Technical/Programming Manual
FT128
Rev 2.2
For Software V2.2.x

FT128 CIE

MA355 **August 2015**

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1 Introduction

1.1 General introduction

FT128 Technical / Programming Manual is a document with information of special interest for planning engineers as well as service / commissioning engineers.

This document should be read in conjunction with FT128 Operation Manual, 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 FT128 connection diagrams according to the drawings / connection diagram list on Table 21 page 176.

When planning a fire alarm installation, the Australian standard AS1670.1 requirements must be followed. Detector type, detector coverage area, detector spacing and special applications in the building, etc. are concerns for the planning engineers and are not covered in this document.

Due to continual development and improvement, different software versions are to be found. This document is valid for FT128 **S/W version 2.2.x** .On the date of this document is **x=0**.

FT128 **S/W version 2.2.x** supports some functions require the FT128 main board 4556 with PCB no. 9285-5A and the later version PCB no. 9285-**6**A.

Hardware H/W

A H/W (e.g. a printed circuit board) has:

- A part number (e.g. 4556)
- A product name (e.g. FT128 Main board 255 addresses)
- A PCB no (e.g. 9285-6A)
- Sometimes a software (S/W) downloaded.

Software S/W

A S/W has:

- A version number (e.g. V2.2.x)
- Sometimes 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 e.g. EBLWin. It has a version number (e.g. EBLWin V2.2.x).

1.2 Definitions / Explanations

Definitions / explanations / abbreviations / etc. frequently used, refer to FT128 Operation Manual for more details.

Refer to FT128 Operation Manual for more details.

2 Overview

2.1 FT128 CIE

FT128 is a microprocessor controlled intelligent fire alarm CIE intended for analogue 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 FT128 loaded with EBL128 system software ≥ V2.0.x[1].

FT128 is designed and assessed to the Australian Standard AS7240.2, AS7240.4 and NZS4512:2003. The Fire Brigade Panel controls and indicators are incorporated as part of the faceplate and conform to AS4428.3.

2.2 Expansion Boards

Up to four expansion boards can be mounted in FT128 CIE. The following expansion board types are available:

Product type	Product name
4580	8 Zones Expansion Board
4581	8 Relay Outputs Expansion Board
4583	Inputs And Outputs Expansion Board

For more details, refer to chapter “Expansion Boards ”, page 22 and drawings F728, F729 and F731.

2.3 Power Supply

The primary power source is a switch mode power supply 230 V_{AC}, 0.6 A / 24 V_{DC}, 1.8 A (40 Watt)[2].

The standby power source is a backup battery (2 x 12V). Up to 24 AH batteries can be fitted in the standard FT128 cabinet.

The batteries and the power supply output are connected to the Main board (4556). See chapter “Power Supply”, page 171 for more information.

2.4 Software (S/W) Versions

Due to continual development and improvement, S/W versions are being updated from time to time. The control unit S/W can be updated on site.

2.5 Documents

The following documents are available:

- Technical / Programming Manual (this document)
- Operation Manual
- Connection diagrams

Information found in one document is normally not to be found in another document, i.e. the documents complement each other. Product Leaflet for FT128 and other units are available as PDF documents on Brooks web site: http://www.brooks.com.au.

[1] Earlier software versions e.g. Win 128 V1.x.x supports only 128 addresses.

[2] Meanwel power supply 40W is obsoleted and has currently been replaced with 75W

2.6 Applications

FT128 is intended for small and medium size installations. The intelligent control unit offers 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.

2.7 PC software (S/W)

The PC program **EBLWin** is used for programming and commissioning of FT128, i.e. to:

- Autogenerate, i.e. to identify the units connected on a COM loop and make default settings, which can be edited, saved and used as site specific data (SSD).
- Create / download / upload (backup) the site specific data (SSD)
- Download new system S/W version, settings, conventions, configurations, control unit & system properties, etc.
- Create / download the user definable alarm text messages shown in the display in FT128, External Presentation Units (1728) and/or Alert Annunciation Units (1736).
- Display the fire alarms, faults and disablements as well as reset, acknowledge and re-enable, etc.
- 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 must have the same version number as the system software EBL128 version number, e.g. **2.2**.**x**. Only x may be different, it indicates a small correction and is not required to be the same.

Old SSD files can be opened in a newer (higher) version of **EBLWin**, saved, edited and thereafter downloaded to an FT128 with the corresponding version. If a backup is required, use the same EBLWin version as the system software EBL128 version.

Notes: EBLWin is not backward compatible with any version of Win128 i.e. SSD files saved in EBLWin cannot be opened with Win128.

It is highly recommended to backup (upload) the SSD file before the system software (EBL128) can be downloaded,

EBLWin key 5094 is a USB dongle that is required on your PC in order to gain access to log on and download SSD files.

3 Control & Indicating Equipment

3.1 Technical Data

The specifications of FT128 Control Panel are shown in Table 1 below and the system limitations are shown in Table 2 on the next page.

Table 1 Control Panel Specifications

Technical Data		
Mains Voltage		230VAC, 1.6A
system voltage		24VDC [3], Nominal
Current Consumption		Quiescent / alarm current is dependent on other equipment fitted in FT128, type and number of expansion boards, connected external equipment, etc. Refer to chapter "Current Consumption", page 168.
Ambient Temperature	Operating	- 5 to + 40 ^{0}C
	Storage	- 40 to + 75 ^{0}C
Ambient Humidity (% RH)		Max.95, non-condensing
Size H x W x D (mm)	Standard	630 x 450 x 220 (including door)
	Large	920 x 450 x 220 (including door)
Enclosure Material		1.5 Zinc anneal steel
Colour (metal cabinet)		Oyster, powder coated ripple finish
Approvals		Australian: Conform to AS7240-2, 7240-4 and AS4428.3 New Zealand: Conforms to NZS4512:2003
Inputs		1 COM loop for 255 addresses.
		1 programmable input I0
Outputs		2 programmable supervised voltage outputs S0-S1
		1 programmable relay output R0
		1 Non-programmable relay output for fault condition R1
		1 programmable relay, driven via S0, 2 changeover contacts available on the termination board.
		RS232 Interface for Web-server 1598
		Optional RS485 output for remote display units
		Power supply (2 x 24 VDC) for Web-server, external equipment, etc.

[3] The rated output voltage is 24 VDC ± 1% for the main power source. Maximum ripple 240 mVp-p. The rated output voltage for the second power source (backup battery) is 20-27 VDC.

Table 2 Control Panel Limitation

Item	CIE
Fire alarms (presented in the FT128 display as ZONE and/or ZONE-ADDRESS)[4]	256
Number of zones	99[4]
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
3379 + 4477 units	50
Total number of detectors and/or Manual Call Points	512[5]
Max. number of AAF zones	50
Max. number of detectors per AAF zone	5
Max. number of I/O Matrix boards with expansion boards. Number without expansion boards.	4 8
Max. number of expansion boards 4580, 4581 & 4583[6]	6
Max. number of outputs per CIE including all kinds of outputs	200
Max. number of inputs	128
Max. number of 4380 units	10

[4] Up to 256 ZONEs and/or ZONE-ADDRESSES can be programmed but only the zone numbers 01-99 can be used.

[5] Max. number of alarm points per CIE (microprocessor) is 512 (including conventional alarm points) and maximum number of alarm points per zone is 32. Care must be taken in order not to exceed 512 detectors and/or Manual Call Points connected to the CIE i.e. 255 COM loop units + 257 conventional detectors / MCP.

[6] Expansion boards are internally connected to COM loop 0, ensure total number of expansion boards and I/O matrix boards connected to the COM loop does not exceed 4. Software 2.1.1 allows to use 4 expansion boards.

3.2 Control Panel Overview

Figure 1 FT128 Control & Indicating Equipment

The FT128 Control and Indicating Equipment (CIE) shown in Figure 1 is housed in a metal cabinet powder coated oyster colour. The cabinet has an inner and outer door. The outer door is fitted with a 003 key to provide access level 1 and is made of tinted high impact plastic and allows easy viewing of all indicators and controls.

Access to the inner door is gained by first opening the outer door which then provides access to the inner door fixing screws.

Opening the inner door allows access to the control unit hardware for the purpose of maintenance or servicing.

Figure 2 The FT128 Front Membrane.

The Fire Brigade panel (**FBP**) as shown in Figure 2 forms integral part of the Control Panel (**CP**) and is used by the Fire Brigade or fire services personnel to inspect which alarm point / zone having activated fire alarm and to take the required operational control of the system.

In the display (LCD, 2x40 alphanumeric characters), the information displayed on the first row is dependent on how many alarm points / zones having activated fire alarm (and also convention).

On the second row, the activated alarm point / zone will be shown with an alarm text, if programmed. For more detailed information regarding the fire alarm presentation, see the FT128 Operation Manual.

Required Fire Brigade personnel manoeuvres are performed via the FBP in FT128.

The Control Panel (**CP**) is used by the FT128 owner, service personnel, etc. to "communicate" with FT128, e.g. for commissioning, monthly tests, disablements and maintenance. Access codes for different access levels are required. A keypad is used to get access to the menu tree, i.e. the main and sub menus for data in / out, manoeuvres, etc. The **CP** also holds several system status LEDs.

FT128 in its basic configuration is equipped with:

- Oyster metal cabinet with acrylic door
- Main board 4556 with:
  - ☞ One COM loop (0) to which the loop units are connected. For connections and more information, see drawing F665 & F666.
  - ☞ Two programmable supervised voltage outputs (S0-S1). Connections and more information, see drawing F665.
  - ☞ One programmable relay output (R0). Default programmed as alarm output for routing equipment (Fire brigade TX). Connections and more information, see drawing F665.
  - ☞ One non-programmable relay output (R1) for routing equipment (Fault TX). Connections and more information, see drawing F665.
  - ☞ One programmable input (I0). Connections and more information, see drawing F665.
  - ☞ Two 24 V_{DC} power supply outputs (for routing equipment and remote display unit). Connections and more information, see drawing F665.
  - ☞ A socket for an **optional** Communication module (RS485 transceiver component) 4552, which will provide an RS485 interface (serial line) for up to eight remote display units (1736 and/or 1728), see drawing F665.
  - ☞ RS232 interface ("D" connector) for a PC with EBLWin. Connections and more information, see drawing F734.
  - ☞ RS232 interface for a Web-server 1598. Connections and more information, see drawing F734.
  - ☞ 24V_{DC} power supply output for a Web-server 1598. Connections and more information, see drawing F665.
- Power supply and space for back-up batteries. Connections and more information, see drawing F665.
- Space for up to four **optional** expansion board mounted on one expansion boards mounting kit.
- Space for different brigade (ASE) interface brackets e.g. Romtec, Tyco ASE, etc.
- Space for optional Web-server.
- Termination board to terminate the CIE and field wiring.
- Depending on the system requirements and space available, the following **options** can be added to FT128:
  - ☞ Occupant Warning System, 60W, 120W or 250W

- ☞ AS1668 Fire Fan Control
- ☞ Zone status indications and control
- ☞ Gaseous Extinguishing System
- ☞ NZ Fire Brigade mimic display
- ☞ MDH power supply and control

3.3 COM Loop

FT128 has one COM loop (0), to which the loop units are connected. Connections to the COM loop are made via the external termination board on the equipment plate as shown in drawing no. F665. Up to 255 loop units can be connected to the COM loop (i.e. address 1-255) when the panel is upgraded with software version ≥ V2.0.x. The exact number of loop units and the cable length are dependent 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 168 and battery calculation spreadsheet. Each COM loop unit has a Technical address (1-255) and each alarm point and Zone Line Input has a presentation number (zone-address). Refer to the FT128 Operation Manual for more information.

Normally the communication (and power supply) direction alternates every 22 seconds. 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 > 12 V DC. If not, a fault will be generated.

3.4 Programmable Voltage Outputs (S0-S1)

The 24V_{DC} outputs S0-S1 are supervised (monitored) [7]. One to five 33K resistors can be connected [8], for connection diagram, refer to drawing F665. When the connections are completed, a calibration has to be performed. See the FT128 Operation Manual chapter "Calibration of Supervised Outputs (menu H5/A3)".

Each output has to be programmed (via EBLWin) for the following:

- Type (Control, Fire ventilation, Alarm device, etc.)
- Output signal period (steady, intermittent, pulse, delay, etc.)
- Supervised / Non-supervised
- Logic, i.e. normally low (default) **or** normally high (24 V_{DC})[9].
- Control expression (contains one or more trigger conditions)

Note: The outputs S0-S1 are programmed as outputs for alarm devices by default.

S0: maximum 500 mA (Fuse F8).

S1: maximum 200 mA (Fuse F6).

See also chapter “Programmable Outputs”, page 77.

3.5 Programmable Relay Output (R0)

Refer to drawing F665 for connection diagram.

The output has to be programmed (via EBLWin) for the following:

[7] 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 reversed compared to activated output.

[8] PCB. 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.

[9] See Section Table 1, page 15 regarding system voltage.

- 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) contacts [10].
- Control expression (contains one or more trigger conditions).

Note: The output R_0 as default, is programmed as an output for Routing equipment (Fire brigade TX)[11]. Activated output is indicated by the LED "Fire Brigade TX".[13] This output can be disabled via "door open" or via menu H2/B10. It can also be tested via menu H1, see the FT128 Operation Manual. See also chapter “Programmable Outputs” page 77.

3.6 Programmable Input (I_0)

Refer to drawing F665 for connection diagram.

The input has to be programmed (via EBLWin) for the following:

- Type “trigger condition”
- Supervised / Non-supervised.
- Logic, i.e. Normally Open (high resistance, 3K3Ω, when supervised)

  or Normally Closed (low resistance, 680R, when supervised)
- Additional information when required: Fault no., Zone, Address and Fault message (Error text)[12]

See also chapter “Programmable Inputs” page 71.

3.7 Relay Output for Routing Equipment (Fault TX) (R_1)

Refer to drawing F665 for connection diagram.

Non-programmable relay output[10]. This output for routing equipment (Fault TX) is normally activated and will be de-activated when a fault is generated[13] in FT128 and this is indicated by the LED "Fault TX activated". This output can be disabled via "door open" or via menu H2/B10. Output for routing equipment (Fault TX) can be tested via menu H1, see the FT128 Operation Manual.

3.8 24 V_{DC} Power Supply Outputs

Two 24 V_{DC}[14] outputs that can be used for:

- Power supply of routing equipment[15] (Fire Brigade TX / fault TX). Max. 200 mA (Fuse F7).
- Power supply of external equipment, e.g. AAU 1736, EPU 1728, etc. Max. 500 mA (Fuse F9[16]).

Connections as per drawing F665.

[10] Relay contacts: maximum 2 A @ 30 V_{DC}.

[11] A control expression is also required, i.e. Fire Brigade TX. Regarding "Fire brigade TX", see also chapter “Alert Annunciation”, page 111 and Fire Alarm Type A and Fire Alarm Type B, page 115.

[12] To view the fault text message, you need to logon and check faults via the “fault acknowledge”.

[13] Also if FT128 primary and secondary power are off and for "Watch-dog fault.

[14] Refer to Table 1 page 15 for system voltage.

[15] Great attention must be taken when the ASE is to be powered from the CIE as some units require high quiescent current. Some ASE’s might need separate battery backed PSU. The battery size must also be calculated correctly to insure compliance with AS1670.1

[16] Fuse F9 is also for the 24 V_{DC} internal power supply output for Web- server 1598

3.9 RS232 Interfaces

Two interfaces can be used:

- EBLWin (PC program). (9-Way female "D" connector, located on the Main Control Board 4556)
- Web-server II 1598. (3-Way Molex connector)

Connections as per drawing F734.

3.10 RS485 Transceiver (Optional)

An IC socket is provided in FT128 Main Board 4556 where an optional RS485 transceiver communications chip 4552 can be fitted. This transceiver chip provides an interface (screw connectors on the external termination board SUB835) for up to 8 Display Units, i.e. AAU 1736 and/or EPU 1728 running in **S/W mode xxxx – 1587**[17]. All Display Units **must be** connected in series[18] (daisy-chained) to the RS485 bus and the V_{DC} supply on the external termination board SUB835.

The data rate in this mode is 9600 baud and the RS485 cable length is maximum 1200 m depending on the cable size. The V_{DC} cable must be => 1.5 mm^2 depending on the cable length, refer to Table 18 page 169 for cable length calculation.

Connections as per drawing F665.

3.11 Power Supply

Connectors for the Power Supply Unit:

- Power supply 230V_{AC} / **24** V_{DC} (Two tab terminals, 6.35x0.8 mm)
- Batteries (2 x 12V, 17 Ah)[19], **24 V_{DC}** (Two tab terminals, 6.35x0.8 mm)

Connections as per drawing F665.

3.12 Internal Power supply

Connector for the Web-server 1598:

24 V_{DC}[9] output (3 ways Molex connector). The total current consumption on this output and the output for Power supply of external equipment (see above) is maximum 500 mA.

Connections as per drawing F665.

[17] xxxx = type of display unit (e.g. 1728). For more information about each type of unit, see chapter “Other Units”, page 69.

[18] If connected in parallel, Display Units may not reset after an alarm, errors may occur after system reboots, software cannot download correctly, and/or other unknown system behaviours may occur.

[19] Batteries are not included in the CIE type number. The batteries have to be ordered separately.

4 Expansion Boards 458X

Up to 4 optional expansion boards can be mounted in the FT128 cabinet on an expansion boards holder. The total number of Expansion Boards allowed in any combination of 4580, 4581, or 4583 is 4 see Table 3 below.

Table 3 Expansion Boards Allowed

No. of Expansion boards (Total of any combination is 4)	Maximum Number Allowed
4580	4
4581	4
4583	4 (with warning)

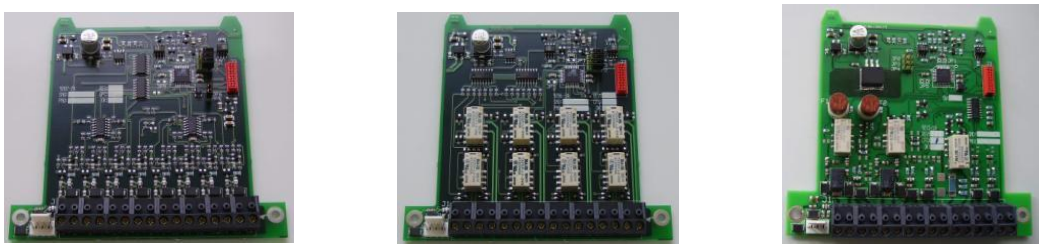


Figure 3 Expansion Boards (from left to right) 4580, 4581 and 4583.

The expansion boards are mounted in an expansion board holder (Expansion boards mounting kit 4551 or Brooks brackets) inside FT128. A supplied cable assembly is used to connect the expansion board(s) to the main board (connector "J2" on the expansion board and "J13" on the main board 4556). See drawings F665.

I/O Matrix board 4582 is a special type of expansion board that plugs (piggy back) onto 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 must have an expansion board address (0-7) set via jumpers on the expansion board. The jumpers "JP2-JP4" are used on boards type 4580, 4581 and 4583, and jumpers "JP1-JP3" are used on board type 4582, see Table 4 below.

EBLWin is used for all expansion boards programming.

Table 4 Expansion boards address setting

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

X=Shunted, Blank = Open

Address 4 - 7 on 4580, 4581 and 4583 are not currently used

4.1 8 Zones Expansion Board 4580

Up to **four** 4580 boards can be used, see Table 3 “Expansion Boards Allowed”, page 22.

Each board has to be programmed via EBLWin with an address (board no.) which is set via the jumpers "JP2 and JP4" as shown in Table 4 above.

The 4580 board has eight conventional Zone Line Inputs (0-7) intended for conventional detectors, MCP, flow switch input or any N/O clean contact. In the last alarm point on each zone line, an End-Of-Line device must be connected, depending on the selected "Type of Zone Line Input", see below.

Connections to "J1:1-16" and "J2" according to drawing F665.

Each Zone Line Input has to be programmed via EBLWin for the following:

- 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 i.e. whether a short- circuit on the zone line generates a fault or fire alarm.
- Zone number (Address optional)
- AVF (Alarm Verification Facility), if required
- Text (Alarm text when required)
- Alert annunciation & time channel
- Disablement & time channel

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

4.1.1 Type of Zone Line Input

Each input must be selected either as **Not used** or as one of the following types / modes.

4.1.1.1 Zone Line Input (EOL Capacitor)

This mode should normally be used. It has the lowest zone line current consumption since the End-Of-Line device is a capacitor, 470 nF (±10 %).

- Maximum allowed cable resistance is 50 Ω.
- Maximum allowed cable capacitance is 50 nF.
- Maximum allowed zone line current consumption is 1.5 mA.

4.1.1.2 Ex Zone Line Input (EOL Resistor)

This mode must be used when the zone input is intended to be connected to intrinsically safe devices e.g. intrinsically safe detectors or manual call points via the Galvanic isolator MTL5061 (2820). The End-Of-Line device is a resistor, 10K (±5 %) with a body surface area > 230 mm^2 (supplied with Galvanic isolator).

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

4.1.1.3 Zone Line Input (EOL Resistor)

This mode is typically used in New Zealand where only EOL resistors are allowed. It has to be used when any of the other types cannot be used (e.g. for some older type of detectors and not Panasonic detectors). The EOL resistor has the highest zone line current consumption since the End-Of-Line device is a resistor, 4K7 (±5 %).

- Maximum allowed cable resistance is 50 ohm.
- Maximum allowed zone line current consumption is 2.0 mA.

Note: Older version of 4580 boards PCB9287-2B requires 10K End-Of-Line resistor while the newer version PCB9287-3A requires 4K7. Table 5 and Figure 5 illustrate the two distinctive differences between the two PCB versions in both hardware and software.

Table 5 4580 Versions with EOL Values to Use

4580	PCB No.	SW Version	EOL Resistor to Use
Version 1	9287-2B	1.0.x	10KΩ
Version 2	9287-3A	2.0.x	4K7Ω

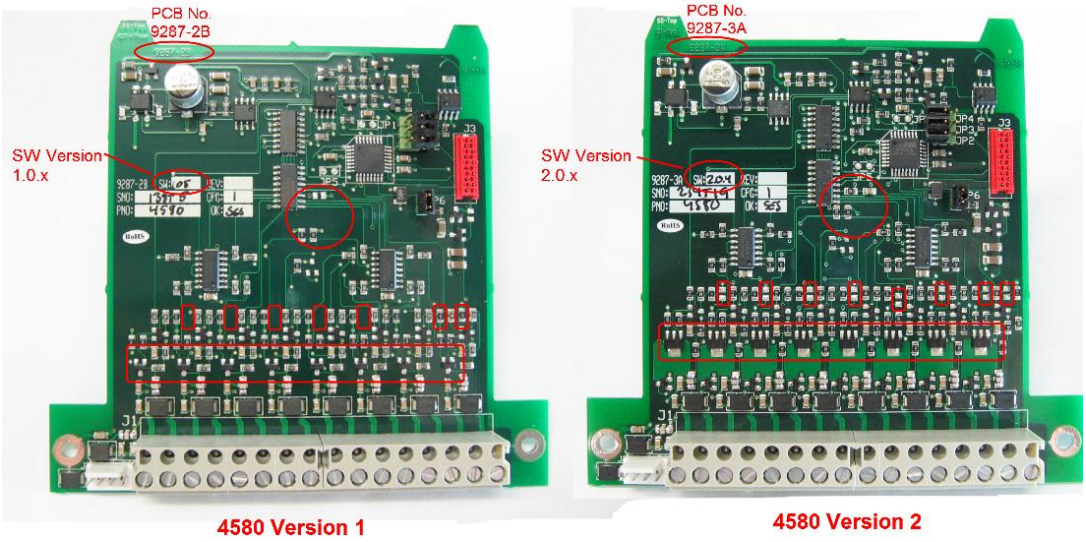


Figure 5 Expansion Board 4580 Top Side Differences

4.1.2 Input States

Each input will be in one of six different states.

4.1.2.1 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}[20]. From this state any other state can be reached / activated.

4.1.2.2 High Current State

The maximum current consumption limit[21] 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 FT128. From this state any other state can be reached / activated except the open circuit state.

4.1.2.3 Alarm State

An alarm point (or more) on the zone line is in alarm state and the alarm limit[21] for the zone line is exceeded, which activates fire alarm in FT128. In this state, the short circuit, open circuit, high current and low voltage states cannot be reached / activated. After the alarm reset, the Zone Line Input will return to the normal state.

4.1.2.4 Short-Circuit State

The short circuit current limit[21] is exceeded, indicating short-circuit on the zone line, which normally generates a fault condition in FT128 **but** instead, a fire alarm can be activated, if this option is selected via EBLWin.

4.1.2.5 Open Circuit State

The open circuit current limit[21] is passed, indicating very low zone line current consumption or no current, i.e. the End-Of-Line device is not detected which generates a fault condition in FT128. From this state any other state can be reached / activated.

4.1.2.6 Disconnected State

Via menu H8/S2 (Disconnect / Re-connect zone line), the Zone Line Input can be disconnected[22], i.e. there is no voltage on the zone line. From this state no other state can be reached / activated.

4.2 8 Relays Expansion Board 4581

Up to **four** 4581 boards can be used, see Table 3, page 22.

Each board has to be programmed via EBLWin for an address, set via jumpers "JP2-JP4" as shown in Table 4 page 23.

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

Connections to "J1:1-16" and "J2" according to drawing F729.

Each output has to be programmed via EBLWin for the following:

- 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[23]
- Control expression (one or more trigger conditions)

For more information, see chapter “Output Programming”, page 81.

[20] Allowed voltage 15-28 V_{DC}.

[21] This limit is dependent on the selected input mode.

[22] This is indicated in FT128 by the LED "Disablements".

[23] Relay contact ratings: Max. 2A @ 30 V_{DC}.

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

4.3 Inputs and Outputs Expansion Board 4583

Since the maximum current consumption for this type of boards can be up to 400 mA, only **two** boards should be used however, up to four boards (V2.1.x and higher) can be configured with a warning if more than two are used when the SSD is validated in EBLWin, used.

Note: If more than two 4583 boards are used, care must be taken not to overload the fuse on the main board (fuse F5)

Each board has to be programmed via EBLWin for an address set via the jumpers "JP2-JP4", see Table 4 page 23.

The I/O expansion board 4583 has two programmable supervised / non-supervised voltage outputs (Output 0-1), one special programmable output (Output 2) intended for German extinguishing system and five programmable supervised or non-supervised inputs (Input 0-4).

Connections to "J1:1-16" and "J2" according to drawing F731.

Outputs 0-1 has to be programmed via EBLWin for the following:

- Type of output, i.e. output for Control, Alarm devices, etc.
- Output signal period (steady, pulse, delay, etc.)
- Supervised / Non-supervised[24]
- Logic, i.e. normally low (default) **or** normally high (24 V_{DC})[25].
- Control expression (containing one or more trigger conditions)

One to five 33K resistors can be connected. When all connections are completed, perform a "Calibration of supervised outputs (menu H5/A1)". Calibration value has to be in the range 4K7-50KΩ. See also the FT128 Operation Manual chapter "Calibration of supervised outputs (menu H5/A1)".

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

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

See also Section “Programmable outputs”, page 77.

Output 2 has to be programmed via EBLWin for the following:

- Type, i.e. output for Control, Alarm devices, etc.
- Output signal period (steady, pulse, delay, etc.)
- Logic, i.e. normally open (default) **or** normally closed.
- Control expression (containing one or more trigger conditions)

Output 2 (J1:11-12): Normally Open (high resistance, 3K3) or Normally Closed (low resistance, 680R). See drawing F731

See also Section “Programmable Outputs”, page 77.

Input 0-4 have to be programmed via EBLWin for the following:

- Trigger condition (triggered by)
- Supervised / Non-supervised
- Logic, i.e. Normally open (high resistance, 3K3, when supervised)

[24] A normally high output cannot be supervised. The supervision voltage is 1.5 – 3.7 V_{DC} (depending on the number of supervision resistors) and the polarity is reversed compared to an activated output.

[25] Regarding **system voltage**, see Table 1, page 15

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 71.

4.4 I/O Matrix Board 4582

The I/O matrix is a special type of expansion boards, it can only be used in conjunction with an **Application Board.** Three types of application boards are available; AS1668 Fan control, Zone control and NZ Generic mimic for index panels, see Figure 6 below.

The I/O Matrix board (80 x 63 mm) is plugged into the Application board ("piggy back" connection) and has 16 switch inputs and 48 LED outputs which can be individually programmed (generic application only). The COM loop and 24 V_{DC} is connected to the Application board.

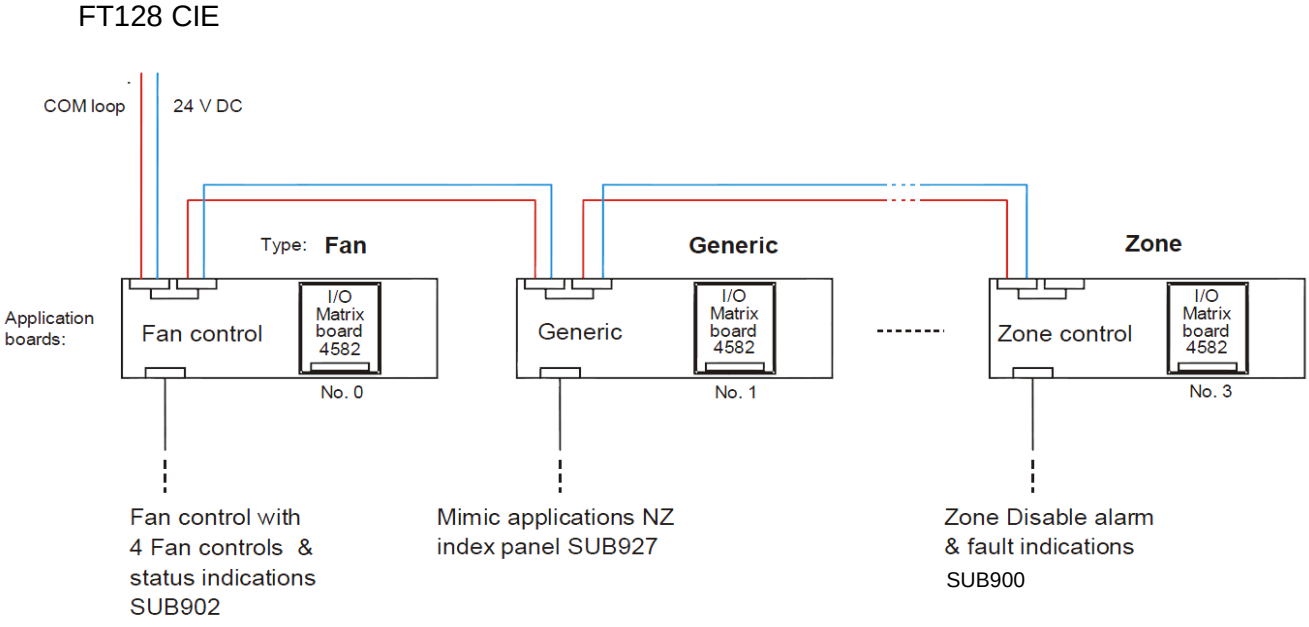


Figure 6 I/O Matrix Board Application Overview

4.4.1 I/O Matrix jumper link setting:

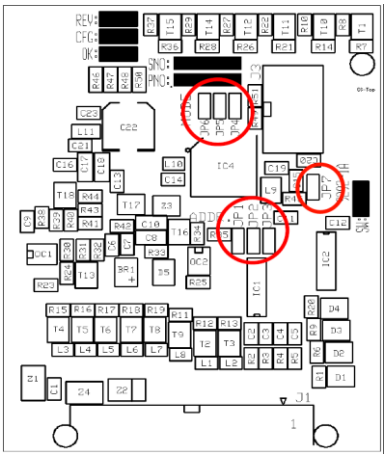


Figure 7 I/O Matrix PCB layout

The PCB layout of the I/O matrix board is shown in Figure 7, jumper links are shown in red circle. Ensure that JP7 is not fitted, this is used for production purposes only. Three different options for the **Application Board Types** can be selected via jumpers (**JP4 & JP5**) on the I/O Matrix board as shown in Table 6 below.

There are no COM loop addresses to be set. Instead, the **Expansion Board No. / Address** (0-7) is set with jumpers (**JP1-JP3**) on the I/O Matrix board. See Table 4, page 23.

The three configuration options for the I/O matrix board are:

- **Generic,** normally used for any special applications e.g. NZ index panel, mimic or relay boards, pump status indications, etc. Maximum of two generic options can be used, if no zone control is used.
- **Fan Control**, up to 8 fan modules can be used if no other applications or expansion boards used or 4 modules if the permitted quantity of generic and zone control are used. 4 fans are the maximum number allowed module.
- **Zone Control**, only 2 zone options can be selected to provide a maximum of 16 zones[26] for each FT128 system, if no generic option is used.

Up to four I/O Matrix boards can be used and up to eight if no expansion boards type 4580, 4581 and 4583 are used **but** maximum two I/O Matrix boards of type Generic and type Zone control i.e. 2 zone control or 2 generic or a combination of both.

In FT128, total of up to 200 outputs can be used, including all types of outputs.

Table 6 I/O Matrix board 4582 type setting

Type (mode) Application Board	JP4	JP5	JP6	Brooks Application Board Part No.
Fan Control				SUB902
Zone Control	X			SUB900
Generic[27]		X		SUB985-SUB988[28]

[26] Due to the space limitation, only 12 zones are available in every zone control module

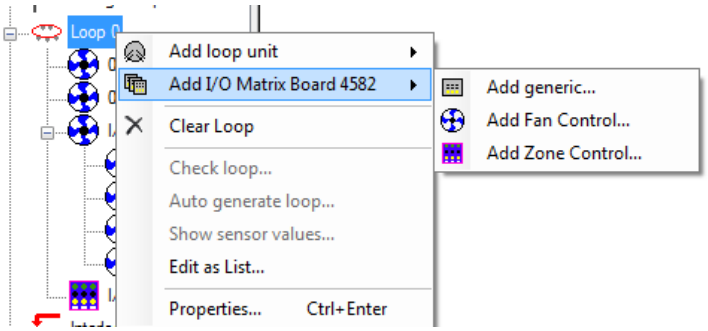
[27] When SUB900 or SUB902 is used as a Generic application board, the Type of Inputs and Outputs can be customised by programming in the EBLWin configuration software.

[28] The new versions of NZ mimic boards SUB985, SUB986, SUB987 & SUB988 replace the discontinued SUB927 and SUB927R, for more details refer to chapter “New mimic options” page 39

Note: Jumper “JP6” is for future use.

Each I/O Matrix board has to be programmed via EBLWin according to its application.

- Set the address on the 4582 via jumpers "JP1-JP3", see Table 4 page 23.
- Right click on the loop and select “Add I/O Matrix Board 4582” to bring up the context menu to select the type of Application Board to be added as shown below:



....and **programmed** for the following:

- **Address** (must be the same board no. as set via jumpers "JP1-JP3").
- **Name** (I/O Matrix Board # - normally not changed)
- **LED test on Input 15** (selected or not selected)

4.5 FT128 External Termination

In the Australian convention, the FT128 main board 4556 is mounted on the rear of the front door. In order to avoid the field wiring termination on the swing door, an adapter board SUB836 [29] is added to the main board. The new version of the adapter board is plugged in the screw terminals of the main board 4556 and interfaced to another external termination board SUB835 mounted on the equipment plate. The adapter board SUB836 is connected to the termination board SUB835 via ribbon cable.

The FT128 has only one programmable relay output. To increase the number of programmable relays in the standard FT128 system, another relay with two changeover contacts has been added to the termination board to provide 2 sets of additional relay contacts[30]. This relay is controlled by the “Voltage output S1” [31] e.g. if S1 is programmed for general alarm, the following will be available:

- Voltage output S1 on CON 8
- Change over alarm contacts R2-1 on CON 5
- Change over alarm contacts R2-2 on CON 4

The PCB physical layout of the adapter board SUB836 is shown in Figure 8.

The PCB physical layout of the external termination board SUB935 is shown in Figure 9.

Note: As shown in Figure 8 and Figure 9, one physical PCB is used for both boards but different components are fitted in each one.

[29] The adapter board shown in Figure 8 and external termination board shown in Figure 9 use a new PCB revision (PCB250 Rev 5). In all previous revisions, the adapter board is soldered in the terminals of FT128 main board (4556) but the new PCB revision has pins to screw in the terminal block on FT128 main board.

[30] The additional alarm contacts can be used to trigger the OWS or for any other application.

[31] The voltage output S1 terminals are still available on the termination board SUB835, please note, the current limitation of S1 is less than 200mA.

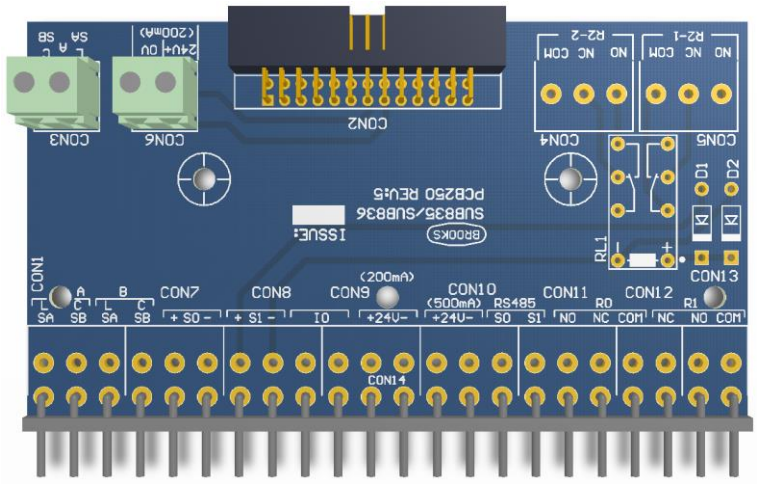


Figure 8 SUB836 Adaptor Board

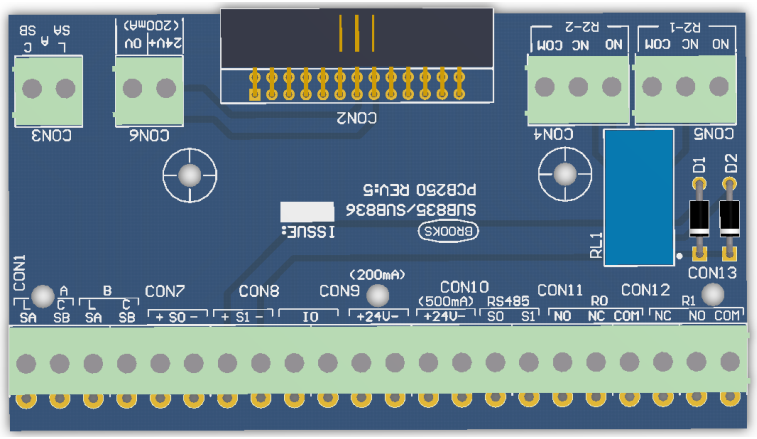


Figure 9 SUB835 external Terminal Board

The adapter board SUB836 provides additional terminals to support connections from COM loop SA & SB (CON 3) and 24V (CON 6) to I/O matrix boards 4582 mounted on the rear of the front door.

