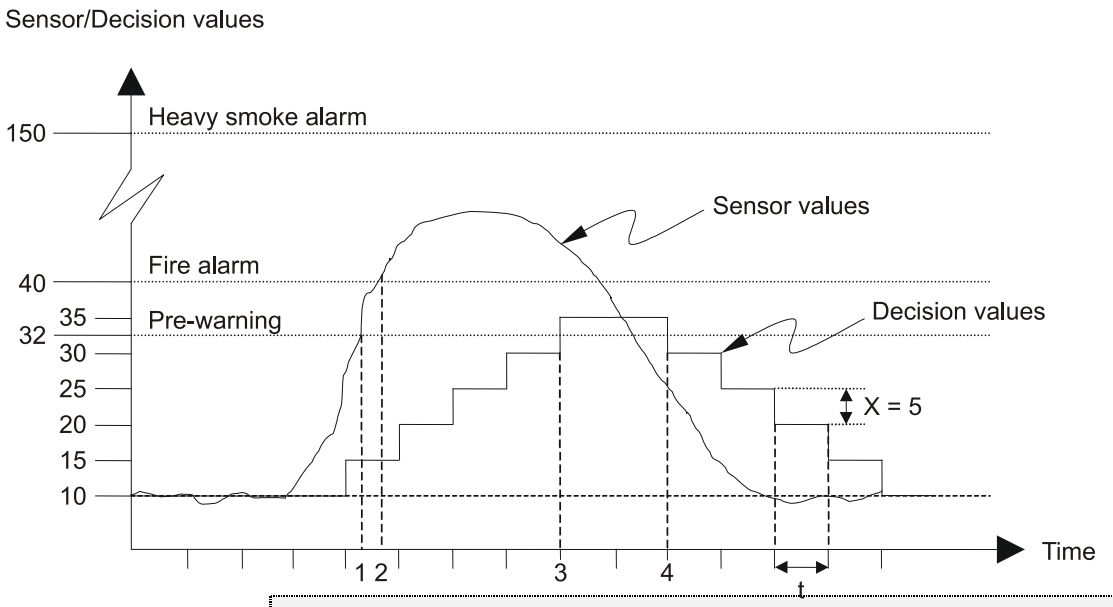


*Figure 20. An **example** of the filtering algorithm for an Analog smoke detector with the step value X = 5. The polling time (t) in **this** example is approx. 2.56 seconds.*

Explanations to the figure:

In this example, the week average sensor value is "10" (=1.0 %/m) at the "starting point", i.e. due to contamination the pre-warning level has been adjusted to "32" (10+22) and the fire alarm level to "40" (10+30). The sensor value is accordingly "10".

In this example, alarm algorithm "N-15" is selected, i.e. normal detection time 15 sec. and normal sensitivity 3% (30). X = 5. The detector polling time **t** ≈ 2.56 sec. (**In system EBL128** the detector polling time **t** ≈ 7 seconds and the step value "X" is according to Figure 19 – but the **principle** is the same.)

In this example, the sensor values and decision values at start are approx. equal ("10"). When smoke comes into the detector the sensor values will increase and by the fourth polling be approx. "27". Since 27-10 > X=5, the decision value ("10") is increased by X=5 to "15". Next polling the sensor value is approx. "45", i.e. the decision value ("15") is increased by X=5 to "20", and so on. In this example the decision value never comes up to the fire alarm level. When the sensor value is reduced to approx. "25" the decision value is set to "30", because 35-25=10 > X=5, i.e. the decision value ("35") is reduced by X=5 to "30", and so on.

1. The sensor value has here reached the pre-warning level but nothing will happen since the decision value has not reached the pre-warning level.
2. The sensor value has here reached the fire alarm level but nothing will happen since the decision value has not reached the fire alarm level.

3. The decision value has here reached the pre-warning level and pre-warning is activated.
4. The decision value is here below the pre-warning level and the pre-warning is automatically reset.

14.4.3 Smouldering smoke algorithm

The smoke from a smouldering fire brings the sensor value to rise very very slowly but not reach the fire alarm level. A smouldering fire can last for hours and sometimes days. The smouldering smoke algorithm will detect such a fire at an "early" stage.

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

If the decision value has been over the smouldering level for **7 minutes** (1-2 in the figure), the pre-warning and fire alarm levels will be lowered:
- 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, but not the fire alarm level, after **additional 90 minutes** (2-4 in the figure), the pre-warning and fire alarm levels will be lowered again:
- 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.

If the decision value continue to rise fire alarm will be activated (5 in the figure).

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, for the whole system, be set in EBLWin, see chapter "**Alarm algorithms**", page **149**.

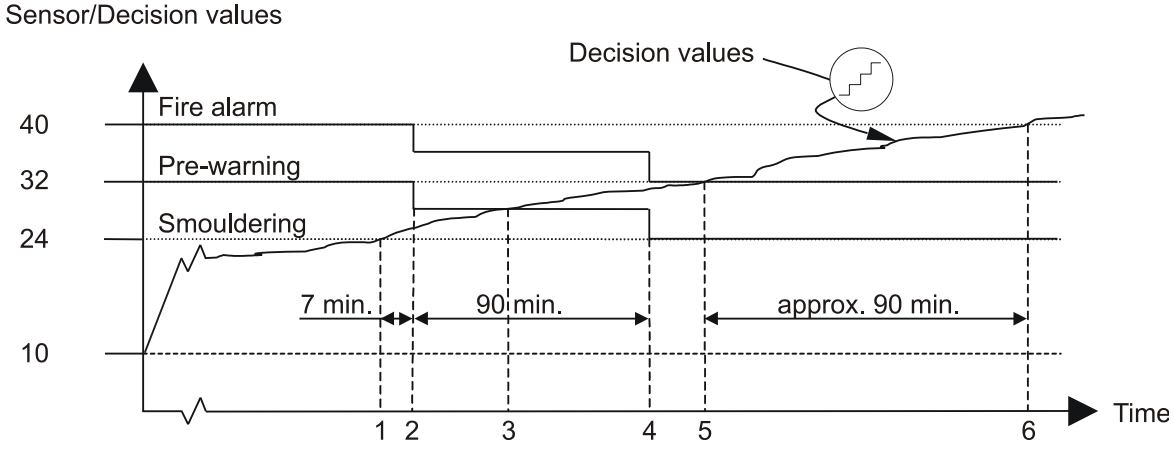


*Figure 21. An **example** of the smouldering smoke algorithm for an Analog smoke detector 4301.*

Explanations to the figure:

In this example, the week average sensor value and the decision value are "10" (=1 %/m) at the "starting point", i.e. due to contamination the smouldering level has been adjusted to "24" (10+14), the pre-warning level to "32" (10+22) and the fire alarm level to "40" (10+30).

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

1. The decision value has here reached the smouldering level. A 7 minutes timer is started.
2. After the 7 minutes the decision value is still over the smouldering level and the pre-warning level and the fire alarm level are lowered. A 90 minutes timer is started.
3. The decision value has here 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 lowered again.
   A 120 minutes timer is started.
5. The decision value has here reached the fire alarm level and fire alarm is activated.
6. The decision value has here reached the original fire alarm level, i.e. the fire alarm would have been activated approx. 90 minutes later than with the smouldering algorithm!

14.4.4 Performance factor

To find out how the environment is where an analog smoke detector 430x and 440x in NORMAL mode is mounted, the **performance factor** can be studied. The performance factor is shown in menu H4/U3 together with the min. and max. sensor values. All three

values should be studied together. (E.g. one or two high sensor values will not result in a high performance factor.) The performance factor is calculated for each detector individually.

$$\frac{\sum_{m=0}^{12343} |X_m - X_{wa}|}{12343} = Pf$$

X_m = momentary sensor values for 24 hours.
X_{wa} = week average sensor value
12343 = pollings during 24 hours

Each sensor value is compared with the week average sensor value. The absolute difference is saved and each twenty-four hour (at midnight) is an "average value" calculated, i.e. the performance factor.

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

An "unstable" environment can cause nuisance alarms (unnecessary alarms). Perhaps should another type of detector or alarm algorithm be used or other functions, e.g. alert annunciation or two-address dependence.

14.5 Algorithms for analog heat detectors

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 EBLWin). One **Regular alarm algorithm** that is normally used and one **Alternative alarm algorithm** that is turned on/off via a time channel (internal or external). E.g. class A1 can be used during night-time and class B can be used during daytime (the alternative alarm algorithm is used to reduce nuisance alarms during working hours). The actual algorithm can be read in menu H4/U3.

When the c.i.e. has picked up a sensor value above the **fire alarm** level (xx° C) 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 the c.i.e. (This results in an approx. 14 seconds alarm delay).

The same is valid for **pre-warning** except it is a lower level (xx° C) than for fire alarm. (If pre-warning shall be generated or not, is selected in EBLWin – Control Unit Properties).

The same is valid for **heavy heat alarm** except it is a higher level than for fire alarm.

The fire alarm, pre-warning and heavy heat alarm levels can, for the whole system, be set in EBLWin, see chapter "**Alarm algorithms**", page **149**.
See EBL128 Operating Instructions MEW01741 for more information.

14.5.1 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.

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 "Class A1 algorithm" will detect a fast temperature rise (rate-of-rise > 4° C per minute) some minutes earlier than the "Class A2 algorithm".

14.5.2 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.

14.5.3 Class B S algorithm

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

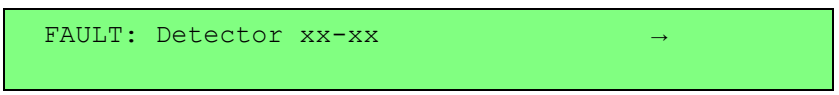
The algorithm is as follows:

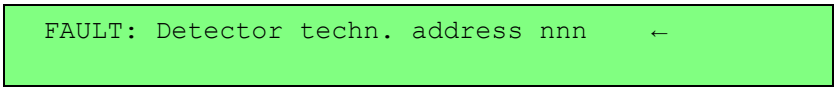
Fire alarm level is 74° C.
Pre-warning level is 64° C.
Heavy heat alarm level is 90° C.

The "Class B S algorithm" can be used when the application temperature is "high" (compare with the "Class A1 an A2 S algorithms).

14.6 Self verification

The analog detectors 430x / 440x **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:





14.7 Minimum / Maximum sensor values

To find out how the environment is, where an analog detector 33xx / 430x / 440x **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[99] can be read in menu H4/U3 or via EBLWin.

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.

14.8 2-zone / 2-address dependence (Co-incidence alarm)

In some premises 2-zone or 2-address dependent fire alarm ("Two unit dependent" in EBLWin) can be used to avoid unwanted / false alarms (nuisance alarms). A time channel can turn on/off this function.

14.8.1 2-zone dependence

Each zone in the system can be programmed to be "Two zone dependent" for fire alarm activation. The zone has to belong to one of ten "Two zone dependent" groups (1-10).[100]

Function:
Two or more zones in the same group have to be in "fire alarm state"[101] at the same time to activate fire alarm in the control unit. When only one of the zones is in "fire alarm state" it is indicated in the control unit (c.i.e.) as follows:

- The buzzer sounds like for pre-warning (0.8 / 5 sec.).
- In the c.i.e. LCD the following information is shown:

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

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

A co-incidence alarm can be manually reset ("Reset" button on the front) and will be automatically reset 5 min. after it is no longer in "fire alarm state" (i.e. below the fire alarm level).

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

[100] See also chapter "Two zone dependence", page 152.

[101] Fire alarm state is when a fire alarm normally would have been activated in the c.i.e.

14.8.2 2-address (-unit) dependence

Each analog detector, addressable multipurpose I/O unit (3361) monitored Input 0 (Z) and 8 zones expansion board (4580) input, can be programmed for 2-unit dependent fire alarm activation. (Heat detectors should not and manual call points must not be 2-unit dependent).

Function:
Two or more units in the same zone have to be in "fire alarm state"[101] at the same time to activate a fire alarm in the control unit. When only one unit is in "fire alarm state" it is indicated in the control unit (c.i.e.) as follows:

- The buzzer sounds like for pre-warning (0.8 / 5 sec.).
- In the c.i.e. LCD the following information is shown:

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

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

A co-incidence alarm can be manually reset ("Reset" button on the front) and will be automatically reset 5 min. after it is no longer in "fire alarm state".

14.8.3 Reset of 2-zone / 2-address dependence (co-incidence alarm

The unit / zone having activated a Co-incidence alarm will be latched in this status for at least 5 minutes and then automatically reset. During these 5 minutes the push button "Reset", on the c.i.e. front / FBP, can be used to manually reset the Co-incidence alarm.

If, during these 5 minutes, at least one more unit (in the zone) or at least one more zone (in the group) comes into "fire alarm state", the Co-incidence alarm ends and normal fire alarms will be activated in the c.i.e.

14.9 Delayed alarm

In some premises delayed fire alarm activation can be used to avoid unwanted false alarms (nuisance alarms). The delay time will be added at the end when a fire alarm normally would have been activated in the c.i.e. This function is a violation to the EN54-2 standard.

Each analog or addressable detector, each addressable multipurpose I/O unit (3361) monitored input (Z) and 8 zones expansion board (4580) input in the system can be programmed (in EBLWin) to delayed fire alarm activation. (Heat detectors should not and manual

call points must not have delayed fire alarm activation). The delay time can be set (in EBLWin, System Properties) to 0-255 seconds.[102]

Function for an analog or addressable smoke detector:
An alarm point has to be in "fire alarm state"[101] all the delay time, in order to activate a fire alarm in the c.i.e. If an alarm point goes back to "normal state" during the delay time, the delay time will be reset and start again if/when the alarm point comes in "fire alarm state" again.

Function for each addressable multipurpose I/O unit (3361) monitored Input 0 (Z) and 8 zones expansion board (4580) input:
A zone in "fire alarm state" will be recorded in the c.i.e. but fire alarm will not be activated. When the delay time has run out the zone will be automatically reset and if it still is in "fire alarm state" a fire alarm will now be activated in the c.i.e.

A delayed alarm is indicated in the control unit (c.i.e.) as follows:

- The buzzer sounds like for pre-warning (0.8 / 5 sec.).
- Information in the c.i.e. LCD, e.g. for a detector:

```
Delayed alarm detector ZZ/AA
```

Programmable outputs can be activated during the delay of a specific alarm point, zone or any alarm point / zone.

14.10 Alarm Verification Facility

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

This function is valid for any **zone line input** but only in the **Australian** and **New Zealand convention** respectively.

In these conventions the function "Delayed alarm" (see above) is not valid.

The function "Delayed" is selected in the dialog box for the zone line input respectively.

Function: A zone in "fire alarm state"[103] will be recorded in EBL128 but a fire alarm will not be activated. After 15 seconds the zone will be automatically reset and if the zone comes in "fire alarm state" again within 110 seconds, a fire alarm will be activated in EBL128, else nothing will happen until the next time the zone is in "fire alarm state" and so on.

[102] Default is 30 seconds and a recommended delay time is ≤ 30 seconds.

[103] A zone with the AVF not selected would in this state activate a fire alarm in EBL128.

14.11 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. A time channel can turn on/off this function.[104]

Trained personnel are required on site to locate the fire (the room) and take the correct measures/actions depending on if there is a fire or not.

Normally analog smoke detectors and zones with smoke detectors only, come in question to be programmed (via EBLWin) for alert annunciation. Heat detectors and manual call points should normally not come in question for Alert Annunciation. A manual call point can only activate the **AA** function if there are no other fire alarms activated in the system (i.e. the second fire alarm will turn off the **AA** function)[105].

The **AA** function is normally turned on (enabled) during daytime working hours only. A time channel can turn on/off (enable / disable) the **AA** function. When the **AA** function is turned on (enabled) it is indicated by the LED **Routing equipment** "Fire brigade tx delay" on the c.i.e. front. Normally only one time channel is 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 (turned off) via menu H2/B11 and will then stay so until turned on (normal) again via menu H2/B11.

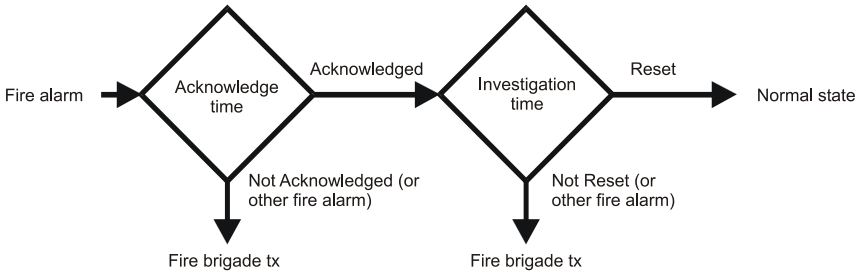


*Figure 22. The **A**lert **A**nnunciation function flow chart.*

Alert **A**nnunciation function:
Indications, print-outs, actions, etc. for an **AA** alarm are the same as for a normal fire alarm **except the output "Fire alarm" for routing equipment (fire brigade tx) in the c.i.e. that will not be activated directly.** [106]

[104] Using an internal time channel is a VdS violation.

[105] This is valid even if "Multiple alarms within same zone" is selected (via EBLWin).

[106] **NOTE!** Programmable outputs type "Fire brigade tx" will however be activated if not the following is added to the control expression: ***AND NOT* Alert Annunciation Activated**.