The external termination board SUB835, as shown in Figure 9, provides two additional alarm relay contacts R2-1 and R2-2 (CON 5 & CON 4), current rating for the contacts is 2A @ 30V dc. The SUB835 provides additional terminals as well, for the COM loop and 24V dc, these terminals can be utilised for modules mounted on the equipment plate and requiring COM loop connections or 24VDC.

5 Optional Modules

5.1 AS1668 Fan Control

Used for Application board type **Fan control** (SUB902) which has a front decal label to indicate and control of up to four fans. Typical fan control front is shown in Figure 12 page 36.

Each fan control module consists of a universal I/O matrix 4582 specifically configured for fan control applications and application board SUB902. Different Programming options are simplified through the EBLWin configuration software.

Each fan control module has controls and fan status indicators for 4 fans. Each fan status is indicated by six LEDs (On / Auto / Off / Running / Stopped / Fault) and controlled via three push buttons (On / Auto / Off). One "Fan Reset" button is provided in every AS1668 fan module. A LED test button is also provided to test LED's for each fan module (if programmed).

In EBLWin, the functionality of the fan control relays Re0 & Re1 in "3361 for fan" module has been improved[32]. New "Enhanced mode" is added to 3361 configuration to enable the programmer to configure Re0 and Re1 independently i.e. start relay and stop relay are now configured separately. The monitored input In0 is in use when the fan is only controlled from the CIE. External control from Mechanical Services Switch Board (MSSB) or via time clock will indicate the fan status without generating a fan fault.

5.1.1 Mode Control

The buttons / LEDs On, Auto and Off are used to manually override the fan mode of operation. The switches are non-latching and the mode of operation will be indicated by the corresponding LEDs.

On: Fan is running in manual override mode independent of the fire mode in the CIE or any external control e.g. MSSB. "On" and "Fan Running" LED's are lit. "On" control has higher priority over alarm and external control.

Auto: Fan either be running or stopped depending on the CIE alarm condition. The fan may also be controlled externally (less priority than alarm) from mechanical services e.g. time clock. LED "Auto" is lit and either "Fan Running" LED or "Fan Stopped" LED is also lit. The "Auto" LED flashes during the time that the fan is changing status (running to stopped or stopped to running) then becomes steady.

Off: Fan is stopped in manual override mode independent of any alarm condition in the CIE. "Off" and "Fan Stopped" LED's are lit. "Off" control has the highest priority over alarm or external control.

5.1.2 Fan Status

Running Indicates fan running, red

Stopped Indicates fan stopped, green

Fault Indicates fan fault, yellow

The fan fault LED is lit if the control from the CIE to change the fan status (via 3361 relay contacts) is not verified via input In0. The request to change the fan status from the CIE can be due to one of the following:

1. Manual operation of the manual override switch (On or Off) for a fan or

[32] In Win128, the two relays Re0 and Re1 have toggle action i.e. cannot be controlled independently, both activated at the same time but with different contacts (Re0 is normally open & Re1 is normally closed).

2. In Auto mode, a fire alarm that controls the fan is activated.

In both cases, if the feedback signal confirming the change of state has not been received by input In0 in 3361 within 30 seconds (default), the fan fault LED will be lit.

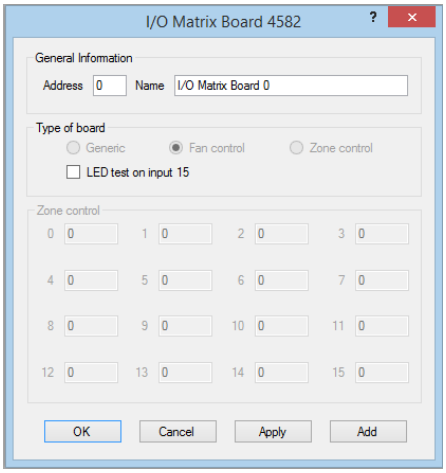
If In0 is configured to be supervised and there is an open circuit fault in the input wiring, the fan fault LED will also be lit.

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

5.1.3 Configuration and Programming

For each fan, a field module (3361) is required and has to be configured in EBLWin as "**3361 I/O unit for fan control".** The AS1668 fans can be configured as follow:

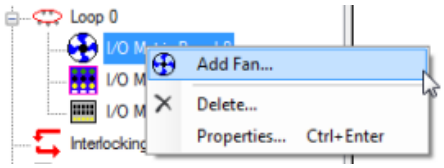
1. Right click on the COM loop and "Add I/O matrix board 4582", the following dialog box appears:



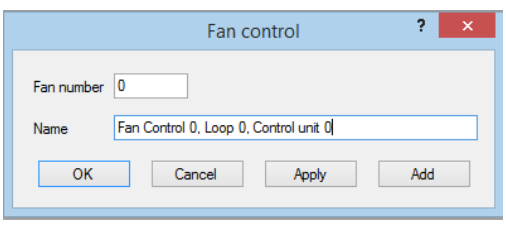
Select the I/O matrix board address (0-5) and change the name to "AS1668 Fan Control". If the LED test function is required, mark the check box "LED test on input 15".

Note: The address selected in EBLWin (0-3) must match the address of the I/O matrix board which is set by the jumpers JP1-JP3 as per Table 4 page 23. The type of board is automatically selected.

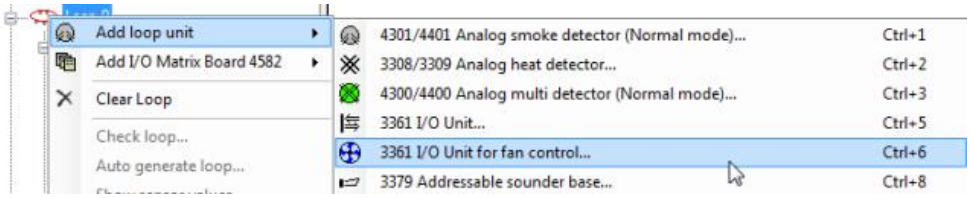
2. Right click on the configured "I/O Matrix Board" and select "Add Fan" as shown below



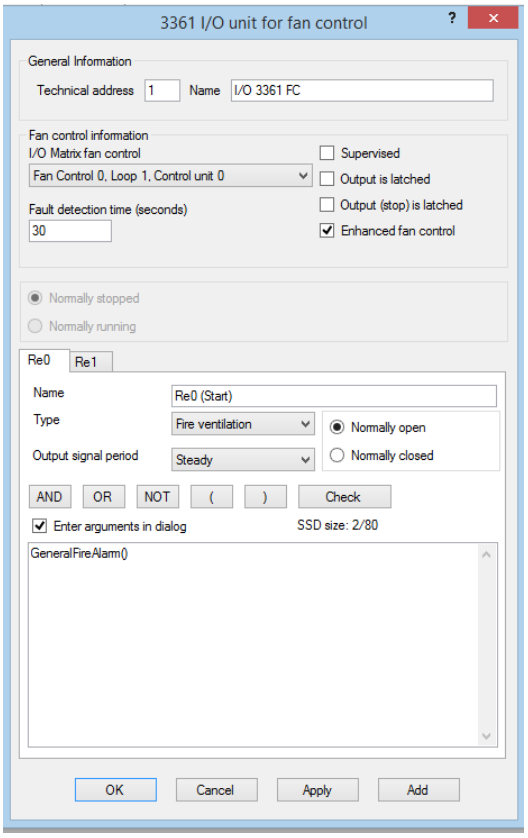
3. The Fan control dialog box appears for the 1st fan to be added. Repeat adding fans as required, maximum 4 fans (0-3).

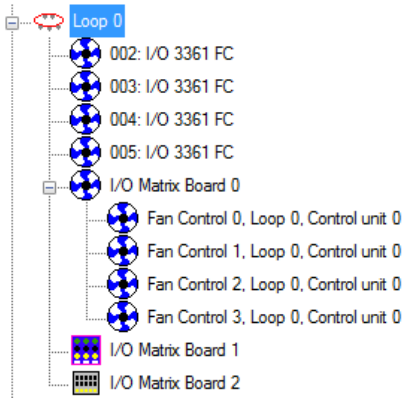


4. For each added fan, a “3361 I/O Unit for fan control…” must also be added. To do this, right click on the COM Loop to Add loop unit and choose “3361 I/O Unit for fan control..”



5. When the 3361 dialog box appears, select from the pull down menu under the Fan control information area, one of the fans that was added in the previous steps as shown below. The final tree view should look like the right side as shown below.



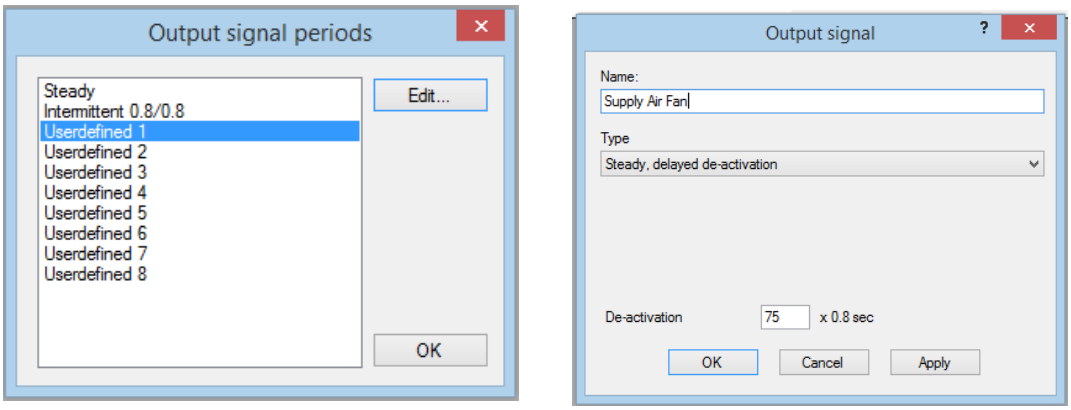


6. On the 3361 properties shown above, select the required configuration as follow:
   - Select whether In0 required to be supervised or non-supervised.
   - Relay output Re0 and Re1 output to be latched or non-latched.
   - Enhanced mode[33] for independent configuration of Re0 and Re1.
   - Write the logical expression for Re0 and Re1 (enhanced mode only[34]).
   - Fault detection time is set to 30 seconds by default, change time if required.
   - Select Re0 and/or Re1 type “Fire ventilation” (default).
   - If a supply air fan is to be configured, on the “Output signal period” on Re0 and/or Re1 dropdown menu select “Supply Air Fan” as shown in step 7.

[33] In non-enhanced mode, if Re0 is normally open, Re1 will automatically be normally closed and vice versa. If "Enhanced fan control” function is selected, Re0 and Re1 tabs will be available for individual programming.

[34] In non-enhanced mode, only Re0 requires logical expression hence Re1 will follow same logical expression.

7. For supply air fan applications, set the post timing required to reset the duct detector as follow:
   - On the “System” tab, select “Output signal period”.
   - In the displayed dialog box shown below, select one of the “Undefined” options
   - Re-name the “Undefined” to Supply Air Fan then click edit.
   - On the drop down menu, select “Steady, delayed de-activation”
   - In the de-activation box, enter 75, this will set the post timing of the duct smoke detector to 60 seconds i.e. the duct detector will reset after 60 seconds of clearing up the smoke.
   - Click ok.



5.1.4 Fan Reset

A fan reset button is added to the front display of the fan control module to comply with the requirements of AS1668.2 and used to independently reset 3361 relays Re0 and Re1 in fire mode conditions. The two relays should be programmed in EBLWin to be “Latched” i.e. resetting the alarm in the CIE will not bring the fans to the non-alarm condition until the reset button is pressed. If the alarm remains active in the CIE, the fan reset button will not function.

5.1.5 Fan Front Display

The fan control and display module is normally mounted in the CIE but it is also possible to remotely install the module and connect it to the COM loop and 24V supply. The fan operation is controlled by Re0 and Re1 relay outputs on the 3361 unit. The feedback signal from the fan pressure switch is connected to the supervised input of 3361 to provide the required indications of the fan status.

The typical front display of AS1668 module and connection diagram are shown in Figure 12, page 36.

Two typical fan application examples are shown in the following sections.

5.1.6 Supply Air Fan

A supply air fan is normally running in the non-fire mode condition and stops when smoke is detected in the air supply duct, timing sequence is shown in Figure 10 below.

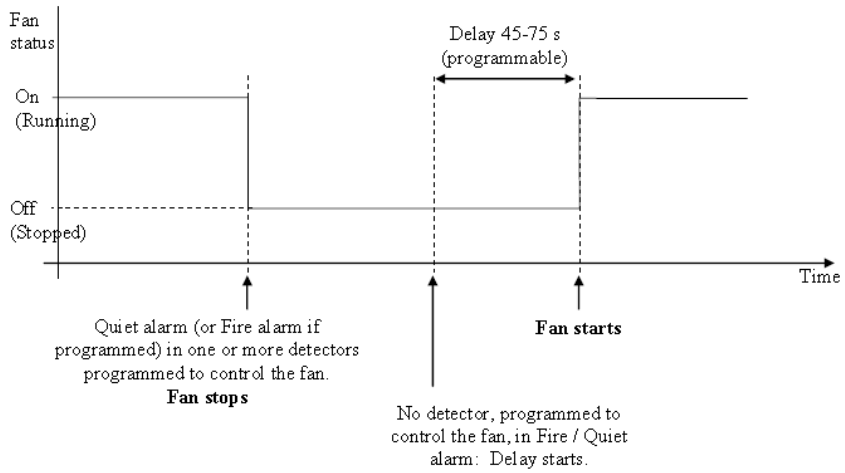


Figure 10 Supply Air Fan Timing Sequence

When the smoke is no longer present in the supply air duct, a time delay (45-75 seconds) starts, the fan remains in the shutdown mode until the time delay is elapsed, then the duct detector resets and causes the fan to restart. The presence of smoke in the supply air does not initiate a Fire Brigade TX signal or any other alarm output (type, quiet alarm). The Occupant Warning System does not sound. Only the “FIRE’ and general alarm indicators will be flashing and a quiet alarm message displayed.

Notes related to supply air fan applications:

1. Only analogue smoke detectors can be used in supply air fan applications.
2. The detector used in supply air fan applications must be selected as a “Quiet Alarm” i.e. check box in EBLWin program is ticked.
3. One detector, several detectors or a zone can be programmed to control the supply air fan.
4. A time signal period output must be configured in EBLWin as shown in section 5.1.3 step 6 to set up the post timing which normally is 60 seconds.

5.1.7 Smoke Exhaust / Spill Fan

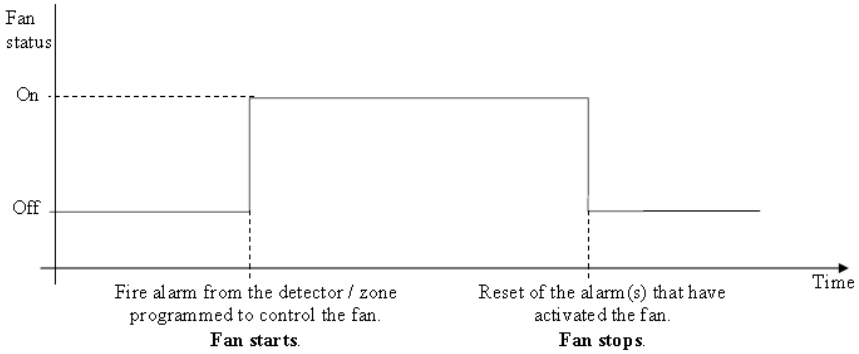


Figure 11 Smoke Exhaust Or Spill Fan Timing

The smoke exhaust fan is normally controlled by general alarm, single device or a zone. Both analogue detectors and conventional zones can be configured to control the fan. Standard time signal period output can be used.

Typical AS1668 fan example is shown in Figure 12 below

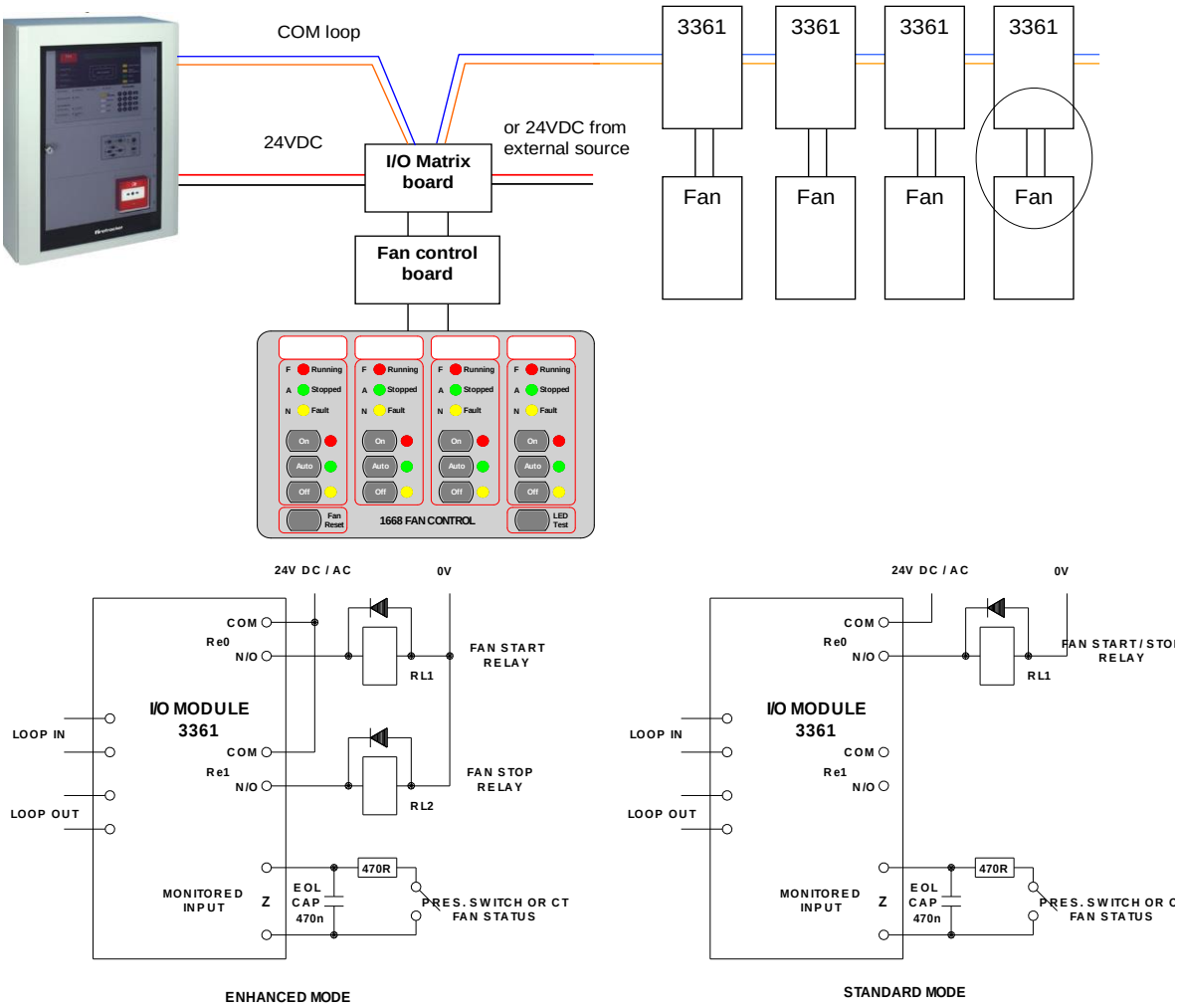


Figure 12 AS1668 Fan Control Example

5.2 Zone Control

The Zone Control Module provides a simplified indication of zone status without the need for a liquid crystal display. The disable controls allow a specific zone to be temporarily disabled without the need to access the CIE menu. This is typically used where building works or maintenance procedures are being carried out in a localised area of a building. The front display layout is shown as part of Figure 13 below.

Only two zone control modules can be used in FT128, if no generic applications are used.

Each zone control module consists of a universal I/O matrix 4582 plugged in a display board SUB900 specifically configured to provide up to 12 individual zone indicators and controls. The module is normally mounted in the CIE. but it is also possible to connect the module remotely via the COM loop and 24VDC supply.

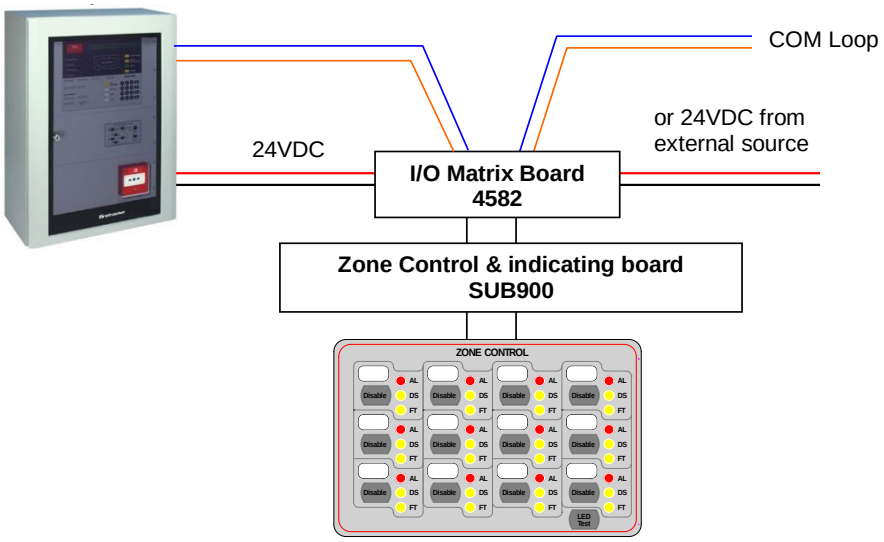


Figure 13 Zone control application

5.2.1 Controls & Indications

Alarm LED (Red) – Illuminates when an alarm from a conventional zone, an addressable device or group of addressable devices designated as a zone enters into an alarm state.

Fault LED (Amber) – Illuminates when either a short circuit or open circuit fault on a conventional zone input or any fault that prevents an addressable alarm point in a designated zone to operate properly.

Disabled LED (Amber) – Illuminates when a zone is disabled either by the disable switch on the zone control card or where the zone is disabled via menu H2/B1.

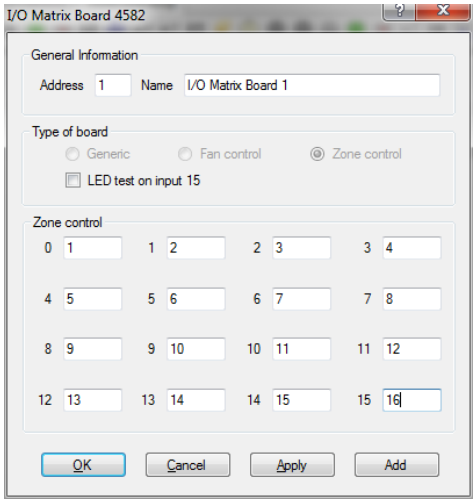
Disable Switch – Pressing the disable switch will disable the specific zone selected. Pressing the switch a second time will re-enable the zone. Functions are the same as menu H2/B1.

LED Test Switch – Pressing the LED test switch illuminates all indicators if input 15 is selected when programming the zone control function.

5.2.2 Zone Control Configuration

When the I/O Matrix board is selected in EBLWin to “Zone Control” type, up to 16 zones [0-15] can be configured. The display Board is limited to only 12 zones and one additional switch for LED test. The following procedures are used to configure the zone control module:

1. Right click on the COM loop and “Add I/O matrix board 4582” then select “Add zone control”. The following dialog box will be showing.



2. Select the zone control module address (0-3) and zone control name (if required). If the LED test function is required on input 15, tick the check box.

Note: The address selected in EBLWin (0-3) must match the address of the I/O matrix board which is set by the jumpers JP1-JP3 as per Table 4 page 23. The type of board is automatically selected.

3. Select the check box “LED test on Input 15” if this button is to be used for LED tests or uncheck the box if LED test facility is not required.
4. Assign the zone number in the corresponding Zone control boxes.
5. Click OK.

5.3 Generic Applications

5.3.1 Overview

The generic feature in the FT128 software supports the remote mimic applications of the I/O matrix board 4582. Currently, this feature is used in the New Zealand Fire Brigade mimic and index panels as well as other products. This section describes one of the main applications of the generic option, the popular NZ index panel. Refer to Brooks technical datasheet TDS019 for other applications.

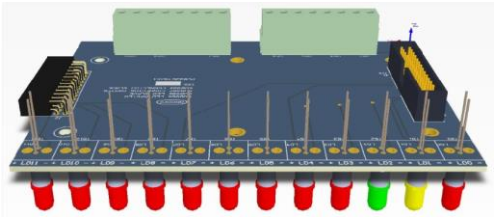
Each NZ master mimic board provides 12 LED indications and screw terminals for 4 inputs (switches). The first 3 LEDs used for Common alarm (red), Normal (green) and Defect (yellow). The remainder 9 LEDs (red) used to indicate separate zone indications or sprinkler flow switch indication. Two of the four inputs are used to interface the NZ Fire Brigade bulgin keys to the CIE. Additional slave mimic boards can be added to provide up to 36 additional red LED indicators.

Up to 4 mimic boards can be used to indicate maximum of 48 individual zone indications, only one I/O matrix is required for every 4 mimic boards, up to two I/O matrix boards can be used in the NZ mimic applications to provide 96 LED indicators, if no zone control modules are used. Refer to drawing F702A for connection diagram. A typical NZ mimic application is shown in Figure 15 below.

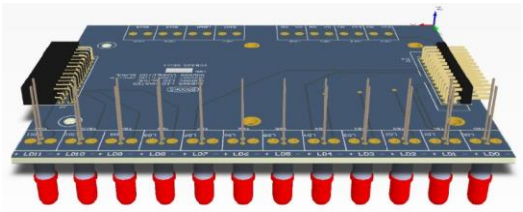
5.3.2 New mimic options

The new design of the mimic boards allows for either LED indicators or screw terminals for graphic or remote LED's. Four new boards are now available as shown in Figure 14 below:

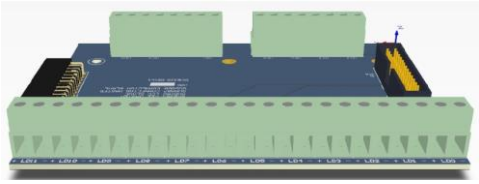
1. **Master LED mimic Board SUB985**: This must be the first board and to be fitted with the I/O matrix board 4582. The boards contains the first 3 common indicators and additional 9 red indicators. It also contain terminals to connect the Bulgin keys. All outputs / inputs are fully programmable.
2. **Slave LED mimic board SUB986:** contains 12 fully programmable red indicators, no provision for terminals or connectors for the I/O matrix. Up to 3 slave boards can be connected to the master board via plug-in connectors.
3. **Master terminals mimic board**: In addition to the connector for the I/O matrix board and Bulgin keys terminals, it also contain terminals to connect 12 remotely located LED's (no on-board LED's). The I/O matrix board is to be fitted to this master board. The board can be utilised to connect existing LED mimics to new FT128 in retrofit applications.
4. **Slave terminals mimic board**: Up to 3 slave boards can be connected to the master board via the plug-in connectors to provide terminals for additional 36 LED's.



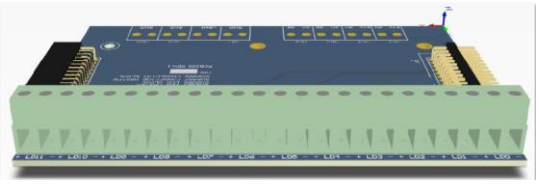
Master LED mimic board SUB985



Slave LED mimic board SUB986



Master Terminal mimic board SUB987



Slave terminal mimic board SUB988

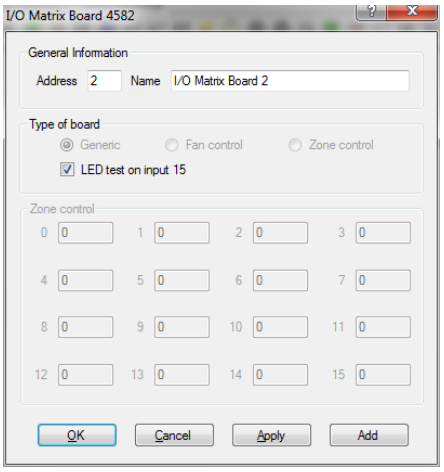
Figure 14 Mimic Board Options

Note: Mounting holes of the new series of mimic boards are slightly different to the mounting holes of the previous version (SUB927) i.e. new mimic LED boards must be used in the new index cabinets.

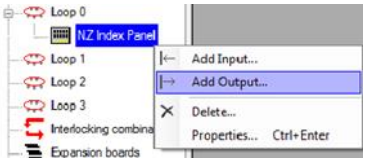
5.3.3 Configuration and programming

The following procedures are used to configure the NZ mimic or index panel:

1. Select the COM loop then "Add I/O matrix board 4582" and select "Add generic". The following dialog box will appear.



2. Enter the address (0-3) (usually automatically assigned) in the general information area and give it an application name e.g. NZ Index panel.
3. Select the check box “LED test on Input 15” if this button is to be used for LED test or uncheck the box if not required.
4. Right click on the Generic Board (i.e. NZ Index Panel as a given example) that was added in step 1 and choose Add Output... from the context menu as required (0-47) and enter the fields in the properties dialog box with its logical expression (similar to programmable relay output).



5. Add input 0 and input 1 to program the Bulgin keys. Select type “NZ Silence switch” for input 0 and assign the name to “Silence Alarms”. Select type “Evacuate” for input 1 and assign the name to “Evacuate”.

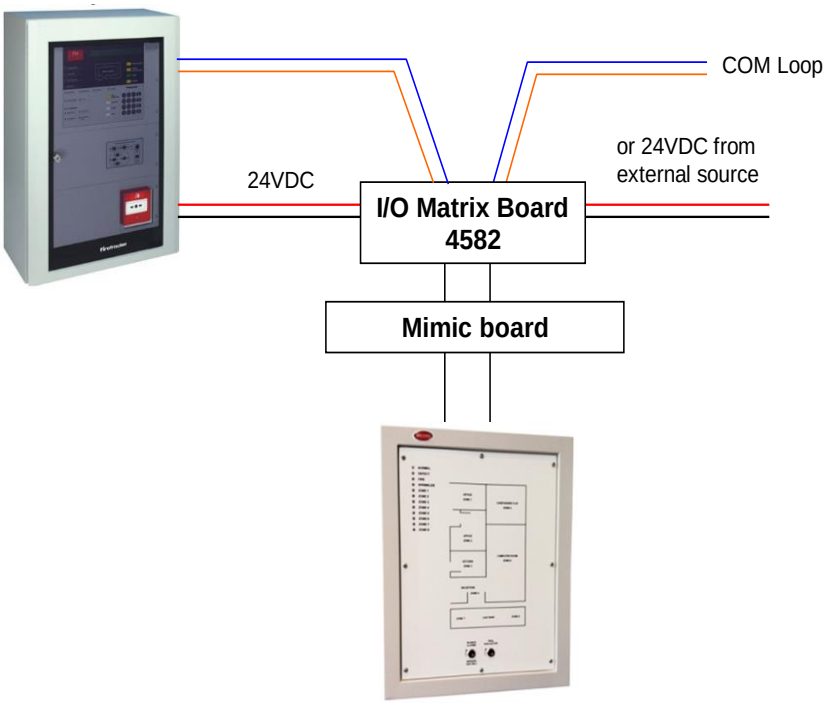


Figure 15 Generic application, NZ index panel

5.4 Occupant Warning System (OWS)

5.4.1 Overview

Brooks OWS is an intelligent occupant warning system that can be incorporated in FT128 with number of options depending on the available space in the standard cabinet, larger enclosures can be used to allow for more options.

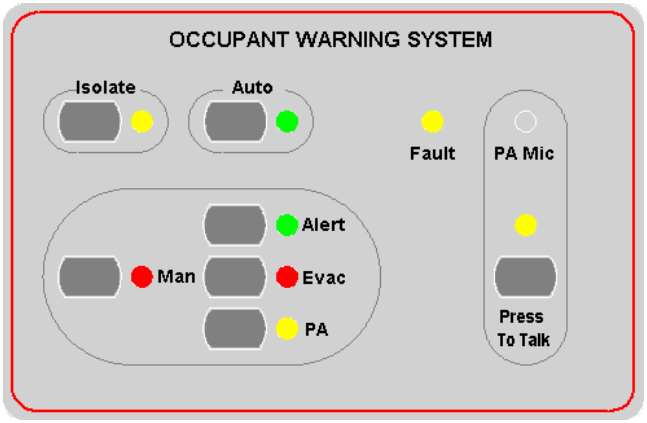


Figure 16 Occupant Warning Display Module

The OWS is supplied with a wide range of high efficiency class-D audio amplifiers: 60, 120 or 250 Watts. A basic OWS system fitted in FT128 supports the following standard Features:

- Digital voice messages for alert and T3 (or AS2220 evacuation tone)[35].
- Supervised trigger Input (short/open circuit fault)
- Supervised dual Strobe 24 VDC output for alert and evacuation strobes.
- Supervised 100V speaker line output (open/short circuit fault).
- Fault Relay output (changeover contacts) [36]
- Fault indicators for strobe output, trigger input and speaker circuit on OWS main board. Only one common fault indicator on the front display.
- Built in electret microphone.
- Auxiliary input to connect to Brooks single or multiple zone remote microphones
- Auxiliary audio enable/disable switch input.

An optional expansion 4 zone splitter board can be fitted with the standard OWS, maximum of 4 boards can be used to provide up to 16 fully supervised speaker zone circuits.

The four zone splitter boards can be used to individually select one of the four zones (or all zones) for PA announcement purposes only[37]. The PA front display can select up to 8 PA zones and requires 2 x 4 zone splitter board.

5.4.2 Audio Amplifiers

- 60 Watt audio amplifier SUB865
- 120 Watt audio amplifier SUB866
- 250 Watt audio amplifier SUB867

[35] In NZ applications, the OWS has to be configured to provide AS2220 tones and voice messages.
[36] OWS faults are hardwired via this common fault relay to input I0 in FT128 to display OWS fault on the LCD.
[37] The tone / message is common for all zones, only PA can select one or multiple zones for announcement.

Due to the limited current capability of FT128 power supply, the OWS requires separate power supply and power supply supervision board. Larger amplifiers may require larger cabinets depending on the space available.

5.4.2.1 60/120 Watt Amplifier Module

Features:

- High energy efficiency class D amplifier design.
- Available in 60W and 120W configuration.
- Standby function to reduce power consumption.
- Designed to mount on top of main control OWS module to save space

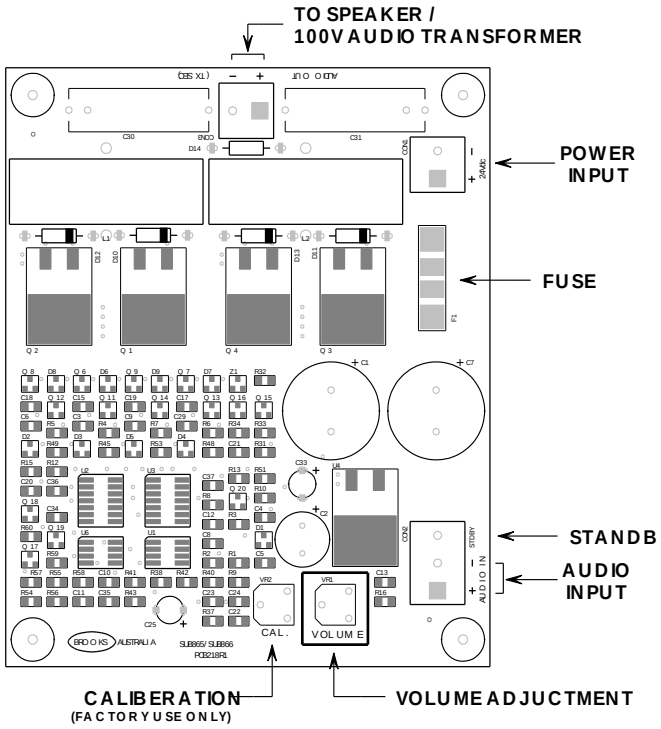
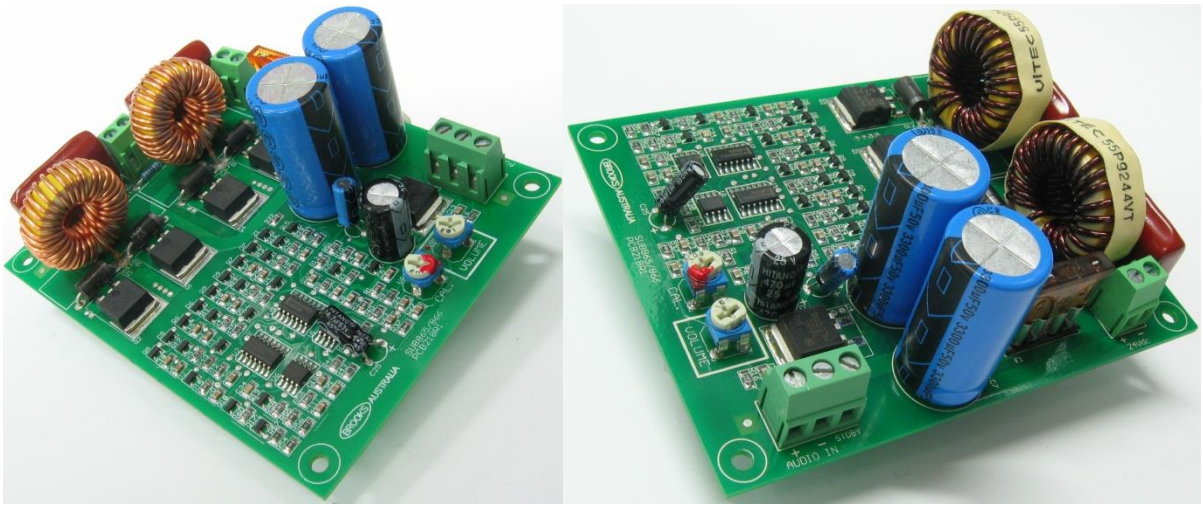


Figure 17 Class-D 60W / 120W Audio Amplifier Board Layout



60 Watt 120 Watt

Figure 18 60W / 120W Audio amplifier photos

Table 7 OWS 60/120W amplifier specifications

Function	60W version	120W version
Voltage input range	20 to 32Vdc	
Fuse rating	5 A (blade fuse)	7.5 A (blade fuse)
Low voltage shutdown	15 V (approx)	
Audio input impedance	10 kΩ	
Output load	4 Ω	2 Ω
Amplifier quiescent Current [38]	40 mA	
Total OWS quiescent Current [38]	118 mA	119 mA
Total OWS active current – full load [38]	2.8 A	5.17 A

5.4.2.2 250 Watt Amplifier Module

- High energy efficiency class D amplifier design.
- Low voltage protection.
- Over current protection
- Standby function to reduce power consumption.