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

During the acknowledge and investigation times:

- If a fire alarm is activated by a detector / zone not programmed for Alert Annunciation or if fire alarm is activated by a manual call point, the output(s) for routing equipment (fire brigade tx) will be activated.
- If "Multiple alarms allowed within same zone" is set via EBLWin, more than one AA alarm is allowed within that zone.
- "Number of zones" can be set via EBLWin. Normally only one zone with **AA** alarm is allowed but up to four zones can be allowed.

Acknowledge and Reset is done on the Alert annunciation unit 1735 / 1736 or Alert annunciation controller 1740. A programmable output ("Alert Annunciation Activated") for indication and programmable inputs ("Alert Annunciation Acknowledge" and "Alert Annunciation Reset") can also be used. In some conventions can this also be done in the c.i.e. (with the dark grey button with no text).

The Acknowledge time can be set to 0-120 seconds.

The Investigation time can be set to 0-9 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.).

14.12 Alarm Acknowledgement Facility (AAF)

This facility is used on the Australian market only.

One AAF zone can consist of one to five analog smoke detectors (4300 / 4301 / 4400 / 4401), one AAF buzzer (e.g. Sounder base 3379) and one AAF Control (AAFC)[107]. All connected on one COM loop.

[107] This unit is available on the Australian market only.

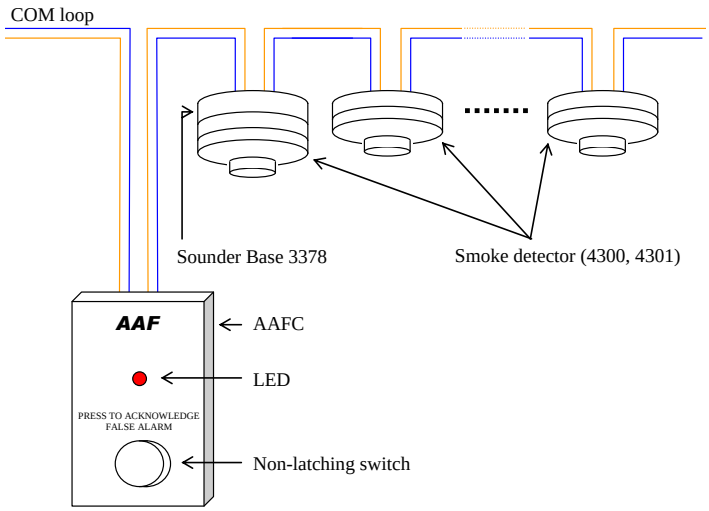


*Figure 23. **A**larm **A**cknowledgement **F**acility units.*

Function (see also the flow chart in the following figure):

- One of the detectors in an AAF zone reaches its fire alarm level. The AA Process starts and the AAF buzzer sounds.
- An **A**cknowledgement **P**eriod starts (AP=0-120 sec. -- programmable).
- If it is a false alarm, acknowledge the alarm on the AAFC before the AP is ended.
- After acknowledgement an **I**nvestigation **P**eriod starts and the AAF buzzer is silent (IP=0-9 min. -- programmable).

If all the detectors in the AAF zone becomes normal again (i.e. goes below the fire alarm level respectively) during the IP, the AAP ends.

If the AP or the IP runs out during the AAP and any detector in the AAF zone still is over its fire alarm level, normal fire alarm(s) will be activated.

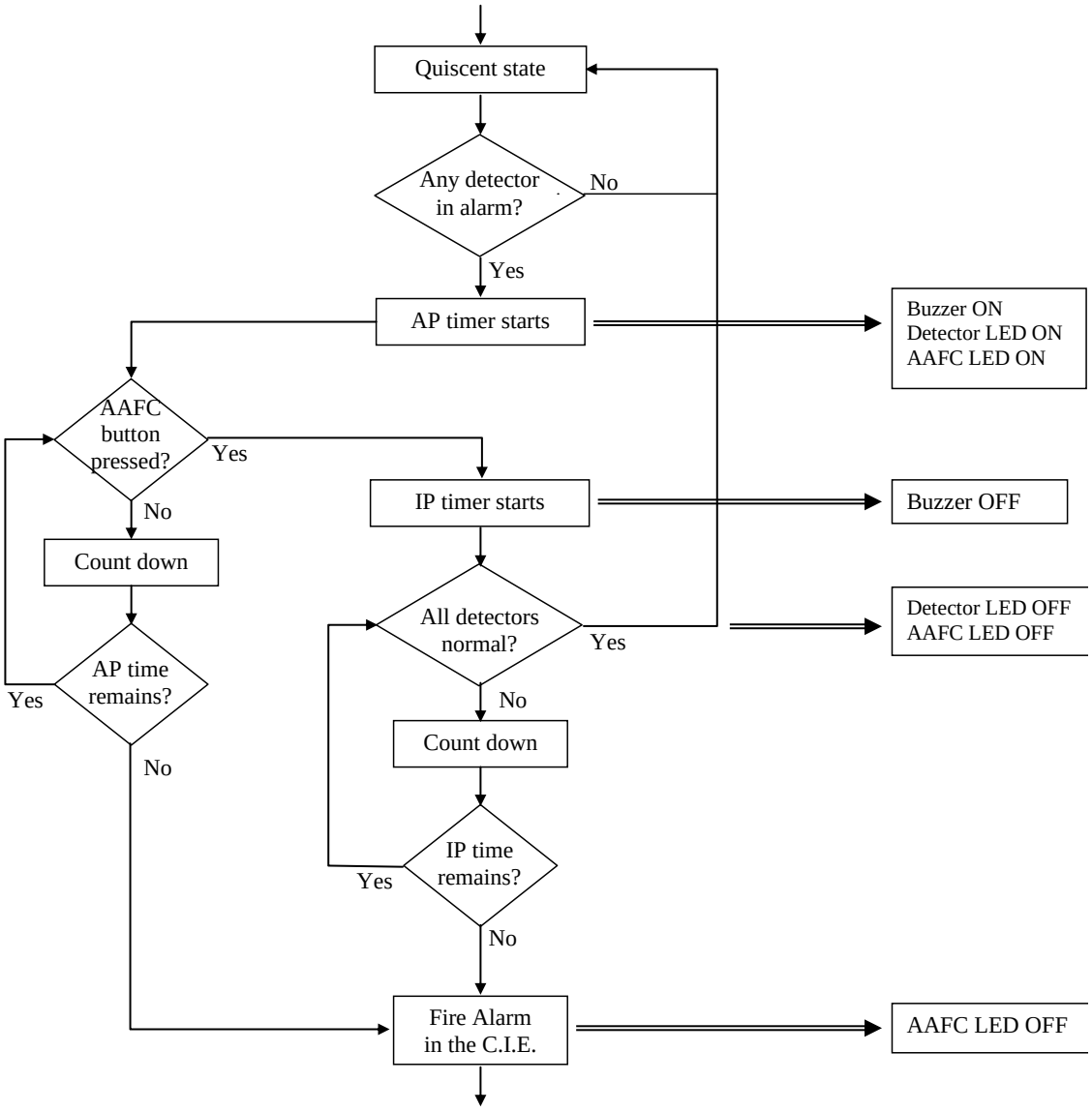


Figure 24. Alarm Acknowledgement Facility (AAF) flow chart.

During the AAF process, an AAF alarm will be indicated in the c.i.e. display ….

…. during the acknowledgement period (AP):

AAF zone xx, activated

…. during the investigation period (IP):

AAF zone xx, investigation in progress

If more than one AAF zones have been activated only the first is shown in the display.

The detectors in an AAF zone can be one to five and not be programmed as 2-unit-dependent and not be controlled by the Alert

Annunciation function. Only Analog photo electric smoke detector 4301 / 4401 and Analog multi detector 4300 / 4400 can be used for AAF. If the Analog multi detector 4300 / 4400 is used, it must be programmed as type "Two addresses", so that only the "smoke part" of the detector can be used for AAF.

Max. 50 AAF zones can be used.

The AAF buzzer (e.g. Sounder base 3379) has to be programmed with the output trigger condition "AAF zone alarm".

14.13 Quiet alarm

Quiet alarm is e.g. used in conjunction with the I/O Matrix board 4582[108], an application board for fan control and an I/O unit 3361 for fan control.

Smoke detectors, programmed for quiet alarm, can be used e.g. for controlling fans (stop / start depending on the type of fan).

Indications and actions:

- In the c.i.e. display: `Quiet alarm detector ZZ/AA` and a user definable text message (alarm text) if programmed.
- LED:s "Fire" in the c.i.e. are blinking (0.4 / 0.4 sec.).
- Buzzer in the c.i.e. sounding (0.8 / 5 sec.).
- Programmable outputs for quiet alarm, e.g. 3361 outputs controlling supply air fans and standard fans i.e. any output with a control expression containing trigger conditions "Quiet Alarm Zone" or "Quiet Alarm Zone Address".

Quiet alarms are non-latching, i.e. they will be automatically reset when the alarm point / zone is no longer above alarm level.

NOTE! Quiet alarm can also be programmed for a 3361 unit "zone line input". In such a case only non-latching detectors can be used.

14.14 Fire alarm type A and Fire alarm type B

Normally the c.i.e. relay output "R0" is used as an output for Routing equipment (Fire brigade tx).

The output shall be programmed (via EBLWin) as type "Routing equipment" and have the trigger condition "Fire brigade tx". The output will then be activated for fire alarm from any alarm point or zone line input.

If the fire alarm routing equipment has provision for transmission of several fire alarm signals and the alarm receiver has provision for reception of several fire alarm signals, a fire alarm type B will indicate that only one detector is activated, which could be a nuisance alarm. If a fire alarm type A is received, the probability of a real fire is higher

[108] See "I/O Matrix board 4582", page 22.

than for a fire alarm type B. The alarm receiver can take different actions depending on if it is a fire alarm type A or B.

14.14.1 Fire alarm type B

The output shall be programmed (via EBLWin) as type "Routing equipment" and have the trigger condition "**One detector alarm**".

The output will be activated for fire alarm from **one** analog addressable smoke, heat or multi[109] detector only.

14.14.2 Fire alarm type A

The output shall be programmed (via EBLWin) as type "Routing equipment" and have the trigger condition "**Multiple detector alarm**".

The output will be activated for fire alarm from:

- **Two or more** analog addressable smoke, heat or multi detectors.
- **Any** manual call point
- **Any** zone line input
- **Any** programmable input with the trigger condition "General Fire"

14.15 Disable zones, alarm points, outputs, etc.

Temporary disablements are made via the menu H2 sub menus. For more information see the EBL128 Operating Instructions (MEW01741), chapter "Disable or re-enable (H2)".

Regular disablements are made via time channels, see chapter "Time channels", page 147.

When alarm reset method "Single with automatic disablement" is selected via the EBLWin "System Properties", the function will be as follows:

If an alarm point or zone is ***in alarm state when being reset*** it will not only be reset but also disabled. It has to be re-enabled (via menu H2/B6) the same way as if it was disabled via menu H2/B2.

Disabled alarm points and outputs are indicated by LED **Fault / Disablements** "General disablements" on the c.i.e. front and are listed in menu H4/U1-U2.

Enhanced Disablement (Default) = Fire alarm, pre-warning and fault signal cannot be activated by the disabled alarm point/zone. If only fire alarm and pre-warning shall be disabled, "Enhanced Disablement"

[109] **NOTE!** A multi detector can have one presentation number (Zone-Address) or two presentation numbers depending on how it is programmed via EBLWin. One presentation number = one detector and two presentation numbers = two detectors regarding fire alarm types A and B.

shall not be selected, see chapter "System properties, Page 2", page 141.

NOTE! Enhanced Disablement is NOT valid when a time channel is used for disablements, only when menu H2/B1-B2 are used.

14.15.1 Disable zone

A whole zone (all addressable alarm points within one zone, except 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/B5 or automatic re-enabling at a specified time.

14.15.2 Disable zone-address

Individual alarm points can be disabled via menu H2/B2.
Re-enable via menu H2/B6 or automatic re-enabling at a specified time.
A time channel can instead be used to disable and re-enable automatically.

14.15.3 Disable 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-enable via menu H2/B7.

14.15.4 Disable all control, ventilation, exting or interlocking outputs

The control outputs of type "Control (general)", "Fire ventilation", "Extinguishing system" or "Interlocking" can be collectively disabled via menu H2/B4. Disabled outputs will stay in (or return to) the normal condition for the output respectively until Re-enable via menu H2/B8.

14.15.5 Disable / Re-enable alarm devices

The control outputs of type "Alarm device (sounder)" 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-enable via menu H2/B9.

14.15.6 Disable / Re-enable outputs for routing equipment

The control outputs of type "Routing equipment (Fire brigade tx and Fault tx)" can be collective disabled via menu H2/B10. Disabled outputs will stay in (or return to) the normal condition for the output respectively until Re-enable via menu H2/B10.

14.15.7 Disable / Re-enable alert annunciation function

The alert annunciation function can be disabled via menu H2/B11. Disabled alert annunciation function will be disabled until Re-enable via menu H2/B11.

14.15.8 Disconnect / Re-connect COM loop

The COM loop can be disconnected via menu H8/S1. Disconnected COM loop will stay disconnected until Re-connect via menu H8/S1.

14.15.9 Disconnect / Re-connect zone line input

A zone line input (e.g. on a 4580 board) can be disconnected via menu H8/S2. Disconnected zone line input will stay disconnected until Re-connect via menu H8/S2.

14.15.10 Disconnect / Re-connect addressable zone interface input

A zone interface input (e.g. 2226/2335/2821/3361) can be disconnected via menu H8/S3. Disconnected zone interface input will stay disconnected until Re-connected via menu H8/S3.

14.15.11 Disable interlocking output

The control outputs of type "Interlocking output" can be disabled via menu H9/C4. Disabled outputs will stay in (or return to) the normal condition for the output respectively until Re-enable via menu H9/C5.

14.16 Test mode

Alarm points / zones can be tested during the Monthly test (via menu H1) or via menu H7. Up to 99 zones can be set in Test mode via menu H7 but only four zones via menu H1. 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.[110] In order to shorten the testing time, any time delay for the detectors / zones in test mode will be "shortened", i.e. fire alarm will be activated faster than normally.

14.17 Test alarm devices

The programmable outputs type "Alarm device" can be collectively activated via menu H8/S6, which make it possible to test the alarm devices. (The test cannot be started if a fire alarm already is activated.) When the test starts the alarm devices will be turned "ON" for 1 second (±1s), "off" for 29 seconds (±1s), "on" for 1 second and so on.[111]

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/S6 or if a fire alarm is activated in the system.

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

[111] The output activation will be continuously (steady). For the alarm devices 3377/4477 and 3378/3379, the tone with the highest priority level (and type "alarm device") will be automatically selected.

14.18 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).
In menu H1, press "Accept" to start the test. The fault output will be activated[112], 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.

14.19 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/A1. A value outside the calibration value range 4K7-50K and 470 nF to 5x470 nF respectively, will generate a fault as well as when the actual value differs from the calibrated value ± a small tolerance.

14.20 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, after some time, result in unwanted false alarms (nuisance alarms) since conventional smoke detectors normally have a fixed fire alarm level. Conventional smoke detectors have no service signal output.

Analog smoke detector: The sensitivity will automatically be constant[113] up to a fixed **service level** when **Service signal** will be activated. Service signal will be activated for 430x / 440x in NORMAL mode, when the week average sensor value is $\geq$ 1.8 %/m. For 440x in Advanced mode when the week average sensor value is $\geq$ 2.0 %/m.

One or more detectors having activated SERVICE signal is indicated by the LED "Service" on the c.i.e. front. A programmable output can also be activated.

When a "dirty" detector has been replaced by a new/clean one, its week average sensor value has to be set to default. This is done via menu H8/S4.

See also the EBL128 Operating Instructions chapter "Sensors activating SERVICE signal (H4/U4)" and "Acknowledge SERVICE signal (H8/S4)".

---

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

[113] The detector is supervised at all times and adapts its fire alarm level in relation to the contamination of the detector, see chapter "Week average sensor value", page 92.

14.21 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 64.

14.22 Alarm texts

The alarm texts are shown in case of a fire alarm.
The display in EBL128: On the first row will always be shown the **presentation number** for an alarm point and on the second row will be shown a user definable **alarm text** for this alarm point, if programmed via EBLWin.

An example of fire alarm information:

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

The display Ext. FBPs 1826[114] & 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; address AA=**00**) is activated, only the zone number (**ZZ**) will be shown.

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

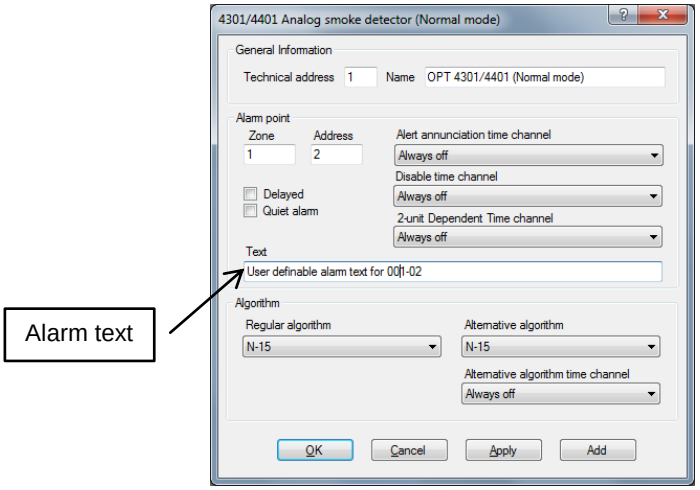
Alarm text
User definable alarm texts with up to 40 alphanumeric characters are created and downloaded via EBLWin.
Each addressable alarm point and each zone can have an individual alarm text shown in EBL128 and the same or another alarm texts shown in each Ext. FBP 1826 / 1828, Alert Annunciation unit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

14.22.1 Creating the alarm texts via EBLWin

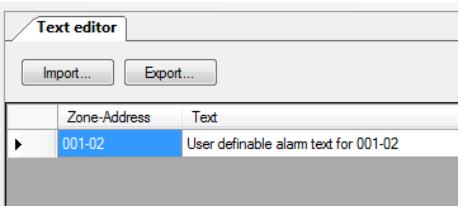
In the dialog box for an alarm point (e.g. a detector)[115], there is a "Text" field where the alarm text for the alarm point can be typed (or edited). This is the text that will be shown in the display in EBL128 when this alarm point has activated a fire alarm and as from version 2.0 it will also be shown in the fault message.