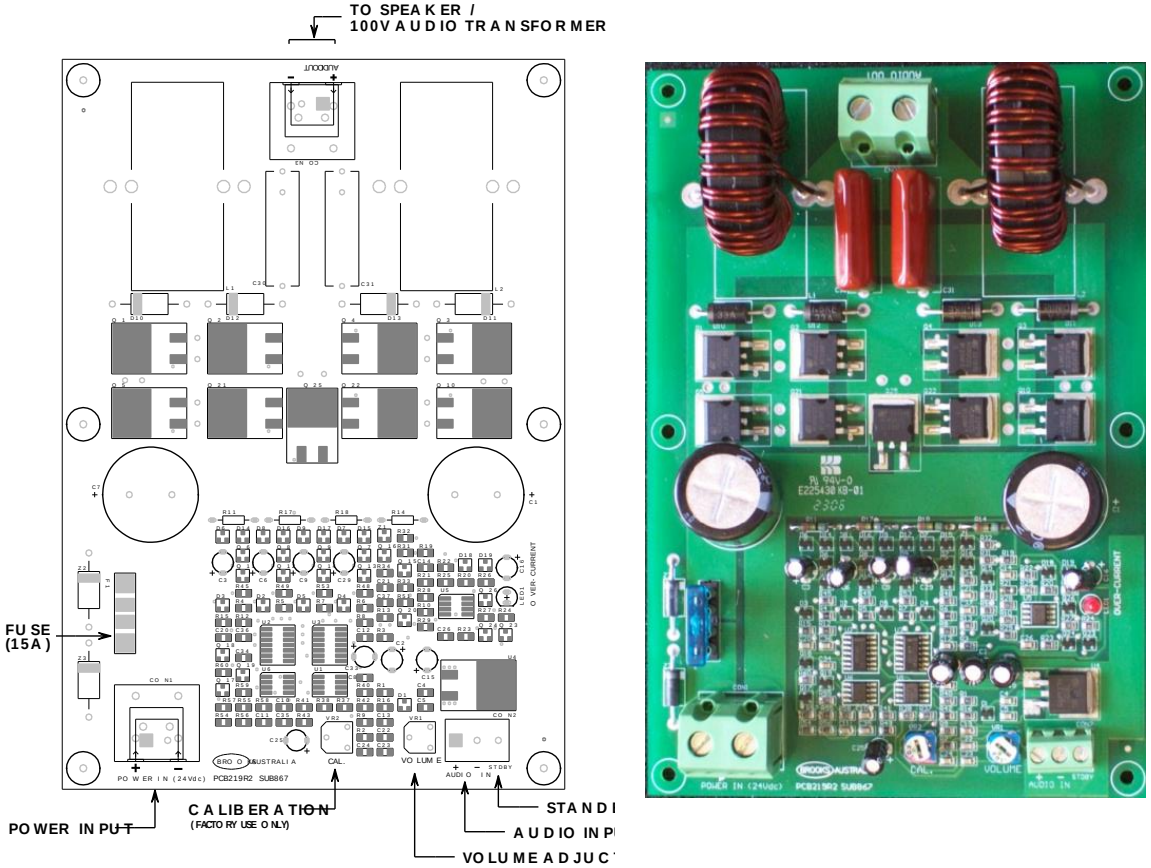


Figure 19 Class-D 250W Audio Amplifier Board Layout

[38] Current measured at 27V supply

Table 8 OWS 250W amplifier specifications

Function	Rating
Voltage input range	20 – 32 V_{DC}
Fuse rating	15 A (automotive blade fuse)
Low voltage shutdown	19 V (approx.)
Audio input impedance	10 kΩ
Output load	1 Ω
Amplifier Quiescent Current [38]	40 mA
Total OWS quiescent current [38]	119 mA
Total OWS active current – full load [38]	10 A

Table 9 Connection of the Audio Amplifier 60W, 120W and 250W

Designator	Type	No.	Label	Pin	Description
CON1	Screw terminal	1	24Vdc	+	Power input. 19V - 32V, 2.8A (60W), 5.2A (120W), 10A (250W) [38]
		2		-	
CON2	Screw terminal	1	AUDIO IN	+	Audio input <=1 V_{RMS}. Input impedance: 10KΩ.
		2		-	
		3		STDBY	Audio amplifier enable/disable input, logic 5V, <= 5mA. It is to minimize the unit power consumption. The amplifier output will be disabled when the input is high.
CON3	Screw terminal	1	AUDIO OUTPUT	+	Audio output to the transformer secondary side on the main control board. 16V_{RMS} to the associated different transformer.
		2		-	

5.4.3 OWS Volume Adjustment

All volume adjustments are made on the Audio Amplifier Module via the trimpot VR1 only. This volume adjustment is given a reference designator, VR1 and named “VOLUME” on all amplifier boards. This trimpot, VR1, is shown in both Figure 17 page 42 and Figure 19 page 43. **Do not use VR2 for adjusting the volume at any time, VR2 is only used for factory calibration purposes.**

The following procedures describe how to adjust the volume.

1. Manually turn on the evacuation tone.
2. Adjust the trimpot clockwise a little at a time to increase the volume on the audio amplifier.
3. Then test or measure if the required audio level is met.
4. Repeat 1 to 3 as necessary.

5.4.4 Auxiliary Audio inputs

The OWS provides an auxiliary audio input controlled by a supervised auxiliary enable input. The auxiliary audio input can be connected to a background music source and enabled via the auxiliary input. The auxiliary inputs are also used to connect the Brooks remote desktop microphones. When the CIE is in quiescent conditions and the auxiliary enable input is activated, the auxiliary audio is activated and remote PA announcement or background music will be broadcasted across the speakers.

Note: Shielded cables must be used for Audio signals and its shielding should be connected to the CIE EARTH terminal, this is to reduce disturbances.

5.4.5 OWS Dual Strobe Output

The OWS Dual Strobe output circuit is shown in Figure 20. A small current flows through one of the two strobes constantly, which is normally too small to activate the strobes in normal conditions. The EOL resistor of the output is 47KΩ, however, the EOL resistance may vary based on the strobe model connected.

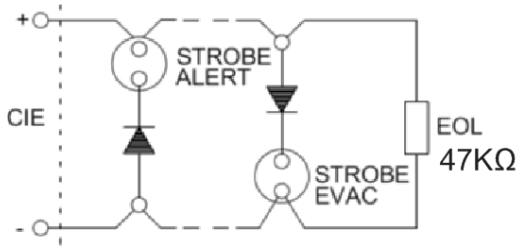


Figure 20 Typical OWS Dual Strobe Control Circuit

Note: Multiple dual strobes can be connected to the dual strobe output on the OWS main board.

5.5 Gaseous extinguishing system control module

5.5.1 Overview

The gaseous extinguishing system control module is provided for use as an option in FT128. The module comprises the following:

- Control Board (SUB928) with software for CIE interface.
- Display Board (SUB929)
- CIE interface board (SUB943).
- Front panel decal with interconnection cable

The gaseous extinguishing system provides outputs to the following Brooks gas ancillary equipment:

- A series of Brooks Warning Signs
- Brooks Local Control Station (LCS)
- Voice / Tone Electronic Sounder
- Dual Strobe Module

The control module combined with other Brooks system components is designed to provide the monitoring and control functions of a complete gaseous extinguishing system that meets the requirements of the relevant clauses 7.1 to 7.6 of the Australian Standard AS4214-2002 (including amendment 1). For more details, refer to FT2GAS Operation / Technical manual MA400.

The control module provides the following inputs / outputs:

- Fully supervised gas release 24V_{DC} output rated @ 5A maximum.
- Fully supervised input circuits e.g. gas lock-off valve input, manual release input and gas discharged sensor input.
- Fully supervised system warning sign 24V_{DC} output rated @ 0.5A maximum.
- Fully supervised 2 wire system 24V_{DC} output for level 1 and level 2 alarm to Brooks warning signs (alarm 1 [+/-] & alarm 2 [-/+]) rated @ 3A maximum.
- Gas release clean-contact relay output rated @ 2A maximum.
- Gas Fault clean-contact relay output rated @ 2A maximum.
- Gas Isolate clean-contact relay output rated @ 2A maximum.
- Four-wire interface for Local Control Station (LCS). Both the local gas isolate control and the local gas release control are fully supervised for open and short circuit faults.
- Adjustable gas release timer, set via a built-in DIP switch.

Note: Additional power supply and PSU supervision board must be used to power the gaseous extinguishing system. The current rating above is the maximum current capacity of the outputs, a power supply and battery calculations of the additional PSU must be performed to ensure that the power supply capacity is sufficient to run the system in full alarm condition without exceeding the maximum current rating of the power supply.

5.5.2 Display board (SUB929) & decal

The front decal of the gaseous extinguishing system is shown in Figure 21 below. The display board SUB929 is mounted on the inner door behind the front decal.

All LED indicators on the front display are covered by a polycarbonate decal clearly labelled with their functions.

When the system sets in the normal condition, all LED indicators will be extinguished.

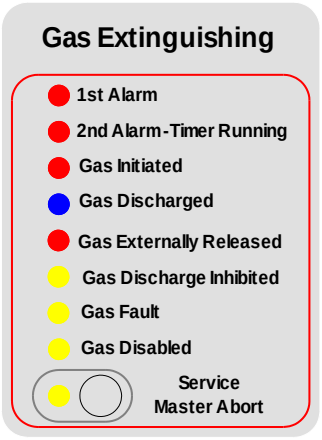


Figure 21 Gas Extinguishing Display Layout

The gaseous extinguishing system status indicating LEDs and flash patterns are described in Table 10 below. The default state of the LED indicators is OFF, if it is not defined below.

Table 10 Gas Front Status LED Indication and flash Pattern

Type	LED Name	Module Conditions	LED Pattern
Alarm	1st Alarm	One zone or zone address in alarm	Fast Flash
	2nd Alarm – Timer Running	Both zones or zone addresses in alarm	
	Gas Initiated	Gas release output activated	
	Gas Externally Released	External gas release control activated	
	Gas Discharged	Gas discharged sensor input activated	
Fault	Gas Fault	Fault in any of the supervised inputs or outputs	Steady ON
Disable	Gas Discharge Inhibited	Gas discharge inhibited via LCS isolate switch	Steady ON
	Gas Discharge Disabled	Gas discharge disabled by the service master abort switch or the gas lock-off valve controls	
	Service Switch Active	Illuminates when the master abort switch is activated	
	Service, Master Abort	Gas service master abort switch	

5.5.3 Control board (SUB928)

The control board (SUB928) is mounted on top of the CIE interface board (SUB943) as shown in Figure 22 below.

The gas control board SUB928 provides all the gaseous extinguishing control functions. It provides the termination and supervision of all the field equipment.

5.5.4 CIE interface board (SUB943)

The CIE interface board (SUB943) is mounted at a suitable location inside FT128 cabinet. It provides the required terminations to interface the gas control board SUB928 to FT128. This includes zone alarm, Zone fault, zone isolate and gas release conditions.

Figure 22 Assembled Control & Interface Boards

5.5.4.1 Inputs from FT128 to CIE interface board (SUB943)

The following inputs are provided in the gas interface board:

1. **24VDC supply** (22-30V), 200mA to 3A based on system power calculation[39]
2. **Zone 1 & Zone 2 alarm input** from FT128, normally open clean alarm contact for each zone or zone address required to activate the gas system.
3. **Fault input**[40], zone 1 fault, zone 2 fault or power supply fault in the CIE will activate the system inoperative sign. Fault input from FT128 should be normally closed clean contact.
4. **Zone Isolate input**, if any of the two zone inputs or zone addresses used to release the gas is disabled (open contact), the system inoperative sign will activate.

5.5.4.2 Outputs from CIE interface board (SUB943) to FT128

The following outputs from SUB943 are provided to indicate the gaseous extinguishing system status in FT128 display via programmable inputs:

1. **Gas isolate**, relay output to indicate in FT128 if the gas has been isolated.
2. **Gas fault** relay output to indicate in FT128 if a fault exists in the gaseous extinguishing system.
3. **Gas release** relay output to indicate in FT128 if the gas has been released.

[39] Separate power supply must be used for the gas system,
[40] Individual zone fault output can be configured only in software => V2.0.x software.

6 Peripheral Devices

Alarm points**, analogue** alarm points (detectors, MCP's, etc.) are connected directly to a COM loop. **Conventional** alarm points (detectors, MCP's etc.) are connected to a Zone Line Input in an 8 zones expansion board (4580) or a Zone Line Input in a COM loop unit 3361. Programmable inputs can also be used for flow switches etc.

Short Circuit Isolators **must** be used on the COM loop if more than 40 alarm points are connected to the COM loop.

I/O Matrix boards are plugged ("piggy back") to an Application board (Zone, Fan, Generic, etc.), which is connected to the COM loop, refer to chapter "Expansion Boards 458X", page 22.

Sounders, Strobes, door holders, etc**.** are connected to the programmable outputs in FT128 (S_0-S_1, R_0[41]) and/or to COM loop output units e.g. 3364 / 3361 and/or 8 relays expansion boards 4581. Addressable sounders (3379 / 4477) are connected directly to the COM loop.

Input devices e.g. timer, external fault, etc. are connected to programmable inputs, i.e. to input (I_0) in FT128 and/or to input units connected to the COM loop e.g. 3361.

Routing equipment (Fire brigade T_X / Fault T_X) is normally connected to the R_0-R_1 outputs in FT128. Also any programmable output can be used.

Remote display units [42] are connected to the RS485 interface[43] in FT128.

For more information, see the following Sections and the Product Leaflets on our web site: http://www.brooks.com.au

6.1 COM Loop Units

The COM loop supports up to 255 addressable COM loop units [44] for software version ≥ V2.0.x.

Note*:* Depending on the type and number of units, the total current consumption will vary. The cable length is dependent on the current consumption and the cable resistance.

See chapter "Current Consumption", page 168.

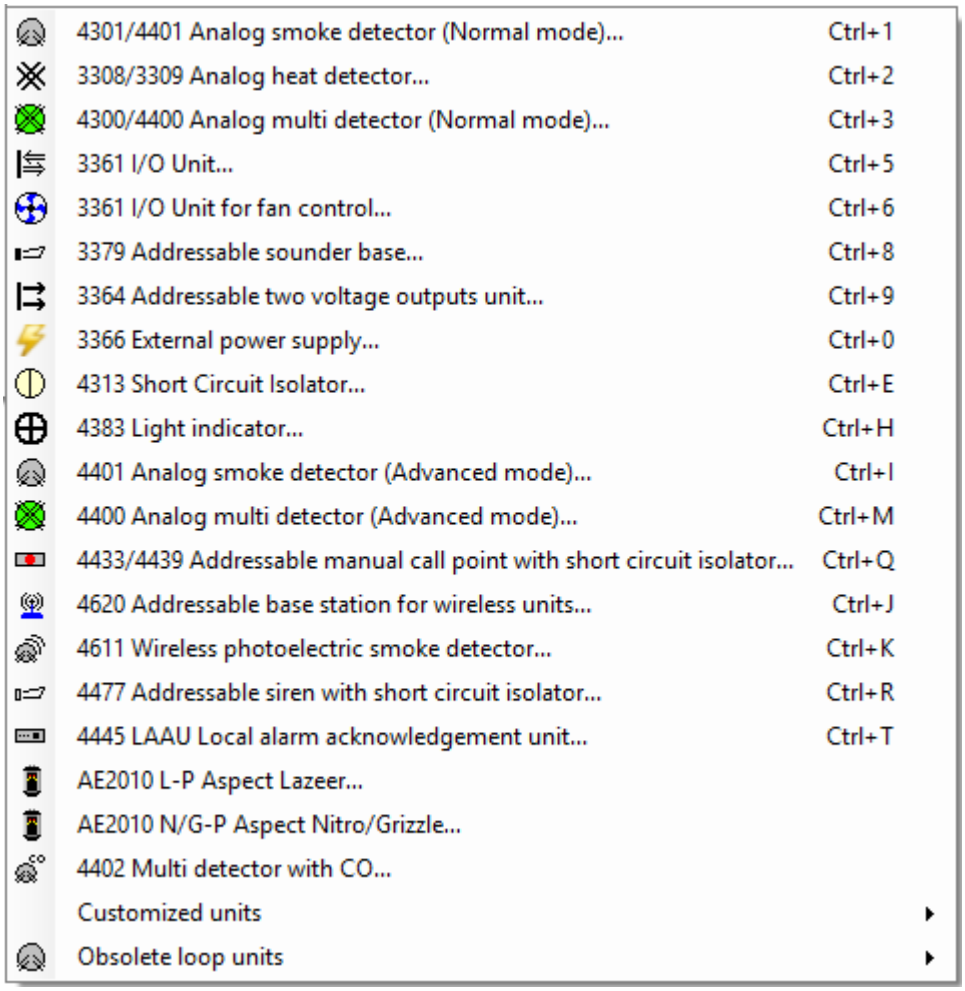
The following units can be connected to the COM loop in **NORMAL** mode (some units can be used in different modes):

[41] R0 is normally used to trigger the OWS (if fitted). FT128 termination board also has a relay activated from S1, it can be used to trigger the OWS or to control magnetic door holders (up to 2 A).

[42] External Presentation unit 1728 and Alert Annunciation unit 1736

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

[44] Conventional detectors can be connected to an 8 zones expansion board 4580 or to the Zone Line Input (Z) on an addressable I/O unit 3361.



Notes:

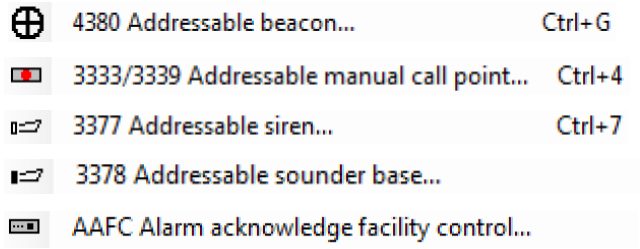
The following loop units are not available in Australia or New Zealand:

- Customized units: Customised I/O 1 (1=Exit Light),
- Multi Detector with CO: 4402
- Wireless Units: 4611, 4620
- Aspiration Detectors: AE2010 L-P Aspect Lazeer, & AE2010N/G-P Aspect Nitro/Grizzle

Notes: **3361** The I/O Unit for Fan control is used only in the Fan control applications.

AAFC the Alarm Acknowledge Facility Control is used in conjunction with AAM

Obsolete loop units (listed below) may be found in old installations and can be used in FT128 installations as well.



Notes:

3333/3339 can be used instead of 4433/4439 when the built-in Short Circuit Isolator is not to be used.

3377 can also be used instead of 4477 when the built-in Short Circuit Isolator is not to be used

Address setting / Technical address

Each COM loop unit must have a unique technical address (001-255). This address and the mode are set with an Address Setting Tool 3314 / **4414**. Except otherwise stated, the **NORMAL** mode is used in FT128 (default). To set the detectors 440x in **Advanced Mode,** the Address Setting Tool **4414** must be used.

6.1.1 Input Units

Each COM loop input unit is added and programmed via EBLWin. Depending on type of unit, the following to be programmed:

- Technical address (COM loop address) 001-255
- Name (normally not changed)
- Zone number and Address within the zone
- Alarm text (user definable)
- Regular Alarm algorithm (some units only)
- Options
  - ☞ Alternative Alarm algorithm & Time Channel (some units only)
  - ☞ Alert annunciation & Time Channel (some units only)
  - ☞ Disablement & Time Channel (some units only)
  - ☞ Two-units-dependent fire alarm, i.e. co-incidence alarm & Time Channel (some units only)
  - ☞ Delayed (fire alarm)
  - ☞ Quiet alarm

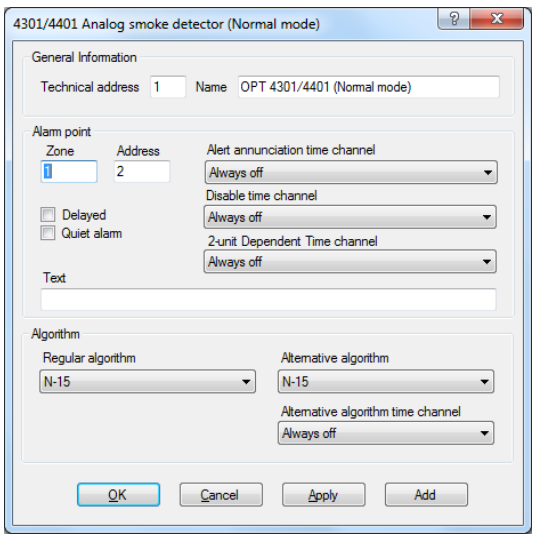


Figure 23 EBLWin Properties Dialog Box for 4301/4401 (Normal Mode)

6.1.1.1 Analogue Sensor Bases (ASB)

An Analogue detector (Sensor) to be plugged in an Analogue base. The COM loop address is set in the detector, see below.

3312 Analogue Base 3312 has screw terminals for the COM loop and an RIL. Prepared for mechanical lock of the detector - if required. Recess for label holder (3391). The base has an address label on which the plugged-in detector's COM loop address can be written.

4313 Analogue Base with isolator. An Analogue detector (Sensor) is to be plugged in 4313. Terminals are provided for remote indicators (RIL). Prepared for mechanical lock of the detector - if required. Recess for label holder (3391). It has also a built-in Short Circuit Isolator (see page 62). The isolator's COM loop address is set with the Address setting tool 3314 / 4414. The base has an address label on which both the plugged-in detector's COM loop address and the isolator's COM loop address can be written.

The Address setting tool 3314 / 4414 is also used for mode setting:

NORMAL mode: Used for 4313 in system FT128.

6.1.1.2 Addressable Manual Call Points

4433 Addressable Manual Call Point[45] with isolator. Conforms to EN54-11, replaces 3333. This MCP is similar to 3333 but it also has a built-in Short Circuit Isolator. A built-in LED will indicate that a 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 protects the glass from accidental triggering. The COM loop address is set with the Address setting tool 3314 / 4414.

The isolator does not use any COM loop address

4433 is to be surface mounted in the supplied red back box or flush mounted as it is mounted in the FT128 cabinet.

For indoor use and in dry premises.

The Address setting tool 3314 / 4414 are also used for mode setting:

NORMAL mode: The built-in Short Circuit Isolator is **in use**. Programmed in EBLWin as MCP type 4433. Flashing or non-flashing LED is set via EBLWin.

2330 mode: The built-in Short Circuit Isolator is **not in use**. Programmed in EBLWin as MCP type 3333. [46] Flashing or non-flashing LED is set via EBLWin.

4439 Enclosed Addressable Manual Call Point with isolator[45]. Replaces 3339. 4439 is same as 3339 unit but it has built-in Short Circuit Isolator. The isolator does **not** use any COM loop address. The Address setting tool 3314 / 4414 is also used for mode setting same as 4433.

For indoor use in premises where IP56 rating is required. Operating temp. -10 to +55°C.

Addressing & programming 4433/4439 with SCI

1. Connect the address setting tool to the MCP terminals SA and SB (without loop connection).
2. Turn on the address setting tool then hold down both Write and Read buttons simultaneously until “MODE: 0-3” appears.
3. Press “0” to select “M0 NORMAL” mode.
4. Enter the required technical address then press “write”.

[45] The manual call points have a response time ≤ 5 s

[46] When 4433/4439 is used as a replacement for 3333/3339, in EBLWin, 3333/3339 must be selected (not 4433 or 4439).

In EBLWin, select 4433/4439 from add loop unit and add to the COM Loop.

Addressing & programming 4433/4439 without SCI

1. Connect the address setting tool to the MCP terminals SA and SB (without loop connection).
2. Turn on the address setting tool then hold down both Write and Read buttons simultaneously until “MODE: 0-3” appears.
3. Press “1” to select “M1 2330” mode.
4. Enter the desired technical address then press “write”.

In EBLWin, select 3333/3339 from the “Obsoleted units” and add to the COM Loop.

Notes:

1. Incorrect addressing mode or programming will cause the unit to report a “No reply …..” fault in the control unit.
2. When 4433 or 4439 is used in FT512 system, the MCP must be addressed in 2330 mode and programmed as 3333 / 3339.
3. The Short Circuit Isolator feature in 4433 or 4439 can be used only in FT1020G3 or FT128

6.1.1.3 Analogue Detectors

3308 Analogue heat detector. To be plugged in an Analogue base (3312 / 4313 / 3379). Built-in LED is lit to indicate that the detector has activated a fire alarm. Prepared for mechanical lock (screw attached) – if required. The COM loop address is set with the Address setting tool 3314 / 4414. The detector 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: 3308 is set in EBLWin in this mode to one of three algorithms (static response temp. range) for class:

- A1 (54-65°C), min./typical/maximum ambient temp. -20/+25/+50°C
- A2 S (54-70°C), min./typical/maximum ambient temp. -20/+25/+50°C
- B S (69-85°C), min./typical/maximum ambient temp. -20/+40/+65°C

3309 Analogue heat detector. Enclosed (IP67)[47]. Built-in LED is lit to indicate that the detector has generated fire alarm. Terminals for Remote Indicator (RIL). Recess for label holder (3391). The COM loop address is set with the Address setting tool 3314 / 4414. The Address setting tool is also used for mode setting:

NORMAL mode: 3309 is in this mode via EBLWin set to one of three algorithms (static response temp. range) for class:

- A1 (54-65°C), min./typical/maximum ambient temp. -20/+25/+50°C
- A2 S (54-70°C), min./typical/maximum ambient temp. -20/+25/+50°C
- B S (69-85°C), min./typical/maximum ambient temp. -20/+40/+65°C

4300 Analogue multi detector. Discontinued and replaced by 4400 in Normal mode, see below. 4300 is a smoke detector and a heat detector within the same housing. Scattered light (i.e. reflection of infrared light) is used to detect smoke and the heat sensing element is a thermistor. The detector unit (actually the heat detector) can detect methylated spirits (alcohol) fire (EN54-9, test fire TF6; liquid fire), which is normally impossible for a photo electric smoke detector to detect.

[47] 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 ≤ Ta ≤ 65°C**.

The detector has unleaded soldering.

To be plugged in an **Analogue base (3312 / 4313 / 3379).**

Built-in LEDs are lit to indicate that the detector[48] has activated a fire alarm. Prepared for mechanical lock (screw attached) – if required.

Via EBLWin, the mode of operation can be selected as follow:

Zone-Address
001-01 (smoke)
001-02 (heat)
COM loop address
e.g. 123

a) **Two presentation numbers (address):** The detector unit works as <u>two separate detectors</u>. The smoke detector is programmed for one zone-address and the heat detector for another zone-address[49]. (Can be used to disable e.g. the smoke detector during working hours and/or in control expressions for programmable outputs).

Zone- Address
001-01(smoke or heat)
Technical address
000123

b) **One presentation number (address):** The detector unit works as <u>one detector</u> and is programmed for one zone-address.

If alternative b) is to work with "OR-functionality" or with a "Decision algorithm", program this via EBLWin using either of these functionality options:

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:

<u>Fire alarm</u> will be activated if:

Temperature (°C) + adjusted smoke value [50] <u>≥</u> 58.

<u>Pre-warning</u> will be activated if:

58 > temperature (°C) + adjusted smoke value[50] <u>≥</u> 50.

20°C => 3.8 %/m
↓ ↓
40°C => 1.8 %/m

The "Decision algorithm", see Figure 24, can be used to reduce false alarms (nuisance alarms), because at a normal room temperature, more smoke is required to activate fire alarm than when the room temperature is high (or is rising). In a real fire condition, the room temperature will rise rather fast and less smoke is required to activate fire alarm. Very little smoke requires a "high" temperature to activate fire alarm and a lot of smoke will activate fire alarm also at a "low" temperature.

[48] i.e. the heat detector and/or the smoke detector.

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

[50] 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 temp. Cannot be lower than 0°C in the algorithm / graph.

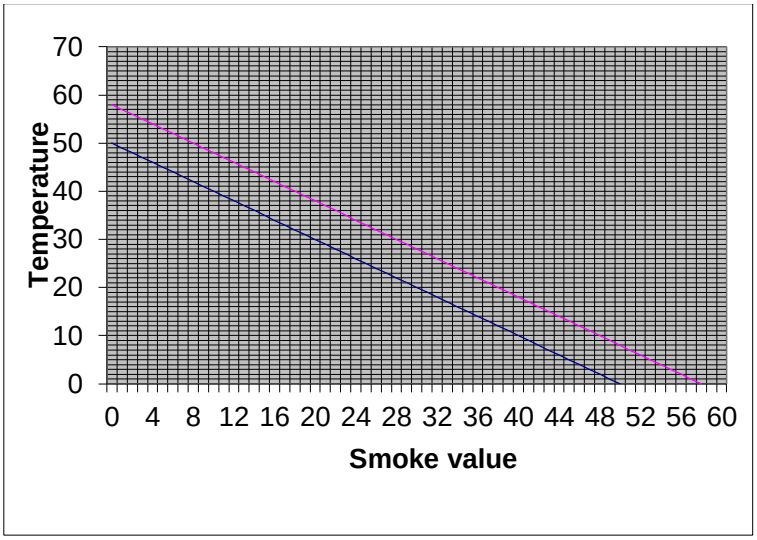


Figure 24 Decision Algorithm Graph.

When the calculated value in the decision algorithm exceeds the lower graph, pre-warning will be activated. When it exceeds the upper graph, fire alarm will be activated.

Temperature = °C. Smoke value = obscuration (%/m) x 10.

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

Note: The multi detector 4300 in system FT128 takes two COM loop (technical) addresses of the available 255 addresses. One address that is set with the 3314 / 4414 tool but also the following address will be "occupied" for the heat part of the detector and cannot be used by any other unit on the COM loop.

The Address setting tool 3314 / 4414 is also used for mode setting:

NORMAL mode: 4300 is set to this mode in EBLWin. For the smoke detector, set to one of six algorithms H-15, H-35, L-15, L-35, **N-15** or N-35 and for the heat detector set to one of three algorithms for class **A1** (static response temp. 54-65°C), A2 S (54-70°C) or B S (69-85°C).

4301 Analogue photo electric smoke detector. Discontinued and replaced with 4401 in **Normal** mode, see below. Scattered light (i.e. reflection of infrared light) is used to detect smoke. To be plugged in an Analogue base (3312 / 4313 / 3379). Built-in LEDs are lit to indicate that the detector has activated fire alarm. Prepared for mechanical lock (screw attached) – if required.

The 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:

NORMAL mode: 4301 in this mode is set in EBLWin to one of the six alarm algorithms H-15, H-35, L-15, L-35, **N-15** or N-35.

4400 Analogue multi detector. Replaces 4300 in **Normal** mode, 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. To be plugged in an Analogue base (3312 / 4313 / 3379). Built-in LEDs are blinking to indicate that the detector [51] has activated fire alarm. Prepared for

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

mechanical lock (screw attached), if required. 4400 has slightly different design to the 4300 detector and the smoke chamber net has even made with smaller holes, this will keep insects and particles [52] 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: Only the new Address setting tool 4414 can be used to set 4400 to "Advanced" mode. **Note**, the Address setting tool 3314 cannot be used to set "Advanced" mode!

In Advanced mode, 4400 will use an 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 Section Advanced Mode, page 127.

An alternative smoke and/or heat algorithm can be used via one or two time channels. 4400 has a green polling LED. Via EBLWin, the green polling LED can be set to 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 a replacement for the Analogue multi detector 4300 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.

4401

Analogue photo electric smoke detector. Replaces 4301 in **Normal** mode, see above. Scattered light (i.e. reflection of infrared light) is used to detect smoke. To be plugged in an Analogue base (3312 / 4313 / 3379). Built-in LEDs are blinking to indicate that the detector has activated fire alarm. Prepared for mechanical lock (screw attached) if required.

4401 has slightly different design to the 4301 detector and the smoke chamber net has even made smaller with holes that will keep insects and particles [52] larger than smoke particles out of the chamber. The 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 only 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 Section "Advanced Mode", page 127.

[52] For example dust, steam, etc.

An alternative area alarm algorithm can be used via a time channel. 4401 has a green polling LED. Via EBLWin, the green polling LED can be set to either 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: In this mode 4401 has to be programmed in EBLWin as a **4301** detector, i.e. the 4401 detector will work as a replacement of the Analogue 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.

6.1.1.4 Conventional Detector Bases (CDB)

2324 Base. A conventional detector is to be plugged in a conventional detector base 2324. Built-in LED is lit to indicate that the detector plugged in the base has activated fire alarm. Terminals for remote indicator (RIL) are provided.

6.1.1.5 Conventional Detectors

4318 Combination heat detector. Rate-of-rise **and** fixed temperature, 59°C, heat detector class **A1R**. Static response temperature range 54-65°C, ambient temperature minimum/typical/maximum -10/+25/+50°C.

To be plugged in a conventional detector base 2324.

4350 Multi detector. This detector is **discontinued** and will not be replaced. 4350 is 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 reduce false alarms, an AI function is used, i.e.

a. Combined heat and smoke sensing

b. Variable delay function

c. Adaptive learning function

4352 Photoelectric smoke detector. **Discontinued** and replaced with 4452. 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 reduce false 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.). To be plugged in a conventional detector base 2324.

4452 Photoelectric smoke detector. Replaces 4352, see above. Similar to 4352 but 4452 has a little different design compared to 4352 detector (see 4401 above) and the smoke chamber net has smaller holes. This will keep insects and particles[52] 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, minimum/**typical**/maximum ambient temperature -10/**+25**/+40°C. To be plugged in a conventional detector base 2324.

4376 Heat detector. Fixed temperature heat detector similar to 4375 but 80°C, class **BS** (static response temp. range 69-85°C), latching, minimum/**typical**/maximum ambient temperature -10/**+40**/+60°C. To be plugged in a conventional detector base 2324.

6295 Heat detector: Enclosed (IP67)[53]. Fixed temperature heat detector, 57°C, class **A2S** (static response temperature range 54-70°C), latching. Minimum **/typical/** maximum ambient temperature -40**/+25/**+50°C. Built-in LED is lit to indicate that the detector has activated a fire alarm. Terminals for a Remote Indicator (RIL) are provided.

6296 Heat detector: Enclosed (IP67)[53]. Same as 6295 but 72°C, class **BS** (static response temperature range 69-85°C), latching. Minimum/**typical**/maximum ambient temperature -40/**+40**/+65°C. Built-in LED is lit to indicate that the detector has activated a fire alarm. Terminals for a Remote Indicator (RIL) are provided.

6297 Heat detector: Enclosed (IP67) [53]. Same as 6295 but 87°C, class **CS** (static response temperature range 84-100°C), latching. Minimum/**typical**/maximum ambient temperature -40/**+55**/+80°C. Built-in LED is lit to indicate that the detector has activated a fire alarm. Terminals for a remote indicator (RIL) are provided.

6298 Heat detector: Enclosed (IP67) [53]. Same as 6295 but 117°C, class **ES** (static response temperature range 114-130°C), latching. Minimum/**typical**/maximum ambient temperature -40/**+85**/+110°C. **No** built-in LED but terminals for a Remote Indicator (RIL) are provided to indicate that the detector has activated a fire alarm.

6.1.1.6 Accessories

3314 Address setting tool. Discontinued, replaced by 4414, 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 supplied with the unit and can be used when required.

Slide the ON/OFF switch to the ON position and wait for a beep. Plug the detector's SA & SB terminals onto the tool's SA & SB terminals or when required, use the connection cable.[54]

How to read: Press "READ", wait for a beep and read the address and mode.

How to write: Press "WRITE" and "READ" simultaneously to select the mode **and/or** write the address. Press "WRITE" and wait for a beep. ("READ" again as a check.)

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 (Advanced55, NORMAL and 2330), 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 replaces 3314 but 4414 is only required when the 4400 and 4401 detectors are configured for the 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[54].

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" simultaneously then press 0, 1, 2 or 3 for the mode respectively. Type the address (1-255) and press "Write". Wait for OK, address and mode info and a

[53] This detector holds the ATEX classification: **Ex II 3GD EEx nA II T5 (T 100°C), -40°C ≤ T_a ≤ 50°C**.
[54] Some units have flying leads for easier connection. After use they might be disconnected and thrown away.

[55] 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).

beep. (Press "Read" again to double check), Instructions are on the rear of the tool.

3309 Label holder. To be mounted on the analogue base 3312 / 4313 / 3379[56]. 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, excludes labels.

3391 Labels for 3390. Packet with self-adhesive white labels for label holder 3390. 10 x A4-sheets, 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[57]. COM loop powered unit.

The unit has two **programmable** inputs:

Monitored input

….used as Zone Line Input (Z) (terminals 6 & 7): End-Of-Line capacitor 10uF [58] mounted in the last unit on the zone line. A short circuit on the input can generate a fault or a fire alarm (set via EBLWin). This input is intended for conventional detectors.[59] Max. 1.5 mA, cable characteristic is max. 50 and max. 50nf.

….used as general input (In0) (terminals 5 & 7): An input for NC or NO contacts (set via BLWin).

Isolated input (In1) (terminals 8 & 9): An optocoupler input (external 24 V_{DC} / 8 mA is required). Normally low or high (set via EBLWin).

The unit has two **programmable** relay[60] 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 F733 and F735. The unit's dimensions: 90L x 70W x 32H mm. A plastic protection cover is attached. The cover's dimensions: 129L x 73W x 45H 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). 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 FT128.

[56] Also in the enclosed analogue heat detector 3309.

[57] The same physical unit (3361) is also used in AS1668 Fan control applications and has a separate dialog box in EBLWin.

[58] 470nF is revised to 10uF.

[59] It is via EBLWin possible to define this input function to be a manual call point ("Used as MCP"), i.e. it cann**ot** be disabled via a time channel, cannot included in two-unit dependence or cannot use the “AVF” function.

[60] Relay contacts: maximum 2 A @ 30 V_{DC} / 125 V_{AC}.

3364 Addressable 2 voltage outputs unit. The unit is connected directly to the COM loop. External 24 V_{DC} supply is required (via a 3366AU unit or FT128).

The unit has two programmable and supervised voltage outputs (VO0-VO1), intended for alarm devices (e.g. sirens, strobes, etc). An End-Of-Line capacitor (470nF) is to be mounted in the last device alternativly a capacitor (470nF) in up to five alarm devices (T-off).

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 99 and besides that function, the output VO2 will also not be powered for approx. 30 sec. after:

- the "/Mains OK input" (terminal 8) goes high, see below.
- the COM loop communication is interrupted i.e. 3364 has no connection / communication with FT128.

The unit has two inputs, i.e. one for 24 V_{DC} supply and one for "/Mains OK".

- **Vo0**: Normally low or high (set via EBLWin), 24 V_{DC}, 1 A.[61]
- **Vo1**: Normally low or high (set via EBLWin), 24 V_{DC}, 1 A.[61]
- **Vo2**: Normally high, 24 V_{DC}, 1 A.[61] (Fire door closing function.)
- **24 V_{DC}**: From an external power supply (unit 3366AU or FT128)
- **Mains OK**: From an external power supply unit (3366AU). Normally low = the main power source (230 V_{AC}) in the External power supply unit is okay[62].

For connections and examples, see drawings F733 & F737. The unit's dimensions: 90L x 70W x 32H mm. A plastic protection cover is attached. The cover's dimensions: 129L x 73W x 45H 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).

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

The Address setting tool 3314 / 4414 is also used for mode setting:

NORMAL mode: Used for 3364 in FT128.

6.1.3 Alarm Devices (Addressable Sounders)

4477 Addressable siren. Replaces 3377, the new 4477 is similar to 3377 unit but it has a built-in Short Circuit Isolator, refer to section 6.1.5 Built-in Isolators page 63. The isolator does **not** use any COM loop address.

The power to the siren is supplied via the COM loop, i.e. the number of sirens is dependent on the type and number of other units connected to the COM loop.[63]

Three sound types (tones) and three priority levels are available.

- **Steady** (continuous) 990 Hz
- **Intermittent** (pulsed) 990 Hz, 0.5s / 0.5s (1 Hz)
- **Alternating** (two-tone) 990 / 650 Hz, 0.25s / 0.25s (2 Hz)

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

[62] When the 24Vdc power to 3364 is supplied from FT128, this terminal must be connected to negative. To simulate “Mains Ok” for 3364.

[63] The number of 4477 + 3379 units must be ≤ 50.

For each level, an output control expression and a sound type is programmed (via EBLWin). For more technical data, see the product datasheet.

The COM loop address is set with the Address setting tool 3314 / 4414 which 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.

Note: See also Table 2 "Control Panel Limitation", page 16.

3379 Addressable sounder base. 3379 consists of an analogue base 3312 mounted together with a sounder. 3379 is mounted in the ceiling. An Analogue detector can be plugged in the base, which has screw terminals for the COM loop and a Remote Indicator (RIL). Prepared for mechanical lock of the detector - if required. Recess for label holder (3391). 3379 is COM loop powered i.e. the number of sounder bases is dependent on the type and number of other units connected to the COM loop [63].

Three sound types (tones)[64] and three priority levels are available.

- Steady (continuous) 3650 Hz
- Intermittent (pulsed) 3650 Hz, 0.5s / 0.5s (1 Hz)
- Intermittent (pulsed) 3650 Hz, 0.167s / 0.167s (3 Hz)

For each level, an output control expression and a sound type is programmed (via EBLWin). High sound output (approx. 4.5 dB higher) can be selected via EBLWin (more current will be required). For more technical data, see the Product datasheet.

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: 3379 used in FT128.

Note: See also Table 2 "Control Panel Limitation", page 16.

4380 Addressable beacon [65]. 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 is an option which gives the beacon a higher IP protection (IP33C). 4380 is powered via the COM loop, i.e. the number of beacons is dependent on the type and number of other units connected to the COM loop but 10 maximum.

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 technical address is set with the Address setting tool 3314 / 4414. The unit has an address label on which the COM loop address can be written.

The Address setting tool is also used for mode setting:

NORMAL mode: 4380 used in system FT128.

[64] High tone can be selected via EBLWin V2.1.x and higher, more current will be required.

[65] The addressable beacon is discontinued and will be replaced by new VAD's

4383 Light indicator. 4383 is a light indicator used to complement the 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 is 1 Hz. 4383 is COM loop powered, i.e. the number of indicators is dependent on the type and number of other units connected to the COM loop. The light indicator is plugged in an analogue detector base 3312, 3379 or 4313 and an analogue detector is plugged in the light indicator.
A control expression for activation has to be programmed, similar to a programmable output or alarm device. It takes one COM loop address. For more technical data, see the Product Datasheet.
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: 4383 used in system FT128.

6.1.4 Short Circuit Isolators (Addressable)

According to the Australian standard **AS1670.1, at least one Short Circuit Isolator must be used every 40 alarm points on the COM loop**. Up to 64 isolators can be connected to FT128 COM loop.

Each COM loop Short Circuit Isolator is to be programmed (via EBLWin) for the following:

- Technical address[66]
- Name (Normally not changed)
- Sequence Number (Serial Number in the COM loop's A-direction) 0-63

For connections, see drawing F733.

4313 Analogue base with isolator. 4313 is an Analogue base with built-in Short Circuit Isolator. In case of short circuit on the COM loop, the number of disabled units will be minimised. 4313 is a COM loop powered unit. For more information, see the Product Datasheet. 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 FT128.

Up to 64 Short Circuit Isolators can be used, which give 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: FT128 has one built-in isolator in the-A direction (no. "A") and one in the B-direction (no. "B").

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

See Refer to Chapter 11 "Short Circuit Isolators" page 92 for more information. See also FT128 Operation Manual, Section "Fault messages".

[66] The units 4433, 4439 and 4477 have a built-in isolator that doesn'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.

6.1.5 Built-in Isolators

The units 4433, 4439 and 4477 have a built-in isolators that do not require any separate COM loop addresses, only the Sequence Number, 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, Intrinsically Safe (IS) and approved products are required. The IS alarm points are connected to an interface outside the hazardous area.

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

Conventional units are connected via a Galvanic isolator MTL 5061 (2820) to an Expansion board 4580 Ex Zone Line Input See drawings F735 and F736.

6.1.6.1 Galvanic isolators / IS barrier units

MTL5061 Galvanic Isolator (2820). The isolator is used to connect conventional intrinsically safe detectors and manual call points to an expansion board 4580 Zone Line Input (programmed in "Resistor-Ex" mode). 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: 175L x 125W x 150H mm. BASEEFA / ATEX classification: EEx ia IIC Tamb=60°C.

2822 Isolated Zone Interface. The Isolated Zone Interface (2822) contains 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 EOL 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.) External 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 analogue 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.

6.1.6.2 Intrinsically Safe Mounting Bases

YBN-R / 4 IS Intrinsically Safe mounting base (2812). In the base, an intrinsically safe conventional smoke or heat detector can be plugged. The base has terminals for the zone line (in/out) and for an RIL.

6.1.6.3 Intrinsically Safe Photoelectric Smoke Detectors

SLR-E-IS Intrinsically Safe photoelectric smoke detector (2810).

A conventional intrinsically safe photoelectric (optical) smoke detector, to 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, Tamb= 50°C. Max 20 per zone.

2840 Analogue IS smoke detector. An analogue / addressable photo- electric smoke detector. The detector can be used with higher IP rating back- box. Three cable glands are supplied with the back-box. The detector has one built-in LED to indicate that the detector has generated a fire alarm. The detector is programmed in EBLWin as an analogue photoelectric smoke detector 4401 (in NORMAL mode) but it has to be connected to the COM loop via an IS barrier unit 2842. ATEX class: Ex ia IIC T5.

6.1.6.4 Intrinsically Safe Heat Detectors

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

2841 Analogue IS heat detector. An analogue / addressable heat detector. The detector can be used with a back-box 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 programmed in EBLWin as an analogue heat detector 3308 (in NORMAL mode) but it has to be connected to a COM loop via an IS barrier unit 2842. ATEX class: Ex ia IIC T5.

6.1.7 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 470Ω). The call point is connected to Galvanic isolator 2820. The call point is 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, Ta = -30 to +70°C. Max 20 per zone.

6.1.8 Other COM Loop Units

3366AU External power supply. Conforms to AS7240.4. The unit is connected to a COM loop, i.e. it is monitored from FT128 e.g. loss of the main power source will generate a fault in FT128. It can be used as a power supply for external equipment requiring 24 V_{DC} with battery backup, e.g. the 3364 unit. It also has a "/Mains OK" output (normally low), intended to be connected to the corresponding input on the 3364 unit.

An oyster metal housing 320W x 330H x 125D mm is used for 3366AU. There is **space** for two sealed Lead-Acid backup batteries, 2 x 12V, 7Ah or 12Ah as the standby power source. Batteries with higher capacity (up to 60 Ah) have to be placed outside the housing. There are cable inlets on the top, and back sides of the housing.

The unit has one **24** V_{DC}[67] **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

[67] The rated output voltage for the main power supply is 24 V ± 1%. Max. ripple 500 mVp-p. The rated output voltage for the standby power source (the backup battery) is 18 – 28 V_{DC}. **NOTE!** The voltage will, however, be decreased to approx. 15 V while the output will be switched off in order to avoid damaging the batteries.

battery charging is in progress.[68] In case of no battery charging e.g fire alarm, the continuous current consumption can be up to **4 A**.

It has a number of Battery Protection Functions, e.g. monitoring high current output, low battery voltage etc. For more information, see the Technical Description and the Product Datasheet.

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

The Address setting tool is also used for mode setting:

NORMAL mode: Used for 3366 in FT128.

AAM

Brooks Alarm Acknowledgement Module[69]. The **AAM** is a box with an alarm indication LED and a non-latching switch "Press to acknowledge & investigate alarm".

One AAM per Alarm Acknowledgement Facility Control (AAFC) zone and up to 100 AAFC's zones can be used. The COM loop address is set with the Address setting tool 3314/4414. See also chapter "Alert Annunciation Applications" on page 112.

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

NORMAL mode: Used for AAFC in system FT128 version < V2.2.x

2330 mode: Used for AAFC in system FT128 version ≥ 2.2.x

Note: The new local alarm acknowledgement unit (LAAU) 4445 is developed by Panasonic, it is equivalent to Brooks Alarm Acknowledgement Module (AAM).

4445

Local Alarm Acknowledgement Unit (LAAU). The **LAAU** consists of a PCB with an alarm indication LED and green non-latching switch for acknowledgement of an alarm. The PCB is mounted on the rear of a white ABS lid. It can be wall mounted in a 65mm circular mounting box. One LAAU per LAA zone and up to 100 LAA zones per control panel can be used. The COM loop address is set with the address setting tool 3314/4414. See also chapter "Alarm Acknowledgement Facility (AAF)" page 112.

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

NORMAL mode: Used for 4445 in system FT128 version ≥ V2.2.x

2330 mode: Used to program Brooks AAM.

Note: The programming in EBLWin and the operation of the Panasonic 4445 are typically the same as for Brooks AAM but using different terminology i.e.

LAAU = AAM

LAA zone = **AAFC** zone

The mode setting is also different in software version ≥ V2.2.x

[68] A current consumption of **0.85-2.2 A** allows only the **"low current charging mode"**, i.e. the battery capacity can be **up to 27 Ah**. A current consumption **≤ 0.85 A** allows the **"high current charging mode"**, i.e. the battery capacity can be **up to 60 Ah**. However, batteries larger than 12AH require different enclosure to suit.

[69] The AAFC function in EBLWin V2.2.0 has been moved from "Add loop unit" menu tree to the "Obsolete loop unit" submenu.

6.2 Units Connected To Optional RS485 Interface

A combination of up to eight External Presentation Units (1728) or Alert Annunciation Units (1736) can be connected to the RS485 interface [70] terminals on the termination board or directly via (J1:15-16) in FT128. (Power supply at J1:13-14).

Note: RS485 interface module 4552 (chip) must be installed in the main board. Display Unit software version => 1.4.1 is also required.

Address and S/W mode settings

The display and the push buttons (in the unit) are used to set the address, which also can be changed via FT128. The S/W mode must be set to **xxxx – 1587** (**xxxx** = type number). Refer to the Technical Manual of 1728 and 1736.

The first unit is to have the address 00, the second unit address 01 and so on[71]. Follow the Address setting instructions in the Technical Manual for each unit.

"Selective alarm presentation" can be programmed via EBLWin, i.e. you can select which alarms to be presented in each unit, see the Technical Manual for the unit respectively.

6.2.1 Alert Annunciation Units

When the **A**lert **A**nnunciation (**AA**) function is to be used in system FT128, 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 Section "Alert Annunciation", page 137.

1736

Alert Annunciation Unit (AAU). A compact size enclosure 145H x 220W x 50D mm made of grey high impact ABS. Fitted with a supplementary "O" ring gasket, it complies 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 should be wall mounted. Two compression glands are included.

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 FT128. Furthermore, at least 617 texts can be stored for selected fire alarms in the unit and will in such a case be shown, instead of the texts sent out from FT128 for these alarms. These text messages will be downloaded to the unit via FT128. A built-in buzzer will sound to indicate a non-acknowledged **AA** alarm.

New software versions can be downloaded directly in the unit. The unit is power supplied from FT128 or can be externalyl powered.

The unit has the following indications:

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 FT128 due to:

- the activated fire alarm is not an **AA** alarm
- the **AA** function has been terminated, 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:

[70] The RS485 transceiver 4552 is an option.

[71] The connection order on the line is not dependent on the unit address.

Alarms queued, used to scroll amongst the alarms.

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

Silence alarm devices, used to silence OWS or sounders.

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

The unit must run in **S/W mode 1736 – 1587**, which has the highest performance in regards to functionality, response time, ability to store alarms, etc.

Up to 1200 m cable can be used for RS485, the 24V supply cable length is mainly dependent on the cable size. Refer to Table 16 page 167. For more information, see 1736 Technical Manual.

6.2.2 External Presentation Units

1728

External Presentation unit (EPU). Same enclosure as 1736 except that there are 2 more buttons on the 1736 not exist in 1728, the Silence Alarm Devices and Reset buttons also the Acknowledge button is renamed in 1728 to Silence Buzzer. The push buttons are disabled until an alarm event is received. The unit is to be wall mounted. Two compression glands are included.

This unit is intended for pre-warning, co-incidence[72], 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 same as 1736 (alpha-numeric LCD, 2x40 characters), with back-light. An alarm text will be presented with each alarm, if programmed in FT128. Furthermore, at least 617 texts can be stored in the unit for selected fire alarms and will in such a case be shown, instead of the texts sent out from FT128 for these alarms. These text messages will be downloaded to the unit via FT128.

Any fault in the system will be presented as "General fault in system", a built-in buzzer will sound similar to FT128 buzzer and can be silenced. Any disablement in the system will be presented as "General disablement in system".

The buzzer can be silenced but the alarm devices in the system e.g. OWS, sounders, etc. cannot be silenced via this unit. New software versions[73] can be downloaded directly in the unit. The unit is power supplied from FT128 or an external power supply. The unit must run in **S/W mode 1728 – 1587**, which has the highest performance in regards to functionality, response time, ability to store fire alarms, etc.

The number of units that can be power supplied via FT128 (or an External Power Supply) is dependent on all other units connected to the same CIE / external power supply.

Up to 1200 m cable can be used for RS485. The 24VDC supply cable length is mainly dependent on the cable size. Refer to Table 16 page 167. For more information, see External Presentation Unit 1728 Technical description.

[72] Two zone / address dependence.

[73] Display units software => V1.4 must be used with FT128.

6.3 Units Connected To RS232 Interface J5 (On 4556)

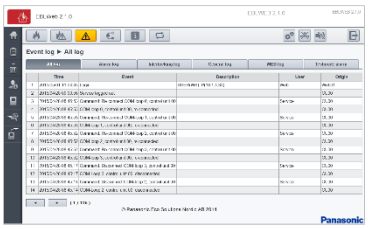
6.3.1 Web-servers

1598 Web-server II. This unit can be used in the following applications:

a) for presentation of the actual CIE status in a PC using a web browser such as 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[74] and three different access levels.

c) as a gateway to other PC systems etc.:



c1) EBL Talk (RS232 or TCP/IP) is an open protocol, used to transmit and present fire alarm information in a separate PC / system.

c2) Tateco, (RS232) used to transmit and present fire alarm information in an Ascom Tateco paging system.

c3) SIA, (RS232) used to transmit and present fire alarm information in a separate PC application.

c4) MODBUS (RS232) used to transmit and present fire alarm information in a separate PC application.

d) As a gateway to a security management system via EBLnet. (TCP/IP) EBLnet licence required.

The Web-Server has to be preconfigured with proper TCP/IP protocols using @CHIPTOOL before setting up the Web-Server SSD configuration in the PC program EBLWin. The Web-Server SSD configuration is downloaded to the Web-Server via TCP/IP using an Ethernet cable. The Web-Server software is also downloaded via the PC program EBLWin.

The Web-server II consists of a light grey plastic enclosure (90x25x69.5 mm), which can be mounted on a 35 mm DIN rail inside the FT128 CIE.

Web-server II has the following interfaces:

RS232 (PLC COM) to connect the web-server to J5 in the FT128 CIE.

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}, maximum 65 mA), e.g. to J4 in the FT128 CIE.

Details for setting up the Web-Server is found in MA440 Web Server II Manual Rev 1.0 for FT1020G3 and FT128.

6.4 Units Connected To RS232 Interface J3 (On 4556)

J3 is a 9 ways female "D" connector. This interface is used only for connection of the FT128 to a PC with the PC program EBLWin, which is used for download / backup of Site Specific Data (SSD), etc.

[74] Consists of 6 digits.

6.5 Other Units

6.5.1 External LEDs

BARIL Remote Indicator RIL. Used when a detector is placed out of view or hidden e.g. roof space detectors. The LED is lit at the same time as the LED in the detector / base that is connected to. It has a "Burning house" symbol instead of a text. BARIL can be connected to all types of Panasonic detectors / bases. To be wall mounted (87 x 87 x 30 mm).

The input is polarised, connections as follow:

J2:1 (+5 to +35 VDC) for Conventional detectors / bases

J2:2 (< 25 mA) for Analogue detectors / bases

J2:3 (0 V)

To be wall mounted (87 x 87 x 30 mm)

6.5.2 Alarm Devices (Sounders, Etc.)

Regarding addressable alarm devices, see page 60.

The alarm devices used in FT128 can be one or two of the following equipment:

1. Occupant Warning System (OWS) with different power output built in FT128 and provides a supervised 100V speaker circuits and 24V dual strobe output.
2. 24VDC strobes or alarm bells connected to S0 – S1.
3. Full EWIS system interfaced to FT128.

Connections of alarm devices according to drawing F665 and F737.

6.5.3 Magnetic Door Holders

Different magnetic door holders to suit the applications are required. A separate 24V non-battery backed power supply is recommended. Door holders must be provided with a "suppression diode" (e.g. 1N4004) in parallel with the coil, similar to the alarm devices, see drawing F665. Typical example is shown in Figure 25 below.

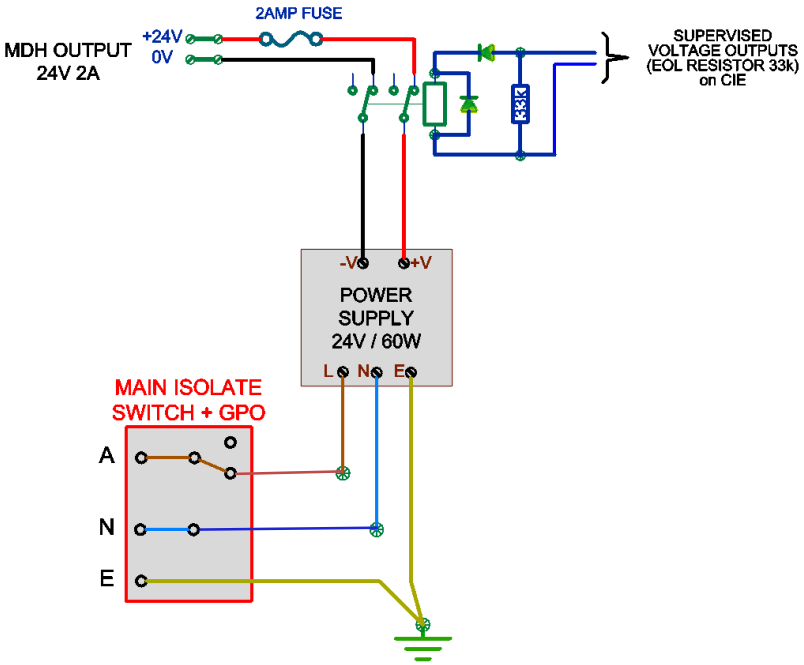


Figure 25 Connection example of 2A MDH power supply

6.5.4 Duct Detector Chambers

6377 Duct Detector Chamber UG-4. The housing is made of grey ABS and the venturi pipe is made of aluminium. It is supplied with four IP65 glands for cable entry. 6377 can be used in conventional as well as Analogue fire alarm systems, depending on the base and detector mounted inside the housing (base 2324 + 4452 or base 3312 + 4401). The venturi pipe is available with or without a built-in fan and in three lengths (0.6, 1.5 & 2.8 m). The pipe can easily be shortened to suit the ventilation duct. Mounting bracket and filters are also available. For more information see Duct Detector Chamber Datasheet.

7 Programmable Inputs

FT128 has one programmable input (I0). In FT128, the Inputs and Outputs expansion board 4583 can also be mounted, five programmable inputs (Input 0-4) are available which can be configured to be supervised or non-supervised. See chapter “Expansion Boards ” pages 22.

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

Each input is programmed via EBLWin as per the dialog boxes shown in Figure 26 below.

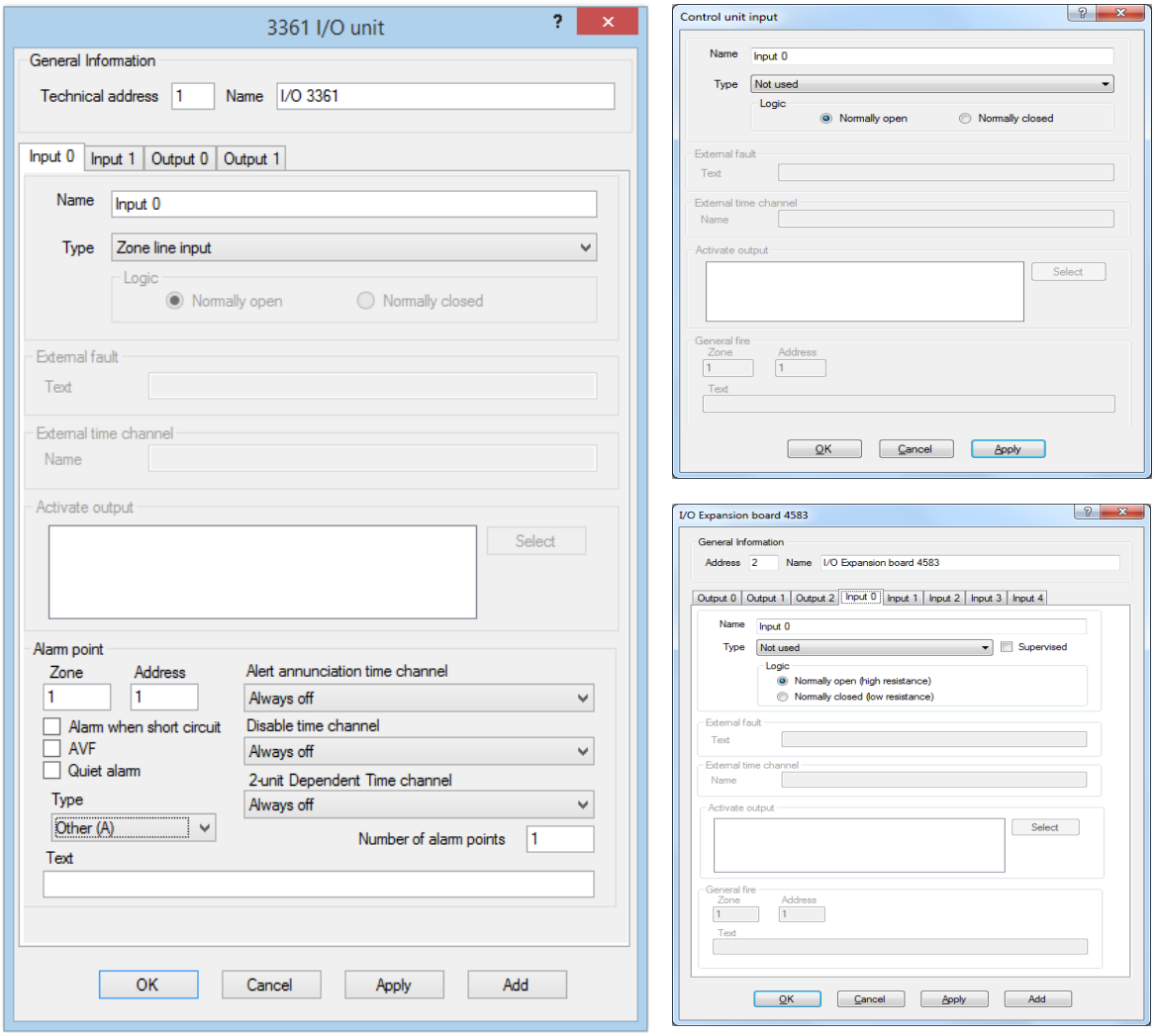


Figure 26 EBLWin “Input” dialog Boxes

Different trigger conditions might require additional information i.e. only the enabled fields can / should be filled in.

7.1 Control Unit Input I0

Connections, see drawing F665.

7.1.1 Not supervised

Normally open (R > 20KΩ) **or** Normally Closed (R < 500Ω)

Activation time: >1 sec.

7.1.2 Supervised

Each supervised input can be in one of the four different states shown in Table 11 below

Depending on the selected logic, Normally Open (high resistance) **or** Normally Closed (low resistance), the four conditions in the table are valid.

Table 11 Control Unit Inputs I0 & 4583 Inputs 0-4

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 > 2KΩ (nom. 3K3Ω)	Not activated	Activated
2K ≥ R > 70 (nom. 680)	Activated	Not activated
R ≤ 70	Short-circuit	Short-circuit

Input line fault

If open circuit (cut-off) or short-circuit is detected on a supervised input, a fault will be generated in FT128 and the following fault message will be displayed:

FAULT: Programmable input

7.2 Input 0-4 in Expansion Board 4583

Connections, see drawing F731.

7.2.1 Not supervised

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

Activation time: > 10 sec.

7.2.1 Supervised

Each supervised input can be in one of the four different states shown in Table 11 above

Depending on the selected logic, Normally Open (high resistance) **or** Normally closed (low resistance), the four conditions in Table 11 are valid.

Input line fault

If open circuit (cut-off) or short-circuit is detected on a supervised input, a fault will be generated in FT128 and the following fault message will be displayed:

FAULT: Programmable input x exp. board x

7.3 3361 Unit Inputs In0 / Z & In1

Connections, see drawing F735.

7.3.1 Input In0

Input 0 can be used as a general input (In0) – same as the CIE inputs **I0** or used as a Zone Line Input (Z) requiring an End-Of-Line capacitor (470 nF).

7.3.2 Input In1

Input 1 is an isolated optocoupler input requiring a NO / NC contact and external 24VDC (8 mA).

8 Input Programming

Input programming is performed in EBLWin. Each input must have an individual Trigger condition "Type" and Logic. It is not allowed to let two or more inputs have the same trigger condition for some inputs.

8.1 Type (Trigger Conditions)

The following trigger conditions are available:

1. **Activated 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** (maximum 100)
22. **Interlocking** (maximum 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 100 per C.U.)
29. **Zone Line Input**[75]

[75] Only valid for the Addressable multipurpose I/O unit 3361 input "In0", used as Zone Line Input (Z).

8.2 Comments on Trigger Conditions:

1. This trigger condition should be used in conjunction with a programmable **COM loop unit output** in order to test / activate the output via this input. The output is active as long as the input is active. This is valid even if the output is disabled.
2. "Activated Fault routing equipment" signal (feed-back) to FT128 will lit the LED "Fault TX activated" on the front membrane. Output with trigger condition "Indication Fault TX Activated" will be activated.
3. Activated Ventilation equipment feedback to the FT128 control unit to lit the LED "Ventilation".
4. Output with trigger condition "Activated Key cabinet" will be activated.
5. "Activated Fire brigade TX" signal (feed-back) to FT128 will light up the LED "Fire brigade TX" on the front membrane. (Normally the LED will be lit when a corresponding output is activated[76]). Output with trigger condition "Indication Fire Brigade TX Activated" will be activated.
6. Key cabinet, (for fire brigade) will activate a Key cabinet alarm. This feature is not used in Australia or NZ due to different fire brigade requirements.
7. Alert annunciation, see chapter “Alert Annunciation” page 111 and FT128 Operation Manual for more info.
8. Same as 7.
9. "Fire door closing" outputs will be activated for 20 seconds by this trigger condition.
10. Normally used for the New Zealand fire brigade Bulgin key switch "Evacuate". When the switch is set to the evacuate position, the OWS or sounders will be active until the switch restores to the normal position.
11. External fault will activate a fault in FT128. A user definable fault message ("Error 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 FT128 (Zone), e.g. a sprinkler zone alarm. This trigger condition is normally used for a 3361 unit monitored Input 0 used as a Zone Line Input (End-Of-Line capacitor) and as the type "Extinguishing".
14. Used to start a new "countdown", see 15 below.

    Push button: N/O 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 13 above.

    Push button info: N/O, latching action. One or more push buttons can be used. Manual reset of push button(s).
16. Activated input will generate a fault in FT128. Output with trigger condition "Extinguishing system fault" will be activated.

    The following fault message will be shown:

    FAULT: Extinguishing system fault

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

17. Activated input will light up the LED "Extinguishing" on the front membrane. (Normally the LED will be lit when a corresponding output is activated.) Output with trigger condition "Extinguishing system released" will be activated.
18. External fuses (for the external power supply equipment) fault output will generate a fault in FT128. The following fault message will be shown:

    FAULT: External fuses

19. External power supply equipment fault output will generate a fault in FT128. The following fault message will be shown:

    FAULT: External power supply

20. Activated input will generate a fault in FT128. 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 FT128. 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 94.
23. Fault output "Loss of the battery charger to external power supply equipment" will generate a fault in FT128. It will have the same time delay, as set for the "Loss of main power source" fault for FT128. 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 generate a fault in FT128. It will have the same time delay, as set for the Loss of main power source fault for FT128. The following fault message will be shown:

    FAULT: Mains, ext. power supply

25. Default, no programmable input is selected.
26. Used for the "outside switch" (i.e. the New Zealand FB Silence switch).

    Turned on: Alarm devices and the CIE buzzer will be disabled. The following fault message will be shown:

    FAULT: FB Silence switch

    From Turned on to Turned off: All fire alarms will be isolated, all zones in alarm will be disabled, alarm devices and the CIE buzzer will be re-enabled and the fault will be serviced.

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 symbol 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. Use End-Of-Line capacitor with value 470nF.

8.3 Logic

The logic has to be set (in the EBLWin dialog box "Input Properties").

8.3.1 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).

8.3.2 Supervised

Valid for the CIE 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, 3K3Ω) **or** Normally Closed (low resistance, 680R), the function will be according to Trigger Conditions listed in Table 11 page 72.

9 Programmable Outputs

FT128 has two programmable voltage outputs (S0-S1) and one programmable relay output (R0). One or two 8 relay outputs expansion boards 4581 can be mounted in FT128. Input and Output expansion board 4583 with three programmable outputs (Output 0-2) can also be mounted in FT128. See “Expansion Boards ” page 22.

On the COM loop, an 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 can be connected.

Addressable siren 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 and light respectively.

Notes:	Units type 3379 + 4477 (or old type 3377) = maximum 50. Units type 4380 = maximum 10

Each output is programmed (via EBLWin), when applicable for the following:

- Name (Normally not changed)
- Type
- Signal period (continuous, pulse, delay, etc.)
- Logic (NO / normally low or NC / normally high)
- Supervised / Non-Supervised (The voltage outputs in FT128 and in the 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 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.

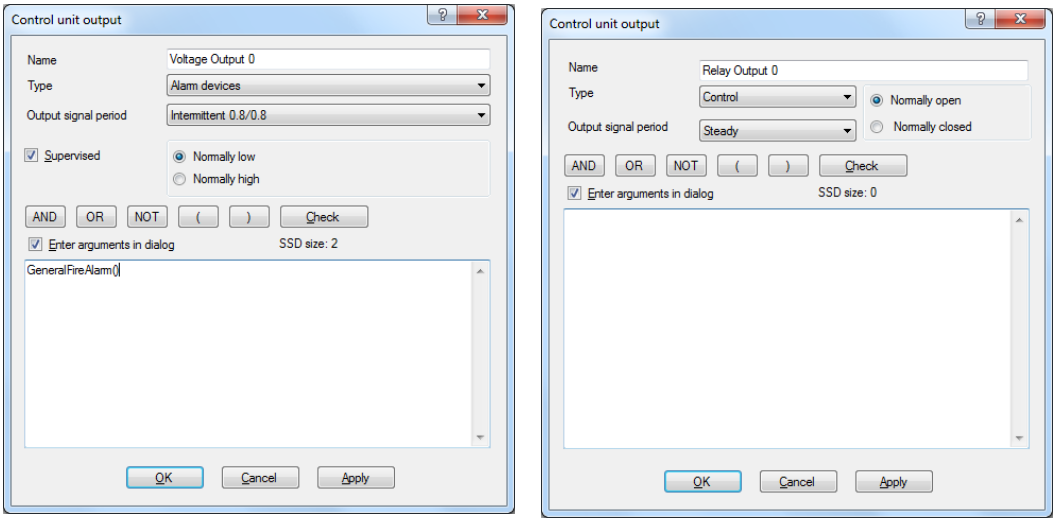


Figure 27 EBLWin "Voltage" & "Relay” Output Dialog Boxes Respectively

Each 4477 and 3379 unit is programmed via EBLWin for the following:

- 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.

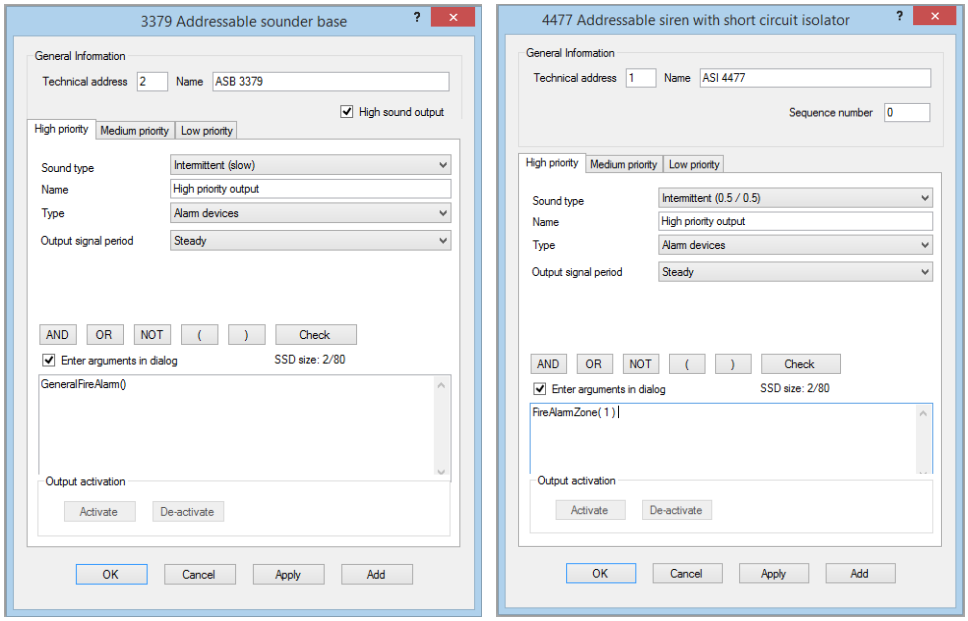


Figure 28 EBLWin 3379 and 4477 Dialog Box

Output test

When a PC is connected to FT128, EBLWin open and you are logged on, each output can be tested for activation / de-activation.

9.1 Control Unit Outputs S0 – S1

FT128 has two programmable, supervised (monitored)[77] voltage outputs:

S0 Supervised voltage output, $24V_{DC}$[78], maximum 500 mA (Fuse F8).

S1[79] Supervised voltage output, $24V_{DC}$[78], maximum 200 mA (Fuse F6).

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

For connections and more information, see drawing F665.

[77] Supervised as default but via EBLWin it is possible to set each output individually as non-supervised. A normally high output cannot be supervised.

Supervised outputs have to be calibrated via menu H5/**A1**, see the FT128 Operation Manual. 1-5 supervision resistors 33K can be used. The 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 FT128.

[78] See Table 1 page 15 regarding system voltage.

[79] S1 is also used to drive an ancillary relay on the FT128 termination board, refer to “FT128 External Termination”, page 29

9.2 Control Unit Output R0

FT128 has one programmable relay output:

R0 Relay output, N/O or N/C contacts[80] programmable.

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

For connections and more information, see drawing F665.

9.3 8 Relay Outputs Expansion Board 4581 Output 0 – Output 7

Each 4581 board has eight programmable relay outputs:

Output 0 Relay output, N/O or N/C contacts programmable

Output 1 Relay output, N/O or N/C contacts programmable

Output 2 Relay output, N/O or N/C contacts programmable

Output 3 Relay output, N/O or N/C contacts programmable

Output 4 Relay output, N/O or N/C contacts programmable

Output 5 Relay output, N/O or N/C contacts programmable

Output 6 Relay output, N/O or N/C contacts programmable

Output 7 Relay output, N/O or N/C contacts programmable

Relay contact ratings: Max. 2A @ 30 V_{DC}.

For connections and more information, see dwg. F665.

9.4 Inputs and Outputs expansion board 4583 Output 0–1

Expansion board 4583 has two programmable, supervised [77] voltage outputs:

Output 0 Supervised voltage output, 24V_{DC}[78], maximum 200 mA (Fuse F1).

Output 1 Supervised voltage output, 24V_{DC}[78], maximum 200 mA (Fuse F2).

For connections and more information, see drawing F731.

See also chapter “Inputs and Outputs Expansion Board 4583”, page 26.

9.5 3361 Unit Outputs Re0 – Re1

Each 3361 unit has two programmable relay outputs:

Re0 Relay output, N/O or N/C contacts programmable

Re1 Relay output, N/O or N/C contacts programmable

Relay contacts: maximum 2 A @ 30 V_{DC} / 125 V_{AC}

Connections and more information, see drawings F735.

9.6 3364 Unit Outputs VO0, VO1 & VO2

Each 3364 unit has two programmable, supervised voltage outputs[77]:

VO0 Supervised voltage output, 24V_{DC}, maximum 1A[81]

VO1 Supervised voltage output, 24V_{DC}, maximum 1A[81]

VO2 voltage output, 24V_{DC}, max. 1A[81], intended for fire door closing. Normally high.

[80] Relay contacts: maximum 1 A @ 30 V_{DC}.

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

VO0-VO1 are set to outputs for "alarm device" by default.

24 V_{DC} required from an external power supply unit (e.g. 3366AU).

Connections and more information see drawing F737.

9.7 The 4477 Unit Output (Siren)

Each unit has one programmable output:

Output **Siren**, with two priority levels and three sound types.

Connections and more information, see drawing F665 & F729.

9.8 The 3379 Unit Output (Sounder)

Each 3379 unit has one programmable output:

Output Sounder, with three priority levels and three sound types.

Also "High sound output" can be selected (4.5 dB).

Connections and more information, see drawing F665 & F729.

9.9 The 4380 unit output (beacon)[82]

Each 4380 (under Obsolete Loop Units) unit has one programmable output:

Output **Beacon**

Connection is similar to other COM loop units as shown in drawing F729.

9.10 The 4383 unit output (Light indicator)[83]

Each 4383 unit has one programmable output:

Output **Light indicator**

Connections and more information, see drawing F729.

[82] The unit is discontinued and will be replaced with a new strobe approved to EN54.23.

[83] 4383 is discontinued, it is not complying with the new standard EN54.23 however the unit still can be used in the AU or NZ markets until a compliant unit is released.

10 Output Programming

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

10.1 Type of output

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

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

10.1.1 Comments to the types

1. Default. General (normal) control output[84]
2. Used to activate fire ventilation equipment[85]
3. Used to activate extinguishing equipment[86]
4. Used for OWS or sounders, etc.[87]
5. Used for **fire brigade TX** outputs only[88]
6. General (normal control output. No collective disablement and no LED indication.
7. Output used together with a corresponding interlocking input. See chapter "Interlocking Function", page 94. Activated outputs are shown in menu H9/C1.

10.2 Logic

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

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

( ) Normally Closed/high normally closed contact or normally high voltage output ($24V_{DC}$).

10.3 Supervised / Non-supervised

A voltage output is normally supervised (default). By unmarking this checkbox the voltage output will be not supervised.

Note: A normally high output cannot be supervised.