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

[115] In EBLWin.



The alarm text can as an alternative be typed (or edited) in the EBLWin "Text editor" (menu System | 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. 001-01, 001-02, 002-01 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 and 8 zones expansion board 4580 zone line inputs programmed with address "00" (i.e. ZZZ – **00)**.
Only the texts have to be typed / edited in the "Text" column.

NOTE!
In system EBL128 is the highest possible zone number 099 since only two digits can be shown in the display.

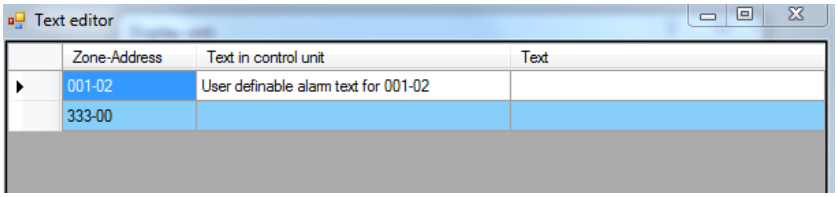
Text column

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[116], the text

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

has to be typed in the EBLWin "Text editor", **for the "display unit" respectively** (Properties | Edit texts…):



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

Zone-Address column

Shows the already programmed alarm points (e.g. 001-01, 001-02, 002-01 etc.).

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

Text in control unit column (only information that cannot 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. 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.

14.22.2 Downloading texts to the DUs 1728 / 1735 / 1736 and ext. FBPs 1826 / 1828

The "display units" have to be connected to EBL128 and the address and mode[117] 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 EBLWin.[118]
Alt. via the DU pop-up menu in EBLWin.

14.23 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 2-14. The RTC has no backup battery, i.e. the date, time, etc. has to be set (via menu H3) after total loss of power supply (i.e. no mains and no backup battery) and .after S/W download.

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

[118] In the "Download SSD to Control Unit" dialog box the "Download display units" check box has to be selected.

14.23.1 Daylight saving time

The time is automatically changed when the Daylight saving time period starts and stops respectively. This is depending on which convention that is used.

- Australian convention: Forward 1 hour the first Sunday in October, 02:00 → 03:00. Backward 1 hour the first Sunday in April, 03:00 → 02:00.
- New Zealand convention: Forward 1 hour the last Sunday in September, 02:00 → 03:00. Backward 1 hour the first Sunday in April, 03:00 → 02:00.
- All other conventions: Forward 1 hour the last Sunday in March, 02:00 → 03:00. Backward 1 hour the last Sunday in October, 03:00 → 02:00.

14.24 Time channels 1-14

Time channel "Always off"
Time channel "Always on"
Time channels **2-14** are controlled by the built-in RTC (real time clock). Up to five on/off times per day can be set for each time channel.

The time channels 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** (2-14) and each **Day** (Monday to Sunday + National Holiday) have to be set, see chapter "Time channels", page 147.

14.25 Time channels 15-63

Time channels 15-63 (ext. time ch. 1-49) are controlled by some external device via a programmable input. 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 (trigger condition "External time channel") per time channel (N). The input has to be connected to some external device, e.g. a key switch, a timer, etc. with a normally open or a

normally closed contact.[119] When the input is "activated" the time channel (N) is ON.

NOTE! Only one input per time channel can be used.

14.26 Event log

The event log is divided into three types, i.e. **Alarm**, **Interlocking** and **General**.

500 events will be stored in each type of log. The logs are circular.

The event logs can be shown via menu H4/U6 (the latest event is shown "on top") or shown / printed via EBLWin or the Web-server.

Date & Time are stored together with every event.

14.27 Loss of main power source

Regarding the Main power source and Second power source, see chapter "Power supply", page 172.

14.27.1 Fault: Loss of main power source

This fault can be delayed since the c.i.e. is powered via the backup battery in case of mains failure, and mains failures are normally very short.

The delay time for the fault "Loss of main power source" can be set via EBLWin to 0-300 minutes (default is 30 minutes).
(A delay time >30 minutes is a violation to the EN54-2 standard.)

14.27.2 LCD backlight

In order to reduce the current consumption the LCD backlight will never be turned on during loss of the main power source.

Exceptions

- Australian convention: The LCD backlight will be turned on also during loss of the main power source.
- New Zealand convention: The LCD backlight will be turned on also during loss of the main power source.

14.28 Evacuate

When the green key "Evacuate" (P5)[120] is pressed[121], all outputs programmed for sounders (i.e. type "Alarm devices"), will be collective turned ON (steady). This is indicated in the LCD:

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

[120] The green key "Evacuate" (P5) on the c.i.e. front is only valid for the Belgian, British Standard, Hungarian, Spanish and Ukrainian conventions. In other conventions this key might be yellow or dark grey and have another or no function.

[121] Alt. when a programmable input is activated. One input only.

```
Evacuate in progress
```

The sounders will remain turned ON until they are turned OFF by pressing the soft key "Evacuate off" (P7).[122]

NOTE 1! The alarm devices (sounders) will always be activated steady (sound continuously) irrespective of the fact that the outputs can be set to anything else for fire alarm (e.g. intermittent).

[122] Alt. when the programmable input is de-activated.

15 Special New Zealand functions

NOTE! The functions in this chapter are valid for the **New Zealand convention** only.

15.1 Alarm devices

15.1.1 Silence alarm devices (inside switch)

On the c.i.e. front, the button "Silence alarm devices" (see Operating Instructions, button "P3") is called the "inside switch" and toggles between two states:

- **Alarm devices disabled**
  All programmable outputs of type "Alarm devices" are disabled, i.e. they cannot be activated.
- **Alarm devices not disabled**
  All programmable outputs of type "Alarm devices" enabled, i.e. they can be activated.

If the inside switch is in its disabled state when the c.i.e. door is being closed the buzzer will beep once and the message "`Silence switch left active`" will be shown in the LCD. This message has lower priority than fire alarms but higher than other disablements and faults.

NOTE! The inside switch has no function if the outside switch (see below) is activated (ON).

15.1.2 New Zealand FB Silence switch (outside switch)

The "**New Zealand FB Silence switch**" is called the "outside switch" since it is placed outside the c.i.e. The outside switch is a key switch and connected to a programmable input with the trigger condition "New Zealand FB Silence switch".

The outside switch is turned ON (i.e. from not activated to activated state).

- All programmable outputs of type "Alarm devices" are disabled[123], i.e. they cannot be activated. The "inside switch" (se above) has no function.
- LED:s "Fire" (on the front) changes from blinking to steady (continuous).[124]
- The c.i.e. built-in buzzer is disabled.
- A fault is generated[125]: "`FAULT: FB Silence switch active`".

[123] Indicated by LED "Disablements".

[124] This is valid also if the fire alarm is activated after the outside switch is turned ON.

[125] Always latched, regardless of if faults are programmed to be not latched.

The outside switch is turned OFF (i.e. from activated to not activated state).

- The c.i.e. built-in buzzer is re-enabled.
- The fault "`FAULT: FB Silence switch active`" will be **`Serviced`**.[126]
- Any fire alarm ("ALM") and acknowledged alarm ("ACK") will automatically be disabled / isolated. (I.e. it has to be re-enabled via menu H2/B1.) Indicated by LED "Disablements".
- Any fire alarm ("ALM") and acknowledged alarm ("ACK") will automatically change the state to "Isolated alarm" (see below) and in the fire alarm list (presented in the LCD) "**`ALM`**" or "**`ACK`**" will be replaced with "**`ISO`**".
  An example:

```
ISO ZONE-ADDR 12-46 LAST ZONE 12  No. 01
This is a user defined alarm text.
```

15.1.2.1 Isolated alarm

A fire alarm will automatically change state to "Isolated alarm" when the "outside switch" (see above) is turned OFF, i.e. when it is not activated any more (see above).

The following is valid for an isolated alarm.

- LED:s "Fire" (on the front) will not be activated.
- The c.i.e. built-in buzzer will not be activated.
- Presented as isolated alarm, see the example above (ISO ……).
- Programmable outputs will not be activated.
- Output for routing equipment (Fire brigade tx) will not be activated.

15.2 Battery faults

For other conventions, see chapter "Security functions", page 173.

15.2.1 FAULT: Battery

The following battery check is performed:

- The battery charging is turned off every 30th second.
- Battery voltage is checked.
- Battery voltage < 24.4 V generates a fault.
  Fault message: `FAULT: Battery`

15.2.2 FAULT: Low battery capacity

The following battery check is performed:

[126] Since this fault is always latched, it has to be acknowledged via menu H6.

- The battery charging is turned off 60 minutes every 24th hour.
- Battery voltage is checked during this 60 minutes period.
- Battery voltage < 24.4 V generates a fault.
  Fault message: `FAULT: Low battery capacity`

If a fault is generated it will be **Serviced** after the 60 minutes period.

15.3 Watchdog reset

Normally the c.i.e. will be "dead" in case of a watchdog fault, since the function cannot be 100% guaranteed. The fault relay output will be "activated" since this relay is activated (powered) in normal state.

In the New Zealand convention the c.i.e. will try to restart. If it was a small temporary disturbance that caused the watchdog fault the c.i.e. might restart and a "restart fault" will be generated as after any restart – else it will try to restart again and again and again.

15.4 Routing equipment isolate (disable)

If any output for routing equipment (Fire brigade tx or Fault tx) are disabled and the door is being closed, the built-in c.i.e. buzzer will beep for two seconds. In the LCD will be displayed: "Routing equipment left disabled". This message has lower priority than fire alarms but higher than other disablements and faults.

15.5 Acknowledged alarm

Acknowledged alarm has the same functionality as a normal fire alarm except for the indication in the c.i.e. display.

When a fire alarm is activated in the c.i.e. it can be acknowledge by pressing the "Acknowledge faults" button on the c.i.e. front.

In the fire alarm list (presented in the LCD) will "**ALM**" be changed to "**ACK**".
An example:

```
ACK ZONE-ADDR 12-46 LAST ZONE 12  No. 01
This is a user defined alarm text.
```

Only the alarm currently shown in the display will be acknowledged, i.e. if there are several alarms it is necessary to scroll and acknowledge each alarm separately.

16 Advanced mode

The latest generation of detectors are the following:

- Conventional photoelectric smoke detector 4452
- Analog photoelectric smoke detector 4401
- Analog multi detector 4400

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

The analog detectors **4401** and **4400** can via the address setting tool **4414** be set in different modes. In this chapter is only the **Advanced mode** described. The detectors are factory set to the **NORMAL mode**, see chapters "COM loop units", page 32 and "Functions / Services / Features", page 98. The analog detectors 4401 and 4400 in NORMAL mode will function as and replace the analog detectors **4301** and **4300** in NORMAL mode respectively. (The analog detectors 4301 and 4300 **cannot** use the Advanced mode.)

The **Advanced mode** can be set with the address setting tool **4414** only. **Not** with the address setting tool **3314**.

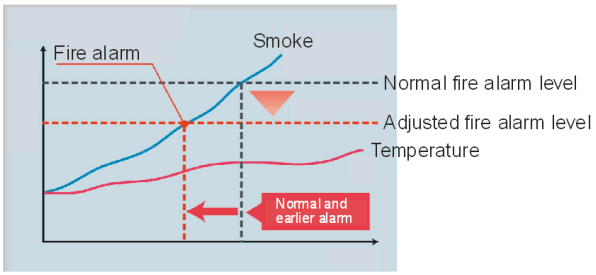
The conventional detector **4452** uses some of the advanced mode functions, see the function respectively below in this chapter.

Artificial **I**ntelligence (AI function) uses combined smoke and heat sensing for the fire judgement, as well as variable sensitivity and time delay based on the smoke and temperature changes just before the alarm level is reached. This will secure the real fire alarms and reduce the not wanted false (nuisance) alarms with up to 46 %.

The AI function is depending on if the detector is a photoelectric smoke detector (4452 / 4401) or a multi detector (4400):

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

Fire alarm activation in conjunction with temperature rise.



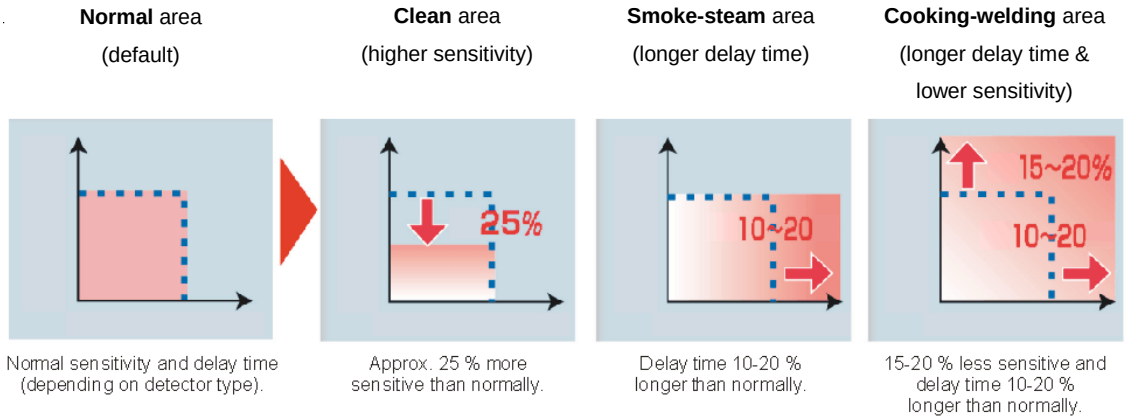
By combined smoke and heat sensing a lower fire alarm level can be used.

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.

A **learning function** will after a **learning period** adapt an **Alarm algorithm** suitable for the smoke and temperature conditions in the **area** where the detector is located.

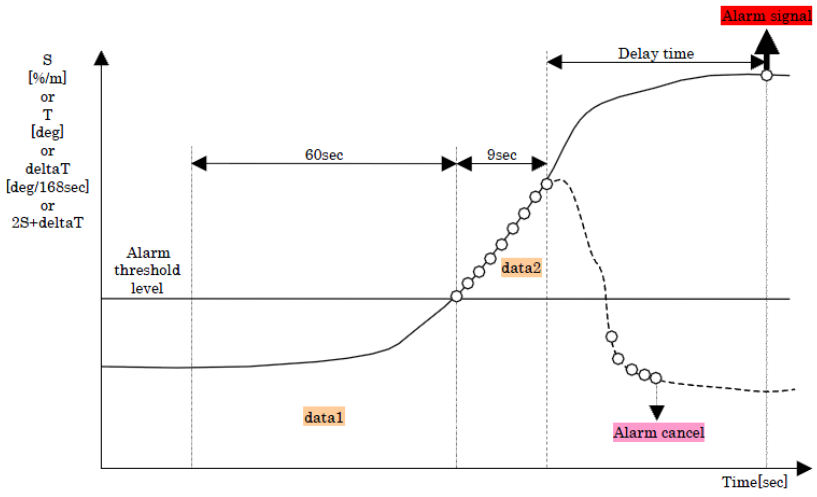
Alarm algorithms for the following **areas** can be adapted:



There is also a **Heater** area Alarm algorithm. This is similar to the alarm algorithm for the **Normal** area but the rate-of-rise function (deltaT) will not be used for alarm activation.

16.1 Pulse up – down counter

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



16.1.1 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.

16.1.2 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.

16.1.3 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.

16.2 Fire judgement

The fire judgement is depending on the **alarm threshold level**, which is depending on the **area alarm algorithm** ("learning mode" in the following tables) and a **delay time**, which is dependent on if the **cause of alarm** is smoke **S**, temperature **T** or **deltaT** or a combination of smoke and temperature **2S+deltaT** and also the **area alarm algorithm**.

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 delay time starts and has to run out before a fire alarm will be activated in the c.i.e.

16.3 Alarm threshold levels

Depending on the detector type and **Area alarm algorithm** there are alarm threshold levels (**S**, **T**, **deltaT** and **2S+deltaT**) not only for fire alarm but also for pre-warning and heavy smoke / heat alarm.

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

4452:

Area alarm algorithm	S[%/m]
	Fire alarm
Normal	4

4401:

Fire alarm threshold level	
Area alarm algorithm \ Cause of alarm	S [%/m]
Normal	3.5
Smoke/Steam	3.5
Clean	2.6

4400:

Fire alarm threshold level				
Area alarm algorithm \ Cause of alarm	S [%/m]	T [deg.]	deltaT [deg./168sec]	2S+deltaT #4
Normal	5	57	18	12
Smoke/Steam	5	57	18	12
Clean	3.7	57	18	10
Heater	5	57	no use	12
Cooking/Welding	5	57	18	14

#4 : With S≧2.5%/m and deltaT≧3deg/168sec

16.4 Alarm delay time

The alarm delay time will be different for the different type of detectors depending on the cause of alarm, Area alarm algorithm and the values before / after the fire alarm threshold level was exceeded.