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

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

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

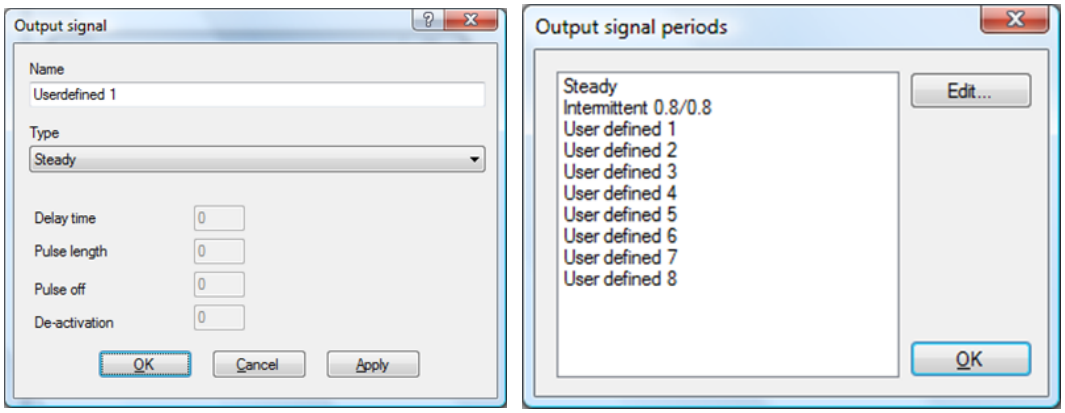
[87] Collectively disabled / re-enabled via menu H2/B9 (all alarm device outputs). Controlled by push button "Silence alarm devices". Fault on / disabled output is indicated by LED "Fault / Disablements Alarm devices" blinking (fault) / continuous (disablement).

[88] 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).

See also chapter "Programmable Voltage Outputs (S0-S1)", page 19.

10.4 Output Signal Period

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



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

10.4.1 Types of output signal periods

The following types are available:

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

10.4.2 Timing of output signal periods

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 Figure 29 below.

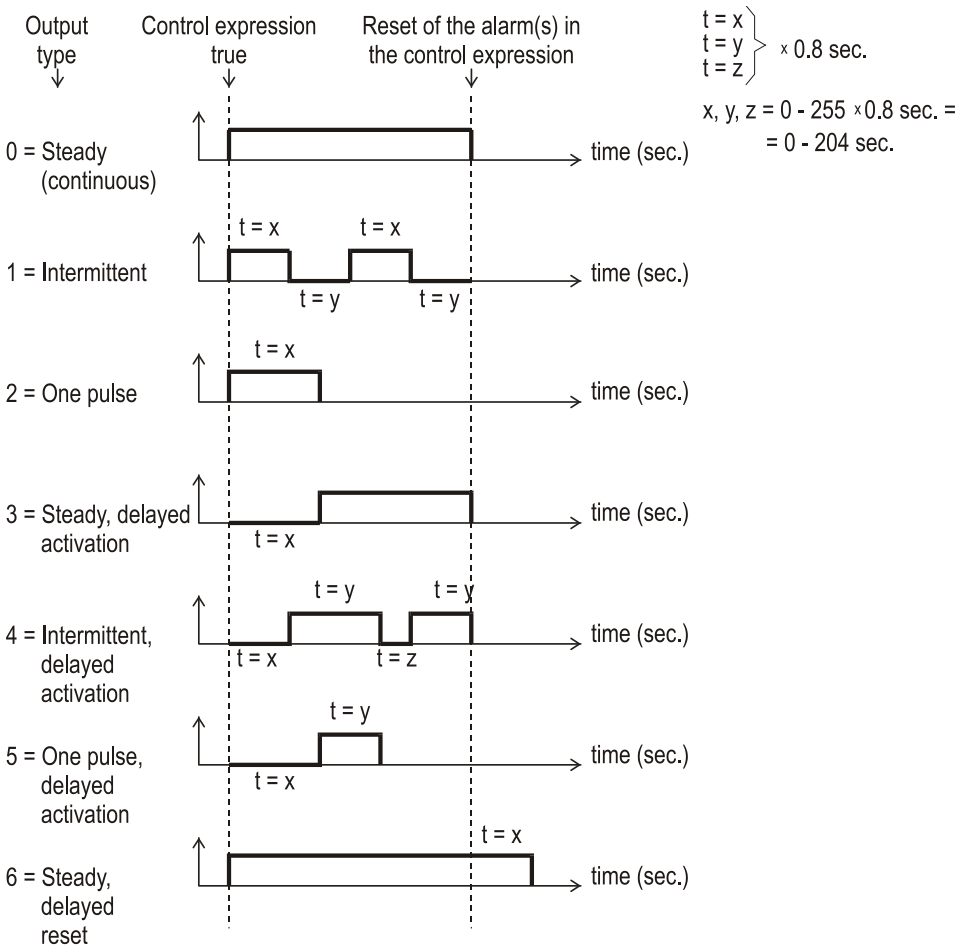


Figure 29 Signal Output Periods

Delay time, Pulse length, Pulse off and/or De-Activation, have to be set for the "Signal period" respectively. For types 2 & 5, the x and y times must be equal and maximum 5.6s. For types 3 & 6 the x time must be maximum 5.6s.

Note: The different types can be used together with the different outputs according to Table 12 below

Table 12 Output signal period for the programmable output

	In FT128				**COM loop units**				
Output / Type	S0-S1	R0	4581 board	4583 board	I/O unit 3361	Unit 3364	Siren, S/B & Beacon & Light indicator 4477, 3379, 4380 & 4383	4582 board	Inter locking
1 Steady (continuous)	X	X	X	X	X	X	X	X	X
2 Intermittent	X	X	XXX	--	--	XX	--	--	--
3 One pulse	X	X	XXX	--	--	--	--	--	--
4 Steady (continuous), delayed activation	X	X	X	X	X	X	X	X	X
5 Intermittent, delayed activation	X	X	XXX	--	--	XX	--	--	--
6 One pulse, delayed activation	X	X	XXX	--	--	--	--	--	--
7 Steady (continuous), delayed de-activation	X	X	X	X	X	X	X	X	--

The types that can be used in the "Output Signal period" for the programmable output respectively are:

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 maximum 5.6s/5.6s and the pulse maximum 5.6s respectively.

10.5 Control Expression

Each programmable output has to be given a control expression [89]. It is created by using Boolean algebra.

If an output is to be used for manual control only e.g. an AS1668 fan control output or an output controlled by input trigger condition “Activate output”, a “never true” control expression must be programmed. In such a case, control expression “TimeChannelActivated” (Always off) can be used.

Trigger conditions (see "Available functions"), logical "Operators" (**AND**, **OR, NOT**) and parentheses are used to build up a "control expression" containing up to 40 trigger conditions. See also chapter "Control Expression Examples”, page 90.

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

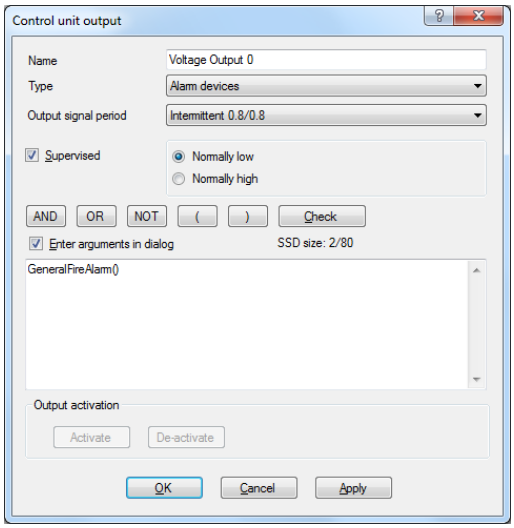


Figure 30 Control expression output dialog box

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 Figure 30, the trigger condition "General Fire Alarm" is selected.

10.5.1 Trigger Conditions

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

The trigger conditions are divided into four groups as follows:

- Alarm
- Interlocking

[89] A programmable output with no control expression will be interpreted by the CIE. as if it does not exist.

- 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.)
26. **First Zone In Alarm Zone Group** (+Zone no. +Zone Group name)
27. **Pre Warning Zone Group** (+Zone Group name +Quantity)
28. **Fire Alarm Zone Group** (+Zone Group name +Quantity)
29. **Heavy Smoke Alarm Zone Group** (+Zone Group name +Quantity)

10.5.1.2 Interlocking

30. **Interlocking Input Area Activated** (+Area no.)
31. **Interlocking Input Area Point Activated** (+Area no. +Point)

32. **General Interlocking Input Activated**
33. **Consecutive Interlocking Input Activated** (sequence) (+start Area no. and point +stop Area no. and point +Quantity)

10.5.1.3 Disablement

34. **Fire Brigade Tx Disabled**
35. **Zone Disabled** (+Zone no.)
36. **Zone Address Disabled** (+Zone no. +Address)
37. **General Zone Address Disabled**
38. **All Control Disabled**
39. **All Alarm Devices Disabled**
40. **Control Disabled Control Unit** (+Control Unit)
41. **Alarm Device Disabled Control Unit** (+Control Unit)
42. **General Disablement**

10.5.1.4 Other

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

10.5.1.5 Comments to the Trigger Conditions (Functions):

Alarm

1. Fire alarm. For more information regarding fire alarm, see FT128 Operation Manual. 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 (1-9): "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.[90] Output is activated when the specified Zone exceeds the pre-warning level. For more information regarding pre-warning, see FT128 Operation Manual.
6. See 5. Output is activated when the specified alarm point exceeds the pre-warning level.
7. See 5. Output is activated when any alarm point or Zone exceeds the pre-warning level.
8. See 5. See also 4 above regarding "Quantity".
9. Heavy smoke / heat alarm. Output is activated when the specified Zone exceeds the heavy smoke / heat level. For more information regarding **heavy smoke / heat alarm**, see FT128 Operation Manual.
10. See 9. Output is activated when the specified alarm point exceeds the heavy smoke / heat level.
11. See 9. Output is activated when any alarm point exceeds 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 FT128 Operation Manual.
14. Output is activated when only one zone (in two-zone dependence) is in fire alarm state. For more information, see FT128 Operation Manual.
15. Output activated when "Multiple detector alarm" is true, i.e. Fire Alarm Type A[91].
16. Output activated when "One detector alarm" is true, i.e. Fire Alarm Type B[91].
17. General Key cabinet alarm activated. For more information, see FT128 Operation Manual.
18. **A**larm **A**cknowledgement **F**acility, requires Alarm Acknowledgement Module **AAM**. "Alarm" is activated in the specified AAF zone. Panasonic new **L**ocal **A**larm **A**cknowledgment (LAA) is typically Brooks AAM.
19. Output activated for any "Quiet alarm" in the specified zone. Normally used in AS1668 fire fan applications or as a non-latching / non-brigade call detector.
20. Output activated for one specified "Quiet alarm" in the specified zone-address. Used in AS1668 fire fan control applications.
21. This control expression is true (i.e. output activated) for 15 seconds after the last alarm is reset.
22. Output of specified Zone-Address is activated for predetermined time (set in EBLWin system properties). Typical application when a smoke detector is

[90] 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).

[91] See Section "Fire Alarm Type A and Fire Alarm Type B", page 115.

programmed to activate 3379. If the smoke is cleared during the delay time, the sounder base will de-activate otherwise, a general alarm in FT128 will be activated.

23. Same as 22 but for specified zone
24. Same as 22 but for any Zone or Zone-Address in the system..)
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.
26. Output is activated only if the first alarm is an alarm in the specified Zone in the specified Zone Group.
27. Pre-warning, Output is activated when any of the alarm points in the specified Zone Group exceeds the pre-warning level. See also 4. Above regarding the quantity. For information refer to the FT128 Operation Manual.
28. Fire alarm, Output is activated when any of the alarm points in the specified Zone Group is in alarm. See also 4. Above regarding the quantity. For information refer to the FT128 Operation Manual.
29. Heavy smoke / heat alarm, Output is activated when any of the alarm points in the specified Zone Group exceeds the heavy smoke / heat alarm level. See also 4. Above regarding the quantity. For information refer to the FT128 Operation Manual.

Interlocking

30. Output activated when one or more interlocking inputs, in the specified interlocking area, are activated.
31. Output activated when the interlocking input, in the specified interlocking area/point, is activated.
32. Output activated when any interlocking input is activated.
33. 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

34. Output activated when any Routing equipment output (Fire brigade TX) is disabled[92].
35. Output activated when the specified zone is disabled[93].
36. Output activated when the specified alarm point (zone- address) is disabled[93].
37. Output activated when any alarm point (zone-address) or zone is disabled [93].
38. 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[93]. This output has to be type Control – neutral.
39. The control expression is true (output activated) when all control outputs of type **Alarm** device are disabled via menu H2/B9[94]. This output must be type Alarm devices.
40. 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[93]. This output has to be type Control – neutral.
41. The control expression is true (output activated) when all control outputs of type **Alarm device** are disabled via menu H2/B9). This output has to be type Alarm devices.

[92] Which is indicated by LED **Fault / Disablements** "Fire brigade TX".

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

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

42. The control expression is true (output activated) when any disablement exists in the system[93].

Other

43. 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 condition "Activated Routing Equipment" is activated[95].
44. 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[96].
45. Output activated when one or more faults are generated in the system[97].
46. Output activated for loss of mains (in the CIE or external power supply 3366AU). **Note**: The output(s) will be activated immediately but the corresponding fault is normally delayed (set via EBLWin).
47. The control expression is true (output activated) for 5 seconds, whenever a reset pulse is sent to the specified Zone-Address.
48. Output activated when the specified time channel is activated.
49. Output activated when Alert annunciation alarm is activated (by any alarm point set to activate this function)[98]. For more information, see FT128 Operation Manual.
50. Output activated when Alert annunciation alarm is activated (by any alarm point set to activate this function) [98] and acknowledged. For more information, see FT128 Operation Manual.
51. Output activated for Door open in the FT128 [99].
52. This trigger condition plus the OR operator has to be used for each detector (Zone-Address) controlling a fire door (normally > two detectors). Type of output is normally "Control, neutral". See Fire Door Closing Function, page 99.
53. Output activated when Service signal is activated (by any sensor)[100].
54. 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).
55. Output activated for Door open in the control unit[99].
56. Output activated when input trigger condition "Extinguishing system fault" is true.
57. Output activated when input trigger condition "Extinguishing system released" is true.
58. Output activated when input trigger condition "Activated key cabinet" is true.
59. Output activated when one or more faults are generated in the control unit[97]
60. Output activated when one or more faults are generated in the control unit[97].
61. Output activated when one or more faults are generated in the specified Zone[97].
62. Output activated when the specified external fault is generated[97].

[95] 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)".

[96] 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.

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

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

[99] Which is indicated by the LED "Door open" in the CIE

[100] Indicated by the LED "Service" in the CIE

63. Output activated when the specified technical warning is generated[101].
64. Output activated when one or more technical warnings are generated.

10.6 Logical Operators

The logical operators available in EBLWin are in the following 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

10.6.1 Control Expression Examples

In order to understand how 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 <u>all</u> the conditions **a**, **b**, **c** are true, i.e. a=1 and b=1 and c=1 makes y=1. All other combinations makes y=0.

This is also shown in the truth 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 <u>one</u> 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 truth 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 truth 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

[101] Indicated by a blinking [i] in the CIE display.

10.6.1.4 Parentheses

Changes priority order.

a ***OR NOT (***b ***AND*** c***)***=y (This is same as the previous but completed with parentheses.)

This is shown in the truth 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 the principles how to build a control expression with "conditions" and logical operators:

Example 1

Output**:**	Voltage output **S0**
Control expression**:**	Pre Warning Zone (10)
Explanation:	Pre-warning activated in zone 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 FT128 is <u>not</u> open (i.e. 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 <u>and</u> zone 24 will activate the output VO0 when there are one or more faults in the system at the same time.

Example 4

Output**:**	Voltage output **S1**
Control expression**:**	Consecutive Fire Alarm (10,10,10,19,**1**) **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

4313 Analogue base with isolator has built-in short circuit isolator that requires a separate COM loop address and a Sequence Number, 00-63.

The units 4433, 4439 and 4477 have built-in isolator that do not require any separate COM loop address, only a Sequence Number, 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 4313/4413 set to 2330 mode instead of NORMAL mode.

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

If one or more Short Circuit Isolators are used[102], 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.

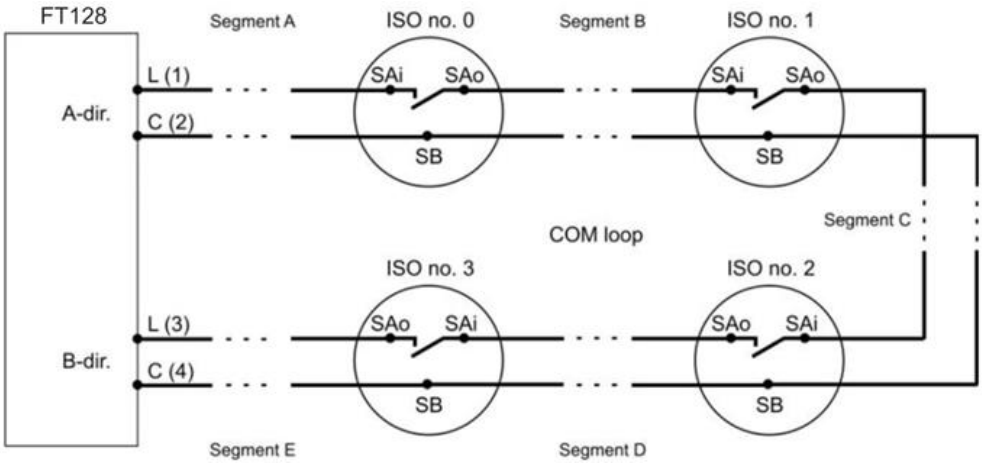


Figure 31 Short Circuit Isolators example in FT128

The first isolator (ISO) in the A-direction must have the sequence no. 0 (ISO no. 0), the next sequence is no. 1 (ISO 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 22 seconds.

COM loop end-point voltage [103] <12 VDC 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 powered down (= 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

[102] At least one short circuit isolator **must** be install every 40 alarm points as required by AS1670.1.

[103] When communicating in the A-direction.

(ISO no. 1 / sequence no. 1) will be re-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 will be re-enabled, 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

nn = A, 00, 01, 02, 03, 04, 05 - - up to 63 or B.

FAULT: Short circuit SCI nn <-> SCI nn

nn = A, 00, 01, 02, 03, 04, 05 - - up to 63 or 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

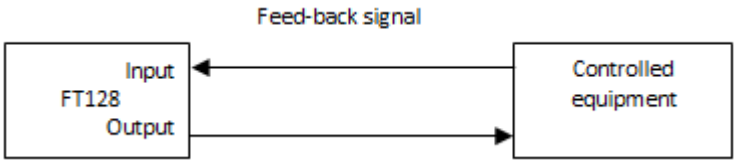
FAULT: No reply techn address xxx

Regarding Fault acknowledge, see the FT128 Operation Manual.

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 10th minute.

12 Interlocking Function

The interlocking function is used to verify that an output has been 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

Up to 100 Interlocking Combinations can be programmed using EBLWin.

Note: Each interlocking input and each interlocking output can only be used in one interlocking combination.

Area and **Point** fields are unique identifiers for each paired interlocking combination synonymous to Zone-Address. They are presented in this format NN-NN with the first 2 digits representing the Area and the last 2 digits representing the Point. Both Area and Point numbers range from 1-99.

It is advantageous to have a numbering system planned correlating to the location ("Area") when assigning a **Name** to the interlocking combinations. Having some form of structure to the numbering will greatly help organise the SSD file and make it easier to understand and assist with troubleshooting later. One should also consider including all I/O devices into this numbering structure so that it will be easier to select from the list of interlocking combinations.

A **Filter Function Box** as shown in Figure 32 below, is available to assist with listing only those interlocking combinations of interests. This will become more powerful when some sort of numbering structure is in place. Figure 32 was from a list of 100 interlocking combinations, typing in "1"[104] in the filter function box quickly narrows down the lists with anything containing "1". One can see the usefulness of having a planned numbering structure in place from this example should all interlocking combinations on containing 1 were called for.

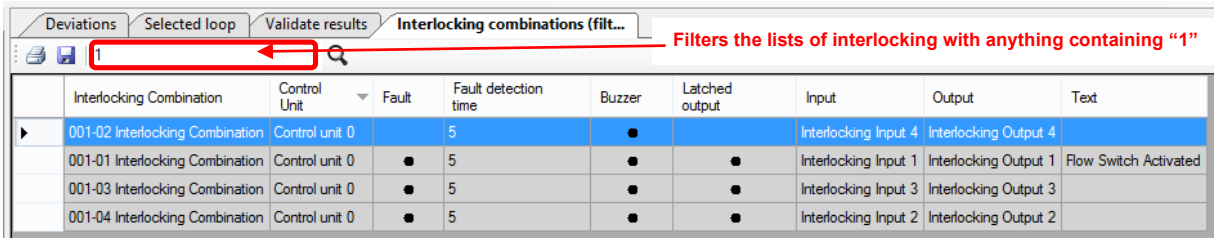


Figure 32 Filter function

Available interlocking inputs and/or outputs will appear in the EBLWin dialog box shown in Figure 33 page 95, only when each input and output have been configured with Type = Interlocking

12.1.1 Interlocking Output

The "Voltage Output" / "Relay Output" dialog boxes are used to configure the interlocking output.

- **Type**: "Interlocking" is to be selected.

[104] Filtering search texts are case sensitive. For this reason, ensure that naming convention is consistent throughout.

- **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.
- **Name**: It is recommended to add information, e.g. the interlocking combination's presentation number (Area-Point).

Activated output will be indicated in menu H9/C1.

12.1.2 Interlocking Input

The "Input" dialog box is used to configure the interlocking input.

- **Type**: "Interlocking Input" is to be selected.
- **Name**: It is recommended to add information, e.g. the interlocking combination's presentation number (Area-Point).

Activated input will be indicated in menu H9/C1.

12.1.3 Interlocking Combination

The interlocking function requires one interlocking output and one interlocking input to be programmed in one interlocking combination.

Note: The interlocking outputs and inputs have to be programmed first before programming the interlocking combination.[105]

An interlocking combination can have only an output or only an input programmed, e.g. when a user definable text message is required to indicate an activated output or input and alerted from the buzzer.

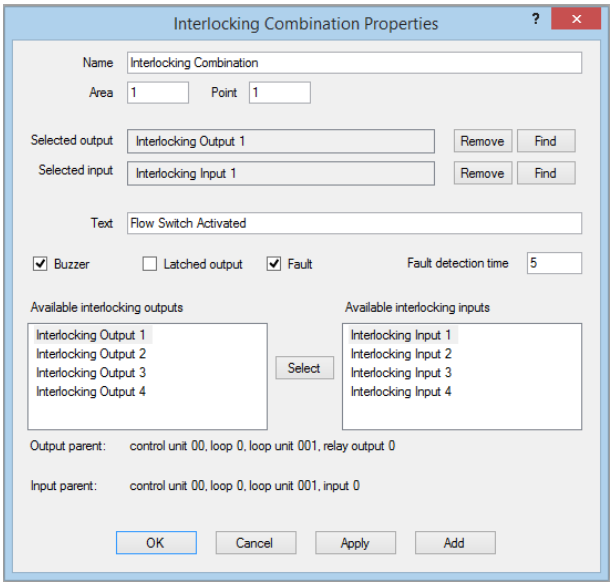


Figure 33 The EBLWin "Interlocking Combination" dialog box

To configure an interlocking combination, the following procedures can be used:

1. Select from each side of the interlocking inputs and/or outputs lists, click the Select button, this puts the selection into the selected output/input fields.
2. Click the Apply button, the selections will disappear from the lists and cannot be reused elsewhere.

[105] In the "Interlocking Combination" dialog box, all the outputs and inputs previously programmed for interlocking are listed, see Figure 33

3 Click on the Remove button beside the respective input/output to delete selections.

4 To locate the device from which each input/output has been used, click on the adjacent Find button. The device dialog box will appear. This is a time saving feature when you have close to hundred interlocks specified.

The configured interlocking combination should display the following:

- **Name**: Displayed in the EBLWin Tree and List views. Default is "Interlocking Combination" that can be edited when required. "Area-Point" will be added in the tree view and shown in the list view.
- **Area** and **Point**: Each “Interlocking Combination” is presented as Area-Point (compare with Zone-Address). Area numbers 1-99 are possible to use and within each are, Point numbers 1-99 can be used.
- **Available interlocking outputs** list displays all the previous programmed outputs, Type = "Interlocking".
- **Available interlocking inputs** list displays all the previous programmed inputs, Type "Interlocking". Select one **output** and one **Input**. Press Select and the selected output and input will be shown in the **Selected output** and **Selected input** field respectively.

It is possible to **Remove** an output / input (from the field).

It is possible to **Find** (open the dialog box) an output / input.

- **Output parent:** Shows where the selected output is situated, e.g. Control unit 0.
- **Input parent:** Shows where the selected input is situated, e.g. Control unit 0.
- **Text** = Interlocking text to be shown in menu H9/C1. Can be written in this field or in the "Texts" dialog box, see chapter "Creating Alarm Texts via EBLWin”, page 120.
- **Buzzer** checked = activated interlocking input will turn on the FT128 buzzer (0.8 / 0.8 sec.) [106]. 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.
- **Fault Detection Time**: If the input is not activated within 5-255 seconds after the output is activated[107], 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 FT128 [108]:

Interlocking input / output activated See menu H9/C1

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

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

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

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

12.3 Information of Interlocking Combinations (H9)

Menu H9 has the following sub menus.

12.3.1 Activated Interlocking outputs / inputs (H9/C1)

See also chapter “Interlocking Indications”, page 96.

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 / deactivate 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 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 individually 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 the 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 this 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 the interlocking outputs, disabled via menu H2/B4, can be re-enabled collectively via menu H2/B8.

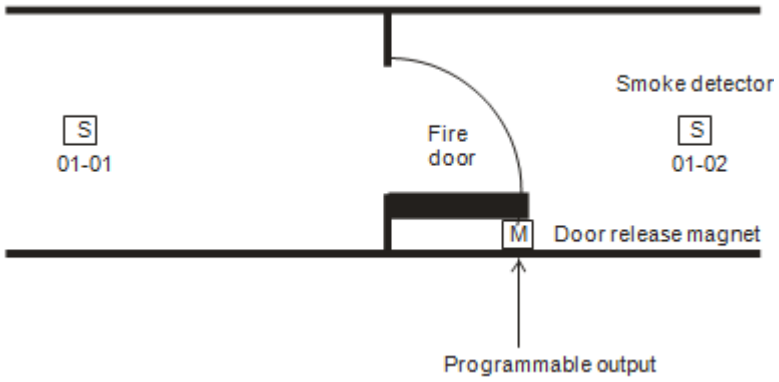
12.4 Interlocking Control Expressions

A programmable output control expression can contain "interlocking" trigger conditions ("Functions") numbers 30-33 (see Section "Control Expression", page 84 i.e. one or more outputs can be activated when one or more interlocking inputs are activated.

13 Fire Door Closing Function

Programmable outputs can be used for fire door closing. A special trigger condition is available (Fire Door Closing.). Type of output is normally "Control, neutral".

One or more alarm points can control the output, i.e. the detectors on both sides of the fire door as shown in the figure below.



In case of one of the following events, the output will be "activated" and the fire door will close:

- Fire alarm (from any of the detectors controlling the fire door)
- "Test mode" (the zone involved set in test mode)
- Fault (i.e. "no answer" from any of the detectors[109] controlling the fire door)
- Disablement (any of the detectors controlling the fire door or the involved zone.
- A definite time every day, if programmed via EBLWin. (The output will be activated for 20 seconds.)
- Via a programmable input (trigger condition trigger condition no. 9 = Door Closing Test Input). The output will be activated for 20 seconds.

Note: For safety reasons, an I/O unit 3361 output should not be used. If a short circuit or double break exists on the COM loop, the I/O unit cannot be forced 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 input / output has to be "Interlocking in-/output". See also chapter Interlocking Function, page 94.

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

14 Functions / Services / Features

Some Functions / Services / Features require programming via EBLWin, see chapter PC software (S/W), page 14.

How to connect the PC and more information, see chapter "Download SSD" page 157 and "Download software (S/W)" page 160.

Notes: The information in the following sections from 14.1 - 14.7 is valid for the analogue smoke detectors 430x / 440x in **NORMAL mode**.

Chapter 14.5 is valid for the analogue heat detectors 3308 / 3309 in **NORMAL mode**.

For the analogue detectors 440x in **Advanced mode**, see chapter “Advanced Mode”, page 127.

14.1 Sensor Value

An analogue smoke detector is like a "sensor". It detects its environment at all times. Each detected analogue value is converted in the detector to a digital "**sensor values**", which is continuously picked up and evaluated by FT128 for each individual detector. In Figure 34 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 FT128) and each week, these stored sensor values are used to calculate a "**week average sensor value**".[110] This is done for each analogue smoke detector individually. In Figure 34 the (digital) week average sensor values are represented by the graph "**Week average sensor value**" (B).

Each analogue 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 34 represented by the graph "**Fire alarm level**" (C) - parallel with the graph "**Week average sensor value**" (B).

In Figure 34 (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 detector is "dirty" and has to be replaced. See "**Service level**" (D) Figure 34. 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.

"Sensor Information" is available via menu H4/U4. Via EBLWin and a PC connected to FT128 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 analogue detectors on a COM loop.

The smoke detector sensor values are presented as obscuration in % per meter (%/m). (Heat detector values as °C.)

[110] The very first week average sensor value will be calculated within 2½ minutes after any restart, i.e. also after SSD download. During this "2½ min. period" all analogue smoke detector fire alarms are suppressed.

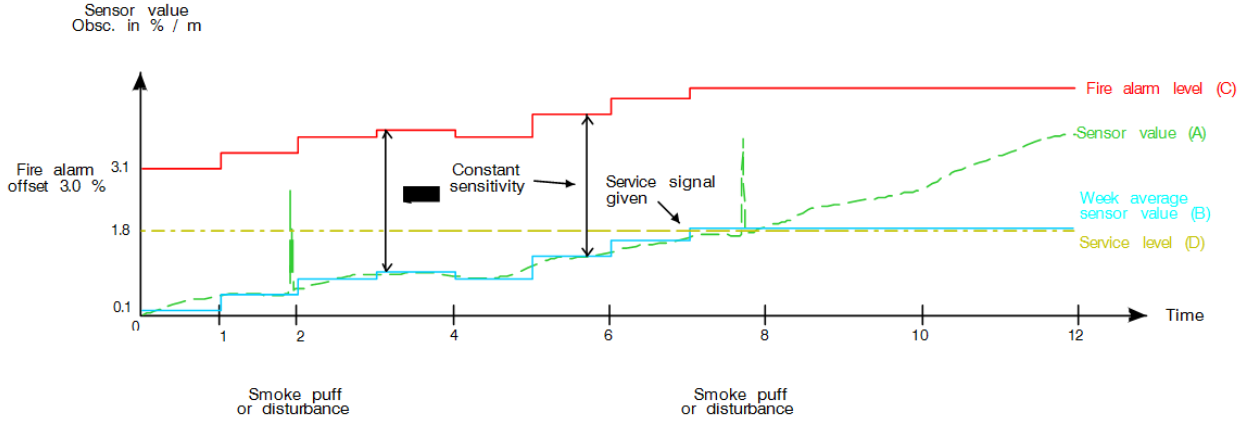


Figure 34 Fire Alarm Level Graph for the Analogue Smoke Detector

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. It is also used in the smouldering smoke algorithm (see page 103). The decision value is calculated, see chapter “Filtering Algorithm”, page 102.

14.4 Alarm Algorithms for Smoke Detectors / Detection Levels / Offsets

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

1. **Fire Alarm** (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 all detectors, be set in EBLWin, see chapter “Alarm Algorithms for Smoke Detectors / Detection Levels / Offsets”, page 101.

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

"Pre-warning", "Fire Alarm" and "Heavy Smoke Alarm" can activate programmable outputs respectively, see chapter “Control Expression”, page 84. See also the FT128 Operation Manual.

14.4.1 Alarm Algorithm / Alternative Alarm Algorithm

In order to secure real fire alarms and reduce nuisance alarms[111], six different alarm algorithms are available. See Table 13, page 102.

The alarm algorithms are based on:

- Normal, high or low sensitivity

[111] So called false / unnecessary alarms.

- Normal (15 sec.) or slow (35 sec.) detection time (alarm delay)

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 required.

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.

Normal detection time (15 sec.) (Default) There will always be min. 15 seconds alarm delay[112]. This is a "normal filter" to reduce nuisance alarms.

Slow detection time (35 sec.). There will always be min. 35 seconds alarm delay[112]. This is an "extra filter" to reduce nuisance alarms but might not fulfil the AS7240.7 requirements.

Each analogue 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 during working hours.

The alarm algorithm in use can be read in menu H4/U3.

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 value to calculate a decision value depending on which alarm algorithm that is used.

The decision value starts at zero. Each time a new sensor value is picked up (sampled) from an analogue smoke detector 430x/440x, this new sensor value is compared with the actual decision value, which will be adjusted if required, see below.

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

If the difference 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 dependent on the selected alarm algorithm, see Table 13 below.

The decision value will consequently not be increased / decreased with a value exceeding the "X" value even if a sensor value is much higher / lower, see Figure 35.

There are six alarm algorithms. The default is alarm algorithm **N-15**, i.e. normal detection time (15 sec.) and normal sensitivity (3%). "X" is the step value.

Note: The L-15, H-35, N-35 and L-35 algorithms may not comply with AS7240.7 requirements.

Table 13 Smoke detector alarm algorithm

Analogue 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% Normal sensitivity	**L-35** 3.6% Low sensitivity
4300[113] / 4301[114] 4400 / 4401	X=8	X=10	X=12	X=4	X=5	X=6

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

[113] 4300 is replaced by 4400.

[114] 4301 is replaced by 4401.

An example showing the alarm algorithm "N-15" is shown in Figure 35, i.e. the step value X = 5. The detector polling time t ≈ 2.56 sec.

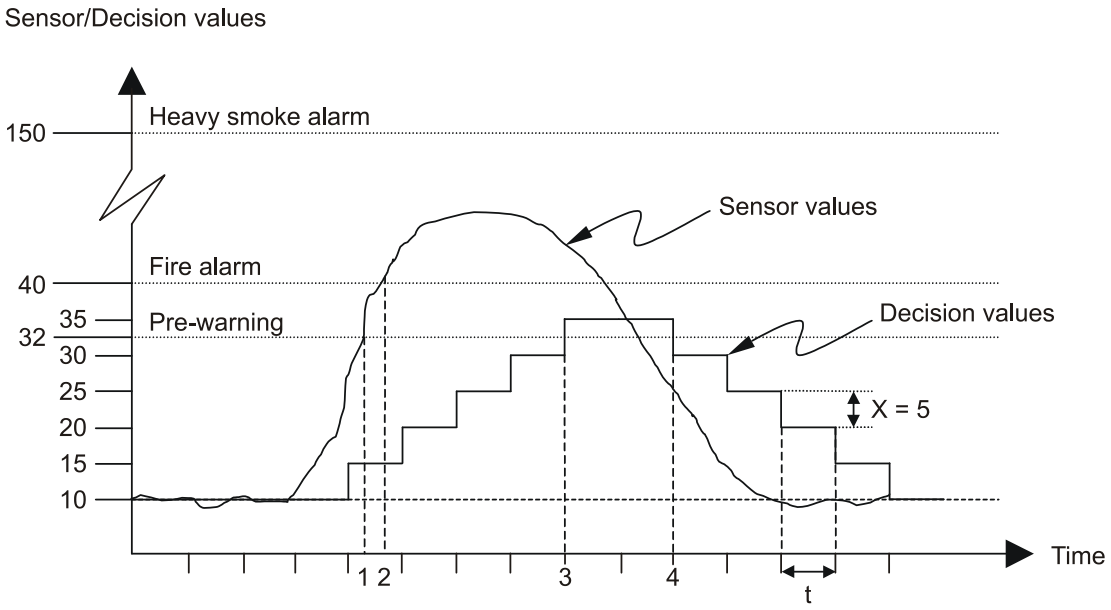


Figure 35 Filtering Algorithm N-15 Graph

Explanations on Figure 35:

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 FT128, the detector polling time t ≈ 7 seconds and the step value "X" is according to Table 13 – but the principle is the same.)

the sensor values and decision values at start are approx. equal ("10"). When smoke enters 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 reach 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.

These comments refer to the numbered points on the graph shown in Figure 35 above

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 causes the sensor value to rise very slowly but not reach the fire alarm level. A smouldering fire can last for hours and sometimes days. To be able to detect such a smouldering fire at an "early" stage, a smouldering smoke algorithm is used.

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

If the decision value has been over the smouldering level 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 continues 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 be set in EBLWin for all detectors collectively, see Section Alarm Algorithms, page 148.

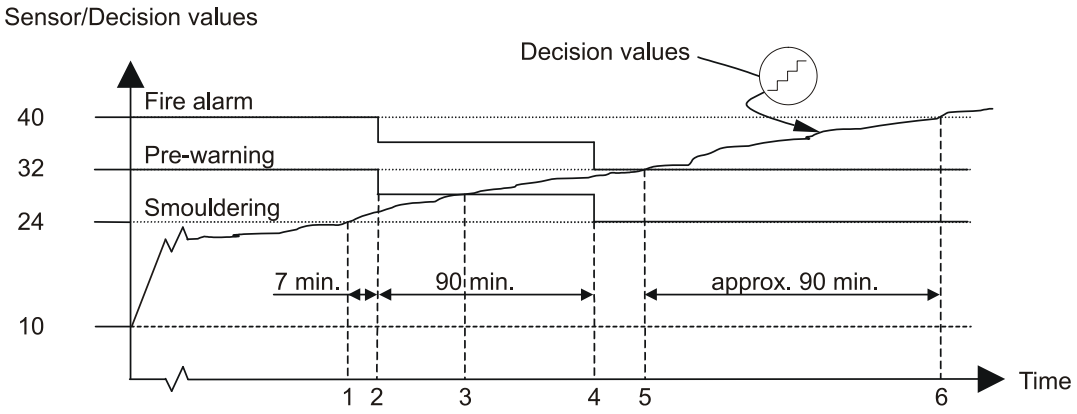


Figure 36 An example with the smouldering smoke algorithm.

Figure 35 Explanations:

In this example, the week average sensor value has earlier been adjusted and is now "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 very slowly from "10" and upwards.

1. The decision value has reached the smouldering level. A 7 minutes timer is started.

2. After the 7 minutes, the decision value is still over the smouldering level. The pre-warning level and the fire alarm level are therefore lowered. A 90 minutes timer is started.
3. The decision value has reached the pre-warning level and pre-warning is activated.
4. After the 90 minutes the decision value is still over the pre-warning level but has not reached the fire alarm level. The pre-warning level and the fire alarm level are therefore lowered again. A 120 minutes timer is started.
5. The decision value has reached the fire alarm level and fire alarm is activated.
6. The decision value has reached the original fire alarm level "40" i.e. the fire alarm would have been activated approx. 90 minutes after the fire alarm is activated by the smouldering algorithm!

14.4.4 Performance Factor

To find out the environment conditions where an analogue smoke detector 430x and 440x in NORMAL mode is mounted, the **Performance factor** (**Pf**) can be studied. The performance factor is shown in menu H4/U3 together with the min. and maximum 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.

Each sensor value is compared with the week average sensor value. The absolute difference is saved and each twenty-four hour (at midnight) an "average value" is calculated, i.e. the performance factor. (12343 = samples per 24 hours.)

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

Where,

X_m = momentary sensor values for 24 hours.

X_{wa} = week average sensor value

If the detector is mounted in a very "stable" environment e.g. an office, the performance factor will be low (min. 0 %/m).

If the detector is mounted in a very "unstable" environment (like a factory) the performance factor will be high (maximum 2.55 %/m).

An "unstable" environment can cause nuisance alarms (unnecessary alarms). Perhaps should another type of detector be used, another alarm algorithm[115] or other actions be taken, e.g. alert annunciation or two-unit-dependence (co-incidence alarm).

14.5 Algorithms for Analogue Heat Detectors

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

The detector conforms to a class according to the requirements of the tests specified in AS7240.5.

Each analogue heat detector can have two alarm algorithms programmed (via EBLWin). One **regular alarm algorithm** that is normally used (default) and one **alternative alarm algorithm** that will be controlled by a time channel (internal or external) e.g. class A1 can be used during night-time and class B can be used during daytime.

[115] Example: An alternative alarm algorithm during working hours.

The alternative alarm algorithm can be used to reduce nuisance alarms during working hours. The actual algorithm is shown in menu H4/U3 or EBLWin.

When FT128 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 FT128. (This results in approx. 14 seconds alarm delay).

The same is valid for **pre-warning,** except it is a lower level (xx° C) value compared to fire alarm. The Pre-warning option under EBLWin –System Properties can be either be enabled or disabled.

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 be set in EBLWin for the whole system, see Section Alarm Algorithms, page 148.

The fire alarm, pre-warning and heavy heat alarm levels can be set in EBLWin collectively for all detectors, see chapter “Alarm Algorithms” page 148. See also the FT128 Operation Manual for more information.

14.5.1 Class A1 Algorithm

Conforms to Class **A1**.

Typical / maximum application temperature 25 / 50° C.

Max. / min. static response temperature 54 / 65° C.

The algorithm is as follows:

- For a rate-of-rise ≤ 4° C per minute:
  - **Fire alarm level is 56° C**.
  - Pre-warning level is 46° C.
  - Heavy heat alarm level is 90° C.
- For a rate-of-rise > 4° C per minute:
  - **Fire alarm level is 46° C**.
  - Pre-warning level is 36° C.
  - Heavy heat alarm level is 90° C.

The "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 / maximum 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 / maximum application temperature 40 / 50° C.
Max. / min. static response temperature 69 / 85° C.

The algorithm is as follows:

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

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

14.6 Self Verification

The analogue 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 FT128. If the self-verification function has detected any fault it will be reported back to FT128. A fault will be activated in FT128 and the following fault message will be shown:

Fault: Detector xx-xx →

FAULT: Detector techn. address nnn ←

14.7 Minimum / Maximum Sensor Values

To find out how the environment is, where an analogue 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 FT128 for each detector individually[116]. 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[117] can be read in menu H4/U3 or via EBLWin.

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

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

To access the minimum and maximum sensor values in EBLWin, right click on the sensor and choose “Show Sensor Values…” in the context menu and it would bring up its sensor log displaying in graphical or tabulated form, Figure 37 and Figure 38.

Note: In order to see the graphs, you must install Microsoft MSChart.exe on your computer or notebook. The software is to be installed only once in your computer so you don’t have to do anything when you install new versions of EBLWin. The link to install Microsoft MSChart as follow:

http://www.microsoft.com/en-gb/download/details.aspx?id=14422

[116] For this feature to work, the panel must be connected to the laptop and logged onto EBLWin with the USB dongle throughout the data capture period.

[117] I.e. the min. / maximum sensor values are from the previous day.

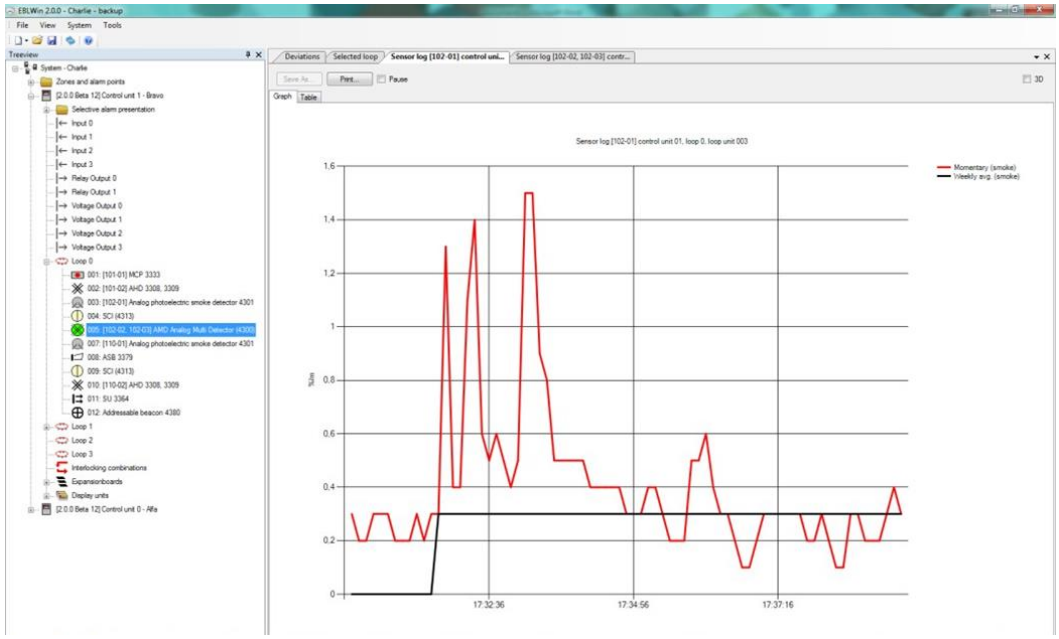


Figure 37 Sensor Log in Graphical Form

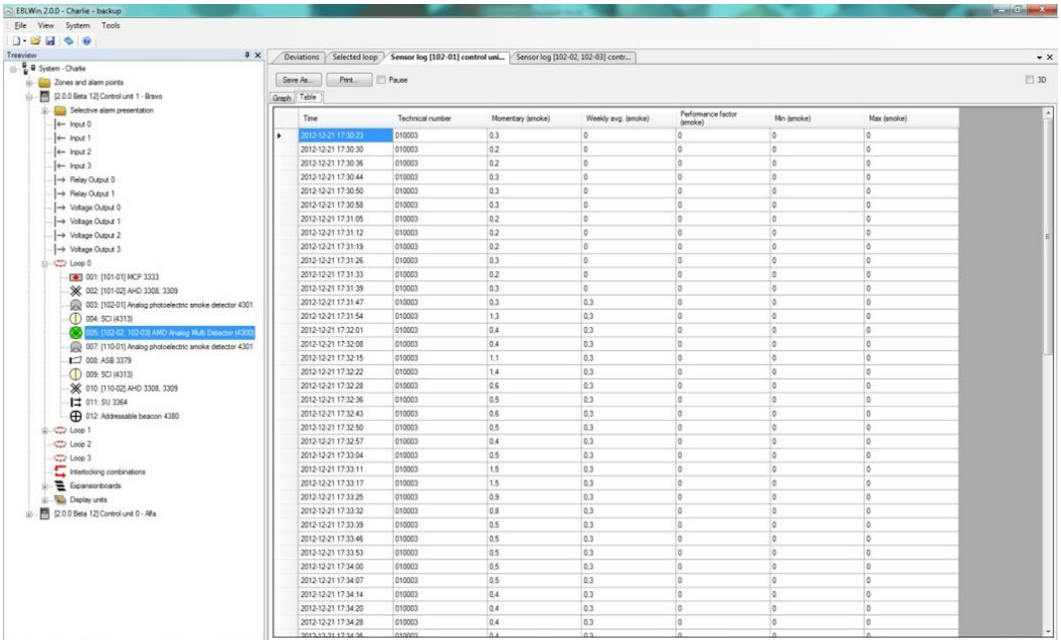


Figure 38 Sensor Log in Tabulated Form

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 false 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).

Function:

Two or more zones in the same group have to be in "fire alarm state"[118] 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 (CIE) as follows:

- The buzzer sounds same as pre-warning (0.8 / 5 sec.).
- On the CIE 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).

14.8.2 2-Address (-Unit) Dependence

Each analogue 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"[130] 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 (CIE) as follows:

- The buzzer sounds same as pre-warning (0.8 / 5 sec.).
- In the CIE LCD the following information is shown:

  Co-incidence alarm detector ZZ/AA

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

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 CIE 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 CIE

14.9 Delayed Alarm

14.9.1 General time delay application

In some premises delayed fire alarm activation can be used to avoid nuisance alarms. The delay time will be added at the end when a fire alarm normally would have been activated in the CIE. This function is a violation to the AS7240.2 standard.

The delayed alarm function in the properties of analogue smoke detectors is called "**Delayed**" while in conventional Zone Line Input properties called "**AVF**". The functionality of the delayed alarm in both types are different as explained below.

[118] Fire alarm state is when a fire alarm normally would have been activated in the CIE

Each analogue detector in the system can be programmed (in EBLWin) to delayed fire alarm activation, “Delayed” alarm check box in the detector properties must be ticked ☑ Delayed. (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. In general applications, it is not recommended to use this function however if it is necessary to be used, it has to be less than 30 seconds.

Function for an analogue smoke detector:

An alarm point has to be in "fire alarm state"[118] for the duration of the delay time, in order to activate a fire alarm in the CIE. If an alarm point restores back to "normal state" during the delay time, the delay time will reset and starts again when the alarm point activates "fire alarm state" again.

Programmable output can be activated using specific trigger type during the delay of specific alarm point e.g. 3379 sounder base.

A delayed or AVF alarm is indicated in the control unit (CIE) as follows:

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

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

Function: for conventional Zone Line Inputs

The “Delayed” check box for addressable multipurpose I/O unit (3361) Zone Line Input 0 (Z) and 8 zones expansion board (4580) input is called Alarm Verification Facility “**AVF**”, if required, check box ☑ AVF must be ticked and functions will be as explained in section 14.10 below.

14.9.2 Specific time delay application

In this specific application of the “Delayed” alarm function, the alarm activation type for an output unit (3379) must be set (in EBLWin) to “DelayedAlarmZoneAddress” (or zone). In this case, when the alarm point activates an alarm, the output unit 3379 will sound during the time delay period without signalling alarm to the CIE. If the alarm point still in alarm after the time delay elapsed, the CIE will be in full alarm condition. The delay for this application can be selected for up to 255 seconds.

The function is identical to the function of the “AAF” without the wall mounted Module “AAM”.

Application Example:

A typical application for the delayed alarm function would be a residential accommodation where false alarms may cause a brigade call. A sounder base 3379 mounted inside the unit will activate upon receiving a delayed alarm from a smoke detector for the delay period configured in the system properties (0-255 sec). If the smoke is not cleared from the smoke detector during the time delay, the control panel will go to full alarm condition. If the smoke clears up within the delay time, the alarm will reset, 3379 will be silenced and the system restores to the normal condition.

Several control expressions are available to cover any possible configuration:

- DelayedAlarmZoneAddress (Zone, Address), true when a specific zone / address is in delayed alarm state.
- DelayedAlarmZone (Zone), true when a specific zone or any detector in a certain zone is in delayed alarm state.
- GeneralDelayedAlarm, true when any zone or zone/address is in delayed alarm state.

14.10 Alarm Verification Facility (AVF)

On some premises, AVF can be used to reduce false alarms. The function is valid for any conventional **Zone Line Input.**

When the AVF is used, the function "Delayed alarm" (see above) is not valid. The function "AVF" is selected in the dialog box for the Zone Line Input.

Function: A zone in "fire alarm state"[119] will be registered in FT128 but a fire alarm will not be activated. Within the first 15-20 seconds, the zone will automatically reset the conventional detectors sensing smoke. If the smoke still exist in the smoke chamber within the following 110 seconds, the zone will latch in "fire alarm state" and a fire alarm will be activated in FT128, otherwise nothing will happen until the next time the zone is in "fire alarm state".

14.11 Alert Annunciation

In some installations the **A**lert **A**nnunciation function can be used to avoid false alarms to the Fire Brigade. A time channel can be used to control this function.

Trained personnel on site are required to locate the fire and take the correct actions depending on whether a real fire exists.

Normally analogue smoke detectors and zones with smoke detectors only, can be programmed (via EBLWin) for alert annunciation. Heat detectors and manual call points should not be programmed 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 and the "Fire brigade TX" output will be activated[120].

The **AA** function is normally turned ON (enabled) during daytime only (i.e. working hours). A time channel is used to 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 CIE 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 remains off until it is turned on (normal) again via menu H2/B11.

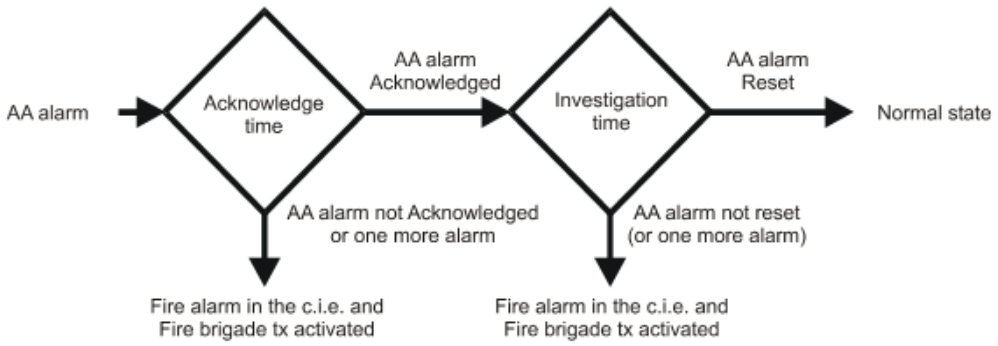


Figure 39 Alert Annunciation function.

Alert Annunciation Function:

Indications, actions, etc. for an AA alarm are similar to a normal fire alarm except that the output “Fire alarm” for routing equipment (Fire brigade TX) [121] will not be activated directly.

[119] A zone with the AVF not selected would in this state activate a normal fire alarm in FT128.

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

[121] **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, otherwise the output for routing equipment (Fire brigade TX) will be activated.

During the acknowledgement 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 used.

Acknowledgement and Reset are done on the Alert annunciation unit 1736. Programmable output "Alert Announcement Activated" for indication and programmable inputs "Alert Announcement Acknowledge" and "Alert Announcement Reset" can also be used.

The Acknowledgement time can be set to **0-120** seconds.

The Investigation time can be set to **0-9** minutes.

14.12 Alert Annunciation Applications

14.12.1 Alarm Acknowledgement Facility (AAF)

The **AAF** function is similar to the "**A**lert **A**nnunciation function" as explained in chapter 14.11 page 111. The COM loop module used to achieve the AVF function is called Alarm Acknowledgement Module (AAM).

The AAM can be either surface mounted in the supplied white box or recess mounted in a single gang box. It enables the occupant to control the smoke detection inside the sole occupancy unit within a pre-determined time delay. The AAM is used in conjunction with the sounder base 3379. The AAM provides the occupant with a facility to avoid the unwanted alarms within the occupancy e.g. cooking fumes, smoking aerosol spray steams, etc.

Each AAF Zone consists of one or up to five analogue smoke detectors (4400 / 4401), one or up to five sounder bases 3379 and one AAM, all connected to the COM loop.

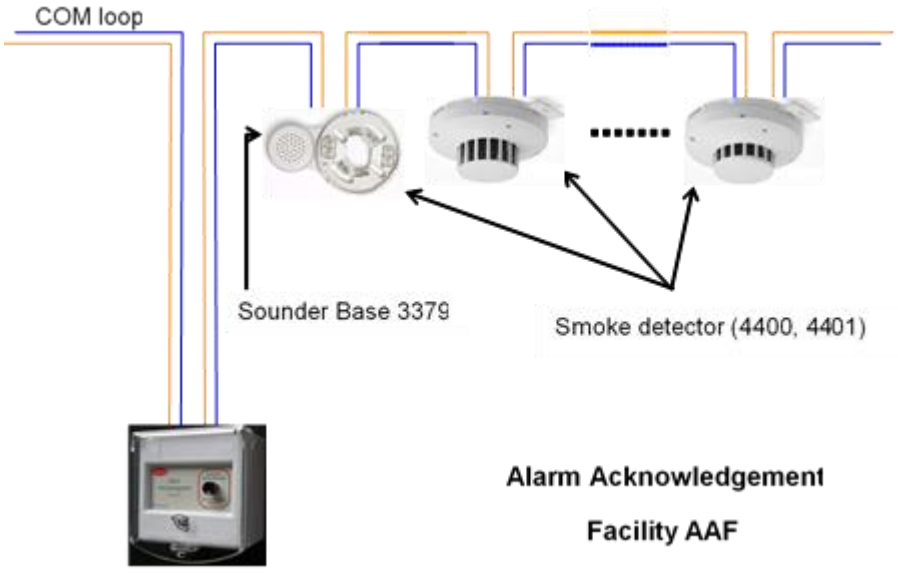


Figure 40 Alarm Acknowledgement Facility Units

Each AAM is configured as an AAFC[122] zone. Each AAFC zone can include up to 5 smoke detectors. If the analogue value of one or more smoke detector in an AAFC zone reaches the alarm level, the alarm acknowledgement process starts and the sounder base will be activated.

The occupant has 30 seconds to press the button on the AAM (acknowledgement time) which provides the occupant with up to 90 seconds to investigate the alarm and clear up the smoke.

The alarm investigation period of 90 seconds is considered appropriate for protected areas with normal levels of ventilation or accessibility. The investigating period is adjustable 0-9 minutes to satisfy other applications. The acknowledgement period also is adjustable 0-120 seconds.

A red LED on the front cover indicates that the acknowledgement button has been pressed; it remains illuminated until the investigation period expires.

A momentary action switch is provided to acknowledge the alarm and silence the sounder base 3379. Pressing the button during the investigation period (while LED is on) will not extend or re-start the timer. The following flow chart explains the sequence of the AAF process.

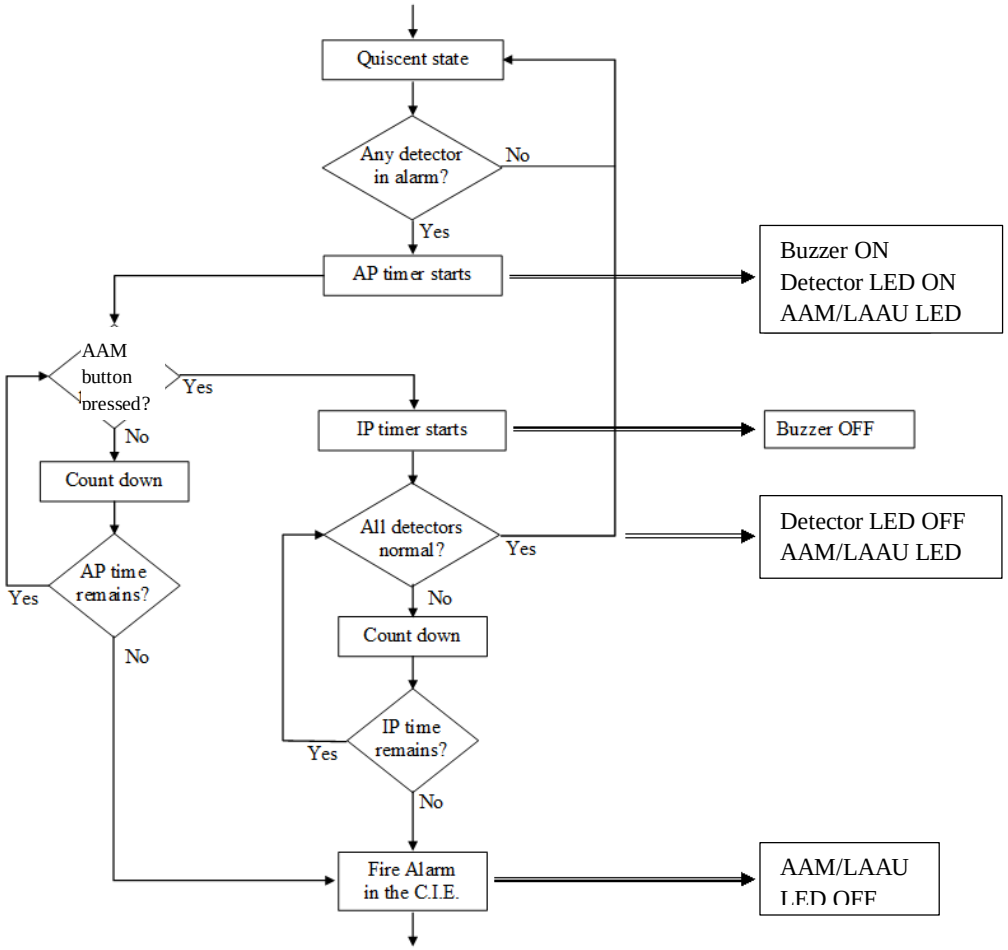


Figure 41 Alarm Acknowledgement Facility (AAF) Flow Chart

During the AAF process, an AAF alarm will be indicated in the CIE display ….

…. during the acknowledgement period (**AP**):

AAF zone xx, activated

[122] The alarm acknowledgement facility control **AAFC** is the trigger type in EBLWin to activate the **AAM**.

…. during the investigation period (**IP**):

AAF zone xx, investigation in progress

If more than one AAF zones are activated, only the first is shown in the display.

Notes:

- Maximum number of analogue smoke detectors in an AAF zone is 5.
- Smoke detectors in an AAF zone cannot be programmed as 2-unit-dependent and not be controlled by the Alert Annunciation function.
- Only Analogue photo electric smoke detector 4401 (4301) and Analogue multi detector 4400 (4300) can be used for AAF. If the Analogue multi detector 4400 is used, it must be programmed as type "Two addresses", so that only the "smoke part" of the detector can be used in AAF function.
- Max. 50 AAF zones (00-49) per C.I.E
- The sounder base 3379 has to be programmed with the trigger condition "AAF zone alarm" (and other trigger conditions).

14.12.2 Local Alarm Acknowledgement (LAA)

The local alarm acknowledgement is the European's equivalent of the Australian alarm acknowledgement facility (AAM). The function is identical to the AAF explained in section 14.12.1 with different terminologies. The functionality of Panasonic's LAAU versus Brooks AAM are shown in Table 14 below.

Table 14 Alarm acknowledgement function

	Panasonic LAAU	**Brooks AAM**
Product code	4445	3340
Module's name	Local Alarm Acknowledgement Unit LAAU	Alarm Acknowledgement Module AAM
Function's name	Local Alarm Acknowledgement LAA	Alarm Acknowledgement Facility AAF
Trigger type in EBLWin	LAA	AAFC
No. of zones	Max. 100 LAA zone	Max. 100 AAFC zone
No. of detectors per zone	5 x 4400/4401 (4300/4301)	5 x 4400/4401 (4300/4301)
Ack. period	10-120 seconds	10-120 seconds
Investigation period	1-9 minutes	1-9 minutes
Sounder unit	3379	3379
Ack. Message on LCD	LAA zone xx, activated	AAF zone xx, activated
Investigation message on LCD	LAA zone xx, investigation in progress	AAF zone xx, investigation in progress

One LAA zone consists of one to five analogue smoke detectors 4400 / 4401 (4300 / 4301), one LAA buzzer (sounder base 3379) and one Local Alarm Acknowledgement Unit (LAAU). All connected on the COM loop.

Note: All devices included in an LAA zone must be connected to the same CIE.

The local alarm acknowledgement connection diagram is shown in Figure 42 below.

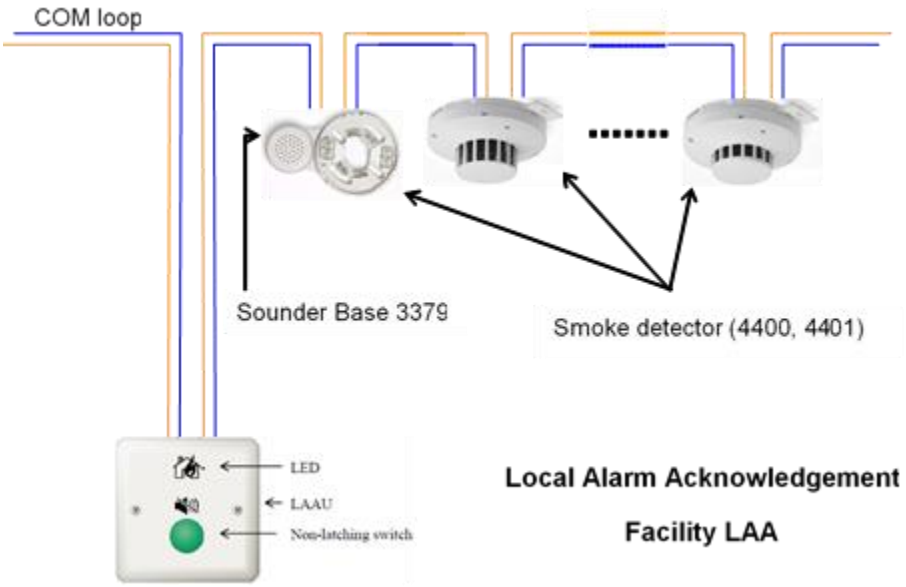


Figure 42 Local Alarm Acknowledgement Facility Connection Diagram

For more details, refer to the flowchart in Figure 41 page 113.

14.13 Quiet Alarm

A smoke detector can be set to quiet alarm i.e. non-latching detector / non-brigade call alarm. This feature is used in AS1668 supply air / stair pressurization fan control applications or in residential units as a non-latching smoke alarm.

In AS1668 supply air fan applications, the type “Quiet alarm” is used to set up the duct detector to be non-latching and resets automatically after the time delay that is configured in EBLWin is expired. In residential applications, type “Quiet alarm” is used in conjunction with the sounder base 3379 as a localised warning in a designated area within the unit while the active fire alarms are situated elsewhere within the unit. It can also be activated from general fire alarm in the common areas.

Photo electric smoke detectors, programmed for quiet alarm are used to control AS1668 fans, this requires fan control module in the control panel and an I/O unit 3361 for fan control. See “Trigger Conditions” page 84.

Indications and actions:

- Detector LEDs are turned on (i.e. also a connected RIL).
- In the CIE display: **Quiet alarm detector ZZ-AA** and a user definable alarm text, if programmed.
- LEDs "Fire" in the CIE are blinking (0.4 / 0.4 sec.).
- Buzzer in the CIE sounding (0.8 / 5 sec.).
- Programmable outputs for quiet alarm is activated, e.g. 3361 outputs controlling the AS1668 fans i.e. any output with a control expression containing trigger conditions "Quiet Alarm Zone" or "Quiet Alarm Zone Address".

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 CIE relay output "R0" is used as an output for Routing Equipment (Fire Brigade TX).

The output is to be programmed (via EBLWin) as type "Routing equipment" and the trigger condition should be "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 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 is to 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** analogue addressable smoke, heat or multi detector only.

Note: A multi detector can have one presentation number (Zone-Address) i.e. when programmed as one address with decision algorithm / one address with OR functionality or two independent presentation numbers i.e. one presentation number for smoke and the second number for heat.

14.14.2 Fire Alarm Type A

The output is to 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** analogue 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[123]. For more information see the FT128 Operation Manual, chapter "Disable or re-enable (H2)".

Regular disablements are made via time channels, see chapter “Time Channels 1-14” page 122 and “Time Channels 15-63” page 122.

When alarm reset method "Single with automatic disablement"[124] 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 CIE 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 required to be disabled, "Enhanced Disablement" should not be selected, see chapter “System Properties, Page 2” page 139

[123] Zones can be temporary disabled via the zone control module (if fitted) on the CIE front.

[124] This reset cannot be used in the Australian or New Zealand conventions.

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 a zone, including the manual call points) can be disabled via menu H2/B1 or via the zone control front buttons (if fitted). This menu is also used to disable a conventional zone, i.e. a 3361 unit's Zone Line Input (Z) and expansion board 4580 Zone Line Inputs.

Re-enable via menu H2/B4 or automatic re-enabling at a specified time.

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 Control Output

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

Re-enable via menu H2/B7.

14.15.4 Disable all Control, Ventilation, Extinguishing or Interlocking Outputs

The control outputs of type "Control (general)", "Fire ventilation" and "Extinguishing system" 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-enabled via menu H2/B8.

14.15.5 Disable / Re-Enable Alarm Devices

The control outputs of type "Alarm device (OWS)" can be collectively disabled via menu H2/B9. Disabled outputs will stay in (or return to) the normal condition for the output respectively until re-enabled 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 collectively disabled via menu H2/B10. Disabled outputs will stay in (or return to) the normal condition for the output respectively until re-enabled 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-enabled 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. 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 / annual test via menu H1 or H7. Up to 99 zones can be set in Test mode via menu H7 at the same time but only four zones via menu H1. For more information see the FT128 Operation Manual. The LED "Test mode" on the CIE front indicates one or more zones in Test mode. Zones in Test mode are also simultaneously shown in the FT128 display[125]. 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 normal.[126]

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 is already activated). When the test starts the alarm devices will be turned "ON" for 5 seconds (±1s), "off" for 25 seconds (±1s), "on" for 5 seconds and so on.[127]

Note: Disabled (and silenced) alarm devices will also 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.

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[128], 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 the test will be terminated and the outputs and LEDs will go back to "normal" status.

Note: In the Australian and New Zealand conventions, testing of the routing equipment is conducted via the ASE.

14.19 Calibration of Supervised Outputs

The supervised (monitored) voltage outputs must be calibrated during commissioning of FT128 system. This is done via menu H5/A1. A value outside the calibration range 4K7Ω-50KΩ and 470 nF to 5x470 nF will generate a fault as well as an actual value that differs from the calibrated value ± a small tolerance.

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

[126] Any 2-zone / -address dependence and the function "delayed alarm" will be ignored.

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

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

14.20 Service Signal

A smoke detector becomes contaminated no matter what environment it is mounted in. In a harsh environment, contamination is accelerated.

Conventional smoke detector: The sensitivity will normally increase in most environments. This can result in nuisance alarms since conventional smoke detectors have a fixed fire alarm level. Conventional smoke detectors have no service signal output and have to be replaced on a regular basis (i.e. before being fully contaminated).

Analogue smoke detector: The sensitivity will automatically be constant[129]. **Service signal** will be activated at a fixed **service level**. Service signal will be generated for 430x / 440x in NORMAL mode when the week average sensor value is ≥ 1.8 %/m. For detectors 440x in Advanced mode, the service signal will be generated when the week average sensor value is ≥ 2.0 %/m.

One or more detectors having activated SERVICE signal is indicated by the LED "Service" on the CIE 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 FT128 Operation Manual chapter "Sensors activating SERVICE signal (H4/U4)" and "Acknowledge SERVICE signal (H8/S4)".

14.21 Fault Signal (Fault Condition)

Fault signal, fault messages, fault acknowledge, etc. are described in FT128 Operation Manual, chapter "Fault".

Programmable inputs can be used to activate fault signal in FT128, see chapter Programmable Inputs, page 71.

For faults from zones and alarm points also the Alarm text (see below) will be shown.

14.22 Alarm Texts

The alarm texts are shown in case of a fire alarm.

The display in FT128: On the first row, the **presentation number** for an alarm point will always be shown and on the second row, a user definable **alarm text** for this alarm point will be shown, 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 Alert Annunciation units 1736 and the Ext. Presentation unit 1728: The same information as in FT128 will be shown, if no other alarm text has been programmed, see below.

Presentation number

When an alarm point is activated, both the zone number and the address (**ZZ-AA**) will be shown.

When a Zone Line Input (e.g. on a 4580 board) is activated, only the zone number (**ZZ**) will be shown.

See also FT128 Operation Manual, chapter "Fire alarm".

User definable alarm texts with up to 40 alphanumeric characters are created and downloaded via EBLWin.

[129] 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 97.

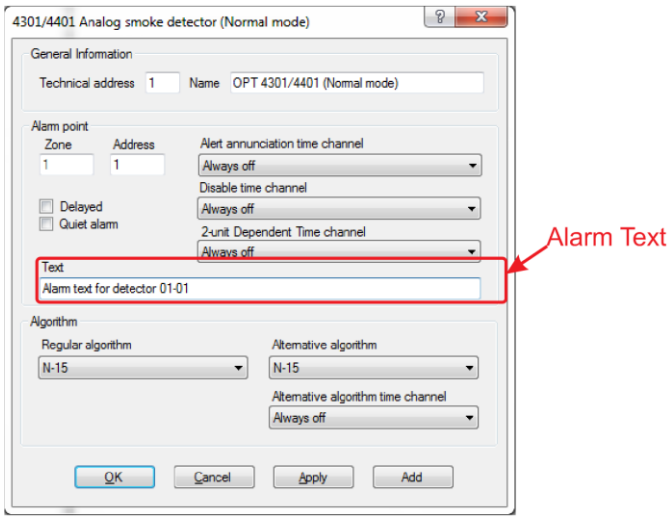
Each addressable alarm point and each zone can have an individual alarm text shown in FT128 display and the same text or another one shown in each Alert Annunciation unit 1736 and Ext. Presentation unit 1728, since specific texts can be downloaded in each unit individually.[130]

14.22.1 Creating Alarm Texts via EBLWin

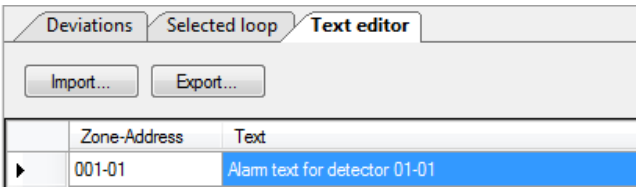
In the dialog box for an alarm point (e.g. a detector), there is a "Text" field where the alarm text for the alarm point can be typed (or edited). This is a custom text that will be displayed on the CIE when this alarm point has activated a fire alarm and as from version 2.0 it will also be shown in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

It is recommended that the text reflects general indicating descriptor where the location of this Zone-Address is e.g. “Main Dining Area” is preferred rather than “Fire in the Main Dining Area” because when the text appears in the fault message, the event is not a fire.

The alarm text can also be edited in EBLWin "Text editor" (menu System | Edit Alarm Texts…).



These texts can be edited in either the alarm point dialog box or the Text Editor. Both text will be synchronised.



Explanation:

Zone-Addres column

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

Shows the already programmed zones, i.e. I/O 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.

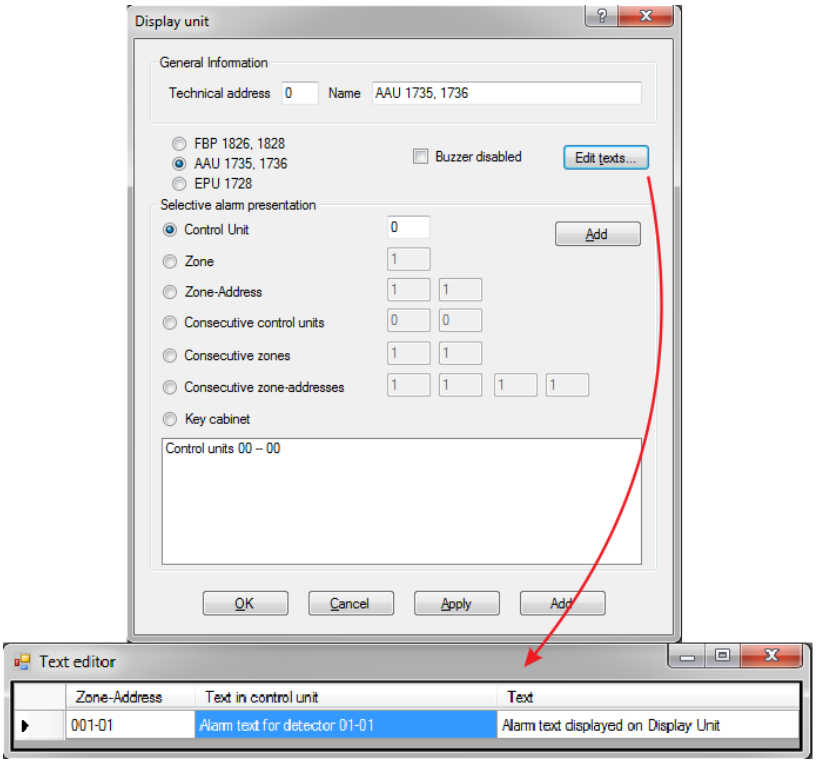
Note: In system FT128 is the highest possible zone number 099 since only two digits can be shown in the display.

[130] Up to 40 alphanumeric characters are allowed in each user defined text entry.

Text Column

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

Note: If any alarm point is required to have a different alarm text in one or more of the "display units" 1736 or 1728[131], the text have to be typed in the EBLWin "Text editor", for the respective "display unit" (Click Edit texts... button in the Display Unit dialog box which will bring up the Text Editor).



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

Zone-Address column

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

Shows the already programmed zones, i.e. MIO unit 3361 Zone Line Inputs 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" 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.

[131] Regarding text priority order etc. see Technical Description (chapter. "User definable text messages") for the "Display Unit" respectively.

14.22.2 Downloading Texts to EPU 1728 and AAU 1736

The "display units" have to be connected to FT128 and the address and mode[132] have to be set in the "display units".

The texts will then be downloaded at the same time as the FT128 site specific data (SSD) is downloaded via EBLWin.[133]

The texts can as an alternative be downloaded in one "display unit" at a time but the PC (with EBLWin) has nevertheless to be connected to FT128.

14.23 Real Time Clock (RTC)

FT128 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 does not have a backup battery, i.e. the date, time, etc. has to be set (via menu H3) after loss of the power supply (no mains and no battery backup) and after software download.

14.23.1 Daylight Saving Time

The time is automatically changed when the Daylight saving time period starts and stops respectively, if set so in EBLWin (system properties / page 2). The daylight saving time will be automatically changed in the AU and NZ conventions as follow:

- **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.

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.

For time channel **1** can no times be set. Default is "Always off" and "Always on" can be selected.

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 analogue 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 146.

14.25 Time Channels 15-63

Time channels 15-63 (external time channel 1-49) are controlled by some external device via a programmable input. Can be used to:

- disable and re-enable alarm points / zones

[132] S/W mode xxxx – **1587**. (xxxx = e.g. 1728)

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

- turn ON (enable) / OFF the Alert Annunciation function
- activate programmable control outputs
- turn ON (enable) / OFF (disable) the alternative alarm algorithm for analogue 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 [134]. When the input is "activated" the time channel (N) is ON.

Note: Do not use more than one input per time channel.

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 171.

14.27.1 Fault: Loss of main power source

This fault can be delayed since the CIE 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).

14.27.2 LCD Backlight

In order to reduce the current consumption, the LCD backlight is normally not turned on during loss of the main power source. However in the Australian and New Zealand conventions, the LCD backlight will be turned on also during loss of the main power source.

14.28 Zone Groups

Zones can be grouped together in a zone group. The zone group is given a name e.g. “Level 2” and then can be used in control expressions to activate outputs e.g. FireAlarmZoneGroup (“Level”).

Maximum 30 zone groups can be defined. Each zone group can contain unlimited number of zones but a zone can only be a member of one zone group.

See also chapter “Zone groups” page 152

Zone groups function is introduced in EBLWin V2.2.0.

[134] Normally low or a normally high for an opto-coupler input.

15 Special New Zealand Functions

Note: The functions in this Section are valid for the New Zealand convention only.

15.1 Alarm Devices

In the New Zealand convention only, the "FIRE" LEDs will indicate steady instead of blinking when the alarm devices are disabled, see below.