4452: Normally 9 seconds.

4401:

Delay time[sec]		
Area alarm algorithm \ Cause of alarm	S data1[%/m]	
Normal Clean	data1 < 0.2	45
	0.2 ≦ data1 < 0.3	39
	0.3 ≦ data1 < 0.4	30
	0.4 ≦ data1 < 1.3	18
	1.3 ≦ data1	9
Smoke/Steam	data1 < 0.2	45+data2/2
	0.2 ≦ data1 < 0.3	39+data2/2
	0.3 ≦ data1 < 0.4	30+data2/2
	0.4 ≦ data1 < 1.3	18+data2/2
	1.3 ≦ data1	9+data2/2

4400:

Delay time[sec]					
Area alarm algorithm \ Cause of alarm	S data1[%/m]		T	deltaT	2S+deltaT
Normal	data1 < 0.6	45	9	9	data2'/2
	0.6 ≦ data1 < 0.8	30			
	0.8 ≦ data1 < 2.5	18			
	2.5 ≦ data1	9			
Smoke/Steam	data1 < 0.6	45+data2/2	9	9	data2'/2
	0.6 ≦ data1 < 0.8	30+data2/2			
	0.8 ≦ data1 < 2.5	18+data2/2			
	2.5 ≦ data1	9+data2/2			
Heater	data1 < 0.6	45	9	no use	data2'/2
	0.6 ≦ data1 < 0.8	30			
	0.8 ≦ data1 < 2.5	18			
	2.5 ≦ data1	9			
Cooking/Welding	data1 < 0.6	45	9	9	data2'
	0.6 ≦ data1 < 0.8	30			
	0.8 ≦ data1 < 2.5	18			
	2.5 ≦ data1	9			
Clean	data1 < 0.3	45	9	9	data2'/2
	0.3 ≦ data1 < 0.4	30			
	0.4 ≦ data1 < 1.3	18			
	1.3 ≦ data1	9			

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".

NOTE!
Max. alarm delay time is 60 seconds.

If the cause of alarm is T or deltaT the alarm delay time will be 9 seconds.

The alarm delay time function will be cancelled after 18 seconds if one of the following conditions is true:
S (%/m) ≥ fire threshold level (S) x 2
T (°C) ≥ fire threshold level (T)
deltaT (°C/168 sec.) ≥ fire threshold level (deltaT)

16.5 Learning function / Learning period

Detectors 4400 and 4401 can use a **Learning function**, i.e. 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 default (Normal) one, an **Area Alarm algorithm**.[127] See also page 129.

16.5.1 Area Alarm algorithms

Normal area is the default Area alarm algorithm for each detector. There are four other **Area alarm algorithms** that can be adapted after the learning period:

- Smoke – Steam area, is depending on occurrence of smoke, i.e. **level 1** = **S** [%/m] ≥ half the fire alarm threshold level (S).
- Heater area, is depending on rise of temperature, i.e. **level 2** = **deltaT** [°C/168 sec.] ≥ 12 (approx. 4.3°C/min.).
- Cooking – Welding area, is depending on 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 area, is the most sensitive condition, requiring a very clean and stable environment, i.e. the values for all the other types of areas (level 1, 2 and 3) must not be exceeded.

16.5.1.1 Smoke – Steam area, level 1

36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h
		✓	✓						✓										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

A **learning period** contains 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**.

When three (or more) of the **36h-periods** during the **learning period** have a check-mark, the Smoke - Steam area Alarm algorithm will be adapted (i.e. as earliest after 3 x 36h = 108h = 4½ days). In the **example** this will happen in the **36h-period** no. 10 (i.e. after 10 x 36h = 360h = 15 days).

After the **36h period** no. 20, a new **learning period** starts. The check-marks are inherited from the previous **learning period**. Depending on if **level 1** is exceeded or not during each **36h period**, the check-marks will remain or be removed.

[127] Via EBLWin is set if an Area Alarm algorithm shall be automatically adapted via the Learning function or manually set via EBLWin. If manually set, also an alternative Area Alarm algorithm can be set that can be controlled via a time channel.

36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h	36h
			✓						✓										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20

In the **example**, the Smoke - Steam area Alarm algorithm will be changed back to the Normal area Alarm algorithm after the **36h period** no. 3, since at that time there are left only two **36h periods** with check-marks in this **learning period**. (If later, one or more **36h periods** will get a check-mark, the Smoke - Steam area Alarm algorithm will be adapted again as long as three or more of the **36h-periods** during this learning period have a check-mark.)

16.5.1.2 Heater area, level 2

The learning function is the same as for the Smoke - Steam area Alarm algorithm but **level 2** is used instead of level 1.

16.5.1.3 Cooking – Welding area, level 3

The learning function is the same as for the Smoke - Steam area Alarm algorithm but **level 3** is used instead of level 1.

16.5.1.4 Clean area, level 1, 2 & 3

For this area Alarm algorithm to be adapted there must be **no** check-mark for **level 1**, **level 2** and **level 3** respectively during the **learning period**, i.e. no check-mark what so ever. The Clean area Alarm algorithm cannot be adapted until earliest one month after c.i.e. power on.

The **Clean area Alarm algorithm** will be changed back to the Normal area Alarm algorithm directly if any **36h period** for **level 1**, **level 2** and **level 3** respectively gets a check-mark, i.e. any check-mark what so ever.

16.5.1.5 Learning function summary

A detector can adapt the following **area Alarm algorithms** depending on if and when **level 1**, **level 2** and **level 3** is exceeded or not.
The following is valid for the different type of detectors:

4452: This detector does **not** use the Learning function.
4400: This detector uses the Learning function (in Advanced mode), i.e. the area Alarm algorithms **Normal**, **Smoke – Steam**, **Clean**, **Heater** and **Cooking - Welding** can be adapted.
4401: This detector uses the Learning function (in Advanced mode), i.e. the area Alarm algorithms **Normal**, **Smoke – Steam** and **Clean** can be adapted.

16.6 Analog data output

The smoke obscuration value (%/m) and the temperature (°C) can be shown via the c.i.e. A new value is calculated every second. (The smoke obscuration value is an average value for the last four seconds.)
The following is valid for the different type of detectors:

4452: This detector has no analog output.
4400: This detector has a smoke obscuration value output, a temperature value output, actual area alarm algorithm output and a CCF (see below) output to the c.i.e.
4401: This detector has a smoke obscuration value output, actual area alarm algorithm output and a CCF (see below) output to the c.i.e.

16.7 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 subtracted from the momentary smoke obscuration values before evaluated in the alarm algorithms etc. The Contamination Compensation Factor (CCF) is calculated during a 36 hours period as follows:

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

This is valid for 18 hours. Then the CCF will be changed also if the average value is higher than the actual CCF. (It will normally be higher because of contamination.)

After another 18 hours (i.e. in total 36 hours) the CCF will be changed if the average value is lower or higher than the actual CCF and it will be saved in the detector's EEPROM, i.e. it can be used e.g. after the detector has been without power supply.

A new 18 + 18 = 36 hours period starts with an average value calculation every 13^{th} minute.

Max. Contamination Compensation Factor (CCF) **is 2 %/m. Service signal will then be activated and shown in the c.i.e.**

The following is valid for the different type of detectors:

4452: This detector has sensitivity compensation. No Service signal.
4400: This detector has sensitivity compensation. Service signal.
4401: This detector has sensitivity compensation. Service signal.

16.8 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 the c.i.e.
The following is valid for the different type of detectors:

4452: This detector has no self diagnosis of internal devices.
4400: This detector has self diagnosis of internal devices. A fault message will be shown in the c.i.e.
4401: This detector has self diagnosis of internal devices. A fault message will be shown in the c.i.e.

16.9 Address setting check

The red indication LEDs in the detectors **4401** and **4400** will in all modes be blinking every second when the detector is powered and the COM loop address is not set with the Address setting tool 3314 / 4414, i.e. as long as the address is "000". The address should be set in the interval 001-255.
NOTE! 4414 is required when Advanced mode shall be used.

16.10 Polling LED

The green polling LED in the detectors **4401** and **4400** can in Advanced mode be set (via EBLWin) to be blinking (20 ms / 7 s), indicating that it receives the commands from the c.i.e. correctly.

NOTE! When the detector is in test mode the green polling LED will be turned off, indicating it is in test mode.

17 Control unit properties

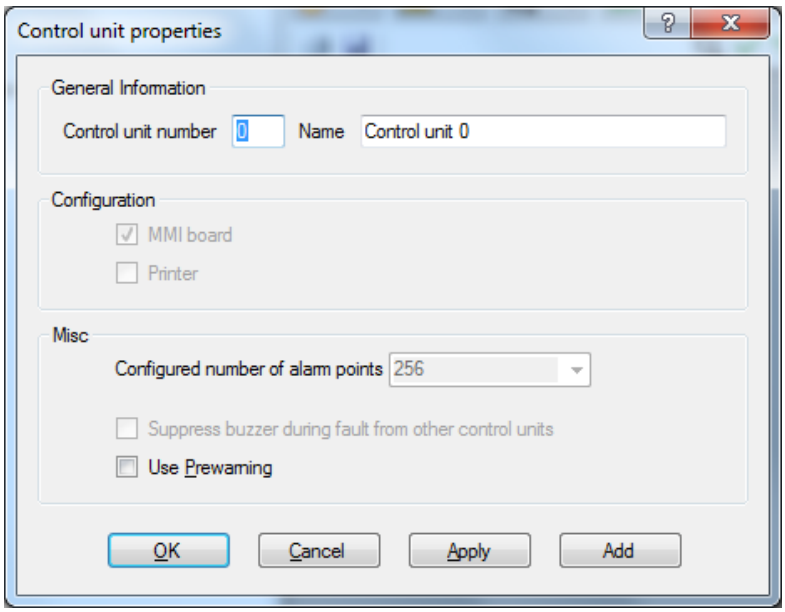


Figure 25. The EBLWin "Control unit properties" dialog box.

NOTE! Default settings in EBLWin might vary depending on convention.

17.1 Control unit properties dialog box

Opens when you add a control unit or via the "Control unit" pop-up menu (Properties...)

17.1.1 General Information

Control unit number: An EBL128 control unit has to have no. 0. No other number is allowed.

Name: Normally not changed but can be changed when required.

17.1.2 Configuration

Not valid for EBL128.

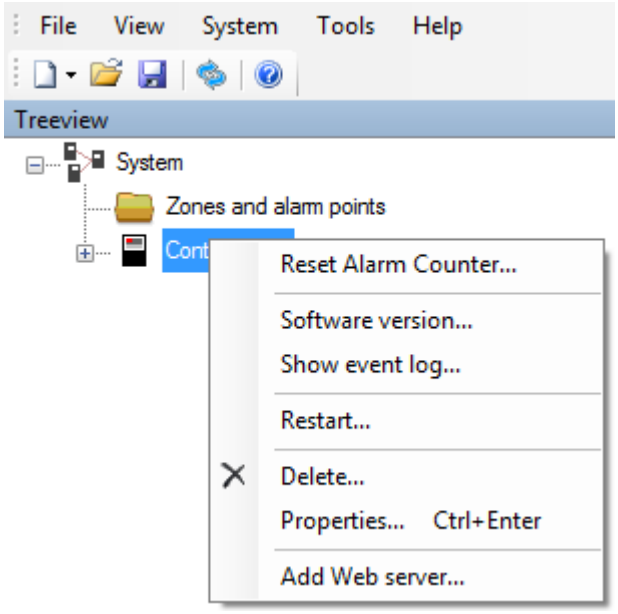
- ~~**MMI board** (default):~~
- ~~**Printer**~~

17.1.3 Misc.

~~**Configured number of alarm points**~~: EBL128 control unit can only have 256.

- ~~**Suppress buzzer during fault from other control units**~~: Not valid for EBL128.
- **Use Pre-warning**: This check box shall be marked if the pre-warning detection shall be enabled, i.e. pre-warnings will be activated. All programmable outputs in the system, with trigger condition "Pre-warning", will be activated (if not disabled).

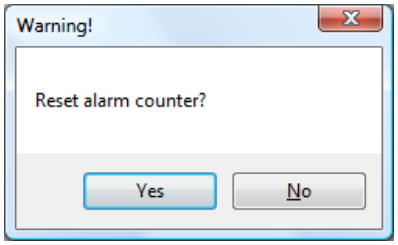
17.2 EBLWin Control unit pop-up menu



Some commands might be disabled since you have to connect and log on to the control unit to be able to select / use them.

17.2.1 Reset alarm counter

The control unit has an alarm counter that can be reset if required. (Level 2, i.e. a special access code is required.)

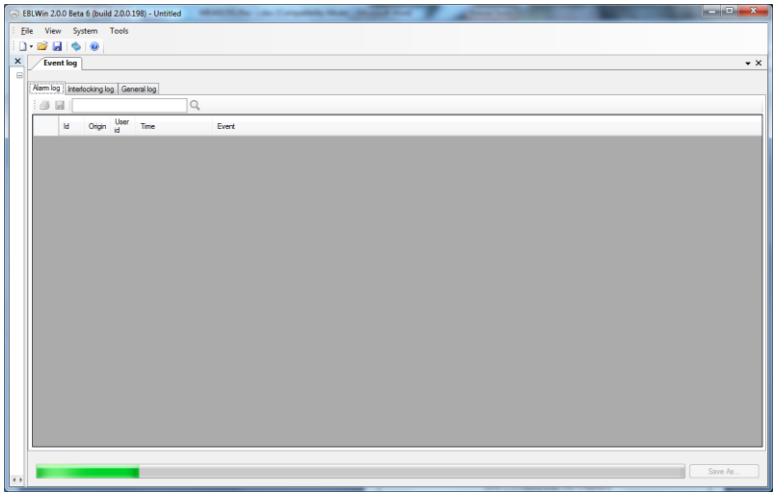


17.2.2 Software version

The control unit software (S/W) version will be displayed.

17.2.3 Show event log

Three different event log lists, Alarm (500 events), Interlocking (500 events) and General log (500 events) can be shown.

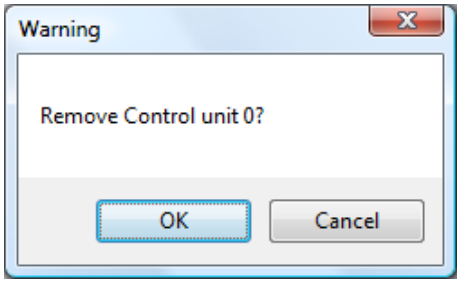


17.2.4 Restart

You can restart control unit via this menu command.

17.2.5 Delete

The selected control unit can be deleted.

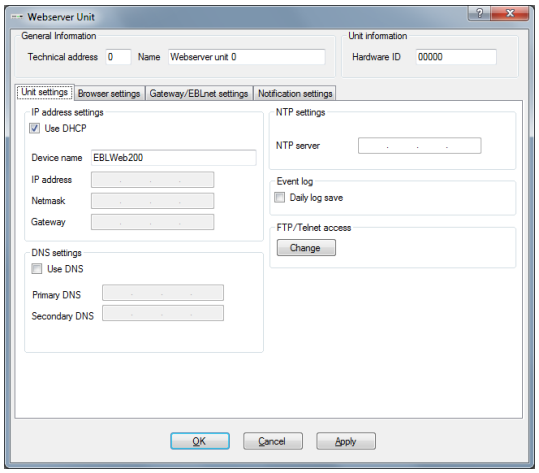


17.2.6 Properties

See beginning of this chapter – Control unit properties dialog box.

17.2.7 Add Web-server

The following dialog box will open:



For more information, see Operating Instructions, EBLWeb V2.1.X for Web-server II, 1598 (MEW01742).

18 System properties (settings)

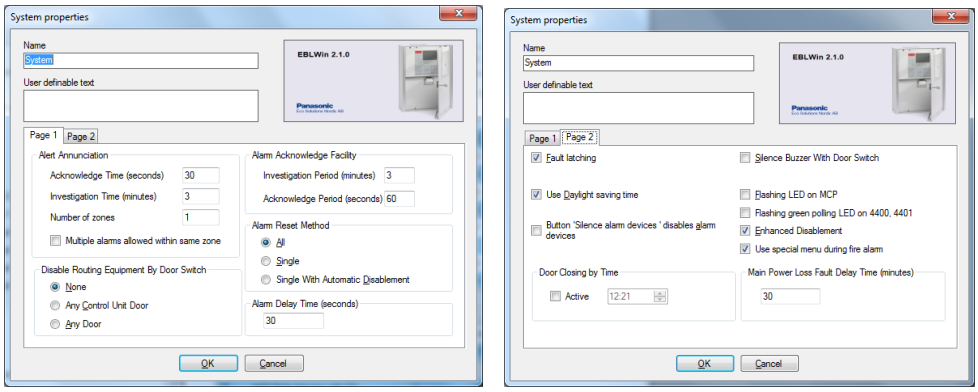


Figure 26. The EBLWin "System properties" dialog box, Page 1 and Page 2.

NOTE! Default settings in EBLWin might vary depending on convention.

18.1 System properties dialog box

Opens via the "System" pop-up menu or via menu "System" (Properties...).

18.1.1 Name

Normally the installation name. (Max. 22 characters.)

18.1.2 User definable text

For user definable text. One row, in total 40 characters. The text will be shown in the control unit display in quiescent condition. See also EBL128 Operating Instructions MEW01741.

18.1.3 System properties, Page 1

18.1.3.1 Alert Annunciation

See also chapter "Alert Annunciation", page 110.

Acknowledgement time: 30 **sec.**
30 is default. 0-120 (= 2 min.) is possible.

Investigation time: 3 **min.**
3 is default. 0-9 is possible.

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

Number of zones: 1
1 is default. 1-4 is possible.

- **Multiple alarms allowed within same zone**
  Normally only one Alert Annunciation alarm is allowed within the zone. If more Alert Annunciation alarms within the zone are allowed, this checkbox shall be marked.

18.1.3.2 Alarm Acknowledgement Facility

Used in conjunction with the AAF Control that is available on the Australian market only.

See also chapter "Alarm Acknowledgement Facility (AAF)", page 111.

Investigation period (IP) time: 3 **min.**
3 is default. 1-9 is possible.

Acknowledge period (AP) time: 60 **sec.**
60 is default. 10-120 is possible.

18.1.3.3 Disable routing equipment by door switch

Valid for the following control unit outputs for routing equipment:
Fire alarm (for Fire brigade tx)
Fault condition (for Fault tx)

- ⊙ **None** (default): Door open in the C.U. or an ext. FBP will **not** disable these outputs.
- ○ **Any control unit door**: Door open in the C.U. will disable these outputs.
- ○ **Any door**: Door open in the C.U. or any ext. FBP will disable these outputs.

In the display (or via menu H4/U1) is shown:
`All outputs to fire alarm routing equip. disabled by open door More`...

18.1.3.4 Alarm reset method

One of the following alternatives shall be selected.

- ⊙ **All** (default): All fire alarms will be reset simultaneously by pressing the "Reset" button (on the c.i.e. front) once.
- ○ **Single**: One fire alarm, i.e. the fire alarm shown in the control unit display will be reset by pressing the "Reset" button once. Any other fire alarm has to be reset the same way, one by one.
  This function is a violation to the EN54-2 standard.
- ○ **Single With Automatic Disablement**: Like "Single" reset but with the Disablement function (see below) as well.
  This function is a violation to the EN54-2 standard.

Disablement function: If an alarm point or zone is reset while it still is in alarm state (e.g. smoke in a smoke detector or a manual call point with a broken glass) this unit will be automatically disabled in order to not activate a new fire alarm within 20 seconds. It will stay disabled until re-enabled via menu H2/B6.

LED "Disablements" on the c.i.e. front is indicating one or more disablements in the system.

18.1.3.5 Alarm delay time (seconds)

Valid for the detectors and zone line inputs with this option selected via EBLWin[128].

30 is default. 0-255 seconds is possible. Note, this delay time starts when the fire alarm normally should have been activated.

18.1.4 System properties, Page 2

- **Fault latching** (default): All faults have to be acknowledged, also corrected faults.
  Checkbox not marked = No fault latching = Not corrected faults can be acknowledged but corrected faults will automatically be deleted from the fault list.
- **Use Daylight Saving**:
  Australian convention: Forward 1 hour the first Sunday in October, 02:00 → 03:00. Backward 1 hour the first Sunday in April, 03:00 → 02:00.
  New Zealand convention: Forward 1 hour the last Sunday in September, 02:00 → 03:00. Backward 1 hour the first Sunday in April, 03:00 → 02:00.
  All other conventions: According to the current EU regulations, i.e. forward 1 hour the last Sunday in March, 02:00 → 03:00. Backward 1 hour the last Sunday in October, 03:00 → 02:00.
  Checkbox not marked = Daylight saving time is not used.
- **Button "Silence alarm devices" disables alarm devices**: Function, see page 125. See also Operating Instructions, chapter "Silence alarm devices". Can be used in all conventions.
- **Silence Buzzer With Door Switch**: If the buzzer in the c.i.e. shall be silenced when the door is opened, this checkbox shall be marked. This is a violation to the EN54-2 standard.
- **Flash LED on MCP**: The manual call point (type 3333 / 3339 / 4433 / 4439) built-in LED will flash to indicate communication with the c.i.e.
  Checkbox not marked = This option is disabled, i.e. the LED is switched off until the call point is operated.
- **Green polling LED**:
  Valid for the detectors 440x in Advanced mode and for detector 4402 in Normal mode.
  The detectors 4400, 4401 and 4402 have a green polling LED.
  Always off = The green polling LED is not used.
  Flash when polled = The green polling LED will be blinking 20 ms / 7 sec. indicating the communication with the c.i.e.
  NOTE! When the detector is in test mode the green polling LED will be turned off until the test mode is turned off.

[128] Regarding the Australian and New Zealand conventions the "Alarm Verification Facility" is valid, see page 103.

- **Enhanced disablements**: Disabled alarm point will not activate pre-warning, fire alarm or fault.
  Checkbox not marked = Disabled alarm point will not activate pre-warning or fire alarm. Fault can still be activated.
  This is a violation to the EN54-2 standard.
- **Use special menu during fire alarm**: Function, see Operating Instructions (MEW01741) chapter "Fire alarm menu (X1-X9)".

18.1.4.1 Door closing by time

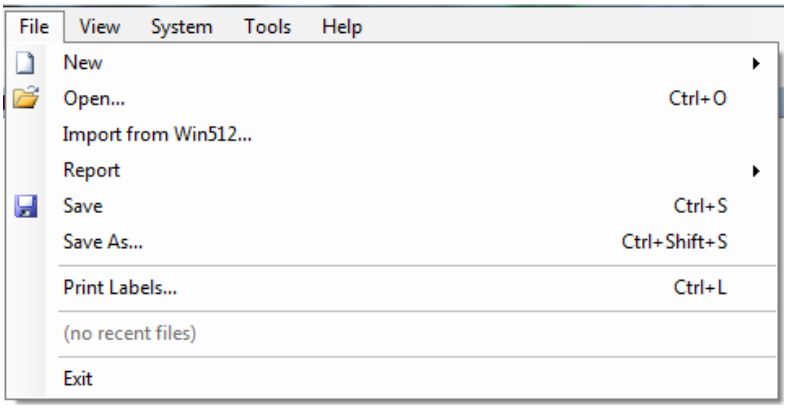
- **Active**: If all fire doors (trigger condition "Fire Door Closing") shall be closed at a definite time every day, this checkbox shall be marked and the time (*hh:mm*) set, e.g. 23:00.

18.1.4.2 Main power loss fault delay time (minutes)

A fault will be activated *mm* minutes after loss of mains (230 V AC). 30 is default. 0-300 minutes is possible. >30 min. is an EN54-2 violation.

19 EBLWin menus

19.1 The File menu



19.1.1 New

To open a new installation. The type of system has to be selected.

System EBL512 G3
System EBL128

19.1.2 Open

To open an installation via a standard Windows dialog box "Open". Also Win128 version 1.1.x installations can be opened but any change of parameters in any algorithm will be set back to default.

19.1.3 Import from Win512

This function is not valid for System EBL128.

19.1.4 Report

Installation Document All System properties, Control unit properties, etc. will be saved in a file (EBLWin Installation Document.htm), via a standard Windows dialog box "Save As".
Alarm points A list of all alarm points will be saved in a file (Alarm points report.htm), via a standard Windows dialog box "Save As".
Outputs affected by alarm points A list of all programmable outputs and which alarm points that will activate them will be saved in a file (Alarm points outputs report.htm), via a standard Windows dialog box "Save As".

19.1.5 Save

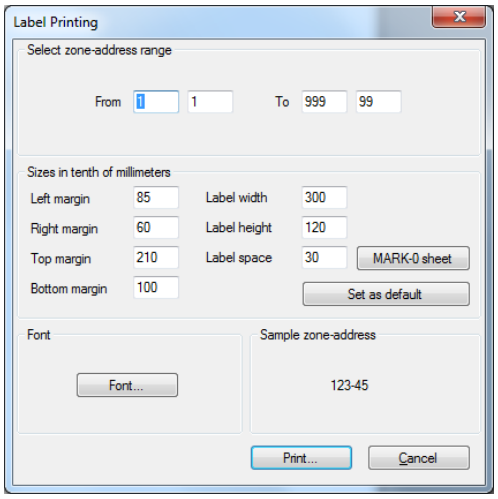
To save an installation (xxxxxx.ebl). The very first time, via a standard Windows dialog box "Save As".

19.1.6 Save As

To save an open installation with another file name (xxxxxx.ebl), via a standard Windows dialog box "Save As".

19.1.7 Print labels

Labels with Zone-Address for the specified range of programmed alarm points will be printed. In order to set the margins etc. the following dialog box will open:

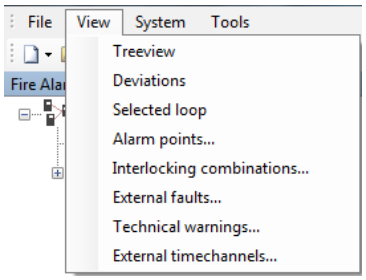


For the **Label holder** (3390) can a MARKO sheet be used, i.e. **Labels for 3390** (3391) 10 sheets à 132 labels.

19.1.8 Exit

To exit / close EBLWin.

19.2 The View menu



First time EBLWin is opened after installation, the tree view will be visible to the left in the window. (To the right will the tabs "Deviations" and "Selected loop" be available.)

19.2.1 Tree view

Visible / open by default.

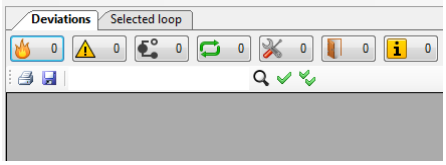
If the tree view for some reason has been closed it can be opened again via menu "View" and "Tree view".

The tree view shows the system and will be updated for every unit added to the system.

The colour of the control unit symbol is black in a new system or if its properties have been revised or units have been added or deleted after the latest download of SSD.

19.2.2 Deviations

To the right of the tree view, the tab "Deviations" is available by default.

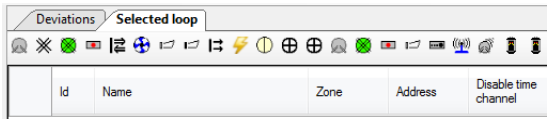


There is a button to open a list of:
- fire alarms (selected or all can be reset)
- faults (selected or all can be acknowledged)
- disablements (selected or all can be re-enabled)
- activated interlocking combinations
- service signals (selected or all can be acknowledged)
- open doors
- technical warnings

You can print and save what you see in the list respectively. A filter function is available.

19.2.3 Selected loop

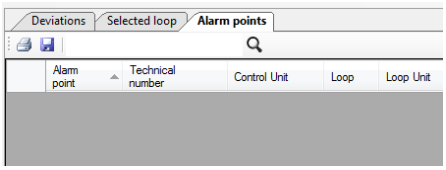
To the right of the tree view, the tab "Selected loop" is available by default.



COM loop units can be added two ways. Via the tree view (COM loop pop-up menu) or via the "Selected loop" tab. Click a COM loop unit symbol to add the unit to the list. Then edit its properties. The "Selected loop" list and the tree view will show the same information.

19.2.4 Alarm points

To the right of the of the tree view can the "Alarm points" tab be available.



This is a list, for the whole system, showing all alarm points and their properties.

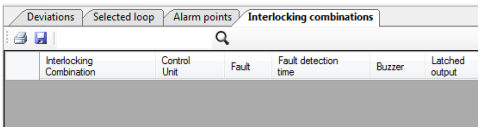
The list can be sorted by clicking the column header respectively.

Double click an alarm point row to open its dialog box.

You can print and save what you see in the list. A filter function is available.

19.2.5 Interlocking combinations

To the right of the tree view can the "Interlocking combinations" tab be available.



This is a list, for the whole system, showing all interlocking combinations and their properties.

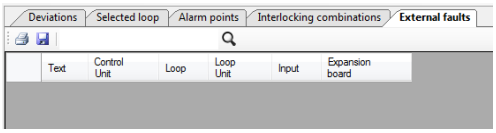
The list can be sorted by clicking the column header respectively.

Double click an interlocking combination row to open its dialog box.

You can print and save what you see in the list. A filter function is available.

19.2.6 External faults

To the right of the tree view can the "External faults" tab be available.



This is a list, for the whole system, showing all external faults and their properties.

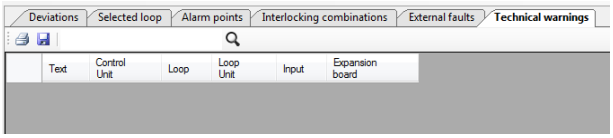
The list can be sorted by clicking the column header respectively.

Double click an external fault row to open its dialog box.

You can print and save what you see in the list. A filter function is available.

19.2.7 Technical warnings

To the right of the tree view can the "Technical warnings" tab be available.



This is a list, for the whole system, showing all technical warnings and their properties.

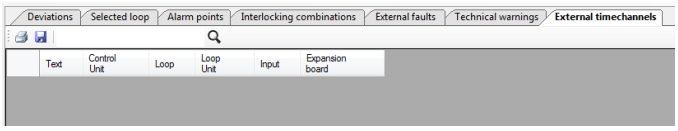
The list can be sorted by clicking the column header respectively.

Double click a technical warning row to open its dialog box.

You can print and save what you see in the list. A filter function is available.

19.2.8 External time channels

To the right of the tree view can the "External time channels" tab be available.



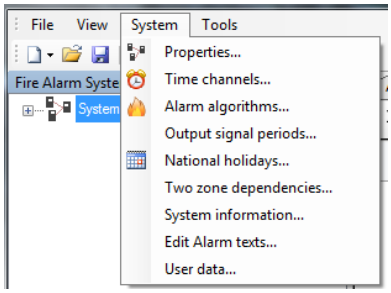
This is a list, for the whole system, showing all external time channels and their properties.

The list can be sorted by clicking the column header respectively.

Double click an external time channel row to open its dialog box.

You can print and save what you see in the list. A filter function is available.

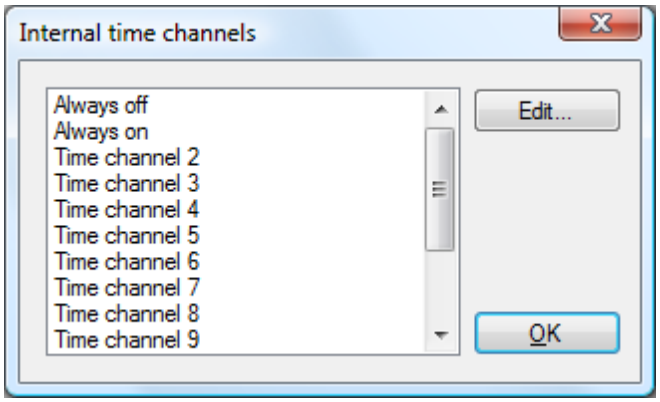
19.3 The System menu



19.3.1 Properties

The same dialog box opens as in Figure 26, page 139.

19.3.2 Time channels



Time channel "Always off"

Time channel "Always on"

Time channels **2-14** are controlled by the built-in RTC (real time clock). Up to five on/off times per day can be set for each time channel.

The time channels 1-14 can be used to:

- disable and re-enable alarm points / zones
- set Alert Annunciation on / off
- activate programmable control outputs

- set alternative alarm algorithm for analog detector types 430x / 440x on / off
- set 2-unit dependence function on / off

The properties for each **Time channel** (2-14) and each **Day of the week** (Monday to Sunday + National Holiday) have to be set for the channel respectively.

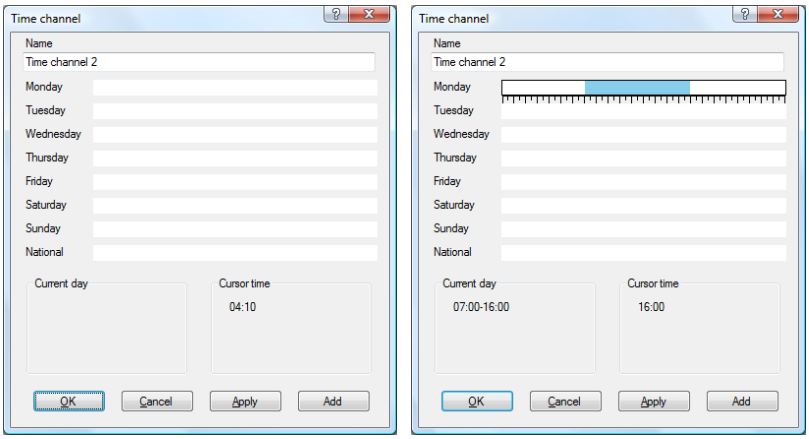
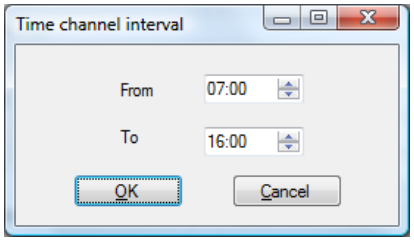


Figure 27. ***Left:*** *The "Time channel 2" dialog box without any programming done.* ***Right:*** *One time interval is programmed for the Monday (time channel 2 is "on" 07:00 – 16:00).*

Name: "Time channel n" is default. Normally not changed but an informative text can be added (e.g. office hours).