15.1.1 Silence Alarm Devices (Inside Switch)

On the CIE front, the button "**Silence alarm devices"** (P3) is called the "**inside switch"** and functions are slightly different in the New Zealand convention, as described below.

The switch toggles between two states:

- **Alarm devices disabled**

  When the button is pressed, all programmable outputs of type "Alarm devices" are disabled e.g. OWS or sounders, strobes, etc. and any new alarms will not re-activate the warning devices.

- **Alarm devices not disabled**

  All programmable outputs of type "Alarm devices" will be enabled, i.e. any alarm can activate the warning devices.

If the "**SILENCE ALARM DEVICES**" switch (inside switch) is left in its disabled state when the CIE door is being closed, the buzzer will beep steady (continuously) and the message "**Silence switch left active**" will be shown in the display. This feature is required in NZS4512 to ensure that the door cannot be closed while the alarm devices are isolated. This message has lower priority than fire alarms but higher than other disablements and faults.

Note: The "**SILENCE ALARM DEVICES**" switch on the front display has no function if the "**Silence Alarms**" Bulgin key in the FT128 cabinet or in the remote fire brigade panel (see below) is turned to the silence alarms position.

15.1.2 New Zealand FB Silence Switch (Outside Switch)

The "New Zealand FB **"Silence Alarms"** switch is called the "**outside switch**" since it is placed outside the CIE. The outside switch is a Bulgin key switch and connected to a programmable input on NZ mimic display board (via 4582) with the trigger condition "**NZ Silence switch**". The fire brigade Bulgin key switch can be in two states:

1. **The Bulgin key switch is turned ON** (i.e. from not activated to activated state).
   - All programmable outputs of type "Alarm devices" are disabled[135], i.e. they cannot be activated. The "Silence alarm devices" (inside switch) has no function (see above).
   - LED's "Fire" (on FT128 front) changes from blinking to steady.[136]
   - The CIE built-in buzzer is silenced.
   - A fault is generated. [137]

   FAULT: FB Silence switch active

[135] Indicated by LED "Disablements".

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

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

2. **The Bukgin key switch is turned OFF** (i.e. from activated to not activated state).
   - The fault “FB Silence switch active” will be “**`Serviced`**.”[138]

   FAULT: FB Silence switch serviced

   - Any fire alarm ("**ALM**") and acknowledged alarm ("**ACK**") will automatically be disabled / isolated i.e. it has to be re-enabled via menu H2/B5-B6. Indicated by LED "General Disablements" on the CIE front.
   - 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

An active fire alarm will automatically change state to "Isolated alarm" when the Bulgin key "outside switch" 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 CIE 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 Section "Battery Protection Functions", page 172.

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 (Auto battery test)

The following battery check is performed:

- The battery charging is turned off for 60 minutes every 24th hour.
- Battery voltage is checked during this 60 minutes period.
- Battery voltage < 24.4 V generates a fault.

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

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 CIE 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 CIE will try to restart. If it was a small temporary disturbance that caused the watchdog fault the CIE might restart and a "restart fault" will be generated as after any restart – otherwise the restart cycle will repeat itself endlessly

15.4 Routing Equipment Isolate (Disable)

If any output for routing equipment (Fire brigade TX or Fault TX) is disabled and the CIE door is being closed, the built-in 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 CIE display.

When a fire alarm is activated in the CIE, it can be acknowledged by pressing the "Acknowledge faults" button on the CIE front.

In the fire alarm list (presented in the LCD), the "**ALM**" will change 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
- Analogue photoelectric smoke detector 4401
- Analogue multi detector 4400

Notes:

The analogue detectors **4401** and **4400** can be set using the address setting tool **4414** in different modes. In this chapter, only the **Advanced mode** is described.

The detectors are factory set to the **NORMAL mode**, see chapters “COM Loop Units”, page 49 and “Functions / Services / Features, page 100.

The analogue detectors **4401** and **4400** will function in NORMAL mode and replace analogue detectors **4301** and **4300** in NORMAL mode respectively. (The analogue detectors 4301 and 4300 cannot use the advanced mode)

The **Advanced mode** can be set with the address setting tool **4414** only i.e. address setting tool **3314** cannot be used.

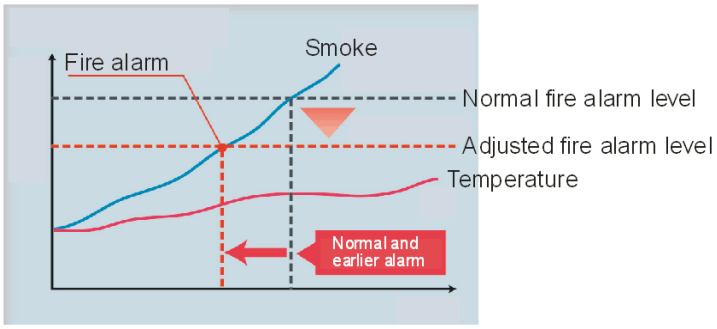
The conventional detector **4452** uses some of the advanced mode functions, see the function respectively below in this chapter.

The **A**rtificial **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 nuisance alarms.

The AI function is dependent 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 adjust the sensitivity (lower alarm threshold level).

Fire alarm activation in conjunction with temperature rise.

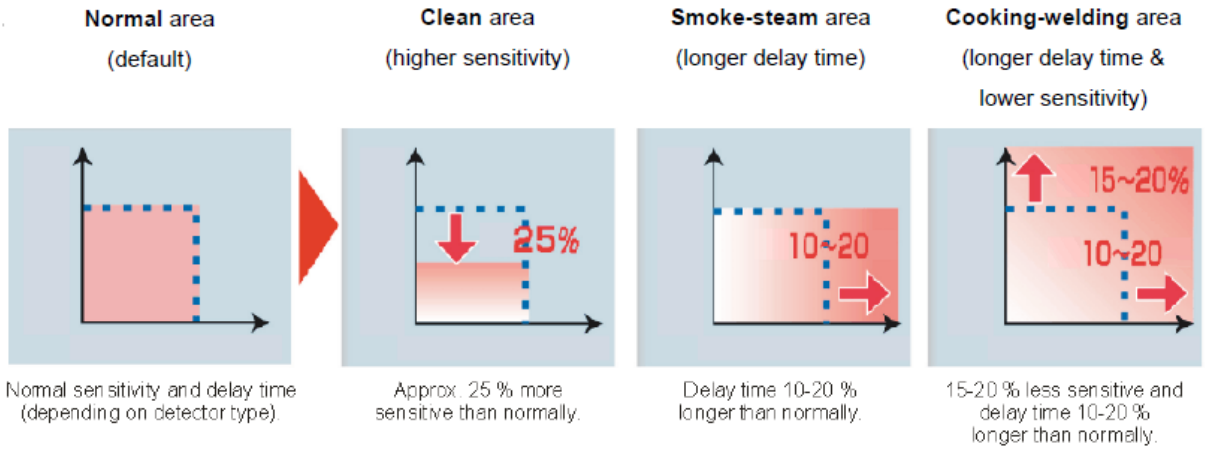


By combined smoke and heat sensing a lower fire alarm level can be used.

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

A **learning function** will adapt after a learning period an Alarm algorithm suitable for the smoke and temperature conditions in the area where the detector is located.

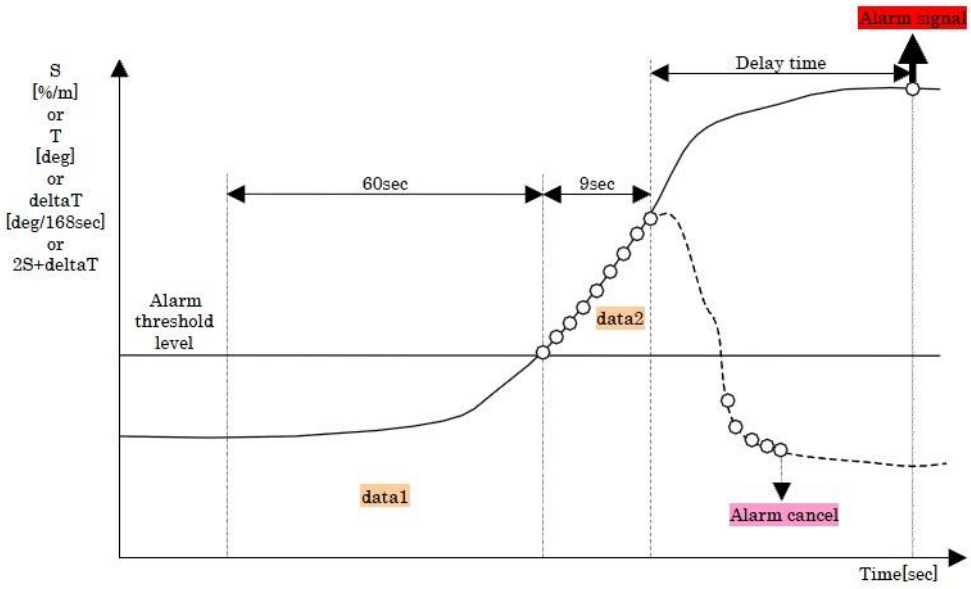
Alarm algorithms for the following areas can be adapted:



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) is not used for alarm activation.

16.1 Pulse Up – Down Counter

The detector has 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 dependent on the **alarm threshold level**, which is dependent 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 CIE

16.3 Alarm Threshold Levels

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

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

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 varies for the different types 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".

Notes:

Maximum 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** [139].

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 dependent on occurrence of smoke, i.e. **level 1 = S** [%/m] **≥** half the fire alarm threshold level (S).
- Heater area, is dependent 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, Level 1

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

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

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

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

After the **36h period** no. 20, the next **learning period** starts again in the **36h period** no. 1. The check-marks are inherited from the previous **learning period**. Depending on whether **level 1** was exceeded or not during the **36h period**, a check-mark or no check-mark will be recorded if it has exceeded and no check mark if it did not exceed.

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 algorithm condition will be changed back to the Normal area alarm algorithm after the **36h period** no. 3, since at that time only two **36h periods** are left with check-marks in the **learning period** now. (should one or more **36h periods** 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 the learning period have a check-mark.)

[139] The Area Alarm algorithm can be set via EBLWin to be either 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.

16.5.1.2 Heating 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 whatsoever.

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 whatsoever.

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** are exceeded or not:

The following is valid for the different type of detectors:

- **4452**: This detector uses not 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 Analogue Data Output

The smoke obscuration value (%/m) and the temperature (°C) can be shown via FT128. 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 analogue 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 CIE.
- **4401**: This detector has a smoke obscuration value output, actual area alarm algorithm output and a CCF (see below) output to the CIE.

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:

1. 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.
2. 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.)

3. 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.
4. A new 18 + 18 = 36 hours period starts with an average value calculation every 13th minute.

Maximum Contamination Compensation Factor (CCF) is 2 %/m. Service signal will then be activated and shown in the CIE.

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 FT128.

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 CIE.
- **4401**: This detector has self-diagnosis of internal devices. A fault message will be shown in the CIE.

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 CIE 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 (Settings)

In EBLWin, please note:

EBL512 G3 = FT1020G3

EBL128 = FT128

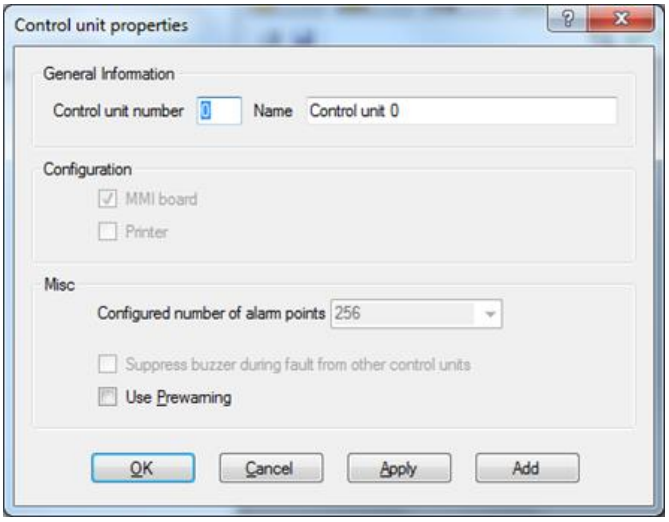


Figure 43 The EBLWin "Control Unit Properties" Dialog Box.

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 FT128 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 FT128.

~~☐ MMI board (default)~~

~~☐ Printer~~

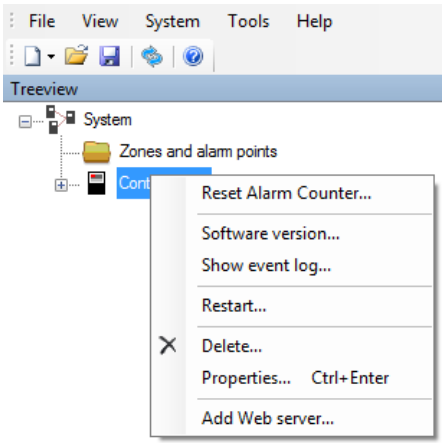
17.1.3 Misc.

Configured number of alarm points: FT128 control unit can only have 256**.**

~~☐ **Suppress buzzer during fault from other control units:**~~ Not valid for FT128.

☐ **Use Pre-warning:** This check box is to be marked if the pre-warning detection is required to 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).

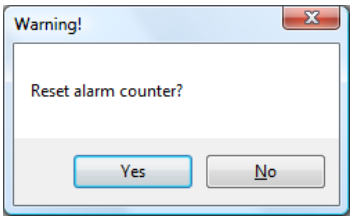
17.2 EBLWin Control unit pop-up menu



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.)

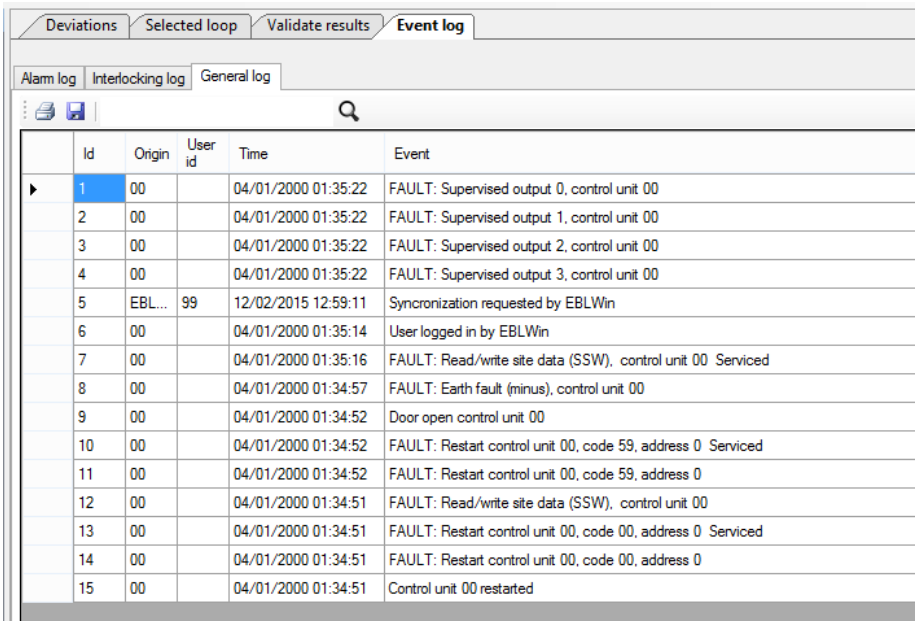


17.2.2 Software version

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.



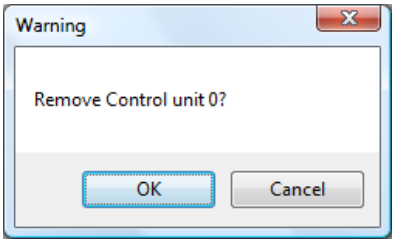
Id	Origin	User id	Time	Event
1	00		04/01/2000 01:35:22	FAULT: Supervised output 0, control unit 00
2	00		04/01/2000 01:35:22	FAULT: Supervised output 1, control unit 00
3	00		04/01/2000 01:35:22	FAULT: Supervised output 2, control unit 00
4	00		04/01/2000 01:35:22	FAULT: Supervised output 3, control unit 00
5	EBL...	99	12/02/2015 12:59:11	Syncronization requested by EBLWin
6	00		04/01/2000 01:35:14	User logged in by EBLWin
7	00		04/01/2000 01:35:16	FAULT: Read/write site data (SSW), control unit 00 Serviced
8	00		04/01/2000 01:34:57	FAULT: Earth fault (minus), control unit 00
9	00		04/01/2000 01:34:52	Door open control unit 00
10	00		04/01/2000 01:34:52	FAULT: Restart control unit 00, code 59, address 0 Serviced
11	00		04/01/2000 01:34:52	FAULT: Restart control unit 00, code 59, address 0
12	00		04/01/2000 01:34:51	FAULT: Read/write site data (SSW), control unit 00
13	00		04/01/2000 01:34:51	FAULT: Restart control unit 00, code 00, address 0 Serviced
14	00		04/01/2000 01:34:51	FAULT: Restart control unit 00, code 00, address 0
15	00		04/01/2000 01:34:51	Control unit 00 restarted

17.2.4 Restart

You can restart control unit via this menu command.

17.2.5 Delete

The selected control unit can be deleted.

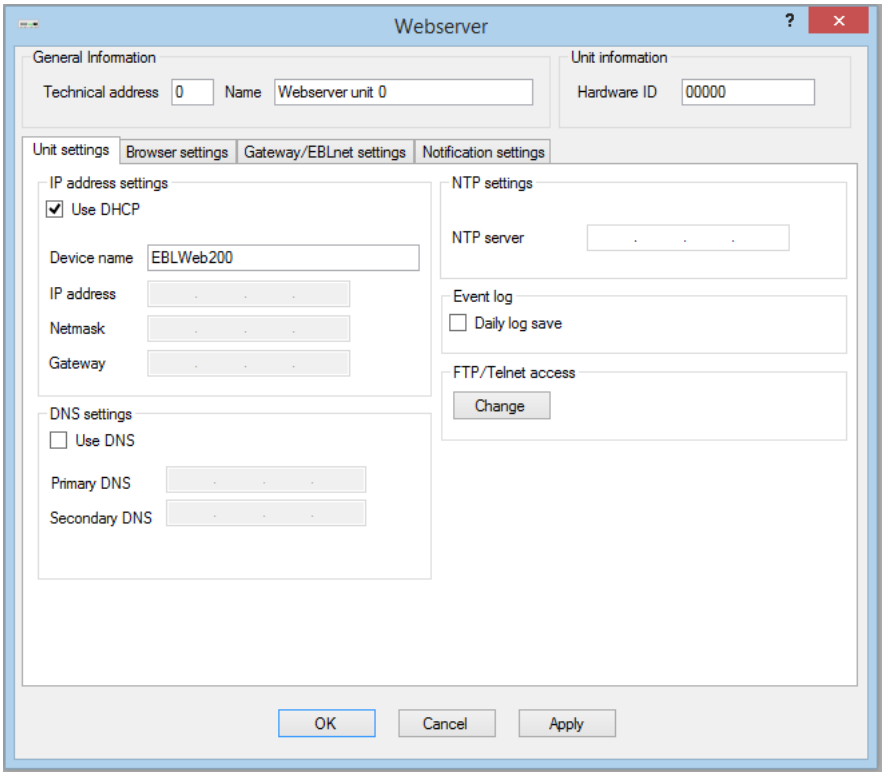


17.2.6 Properties

See beginning of this chapter – Control unit properties dialog box.

17.2.7 Add Web-server

To add a Web-server to FT128, right click on the Control Unit and select “Add Web server”, the Web-server configuration program opens as shown below.



For more information, see Operation and Installation Manual Brooks MA440, EBLWeb V2.1.X for Web-server II, 1598.

18 System Properties (Settings)

18.1 System Properties Dialog Box

To open System properties dialog box as shown in Figure 44, go to the EBLWin menu System | Properties…

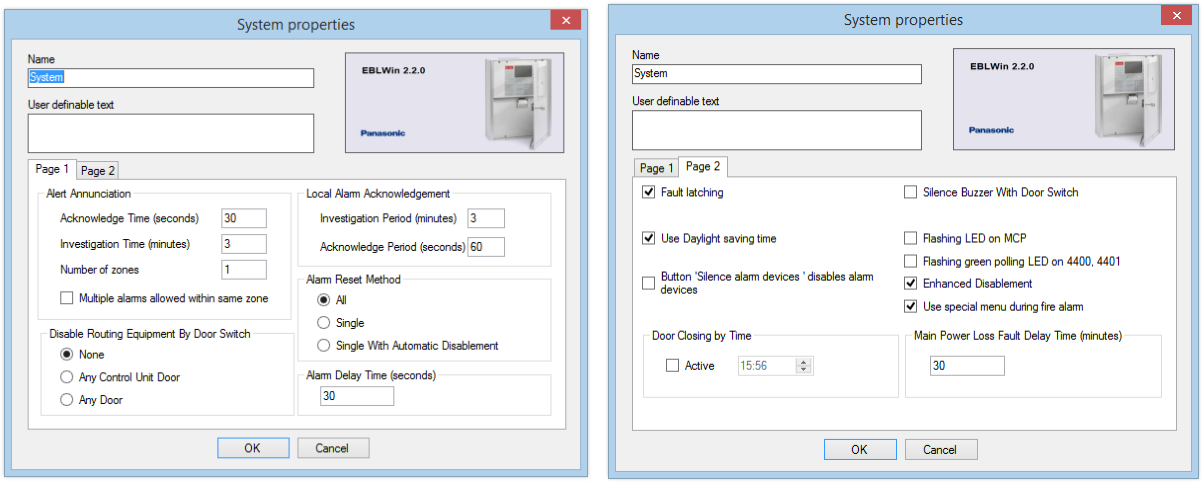


Figure 44 EBLWin System Properties Dialog Box, Page 1 and 2

18.1.1 Name

This field text normally is 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 FT128 Operation Manual.

18.1.3 System Properties, Page 1

18.1.3.1 Alert Annunciation

See also Section “Alert Annunciation”, page 111.

Acknowledgement time: **30 sec.**
Default set at 30 seconds, allowable between 0-120 seconds is possible to set

Investigation time: 3 **minutes.**
Default set at 3 minutes, allowable between 1-9 minutes.

Number of zones: 1

Default set to 1 zone, allowable between 1-4 zones.

- **Multiple alarms allowed within same zone**

Checkbox unmarked (default): only one Alert annunciation alarm is allowed within the zone[140].

Checkbox marked: More than one Alert annunciation alarm within the same zone is allowed.

[140] Alarm from two or more alarm points within the same zone will activate normal fire alarm, i.e. the "Fire brigade TX" output will be activated.

18.1.3.2 Alarm Acknowledgement Facility[141]

Used in conjunction with the Brooks Alarm Acknowledgement Module AAM.

See also chapter “Alert Annunciation Applications

Alarm Acknowledgement Facility (AAF)” page 112.

Investigation period (IP) time: 3 minutes.

Default set at 3 mins, allowable between 1-9 minutes

Acknowledge period (AP) time: 60 seconds.

Default set at 60 seconds, allowable between 10-120 seconds

18.1.3.3 Disable routing equipment by door switch[142]

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 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. 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…

Note: Disable routing equipment via cabinet door must not be used in Australia. The routing equipment can be disabled (isolated) from the ASE.

18.1.3.4 Alarm Reset Method

One of the following alternatives can be selected.

⊙ **All** (default): All fire alarms will be reset simultaneously by pressing the "Reset" button (on the CIE front) once. **This option must be selected.**

○ **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 AS7240.2 standard and should not be used.

○ **Single With Automatic Disablement**: same as "Single" reset but with the Disablement function (see below) as well.

This function is a violation to the AS7240.2 standard and should not be used.

Disablement function: If an alarm point or zone is reset while it is still 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 CIE front is indicating one or more disablements in the system.

[141] In software version ≥ V2.2.0, the alarm acknowledgement facility is called local alarm acknowledgement and used in conjunction with Panasonic LAU instead of Brooks AAM however, the function is typical in both applications.

[142] Disable routing equipment via the door open is not permitted in the AU or NZ conventions. Disabling the routing equipment must be done via the ASE.

18.1.3.5 Alarm Delay Time (Seconds)

Valid for the detectors and Zone Line Inputs with this option selected via EBLWin.

Default set at 30 seconds, allowable between 0-255 seconds.

Note:

The "Delayed" check box in EBLWin software ≥ V2.1.x for conventional Zone Line Inputs has changed to "AVF" in the AU and NZ conventions i.e. when ticked, the Alarm Verification functions will be applied to the smoke detectors within this zone, see chapter "Alarm Verification Facility (AVF)" page 111.

The delay time for analogue detectors starts when the fire alarm normally should have been activated and must be ≤ 30 seconds.

Or

The analogue smoke detectors activating fire alarm will activate an alarm device e.g. 3379 for the delay time period using the new trigger types, see chapter "Specific time delay application" page 110. If the smoke is not cleared within the delay time, the FT128 will go in full alarm condition, in this case the delay can be extended up to 255 seconds. The function is added in EBLWin software ≥ V2.1.2

18.1.4 System Properties, Page 2

- ☐ **Fault Latching** (default): All faults have to be acknowledged as well as corrected faults, this is the default setting in the Australian convention.

  Checkbox not marked, fault is non-latching i.e. Not corrected faults have to be acknowledged but corrected faults will automatically be deleted from the fault list. This option is the default in the New Zealand convention.

- ☐ **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.

  Checkbox not marked = Daylight saving time is not used.

- ☐ **Button "Silence alarm devices disables alarm devices":** The function should not be used in the Australian or New Zealand conventions.

- ☐ **Silence Buzzer with Door Switch:** If the buzzer in the CIE is to be silenced when the door is opened, this checkbox should be marked.

- ☒ **Flash LED on MCP:** The manual call point (type 3333 / 3339 / 4433 / 4409) built-in LED will flash to indicate communication with the CIE

  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 only. The detectors 4400 and 4401 have a green polling LED.

  Always off = The green polling LED is not used.

  Flash when polled = The green polling LED will be blinking 20ms / 7 sec. to indicate the communication with the CIE.

Note: When the detector is in test mode the green polling LED will be turned off until the test mode is turned off

☒ **Enhanced disablements:** Disabled alarm point[143] will not activate pre-warning, fire alarm or fault.

Checkbox not marked = Disabled alarm point[143] will not activate pre-warning or fire alarm. Fault can still be activated.

This is a violation to the AS7240.2 standard.

❑ **Use special menu during fire alarm**: Function, see FT128 Operation Manual "Fire alarm menu (X1-X9)".

18.1.4.1 Door Closing By Time

❑ **Active**: If all fire doors (trigger condition "Fire Door Closing") required to be closed at a certain time every day, this checkbox is to 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 power (230 V_{AC}).

Default set at 30 minutes, allowable between 0-300 minutes.

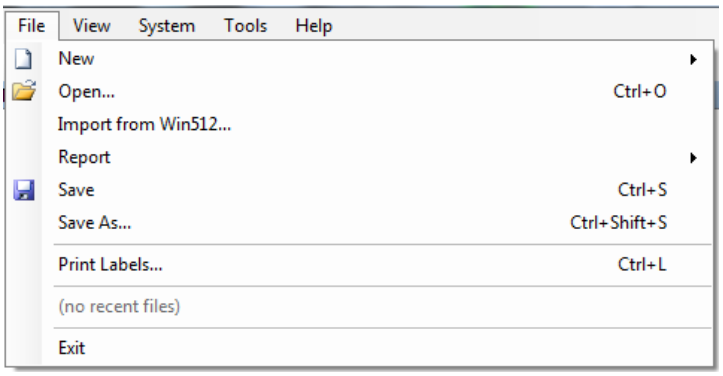
[143] The sensor values for a disabled analogue smoke detector will not be saved.

19 EBLWin menus

When EBLWin is opened, the most recent used / saved (MRU) SSD file will be opened if the checkbox “Open MRU at startup” is selected in the “EBLWin Settings” (Options) dialog box, else a new system will be opened.

Note: If the MRU installation is an FT1020G3 system, a new FT128 system has to be selected via menu “File I New”, see below.

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 (default) **= FT1020G3**

System EBL128 = FT128

19.1.2 Open

To open an installation via a standard Windows dialog box choose Open... . SSD created in 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 FT128.

19.1.4 Report

All reports are exported as a *.htm file that can be saved for later use as a commissioning document.

- **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

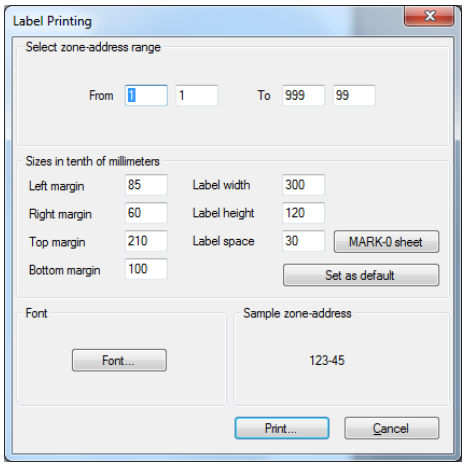
To save an installation (xxxxxx.ebl). The very first time, via a standard Windows dialog box "Save As".

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. change the setting as necessary from the print label dialog box:

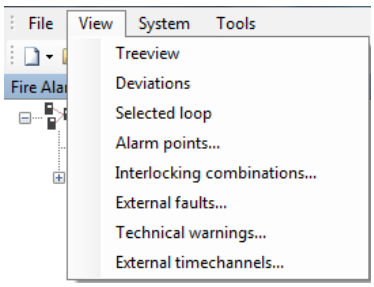


Label holder (3390) should be used for MARK-O sheet settings i.e. Labels for 3390 (3391).

19.1.8 Exit

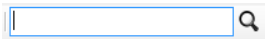
To exit / close EBLWin.

19.2 The View menu

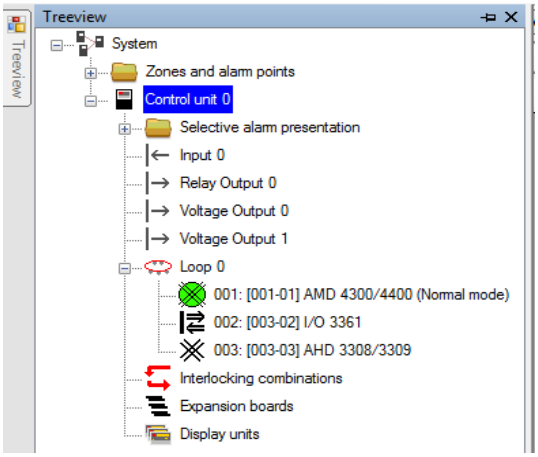


The first time EBLWin is opened after installation, the tree view pane will be visible to the left in the window. on the right pane, the tabs "Deviations" and "Selected loop" will be available by default. More taps can be added from the view menu to display information about Alarm points, Interlocking combinations, etc.

19.2.1 Filter Box

The filter box  will appear in all tabs except when the “Selected Loop” tab is selected. Any text typed in this box is case sensitive. Click on  after the key word is entered.

19.2.2 Tree view



This is opened by default at first start up after installation.

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.

19.2.3 Deviations

To the right of the tree view, the "Deviations" tab in Figure 45 below is available by default. Any list of faults, fire alarms, disablements, etc. can be either printed or saved.

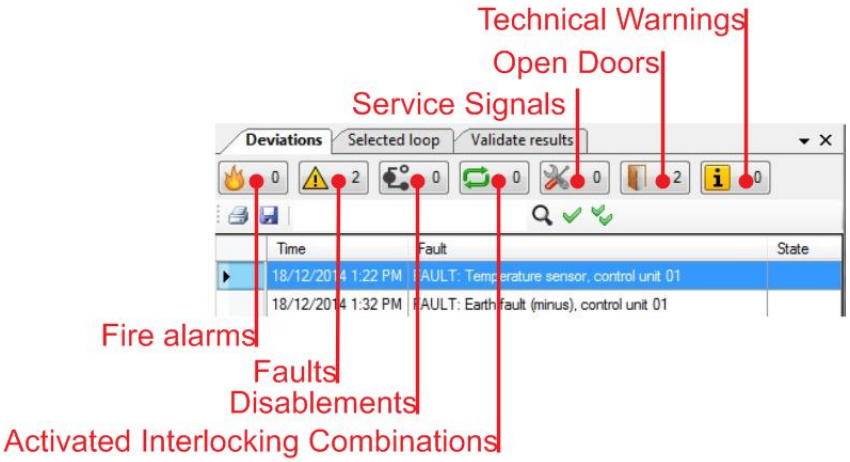


Figure 45 Deviation Tab

Selecting any of the buttons under this tab as shown in Figure 45 above will open a list of the events.

- Acknowledges, resets, re-enables individual items in the lists
- Acknowledges, resets, re-enables all items in the lists. Wednesday

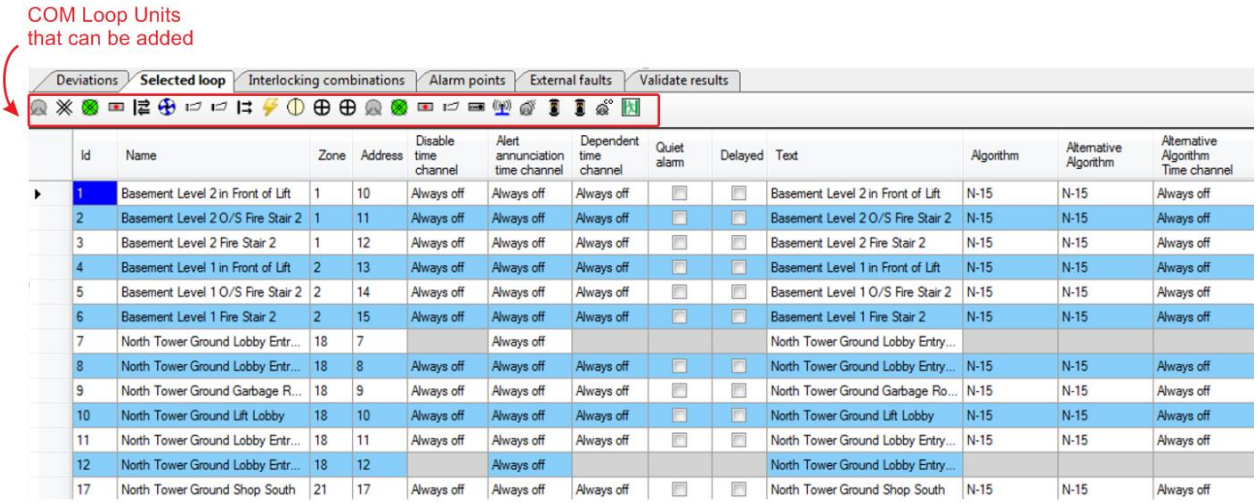
19.2.4 Selected loop

To the right of the tree view, the "Selected loop" tab 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 on the COM loop unit symbol just under the tab to add the unit to the list. Then edit its properties by double clicking on it.

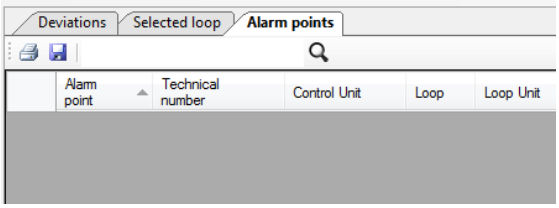
The "Selected loop" list and the tree view will show the same information.



	Id	Name	Zone	Address	Disable time channel	Alert annunciation time channel	Dependent time channel	Quiet alarm	Delayed	Text	Algorithm	Alternative Algorithm	Alternative Algorithm Time channel
▸	1	Basement Level 2 in Front of Lift	1	10	Always off	Always off	Always off	☐	☐	Basement Level 2 in Front of Lift	N-15	N-15	Always off
	2	Basement Level 2 O/S Fire Stair 2	1	11	Always off	Always off	Always off	☐	☐	Basement Level 2 O/S Fire Stair 2	N-15	N-15	Always off
	3	Basement Level 2 Fire Stair 2	1	12	Always off	Always off	Always off	☐	☐	Basement Level 2 Fire Stair 2	N-15	N-15	Always off
	4	Basement Level 1 in Front of Lift	2	13	Always off	Always off	Always off	☐	☐	Basement Level 1 in Front of Lift	N-15	N-15	Always off
	5	Basement Level 1 O/S Fire Stair 2	2	14	Always off	Always off	Always off	☐	☐	Basement Level 1 O/S Fire Stair 2	N-15	N-15	Always off
	6	Basement Level 1 Fire Stair 2	2	15	Always off	Always off	Always off	☐	☐	Basement Level 1 Fire Stair 2	N-15	N-15	Always off
	7	North Tower Ground Lobby Entr...	18	7		Always off				North Tower Ground Lobby Entry...			
	8	North Tower Ground Lobby Entr...	18	8	Always off	Always off	Always off	☐	☐	North Tower Ground Lobby Entry...	N-15	N-15	Always off
	9	North Tower Ground Garbage R...	18	9	Always off	Always off	Always off	☐	☐	North Tower Ground Garbage Ro...	N-15	N-15	Always off
	10	North Tower Ground Lift Lobby	18	10	Always off	Always off	Always off	☐	☐	North Tower Ground Lift Lobby	N-15	N-15	Always off
	11	North Tower Ground Lobby Entr...	18	11	Always off	Always off	Always off	☐	☐	North Tower Ground Lobby Entry...	N-15	N-15	Always off
	12	North Tower Ground Lobby Entr...	18	12		Always off				North Tower Ground Lobby Entry...			
	17	North Tower Ground Shop South	21	17	Always off	Always off	Always off	☐	☐	North Tower Ground Shop South	N-15	N-15	Always off

Figure 46 Selected Loop Tab

19.2.5 Alarm points



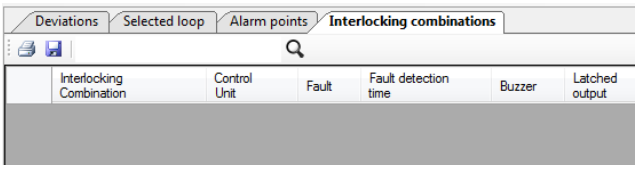
This is a list, for the whole system, showing all alarm points and their properties.

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.

19.2.6 Interlocking combinations



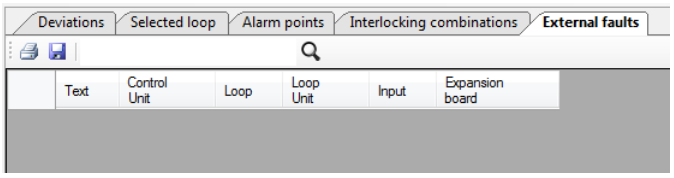
This is a list, for the whole system, showing all interlocking combinations and their properties.

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.

19.2.7 External faults



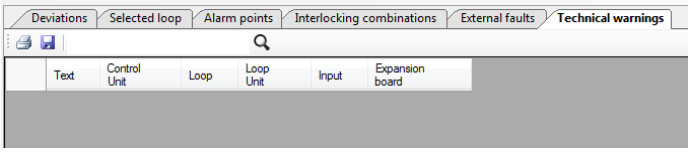
This is a list, for the whole system, showing all external faults and their properties.

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.