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, five 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 for easier time editing:



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.

National: Programmed the same way as the Monday. See also chapter "National holidays", page 153.

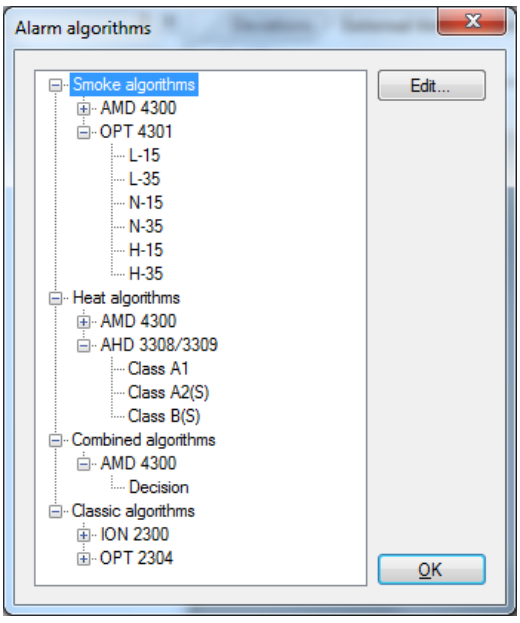
Current day: The programmed time intervals (when the time channel is "on") for the selected day, are shown here.

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

Time channels 3 - 14 are programmed the same way as time channel 2.

19.3.3 Alarm algorithms

The following is not valid for the detectors 4400 and 4401 in Advanced mode. (See chapter "Advanced mode", page 128.)
In Normal mode 440x = 430x.



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 "Edit" and a dialog box displays depending on the selected algorithm:

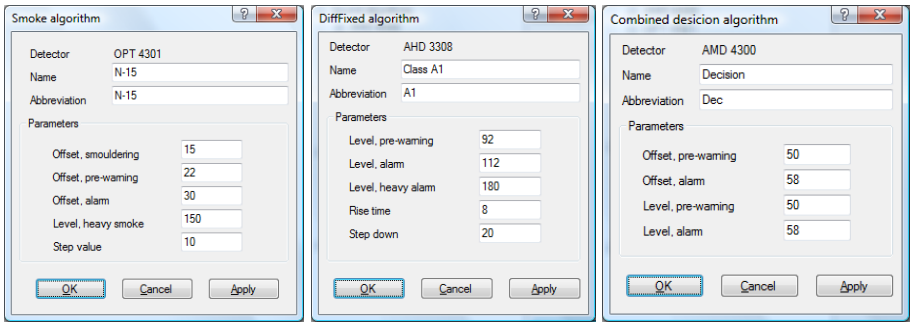


*Figure 28. Smoke algorithm **N-15** for 4301 / 4401, Heat algorithm **Class A1** for 3308 and Combined **Decision** algorithm **Dec** for 4300 / 4400 respectively. All in NORMAL mode.*

Detector: Shortening and Type number (e.g. **OPT 4301** = Analog photoelectric (**opt**ical) smoke detector, **AHD 3308** = Analog heat 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/U4 (e.g. N-15, A1 & Des). Normally not changed.

19.3.3.1 Parameters for smoke algorithms

Valid for the detectors 4300 / 4400 and 4301 / 4401. All in NORMAL mode.

Offset is a fixed value added to the week average sensor value to get the "alarm" level respectively, e.g. week average sensor value 1 + offset 30 = 31 = the fire alarm level (equivalent to 3.1 *% obscuration per meter*).[129]

The step value gives the alarm delay time to the algorithm respectively, see chapter "Functions / Services / Features", page 98.

The following example is for the *N-15 algorithm* for the 4301 detector. The values for other algorithms are different.

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

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

[129] 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 or not, i.e. if it has increased or if it has decreased. The week average value will normally increase very slowly in a long-time period, due to contamination.

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

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

Step value: 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 parameters for fire alarm.

19.3.3.2 Parameters for heat algorithms

Valid for the detectors 3308 / 3309 and the multi detectors 4300 / 4400. All in NORMAL mode.

The "heat alarm" levels are fixed, i.e. there are no offset values. The sensor values can be 0-200, which is equivalent to 0-100° C. The rise time and step down gives a rate-of-rise function (used in the A1 algorithm only). See also chapter "Algorithms for analog heat detectors", page 105.

The following example is for the *A1 algorithm* for the 3308 detector. The values for other algorithms are different.

Level, pre-warning: Level, default 92 (46° C).

Level, alarm: Level, default 112 (56° C).

Level, heavy alarm: Level, default 180 (90° C).

Rise time: Default 8.

Step down: Default 20.

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.

19.3.3.3 Parameters for combined decision algorithm

Valid for the detectors 4300 / 4400. All in NORMAL mode.

Offset, see "Parameters for smoke algorithms" above. Level, see "Parameters for heat algorithms" above. See also "4300", page 37.

The following example is for the *Dec algorithm* for the 4300 detector.

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

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

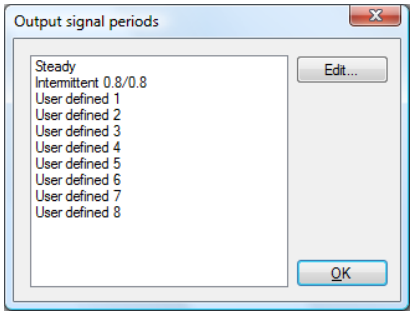
Level, pre-warning: Level, default 50° C

Level, alarm: Level, default 58° C.

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.

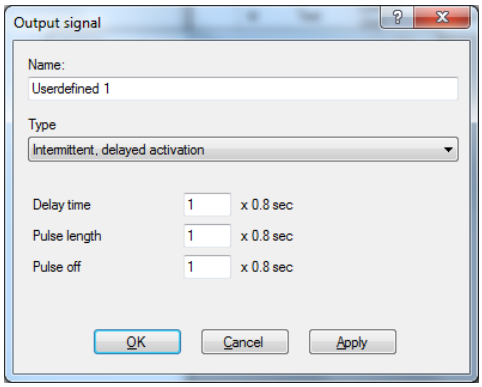
19.3.4 Output Signal Periods

See also chapter "Output signal period", page 77.



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
Pulse
Steady, delayed activation
Intermittent, delayed activation
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.

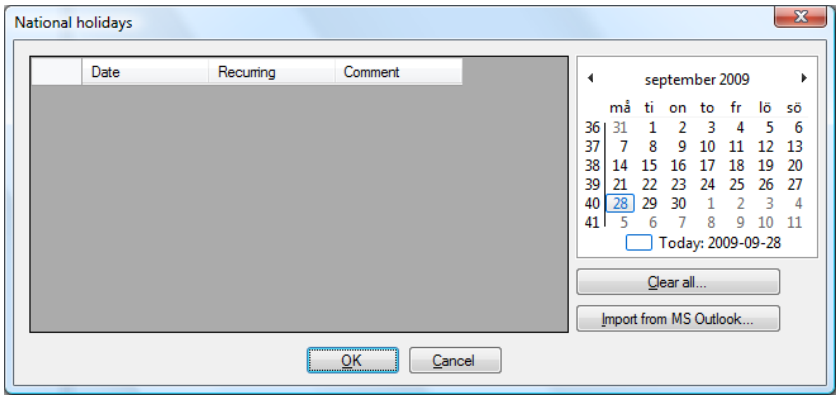
Delay time: Can be set to 0-255 **x 0.8** = **0 - 204 sec.**

Pulse length: Can be set to 0-255 **x 0.8** = **0 - 204 sec.**

Pulse off: Can be set to 0-255 **x 0.8** = **0 - 204 sec.**

De-activation: Can be set to 0-255 **x 0.8** = **0 - 204 sec.**

19.3.5 National holidays



Up to twenty national holidays can be set for the whole system.[130]

National holidays can be added one by one, i.e. by selecting a date in the calendar (up to the right) and click with the left mouse button. A row with that date will be added in the list (to the left). To delete a date in the list, click on the date in the calendar with the left mouse button.

If Microsoft® Outlook® is installed on your PC the national holidays can be automatically added in the list by clicking "**Import holidays from Outlook…**".[131]

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

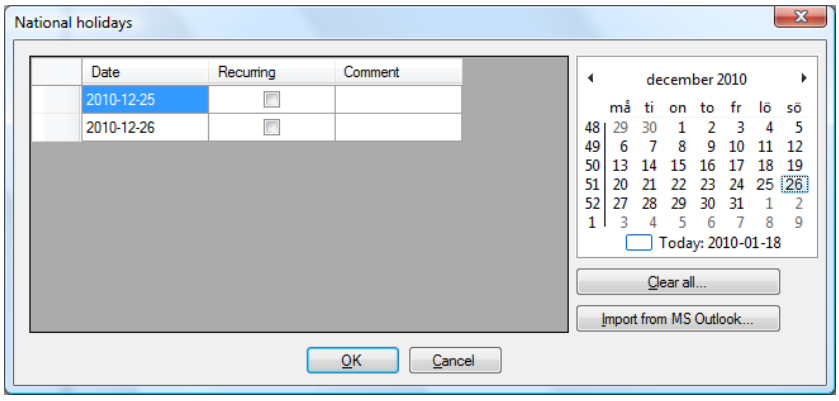
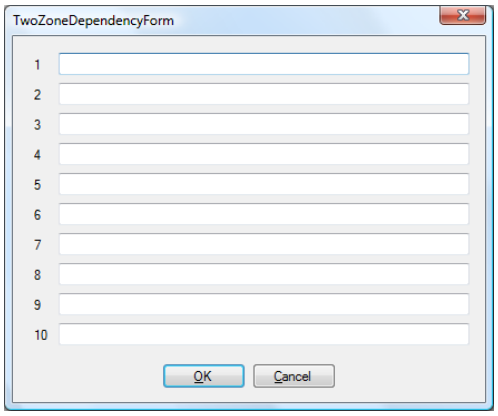


Figure 29. In this example the first row is selected (blue marked).

[130] **NOTE!** ON/OFF times for each time channel (2-14) and every day of the week (incl. national holidays) have to be set.

[131] The National holidays have first to be imported to Microsoft® Outlook. The number and dates of national holidays varies between different countries.

19.3.6 Two zone dependence



See also chapter "2-zone dependence", page 107.

Default for all zones is no two zone dependence.

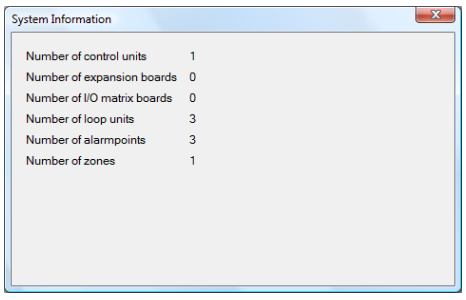
NOTE!
Normally, only conventional zones (i.e. zone line inputs with conventional detectors) should be used for two-zone dependence.
For analog / addressable detectors the two-address (unit) dependence should be used.

Ten (1-10) groups are available.
For each group, write the zone numbers for the two-zone dependent zones (min. two zones!!!) in the white field/line. Use comma as punctuation mark between the zone numbers or a sequence (e.g. xxx-yyy).

NOTE!
Check so that two or more zones are programmed in each group. (A single zone in a group will never be able to activate any fire alarm!)

19.3.7 System information

In this dialog box you can **read** the following information:



This is what has been programmed so far in the system. The information will be updated when units etc. are added or deleted.

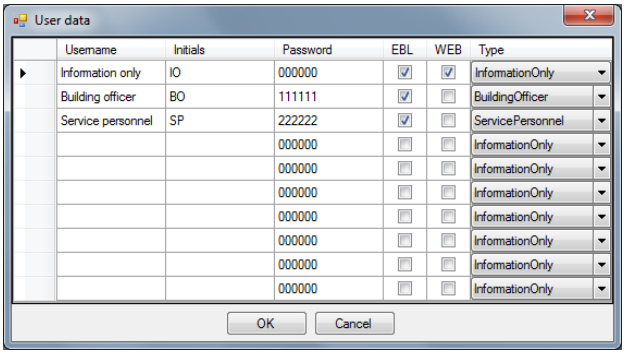
19.3.8 Edit Alarm texts

The user definable alarm text for each alarm point can be created / edited in the alarm point dialog box respectively or via the menu: Systems | Edit Alarm texts.

19.3.9 User data

To log on to the c.i.e. and/or the Web-server a User name and a password are required.

Ten different User names and corresponding passwords can be defined for three different User levels (Information only, Building officer & Service personnel).



User level **Information only** gives access to the menus H4, H6,[132] H9 and H10. (Level 2B according to EN54-2.)

User level **Building officer** gives access to the menus H1 – H4, H6, H7, H9 and H10. (Level 2C according to EN54-2.)

User level **Service personnel** gives access to the menus H1 - H10. (Level 3A according to EN54-2.)

For more information regarding user names, passwords, user levels, logon to a control unit, etc. see EBL128 Operating Instructions, MEW01741.

19.4 The Tools menu

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

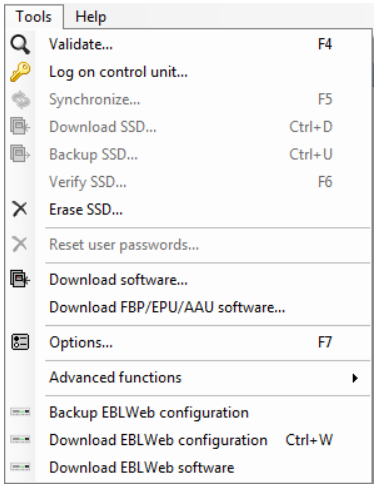


Figure 30 . EBLWin menu "Tools". Some commands are disabled (grey) since they require the PC / EBLWin to be connected and logged on to EBL128.

[132] NOTE! The faults **cannot** be acknowledged on this level.

Validate...: The SSD can at any time be validated, i.e. checked for System Errors, Warnings and EN54 violations. A validation will automatically be done before download of SSD to EBL128. System Errors have to be corrected before the download can start.

Log on control unit: Log on / Log off to an EBL128.[133]

Synchronize…: (When connected and logged on to an EBL128.) Data (i.e. faults, disablements, etc.) will be synchronized, i.e. the data / information are the same in the control unit and EBLWin.

Download SSD…: (When connected and logged on to an EBL128.) Opens a dialog box for download of SSD to the EBL128 control unit, the Web-server and connected "Display Units" (e.g. Ext. FBP).

Backup SSD ("Upload")…: (When connected and logged on to an EBL128.) Opens a dialog box for backup ("upload") of SSD from EBL128 and connected "Display Units" to EBLWin.

Verify SSD…: (When connected and logged on to an EBL128.) The SSD shown in EBLWin will be compared with what is actually stored in EBL128. Same checksums = same SSD.

Erase SSD…: (With EBL128 in **boot mode**.) The SSD stored in the EBL128 control unit will be erased. Also the SSW (see Operating Instructions) will be erased. **NOTE!** An EBLWin key is required.

Reset user passwords…: (When connected and logged on to an EBL128.) If any password has been changed via the control unit menu (H10) or via a Web-server, it will be reset to the password downloaded via the SSD, i.e. the passwords in the EBLWin dialog box "User data" (found in the menu "System").

Download Software…: (When connected and not logged on to an EBL128.) **NOTE!** An EBLWin key 5094 is required. Opens a dialog box for download of an EBL128 S/W file (xxx**.bin**) to an EBL128 control unit. (There is one **.bin** file for each language / customer.)

Download FBP/EPU/AAU software: (When connected to a Display Unit – via RS232.) For download of S/W **(**xxx**.bin** file) to one Display unit. **NOTE!** An EBLWin key 5094 is required.

Options…: EBLWin settings. A Convention (one for each country) is selected the very first time EBLWin is opened. Can be changed if Level 2 is selected, see below. Display Unit language can be selected as well as the EBLWin language.

Advanced Functions:
No "Level" selected (default) = Alarm algorithm parameters cannot 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

[133] Log on require the PC to be physically connected to EBL128 and an EBLWin key 5094 plugged in the PC.

algorithm parameters can be changed. Convention will be possible to change in "Options…".

Backup EBLWeb configuration: (When connected to a Web-server.) Opens a dialog box for backup ("upload") of the Web-server configuration to EBLWin.

Download EBLWeb configuration: (When connected to a Web-server.) For download of the configuration to a Web-server. **NOTE!** An EBLWin key 5094 is required.

Download EBLWeb software: (When connected to a Web-server.) For download of the software to a Web-server. **NOTE!** An EBLWin key 5094 is required.

19.5 The Help menu

View help: A link to a help document. (Normally a link to the this document.)

About EBLWin: The EBLWin version and the EBLWin key Id number.

20 Download SSD

The PC program **EBLWin** is used for creating the **S**ite **S**pecific **D**ata (SSD) and to download it to the EBL128 control unit, the Web-server and/or connected Display Units 1728, 1735, 1736, 1826 & 1828.

When the installation is ready, i.e. all units connected and the power is turned on, the SSD download can take place.

The PC has to be connected to the RS232 port "J3" in the control unit. Start EBLWin and open the wanted installation. Log on to the control unit via the PC (EBLWin).

NOTE!

No password / access code is required to log on to the control unit, instead an **EBLWin key** (5094) is required. This key is plugged in a USB-port in your PC.

In EBLWin (menu "Tools" | "Download SSD...") select the Control unit "0". SSD can also be downloaded to the Web-server and connected Display Units if the checkbox "Download display units" and "Download Webserver SSD" respectively, is marked.
After the SSD download the control unit will restart. A number of faults might then be generated, e.g. due to not connected units.

Disconnected at startup
Normally this function is not used in EBL128 since this control unit has only one COM loop.

In the COM loop Properties dialog box it is possible to select the option "Disconnected at startup". The COM loop will then be disabled directly after the download restart and therefore not generate any faults.

NOTE!
A COM loop "Disconnected at startup" can be re-connected via menu H8/S1 but it will then be disconnected again after next SSD download. Finally the SSD for that control unit has to be downloaded again with the option " Disconnected at startup" not selected.

20.1 COM loop menu

20.1.1 Check Loop

NOTE! If any "Obsolete units" are connected the result of this check might be incorrect.

In the EBLWin COM loop icon pop-up menu select "Check Loop". This function can be used after (or before) the download of SSD. The function is as follows:
The control unit will find connected expansion boards and all units connected on the COM loop. If there is a break (cut-off) or short circuit on the loop only the units in the A-direction will be found and

shown, i.e. an indication where the break (cut-off) or short circuit is located.

For all units, the address (1-255) and the type of unit will be reported to EBLWin. All differences compared to the installation (SSD) that is open in EBLWin will be listed and can be saved and/or printed out.

"Unknown device" means that the type cannot be identified, e.g. because it is an old type (23xx) or it is a faulty unit.

"Several reply" means that more than one unit have got the same address or due to bad COM loop communication.

NOTE!
During this check the COM loop will be disconnected (disabled) and no alarms or faults can be activated. Disconnected COM loop is indicated by the LED "Disablements" (L8) on the c.i.e. front.

20.1.2 Auto generate loop

NOTE! If any "Obsolete units" are connected the result might be incorrect.

The units connected to the COM loop will be identified by EBLWin and added to the COM loop with some auto generated settings, which can be edited before saved and downloaded as SSD to the control unit.

20.2 SSD download to the Control Unit

Start the SSD download from EBLWin, see page 158. Information in the control unit display:

```
Downloading in progress….
```

▓ ▓ ▓ "Progress bar……"

When the download is completed the following information will be shown:

```
Download completed successfully
Control unit will now restart
```

After the restart another text message will be shown in the display:

```
FAULT: Restart, code 25  addr 0
Date: MM-DD   Time: HH:MM    Serviced
```

Code 25 indicates a normal restart after an ok SSD download.
Acknowledge the restart fault.

If the download was not ok another fault will be generated.

```
FAULT: Site specific data (SSD)
Date: MM-DD   Time: HH:MM
```

This text message means that the SSD have **not** been downloaded properly, i.e. a new download has to be performed.

20.3 User definable text messages download

Each alarm point, zone and zone line input can have a unique user definable alarm text programmed via **EBLWin**. When a fire alarm is activated (e.g. an addressable alarm point), the presentation number (Zone - Address) will be shown in the control unit display and in the ext. FBP 1826 / 1828 display[134] together with its alarm text.

All alarm texts, up to 40 alphanumeric characters each, are created and downloaded (included in the site specific data – SSD) via **EBLWin**.

When a printer is available (e.g. in an Ext. FBP 1826) the alarm text will be printed with the presentation number.

A fault message for an alarm point, zone or zone line input will also show the alarm text.

[134] This is also valid for the Ext. Presentation unit 1728 and the Alert Annunciation units 1735 / 1736.

21 Download software (S/W)

The latest EBL128 software (S/W) version is factory downloaded before the delivery. Due to continual development and improvement, different S/W versions can be found.
The valid S/W version can be read in menu H4/U7 or via EBLWin. On site, new S/W can be downloaded via EBLWin.

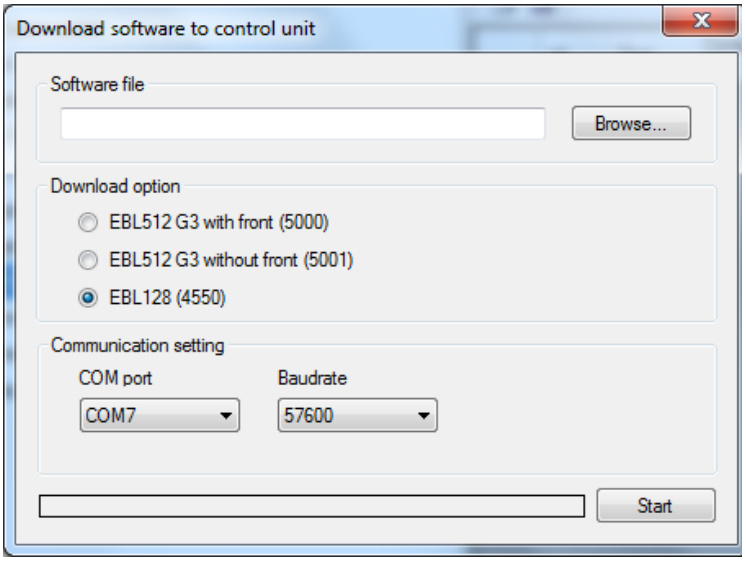
On site can also new S/W for the 1728, 1735, 1736, 1826 & 1828 units be downloaded via EBLWin. See the "Technical Description" for the unit respectively.

21.1 Software download to the Control Unit

To download a new software (firmware) version, a PC and **EBLWin**[135] are used. The .BIN file that shall be downloaded contains both the software and a text file, i.e. there is one .BIN file for each language / country.

Connect the PC to the RS232 port "J3" in the control unit and start EBLWin. Do **not** logon. Check that the EBLWin key is plugged in a PC spare USB port.

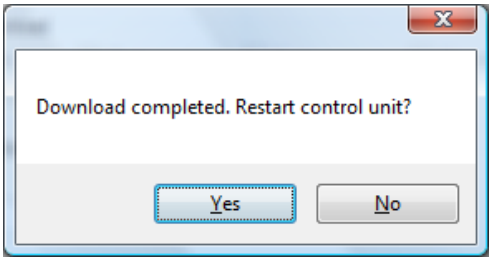
1. In the "Tools" menu select "Download Software…" to open the "Download Software to control unit" dialog box and do the required settings:



- Select the path and the Software file name, e.g. ***English_EBL128_210.BIN*** (210 = version 2.1.0.)
- Select "EBL128 (4550)
- Select the COM port to be used on your PC.
- Select a Baud rate (normally 115200).

[135] To logon to the control unit and to download software, an EBLWin key (5094) is required in a PC spare USB port.

2. Set the Main board in "boot" mode, i.e. put the jumper onto the two pins marked "BOOT" (JP2) and then momentarily short the two solder pads marked "RESET" (JP1). The buzzer sounds continuously. The Main board is now in "boot" mode.
3. Start the download, i.e. click "Start".
4. The download status is indicated by the progress bar.
5. When the progress bar has gone from "red to green" the download is completed and the following dialog box opens:



6. Remove the jumper from the two pins marked "BOOT" (JP2)
7. Click "Yes" and the control unit will restart. Regarding the restart, see also Operating Instructions, chapter "Restart". (Restart code 00.)
8. LED "Operation" (L5) on the front shall now be turned on
9. After the restart fault is acknowledged all LEDs on the front (except LED "Operation") shall normally be turned off.

22 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.

22.1 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 164 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.

22.2 Ext. FBP / EPU / AAU cables

RS-485. See drawing 128-23. Cable length $\leq$ 1200 m to the furthest situated ext. FBP / EPU / AAU.
LIHCH-TP 2 x 2 x 0.75 mm^2 or equivalent (twisted pairs).

22.3 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.

22.4 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.

22.5 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 ELQRB 10 x 2 x 1 mm (0.75 mm^2) or equivalent.

23 COM loop cable length

On the COM loop can theoretically up to 255 COM loop units be connected (i.e. address 1-255). The cable length and max. COM loop current, are depending on the number and type of loop units and the cable type, see Figure 31 and Figure 32, page 165 and 166 respectively.

One of the graphs in each figure has to be used depending on which type of units that are connected to the COM loop. Start checking the terms below for Graph 1, Graph 2 and finally Graph 3.

1. Graph with square dots (when "old" conventional smoke detectors requiring ≥ 15 V are used).

Has to be used when at least one of the following units are used:

2335 / 3361[136] + (2316, 2317, 2318 or 2321 plugged in a 2324)

2330 + (2316, 2317, 2318 or 2321 plugged in 2330 or plugged in a 2324 connected on the external line)

2. Graph with circular dots (when no "old" conventional smoke detectors requiring ≥ 15 V, are used)

Has to be used when at least one of the following units are used:

2300 / 2304

2226 / 2821

2330 + (4318, 4350, 4352, 4452 and all other conventional types **except** 2316, 2317, 2318 or 2321 plugged in base 2330 / 2324)

2335 / 3361[136] + (4318, 4350, 4352, 4452 and all other conventional types **except** 2316, 2317, 2318 or 2321 plugged in base 2324.)

2333

2340 / 2341

3. Graph with no dots

Shall normally be used, i.e. if Graph 1 or Graph 2 above not has to be used.

The following two figures are showing graphs for maximum conductor (wire) resistance and maximum cable length respectively.
Valid for the cable type ELQYB 2 x 1 mm (0.75 mm^2) or equivalent.

Excel sheet

An Excel sheet is also available for an easy check of the current consumption, cable length, etc.

EBLWin

In the COM loop pop-up menu select "Properties..." to open a window showing the quiescent and max. current consumption for the COM loop units connected on that COM loop.

[136] The monitored input used as a zone line input (Z).

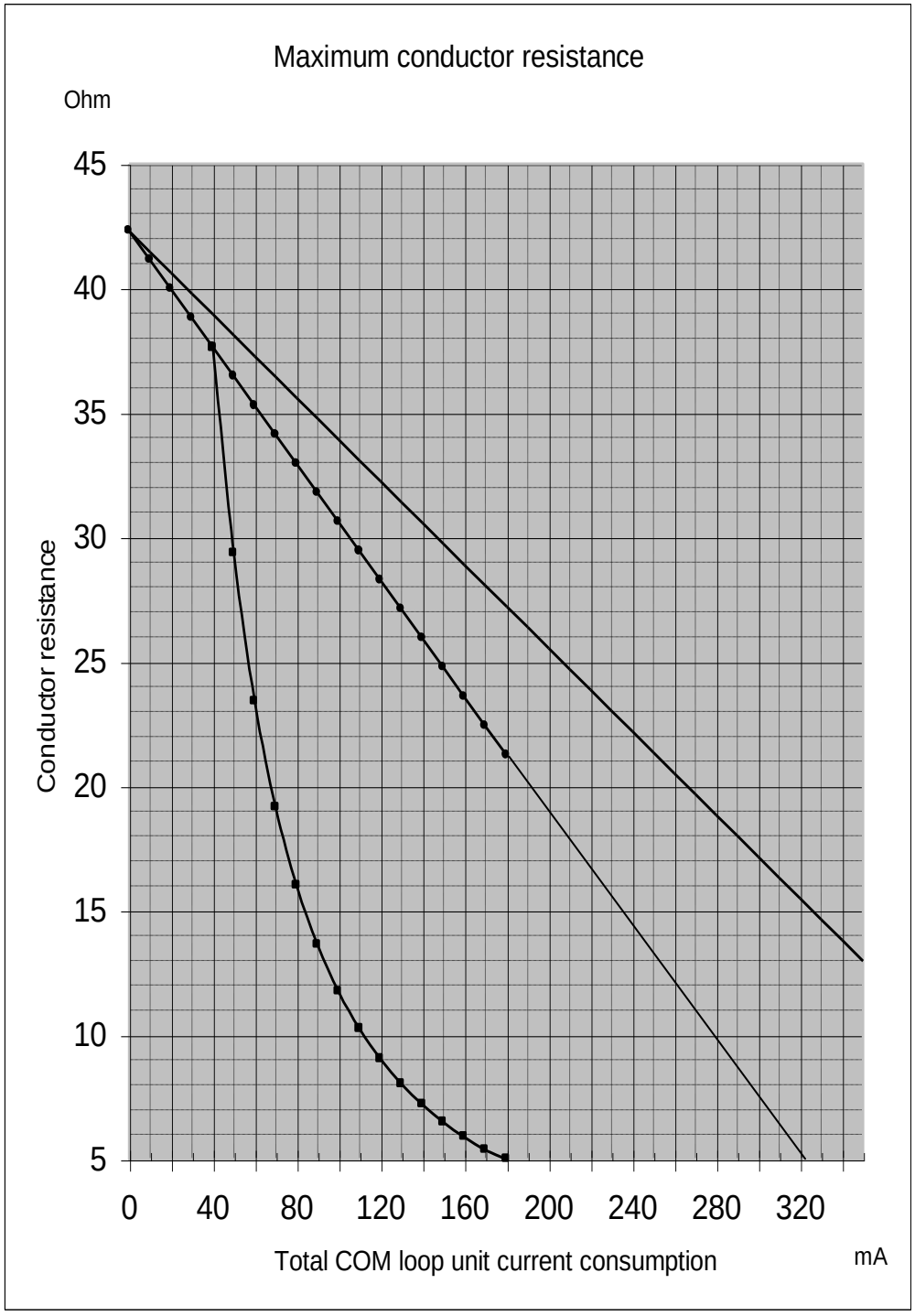


Figure 31. Graphs showing the total conductor resistance in relation to the COM loop units' total current consumption. ***NOTE!*** *The graphs start at "0 mA" but graph 1 ends at "320 mA" and graph 2 ends at "350 mA". End of graph = max. allowed loop current.*

NOTE! The total conductor resistance (ohm) = L conductor (ohm) + C conductor (ohm).

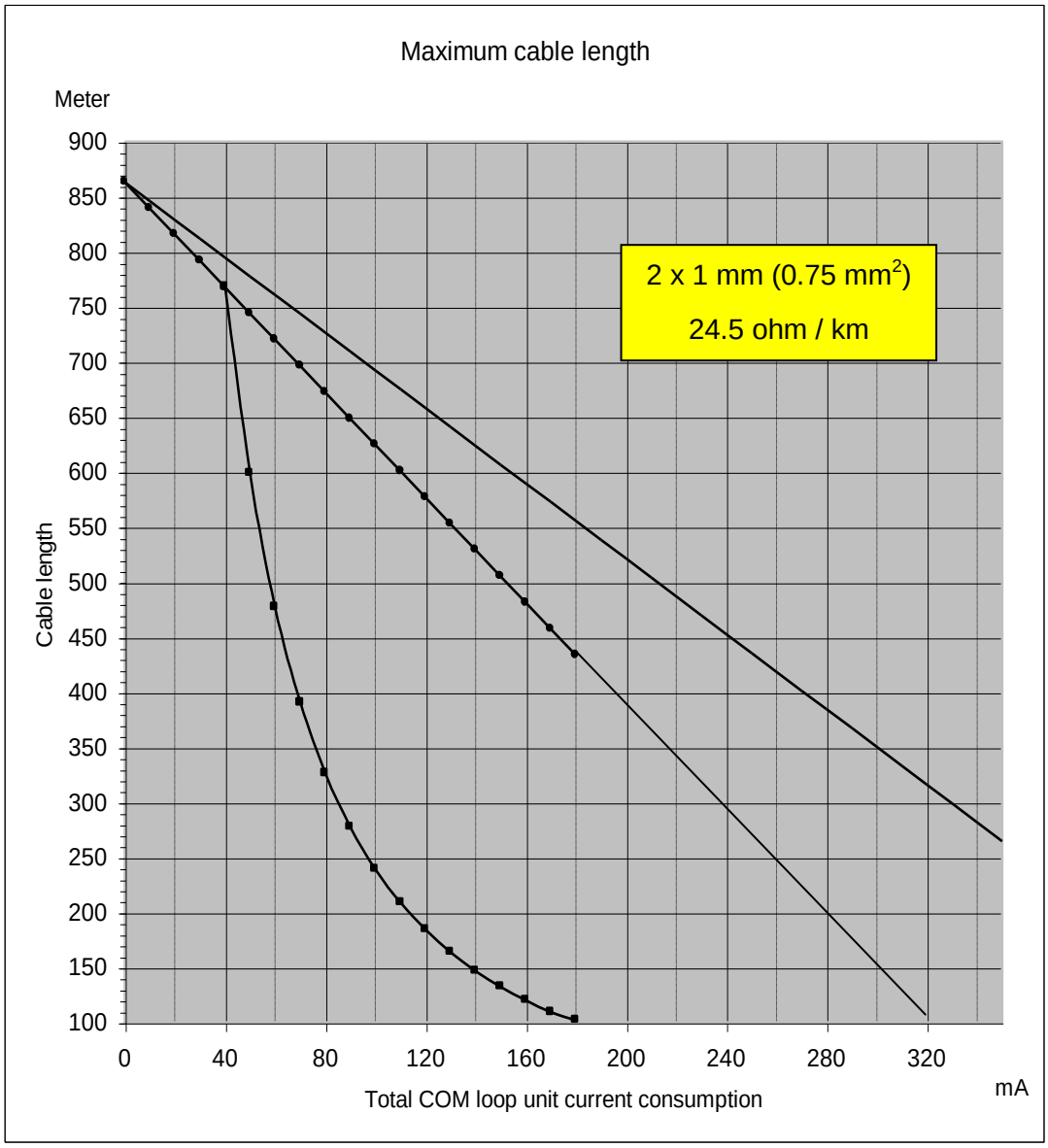


Figure 32. Graphs showing the cable length in relation to the COM loop units' total current consumption. ***NOTE!*** *The graphs start at "0 mA" and 863 m cable length respectively but graph 1 ends at "320 mA" and graph 2 ends at "350 mA". End of graph = max. allowed loop current. (863 m cable length = 42.3 ohm.)*

NOTE! The graphs are valid for the cable type ELQYB 2 x 1 mm ($0.75mm^2$) with the conductor resistance 24.5 ohm / km. The total conductor resistance (ohm) = L conductor (ohm) + C conductor (ohm).

24 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 164.
- 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[137] – 30 V DC.

See also chapter "Power supply", page 172.

NOTE! A grey row in the tables = obsolete unit, can be found in old installations.

C.i.e.	**Normal state** (quiescent) (mA)	**Alarm state** (active) (mA)
Control unit 4550 (backlight off/on) [138]	51/109	67/125
8 zones expansion board 4580 (P.c.b. 9287-**2B**) [139]	22.2 + (see footnote)	22.2 + (see footnote)
8 zones expansion board 4580 (P.c.b. 9287-**3A**) [140]	15	15
8 relays expansion board 4581	15	15
Inputs and outputs expansion board 4583 (No units connected.)	15	15
RS485 transceiver (comm. module for Display Units) 4552	14	14
Web-server II 1598	60	65

[137] 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.

[138] Control unit electronics only, i.e. the COM loop units' current consumption and other connected external equipment's current consumption are not included.

[139] Add 3.5 mA (quiescent) and 12 mA (activated) respectively, for each zone line input used.

[140] Add 0.5 mA per input (zone) for end-of-line capacitor (470nF) and 3 mA per input (zone) for end-of-line resistor (10K).
Add 30 mA per input (zone) activated. (Each input has a 30 mA current limitation, i.e. also for short-circuit on the line.)

COM loop units (input units, etc.)	**Normal state** (quiescent) (mA)	**Alarm state** (activated) (mA)
Analog smoke detector 2300 / 2304 + analog base 2312 [141]	1.7 / 1.8	3.7 / 3.8
Analog smoke detector 3304 + analog base 3312 [142]	0.3	2.3
Analog heat detector 3308 + analog base 3312xx [142]	0.3	2.3
Analog heat detector, enclosed 3309 [142]	0.2	1.7
Analog multi detector 4300 + analog base 3312xx [142]	0.3	2.3
Analog smoke detector 4301 + analog base 3312xx [142]	0.3	2.3
Analog multi detector 4400 + analog base 3312xx	0.3[143]	1.3[144]
Analog smoke detector 4401 + analog base 3312xx	0.3[143]	1.3[144]
Analog multi detector with CO 4402 + analog base 3312xx	0.3[143]	1.3[144]
Addressable heat detector 2340 / 2341 [141]	2	5
Addressable zone interface, isolated 2226 [145]	3	6
Addressable IS zone interface 2821 [145]	3	6
Isolated zone interface 2822	3	6
Addressable zone interface 2335	5	20
Addressable manual call point 2333	2	5
Addressable manual call point 3333 / 3339	2	5
Addressable manual call point with isolator 4433 / 4439	1.6	2.7
Alarm Acknowledge Facility Control (AAFC) [146]	2	5
Addressable detector base 2330 + detector Incl. external line.	1.7 3.5	3.9 [147] 13.2
Addressable base station for wireless units 4611	6	6
Aspirating smoke detector Aspect NITRO AE2010 N-P	2.1	2.1

[141] External indicator (LED) current consumption. 2216: add 2 mA. 2217 / 2218: add 1 mA.

[142] External indicator (LED) current consumption. 2216: add 2 mA. 2217 / 2218: add 1 mA.

Analog base with isolator 4313 can be used instead of Analog base 3312.

[143] Plus 0.025 mA if green polling LED is used.

[144] Plus 0.5 mA if External indicator (LED) is used (e.g. 2218).

[145] 2226 / 2821 also require external power supply, 24V DC, 30 mA.

[146] This unit is available on the Australian market only.

[147] Ext. LED current consumption max. 1 mA. Alarm state on detector and external line: 15.4 mA. **NOTE!** The external line can be used for an ext. indicator (LED) or for conventional detector(s) that will get the same presentation number (zone-address) as the detector plugged in the base.

Aspirating smoke detector Aspect GRIZZLE AE2010 G-P	2.1	2.1
Aspirating smoke detector Aspect LAZEER AE2010 L-P	2.1	2.1

NOTE! On each COM loop, up to 5 sensors / detectors can have their LEDs lit at the same time.

COM loop units (output units, etc.)	**Normal state** (quiescent) (mA)	**Alarm state** (activated) (mA)
Addressable short circuit isolator 4370	2.2	2.2
Analog base with isolator 4313 [148]	1.3	1.3
Addressable multipurpose I/O unit 3361	2.2	max. 12[149]
Addressable 2 voltage outputs unit 3364 [150]	6	6
(Addressable) External power supply 3366	15	15
Addressable siren 3377	1	13
Addressable siren with isolator 4477	1.8	10
Addressable sounder base 3378 (low/high)	2	6 / 12
Addressable sounder base 3379	0.75	2.5[151]
Addressable beacon 4380	1.7	5
Light indicator 4383	1.5	4
I/O matrix board 4582	6	6
Fan control application board 4594 [152]	6	6

[148] Detector not included.

[149] Only if the input In 0 is used as a zone line input, else approx. 2.2 mA.

[150] External 24 V DC power supply also required, e.g. the 3366 unit.

[151] High sound output: 4.5 mA.

[152] Two 4594 boards are mounted on a Fan control panel 4594. 24 V DC power supply also required.

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
External Presentation unit 1728	**26**@24 V / 48@12 V	**49**@24 V / 88@12 V
Alert Annunciation unit 1735 / 1736	**26**@24 V / 48@12 V	**42**@24 V / 79@12 V
External FBP 1826 / 1828	**26**@24 V / 48@12 V	**49**@24 V / 88@12 V
Printer 1835 (for ext. FBP 1826) [153]	**4**@24 V / 7@12 V	**4**@24 V / 7@12 V
Alarm devices (sounders, etc.)	0	Acc. to the producer
Door release magnets	Acc. to the producer	0
Alert annunciation controller 1740	10	40

NOTE! Regarding the 1728, 1735, 1736, 1826, 1828 and 1835 units, see the next page.

[153] When the printer is active the current consumption is 161 / 345 mA momentarily.

The following table is a **help** when calculating the cable length and/or the number of units. The table is based on the current consumption at the lowest power supply voltage allowed i.e. 21 V DC by battery back-up (no mains).

Recommended cable type is LIHCH-TP 2 x 2 x 0.75 mm^2.
Wire resistance for this cable is approx. 25 ohm / 1000 m.

Up to four units can be connected but it is depending on the type of units and the cable (type and length).

Number of units	**Allowed cable resistance (ohm) / length (m)**		
	Units 1735, 1736	**Units 1728, 1735, 1736, 1826, 1828 & no printers 1835**	**Units 1728, 1735, 1736, 1826, 1828 & one[154] printer 1835**
4	25 / 500	21 / 420	4 / 80
3	34 / 680	28 / 560	10 / 200
2	50 / 1000	42 / 840	16 / 320
1	100 / max. 1200	84 / max. 1200	18 / 360

Explanation: 25 (ohm) ÷ 25 (ohm wire resistance per 1000 m) = 1000 m but the wire goes from the c.i.e. to the last unit and back to the c.i.e. again, i.e. the cable length = 1000 (m) ÷ 2 = 500 m.

NOTE!

The table is based on the recommended cable type. If a cable with greater area is used the wire resistance (ohm per 1000 m) will be lower and the possible cable length will be longer.

It is also possible to use an external power supply, e.g. 3366, when a greater number of units are required or if a longer cable length is required.

[154] Printing will only be performed if and when the door in the ext. FBP is being opened. If the door is not opened until after all the alarms are reset, there will be no printing.

25 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.[155]

Batteries shall fulfil UL94V-0.

Recommended batteries are Panasonic LC-PD1217P.

The batteries and the rectifier are connected to the Main board (4556), which also handles the charging of the batteries.

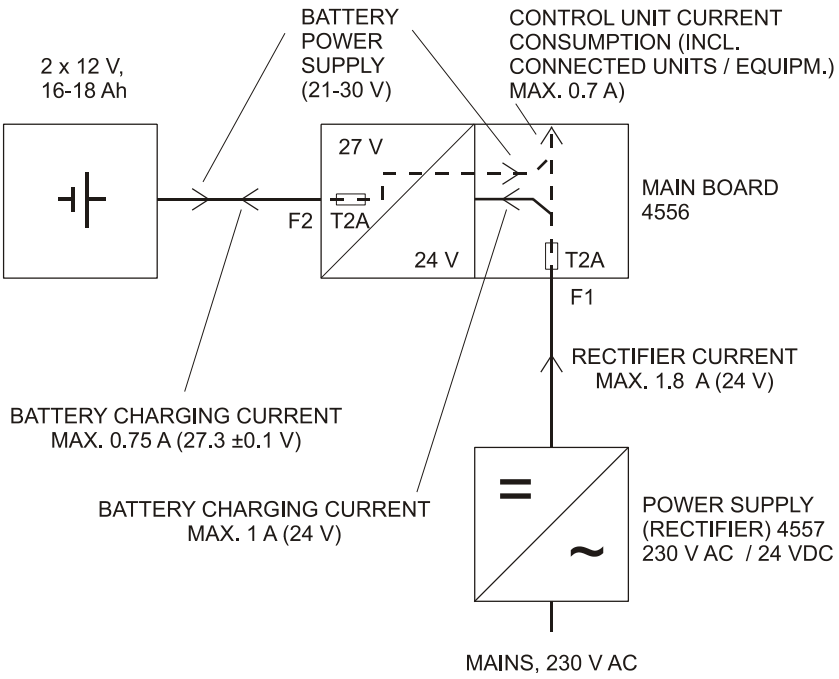


Figure 33. EBL128 power supply block diagram. Fuse F2: Ceramic. (One ceramic 2 A fuse is connected, in series, between the two batteries.)

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.

25.1 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*

[155] 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.

recharged to at least 80% of its rated capacity within 24 hours and to its rated capacity within another 48 hours.

If this section is to be fulfilled, max. 18Ah batteries can be used since 0.7A x 24h ÷ 0.80 = 21Ah[156]. For $\mathbf{I^{TN}}$ in relation to the **back-up time**, see the table in chapter "Second power source (Battery)", page 175.

25.1.1 Battery charging functions:

Battery charging is performed in two steps:

1. **Constant charging current.** The charging current is constant (fixed)[157] 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.

25.1.2 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. It will generate a fault and the following fault message will be shown:

```
FAULT: High current consumption in CU
Date: MM-DD   Time: HH:MM
```

- Normally every 14th minute the battery voltage is checked. A battery voltage below 18.9 V will generate a fault[158] and the following fault message will be shown:

```
FAULT: Battery
Date: MM-DD   Time: HH:MM
```

NOTE! Regarding this fault and the New Zealand convention, see chapter "FAULT: Battery", page 126.

[156] 21 Ah batteries with the required physical size are normally not found on the market.

[157] The charging current is **0.7** A (typical). (Very close to the end of the charging cycle it will lower.)

[158] In the New Zealand convention every 60 seconds and 24.4 V respectively.

- When 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.)
- Every 4th hour the battery circuit (connection cables, fuses, etc.) resistance is checked. A resistance over 1.4 ohm will generate a fault and the following fault message will be shown:

```
FAULT: Low battery capacity
Date: MM-DD   Time: HH:MM
```

NOTE! Regarding this fault and the New Zealand convention, see chapter "FAULT: Low battery capacity", page 126.

- In case of no main power source (230 V AC), i.e. when the backup battery is used as the only power source, the battery will be switched off at a battery voltage below 18.0 V.[159] **The c.i.e will in this case be totally powerless (dead).** Only the battery voltage will be checked and when it is at least 22 V, the battery will be switched on and the c.i.e. will work again.

25.2 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 167, to calculate the following current consumptions:

- $\mathbf{I^{CN}}$ = the current consumption for EBL128[160] in normal state.
- $\mathbf{I^{RN}}$ = the current consumption for all other equipment[161] in normal state.
- $\mathbf{I^{CA}}$ = the current consumption for EBL128[160] in alarm state.
- $\mathbf{I^{RA}}$ = the current consumption for all other equipment[162] in alarm state.

The total EBL128 current consumption in **Normal** (quiescent) **state**: $\mathbf{I^{TN} = I^{CN} + I^{RN}}$

[159] This is done in order not to damage the battery.

[160] Including the COM loop units but excl. the battery charging current.

[161] External equipment connected to the control unit (e.g. ext. FBPs, door release magnets, relays, routing equipment, etc.).

[162] External equipment connected to the control unit (e.g. ext. FBPs, sounders, relays, routing equipment, etc.).

The total EBL128 current consumption in **Alarm** (activated) **state**: $\mathbf{I^{TA}} = \mathbf{I^{CA}} + \mathbf{I^{RA}}$

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 33, page 172.
Total EBL128 current consumption in relation to **back-up time**, see the table in chapter "Second power source (Battery)", page 175.

25.3 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 time exceed 1.8 A**. Allowed input voltage is 176-264 V AC. The output voltage is 24 V with a tolerance of ±1%. [163]

25.4 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[164], 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 shows the relation between the total current consumption in normal state $\mathbf{I^{TN}}$ and the back-up time.

$\mathbf{I^{TN}}$ (A)	**Back-up time** (hours) 16 / 18 Ah battery
0.7	22 ¾ / 25 ¾
0.6	26 ½ / 30

[163] 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.

[164] According to national regulations, customer demands, etc.

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**.

25.5 Form / Table of current consumption

Some national regulations require different forms / tables regarding current consumption, to be filled in. In such a case 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.

26 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**[165]	**Required version**[166]
4550; EBL128	2.1.0	2.1.0
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	2.0.4
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
4582; I/O Matrix board	1.0.4	1.0.2
4583; Inputs and Outputs expansion board	1.0.2	1.0.0
4583DE; Inputs and Outputs expansion board	1.0.2DE	1.0.2DE
1728; Ext. Presentation Unit (EPU)	1.4.1	1.4.1
1735 / 1736; Alert Annunciation unit (AAU)	1.4.1	1.4.1
1826 / 1828; Ext. Fire Brigade Panel (FBP)	1.4.1	1.4.1
EBLWin	2.1.0[165]	2.1.0
1588; Web-server	Cannot be used.	Cannot be used.
1598; Web-server II	2.1.0	2.1.0

New S/W can be downloaded "on site" except for the 458x boards.

[165] The latest version can vary depending on the market / country.

[166] Sometimes the latest version is not **required**. It is possible to use an earlier version but check the difference between the versions before use.

27 Technical data

Voltage

Primary (V AC): **230** (176-264)
System (V DC): 24[167]

Current consumption

Quiescent / active: See chapter "Current consumption", page 167

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.

[167] 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 21.6-30 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. 18.0 V when it will be switched off in order not to damage the battery.

28 Limitations

28.1 C.i.e.

Max. number of "items":

Item	Max. no.
Fire alarms (presented in the EBL128 display as ZONE and/or ZONE-ADDRESS) [168]	256
Number of zones	99
Faults	200
External faults	50
Technical warnings	50
Short circuit isolators	64
Loop units	255
Trigger conditions (in all the control expressions)	Approx. 1000
Interlocking Combinations	100
3377 + 3378 + 3379 + 4477 units	50
Total number of detectors and/or manual call points	512[169]
Max. number of AAF zones	50
Max. number of detectors per AAF zone	5
Max. number of I/O Matrix boards. If no expansion boards.	4 4+4
Max. number of outputs per c.i.e. incl. all kinds of outputs	200
Max. number of inputs	128
4380 units	10

[168] Up to 256 ZONEs and/or ZONE-ADDRESSes can be programmed but only the zone numbers 01-99 can be used.

[169] Max. number of alarm points per c.i.e. (microprocessor) is 512 and max. number of alarm points per zone is 32, i.e. 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. (12 x 32 = 384; 128 + 384 = 512).

29 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 EBLWin. When downloading the S/W and/or the SSD, different settings, conventions, languages, etc. can be selected to fulfil the national regulations / requirements.[170]

29.1 Conventions

In accordance with the section above, a convention is selected the very first time EBLWin is opened after the installation. This will be the default convention for every new installation.[171] It is, however, possible to change the convention in the EBLWin dialog box "EBLWin settings". The conventions that can be selected are listed in the valid EBLWin version (menu Tools | EBLWin Settings).

NOTE! To change convention is "Advanced functions" Level 2 required. For this is a Level 2 password required. Also note that the convention will be changed only for the open installation.

29.2 Language

The language for the text shown in the EBL128 display (alarms, faults, menus, etc.) is depending on which binary (*.bin) file has been downloaded.

[170] Some of the SSD settings might then be a violation to the EN54-2 standard and if so a "Warning" will be displayed.

[171] Depending on convention, different default settings in EBLWin could be valid and also different functions in EBL128.

30 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.

31 Revision history

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Panasonic

Panasonic Eco Solutions Nordic AB
Jungmansgatan 12, SE-211 19 Malmö, Sweden
Tel: +46 (0)40 697 70 00 • Fax: +46 (0)40 697 70 99
E-mail: info.pesn@eu.panasonic.com • Internet: http://pesn.panasonic.se