19.2.8 Technical warnings



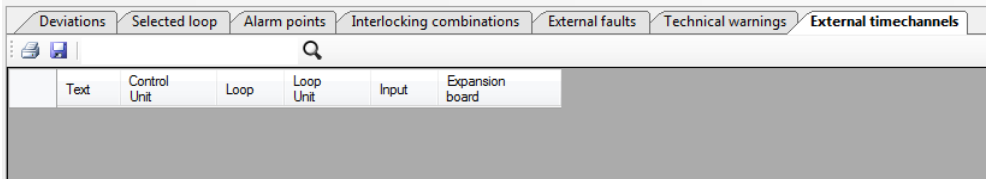
This is a list, for the whole system, showing all technical warnings and their properties.

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.

19.2.9 External time channels



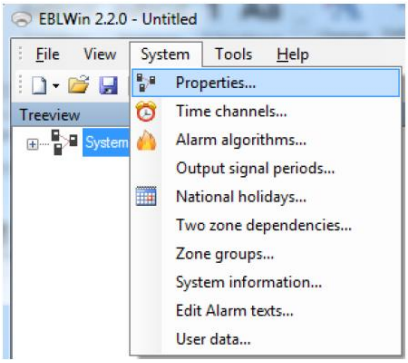
This is a list, for the whole system, showing all external time channels and their properties.

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 44, page 137.

19.3.2 Time Channels

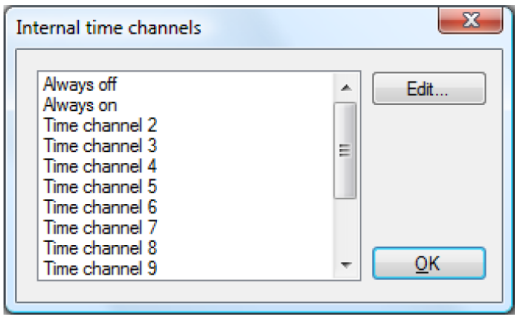


Figure 47 Time Channels Dialog Box.

Time channels Always off and Always on cannot be edited

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
- disable, re-enable and activate programmable control outputs
- set alternative alarm algorithm for analogue 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 channels respectively.

For time channel **2-14** programming, select a time channel in the list (to the left) and click “Edit...”

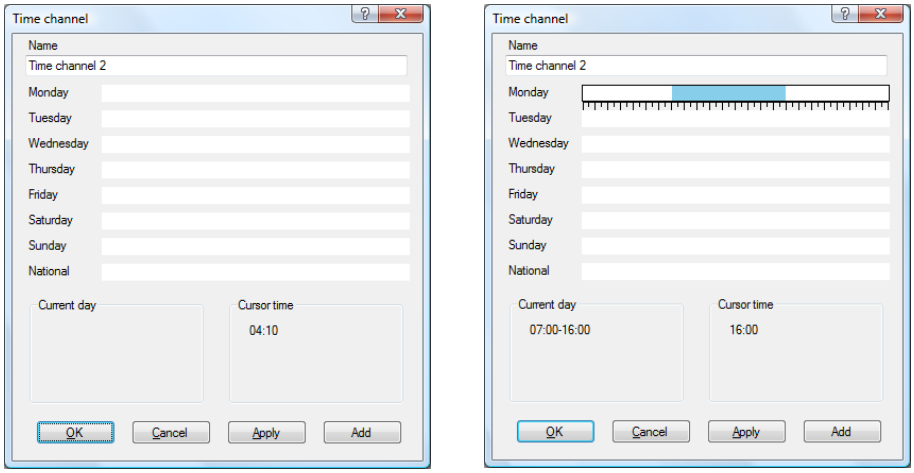


Figure 48 Configuring Time Channels

Figure 48 on the left: The "Time channel 2" dialog box without any programming done. On the right: One time interval is programmed for Monday (time channel 2 is "on" 07:00 – 16:00).

Name: "Time channel n" is default. Normally not changed but informative text can be added e.g. office hours.

Monday: To set the time channel for this day, follow these numbered steps in Figure 49.

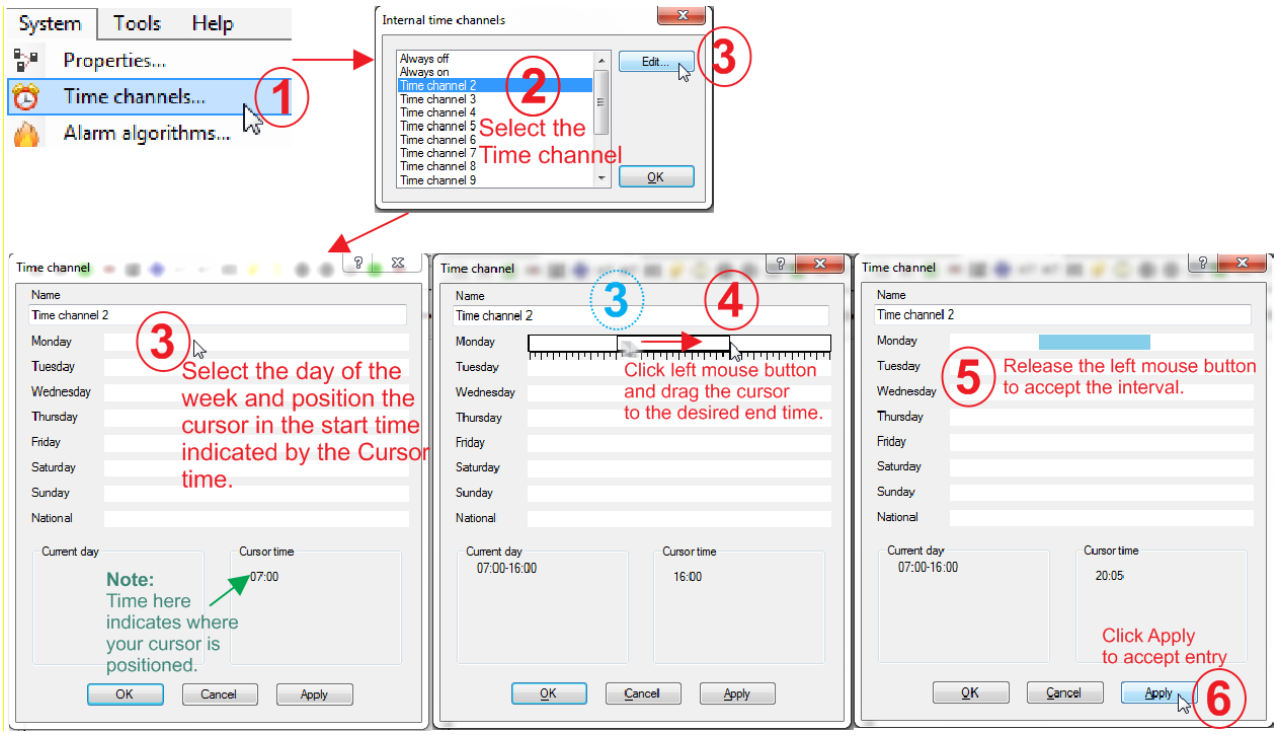


Figure 49 Time Channel Setting

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:

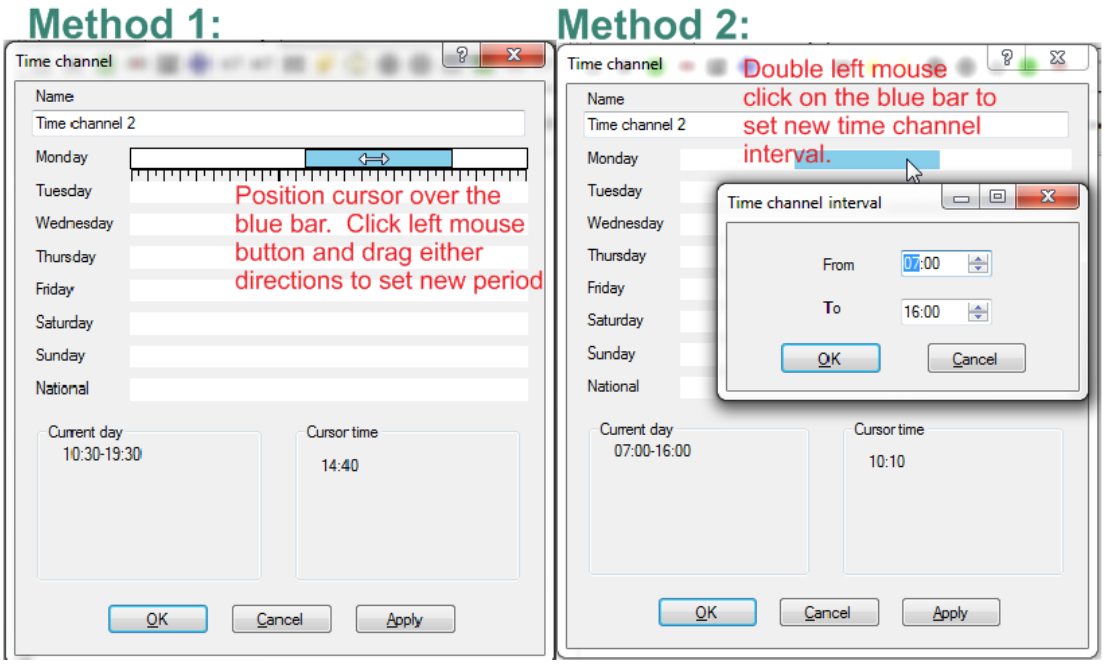


Figure 50 Editing Time Channel Intervals

A time interval can be copied in one day field and pasted into another day field. Click in the blue interval from a selected day, then use Ctrl+C (copy) then Ctrl+V (paste) into another selected day.

All other days are programmed the same way.

National: Programmed the same way as the Monday. See also chapter National Holidays, page 151.

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 to 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 127.)

In Normal mode 440x = 430x.

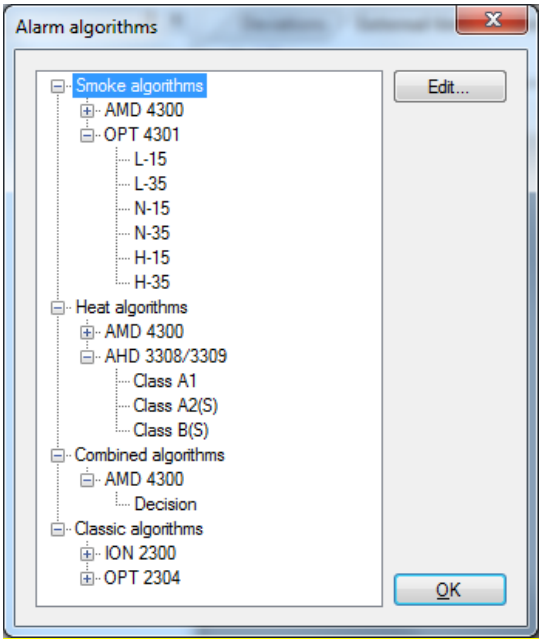


Figure 51 Alarm Algorithms Dialog Box

To open the Alarm Algorithms Dialog Box as in Figure 51, click System | Alarm Algorithms from the EBLWin menu.

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:

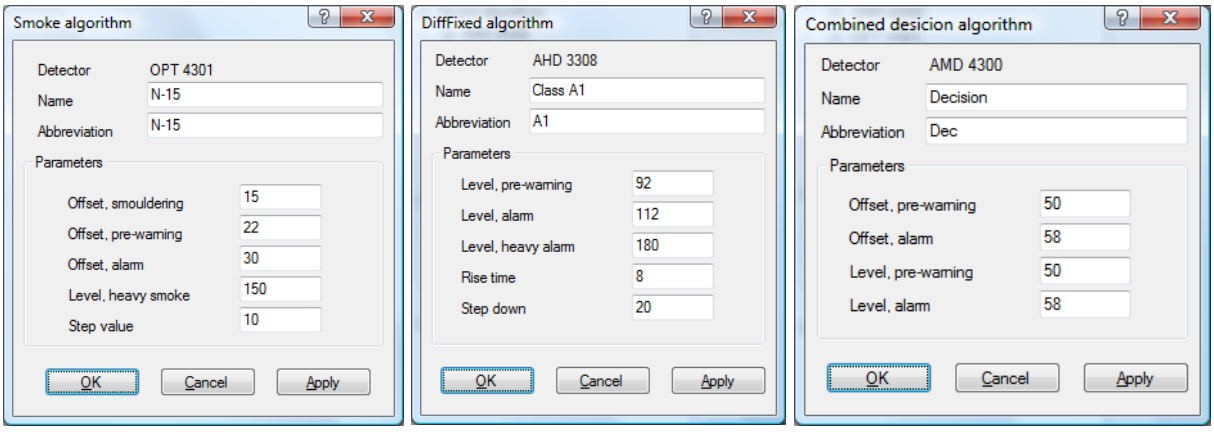


Figure 52 Alarm Algorithms for Various Detectors.

Figure 52 shows 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: abbreviation and Type number (e.g. **OPT 4401** = Analogue photoelectric (**opt**ical) smoke detector, **AHD 3308** = **A**nalogue **H**eat **D**etector and **AMD 4400** = **A**nalogue **M**ulti **D**etector).

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

Abbreviation: The algorithm abbreviation (≤ six characters) as shown in the FT128 display, menu H4/U4 (e.g. N-15, A1 & Dec). 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*).[144]

The step value gives the alarm delay time to the algorithm respectively, see chapter "Functions / Services / Features", page 100.

The following example is for the *N-15 algorithm* for the 4301 detector. The values for other algorithms and the 4300 detector are different.

- **Offset, smouldering**: Offset value, default 15 (1.5%/m).
- **Offset, pre-warning**: Offset value, default 22 (2.2%/m).
- **Offset, alarm**: Offset value, default 30 (3.0%/m).
- **Level, heavy smoke**: Heavy smoke level, default 150 (15%/m).
- **Step value**: Default 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 detectors 3308 / 3309 and the multi detectors 4300 / 4400. All in NORMAL mode.

The "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 Analogue 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 46° C.
- **Level, alarm**: Level, default 56° C.
- **Level, heavy alarm**: Level, default 90° C.
- **Rise time**: Default 8.
- **Step down**: Default 20.

Notes: 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.

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

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 53.

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

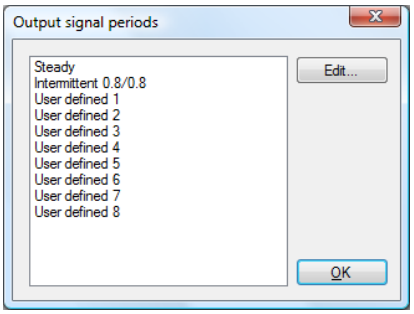


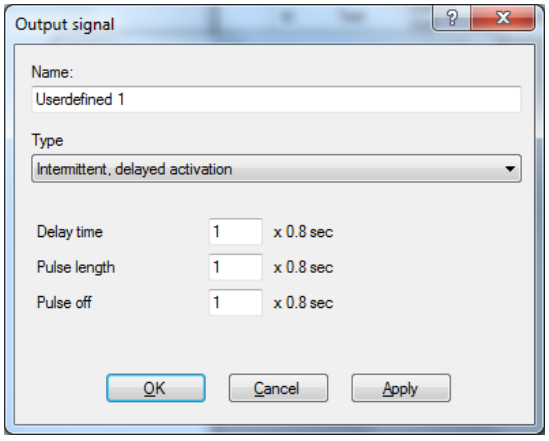
Figure 53 Outputs Signal Periods Dialog Box

See also chapter "Output Signal Period”, page 82.

To open the Outputs Signal Periods Dialog Box as in Figure 53, go to the EBLWin menu System | Output Signal Periods…

In the list shown in Figure 53 above, **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[145]

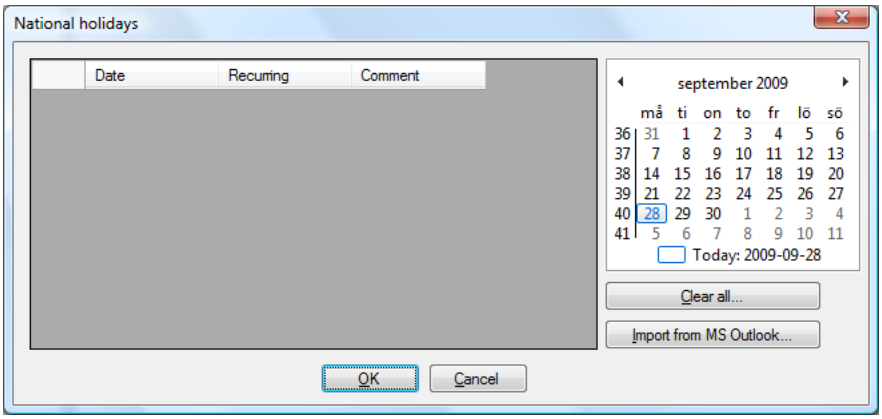


Figure 54 National Holidays Dialog Box

To open the National Holidays Dialog Box as shown in Figure 54, click System | National Holidays from the EBLWin menu.

Up to twenty national holidays can be set for the whole system.[146]

Each national holiday can be added one by one, i.e. by selecting a date in the calendar (up to the right) and click "**Add**" to add a row with the date to 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…**".[147]

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

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

A comment can be added for every date.

[145] Australian government website:http://www.australia.gov.au/topics/australian-facts-and-figures/public-holidays

[146] **NOTE!** ON/OFF times for each time channel (1-14) and every day of the week (incl. national holidays) have to be set.

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

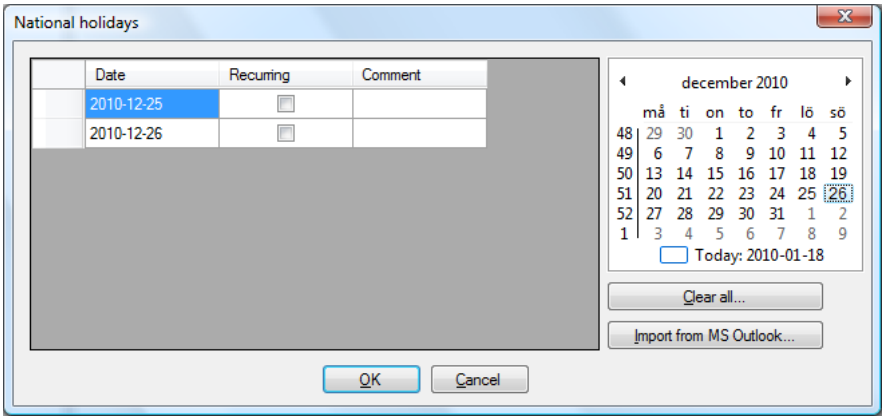
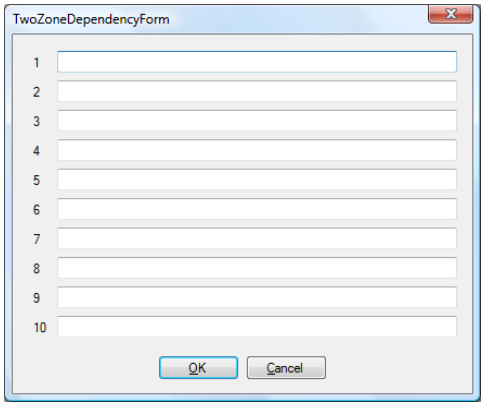


Figure 55 Example Setting for National Holidays

The example in Figure 55, the first row is selected (blue marked). Two "National Holidays" are marked to recur the same date every year.

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

19.3.6 Two zone dependence



See also chapter "2-zone dependence", page 108.

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 analogue / addressable detectors the two-address (unit) dependence should be used.

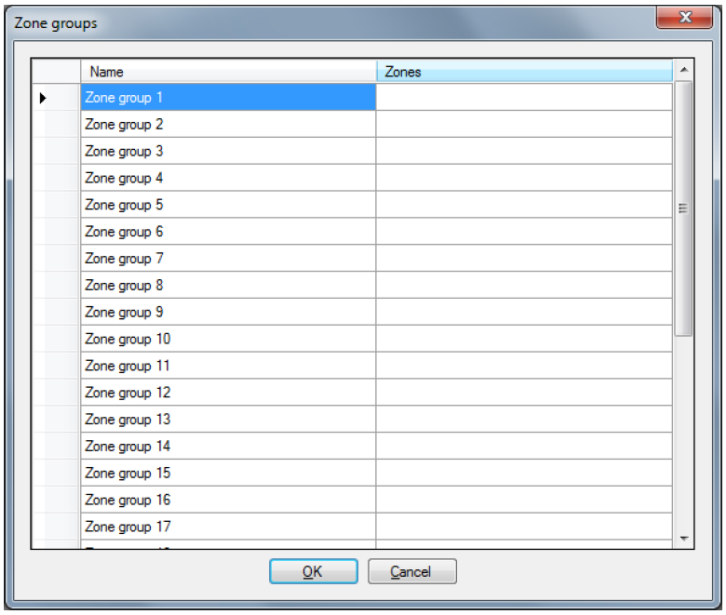
Ten (1-10) groups are available.

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 Zone groups

Thirty zone groups are available as shown in the figure below. The default name zone group 1 – 30 can be changed to provide more descriptive names.



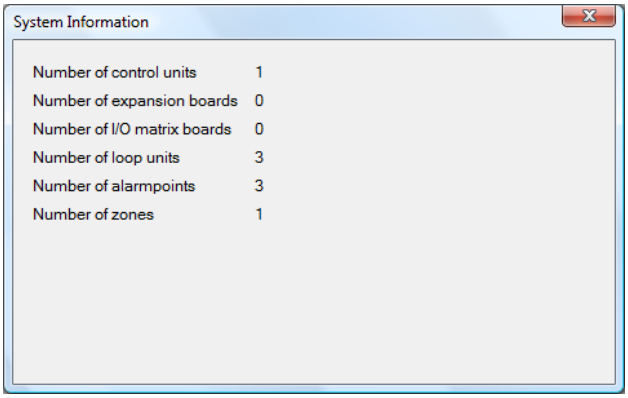
For each zone group, write the zone numbers for the zones that should be included in the zone group in the white field / line. Use comma as a punctuation mark between the zone numbers and a sequence e.g. xxx-yyy.

Default for all zones is that they do not belong to any zone group.

Note: A zone can only be a member of one zone group. A validation error will occur if a zone is programmed to be included in more than one zone group.

19.3.8 System information

A summary of the system configuration is given in this dialog box as shown below:



This gives all that has been programmed so far in the system. The information will be updated when units etc. are added or deleted.

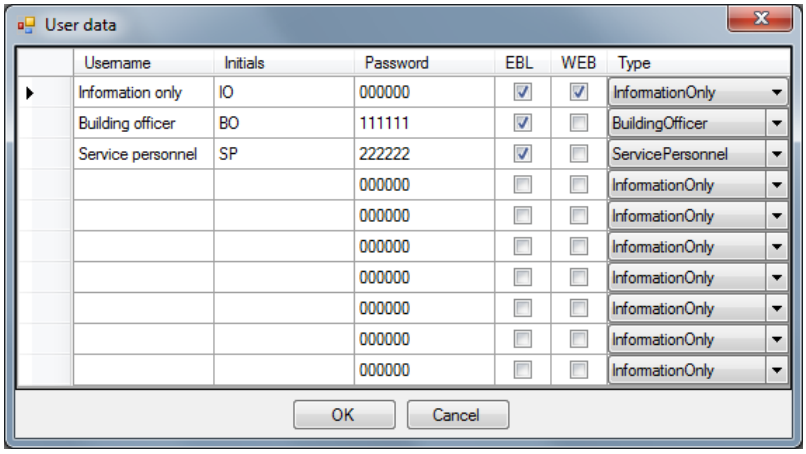
19.3.9 Edit Alarm texts

The user definable text message for each alarm point can be created / edited in the alarm point dialog box respectively or via the menu: Systems | Edit Alarm texts.

19.3.10 User data

To log on to the CIE 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 [148] H9 and H10. (Level 2A)

User level **Building officer** gives access to the menus H1 – H4, H6, H7, H9 and H10. (Level 2B).

User level **Service personnel** gives access to the menus H1 - H10. (Level 3A).

For more information regarding user names, passwords, user levels, logon to a control unit, etc. see FT128 Operation Manual.

19.4 The Tools menu

The EBLWin menu "Tools" is used when the PC is to be connected to FT128 for download / backup etc.

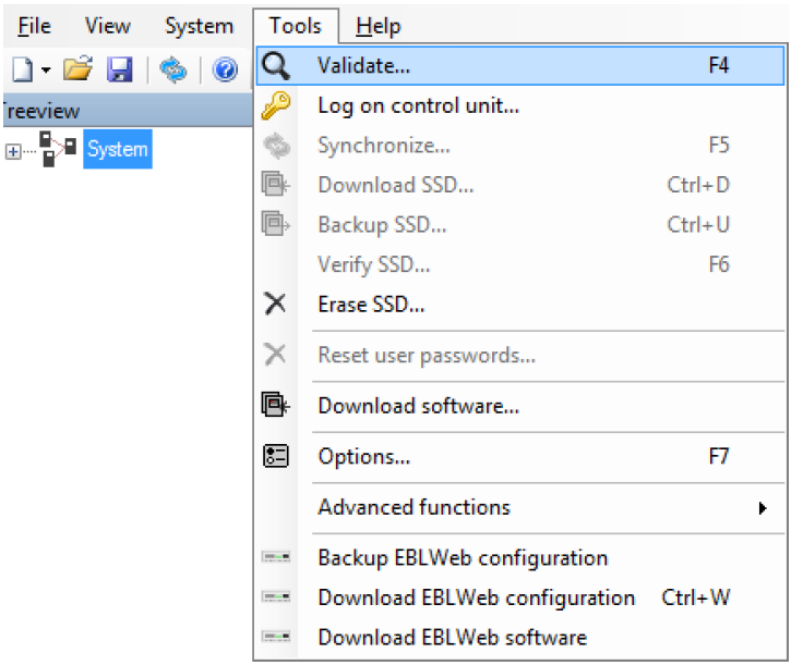


Figure 56 EBLWin menu "Tools".

Some commands are disabled (grey) since they require the PC / EBLWin to be connected and logged on to FT128.

[148] The faults **cannot** be acknowledged on this level.

Validate...: The SSD can be validated at any time, i.e. checked for System Errors, Warnings and violations. A validation will automatically be done before download of SSD to FT128. System Errors have to be corrected before the download can start.

Log on control unit: Log on / Log off to an FT128[149].

Synchronize…: (When connected and logged on to an FT128.) Data (i.e. faults, disablements, etc.) will be synchronized, i.e. the data / information are identical in both the control unit and EBLWin.

Download SSD…: (When connected and logged on to an FT128) opens a dialog box for download of SSD to the FT128 control unit, the Web-server and connected "Display Units" (e.g. 1728).

Backup SSD ("Upload")…: (When connected and logged on to an FT128). Opens a dialog box for backup ("upload") of SSD from FT128 and connected "Display Units" to EBLWin.

Verify SSD…: (When connected and logged on to an FT128.) The SSD shown in EBLWin will be compared with what is actually stored in FT128. If they are the same the checksums = same SSD.

Erase SSD…: (FT128 must be in **boot mode**.) The SSD stored in the FT128 control unit will be erased. Also the SSW (see Operation Manual) will be erased. **NOTE!** An EBLWin key is required.

Reset user passwords…: (When connected and logged on to an FT128.) 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 FT128.) **NOTE!** An EBLWin key 5094 is required. Opens a dialog box for download of an EBL128 S/W file (xxx**.bin**) to an FT128 control unit. (There is one **.bin** file for each convention).

Download 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: Can be one of the following alternatives

- No "Level" selected (default): Alarm algorithm parameters cannot be changed.
- "Level 1" selected: All alarm algorithm parameters, except the fire alarm parameters can be changed.

[149] Log on require the PC to be physically connected to FT128 and an EBLWin key 5094 plugged in the PC.

- "Level 2" selected (a special password is required): Also the fire alarm algorithm parameters can be changed. The convention for the opened installation can be changed in "Options…".

Backup EBLWeb configuration: (When connected to the Web-server TCP/IP). Opens a dialog box for backup of the Web-server configuration to EBLWin.

Download EBLWeb configuration: (When connected to the Web-server TCP/IP). 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 – TCP/IP). For download of the software to a Web-server. **NOTE!** An EBLWin key 5094 is required.

19.5 The Help menu

View help: Opens up Panasonic's Planning Instructions (currently is FT1020G3 Planning Instructions). Please note, some information may not be suitable for the Australian and NZ conventions.

About EBLWin: The EBLWin version and the EBLWin key Id number.

20 Download SSD

Note: An EBLWin USB key must be used to communicate with the control panel and download the SSD using EBLWin V2.x.x.

The **S**ite **S**pecific **D**ata (SSD) for an installation is created (programmed) via the PC program **EBLWin**, which is also used to download the SSD into the FT128, Web-server and/or 1728 & 1736. The SSD will be saved in a file named **xxxxx.EBLWin**. [150]

The EBLWin key is a protection USB device required to log on to the Control Unit, it has a unique number. The EBLWin key identification number will be registered in the control panel event log with the date and time stamp for every SSD download performed in the control panel.

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 FT128. Start EBLWin and open the required 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.

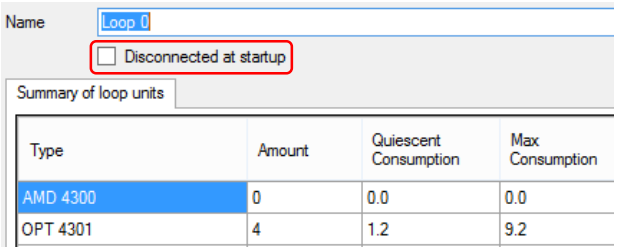
In EBLWin (menu "Tools" | "Download SSD..."), select Control unit "0". SSD can also be downloaded to the Web-server and connected Display Units if the checkbox "Download display units" and "Download Webserver SSD" respectively, is marked.

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 start-up

Normally this function is not used in FT128 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 start-up". The COM loop will then be disabled directly after the download restart and therefore, no faults will be generated.



Note: A COM loop "Disconnected at start-up" can be re-connected via menu H8/S1 but it will then be disconnected again after next restart. Finally the SSD for that control unit has to be downloaded again with the option "Disconnected at start-up" not selected.

20.1 COM loop menu

20.1.1 Check Loop

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 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.

[150] xxxxx = A suitable name of the installation.

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 opened in EBLWin will be listed in EBLWin and can be saved and/or printed out.

"**Unknown device**" means that the type cannot be identified, e.g. faulty unit.

"**Several reply**" means that more than one unit have the same address or due to bad COM loop communication.

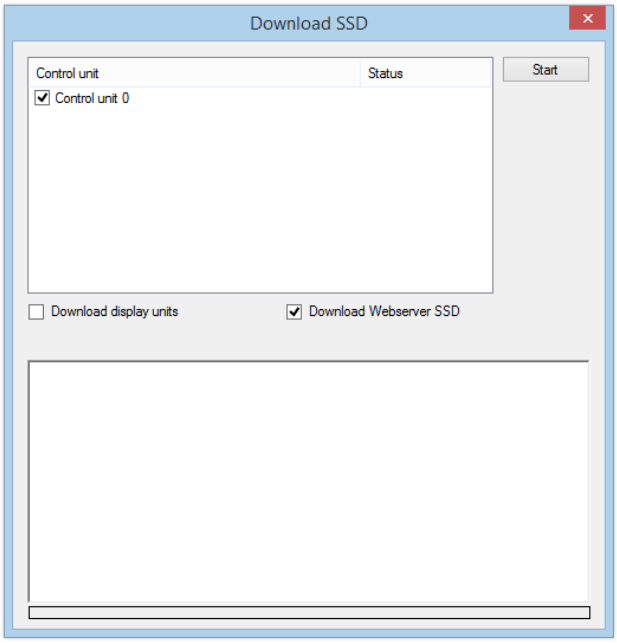
Note: During this check, the COM loop will be disconnected (disabled) and no alarms or faults can be activated. Disconnected COM loop is indicated by the LED "Disablements" (L8) on the CIE display.

20.1.2 Auto generate SSD

If you are on site, the **Auto generate** function can be used to create the SSD. Open a new installation in EBLWin, connect the PC to the RS232 connector J3 in FT128 (on the main board) and log on. [151] Right click on the COM loop and select "Auto generate…". The COM loop units [152] connected on the COM loop will now be identified and listed in EBLWin, i.e. the SSD will be auto generated with default settings for all units (01-01, 01-02, 01-03, etc.), save the installation (SSD). The SSD can now be downloaded (see below) to FT128 directly or be edited before the download.

20.2 SSD download to the Control Unit

Open the required installation (xxxxx.EBLWin) and log on to FT128.151 In "Tools" menu select "Download SSD…" to open the dialog box.



Mark the required check box(es), click “Start”. Information will be shown in the "Status" coulomb and in the large white field. There is a progress bar in the dialog box as well as in the FT128 display:

Downloading in progress……

▮ ▮ ▮ "Progress bar……"

[151] An EBLWin key 5094 (a hardware key) is required, i.e. plugged in a USB port in the PC.

152 Each unit have to be running i.e. be connected, power supplied and the address, mode etc. have to be set. **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).

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: DD-MM Time: HH:MM Serviced

Code 25 indicates a normal restart after a successful SSD download. Acknowledge the restart fault.

If the download was not successful another fault will be generated.

FAULT: Site specific data (SSD)
Date: DD-MM Time: HH:MM

This text message means that the SSD have **not** been downloaded successfully 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 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**.

A fault message for an alarm point, zone or Zone Line Input will also show the alarm text.

21 Download software (S/W)

Note: When existing system requires software upgrade, first, logon to the Control Unit using a compatible EBLWin (or Win128) software version with the existing firmware version in FT128 then conduct SSD backup to save the existing Site Specific Data file. This must be performed prior to any software download.

The latest software version of the EBL128 system software[153] is factory downloaded before the delivery. Due to continual development and improvement, different S/W versions may be found.

The valid (current) S/W version is shown in menu H4/U7 or via EBLWin (Control unit pop-up menu; Software version…).

FT128 can be upgraded with a new S/W version, downloaded on site via EBLWin as well as the display units 1728, 1736. See the 1728 and 1736 manuals respectively.

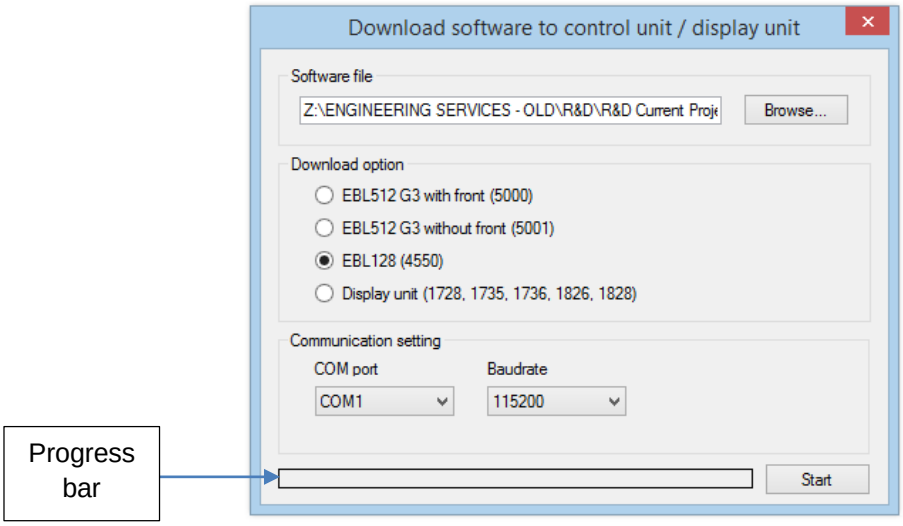
21.1 Software Download to the FT128 (CIE)

Note: Before downloading new software in existing system, SSD[154] backup must be performed using compatible Win and EBL software then saved in the new version of EBLWin.

To download a new software (system program) version, a PC and **EBLWin** [155] are used. The .BIN file that to be downloaded contains both the software and a text file i.e. there is one .BIN file for each convention (AU or NZ).

Before download, the PC has to be connected to the RS232 connector J3 in FT128 (on the main board). Check that the EBLWin key is plugged in a PC spare USB port in your PC.

1. Start EBLWin. Do not Log on to FT128. In the "Tools" menu select "Download Software…" to open the dialog box and do the required settings as shown below.



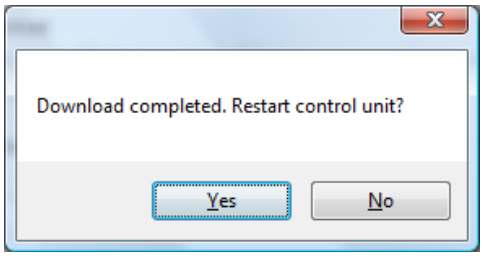
2. Select the path and the Software file to be downloaded, e.g. **Australian_EBL128_220**.bin. (220 = version 2.2.0)
3. Select “EBL128 (4550)”
4. Select the "COM port" to be used on your PC.

[153] The software (firmware) is the system software and always uses “EBL” abbreviation.

[154] It is highly recommended to make a copy of the SSD file in its original version as well.

[155] To logon to the control unit and to download software, an EBLWin key (5094) is required in a PC spare USB port.

1. Select a Baud rate (normally 115200) and baud rate (normally 115200. If the download is not successful, the baud rate might be high, use slower rate and try again.
2. Set FT128 main board in "boot" mode i.e. on the main board, up to the left, push on the jumper onto the two pins marked "**BOOT**" (JP2) and then momentarily short the pins "**RESET**" (JP1). The buzzer sounds continuously. The Main board is now in "boot" mode.
3. Start the download, i.e. click "Start", the buzzer stops sounding. The download status is indicated in the progress bar.
4. When the progress bar changes colour from “red to green”, the download is completed and the following dialog box opens:



5. Remove the jumper from the two pins marked "BOOT" (JP2).
6. Click "Yes" and the control unit will restart. Regarding the restart, see also the Operation Manual, chapter "Restart". (Restart code 00.)

   LED "Operation" (L5) on the front shall now be turned on

   After the restart, fault is acknowledged, all LEDs on the front (except LED "Operation") should normally be turned off.

22 Cable Types

A fire alarm installation is a safety system and it is important that the cables used are suitable and of the correct types. Fire alarm cables should, when possible, be installed as far as possible from mains power cables or any other cables that may generate noise or have strong EMF in order to avoid disturbances from these cables.

The maximum cable length is dependent on the cable type e.g. cross sectional area, units current consumption, etc.

22.1 COM Loop Cables

Loop topology is used for highest safety, i.e. the cable connected in FT128, returns back to FT128. In case of a single break on the loop, communication starts on both directions and a fault is generated, a fault message will also be displayed.

The cable length is dependent on the number and type of loop units, type of cable, etc. See chapter “FT128 cable length calculation” page 164 and drawing number F784-01 and F784-02.

Note: For applications where the environment is noisy, screened cable is recommended. If screened cable is used, the screen should be connected close to each loop unit and only incoming (or outgoing) screen to the CIE earth point.

In order to maximise the COM Loop cable length, Brooks recommend using 7/0.52mm (1.5mm^2) twisted pair (shielded or unshielded) e.g. Brooks BAC0898 1.50mm^2 TPS 2 Core Twisted cable unshielded or equivalent.

When feeder line is required, use suitable multi core twisted pair cable 1.5mm^2.

22.2 Remote Display Units Cables

For RS-485, CAT5 (twisted) cable can be used, cable length ≤ 1200 m to the furthest away situated external EPU / AAU.

For 24VDC supply, Cable type Brooks BAC0898 1.5 mm^2 is recommended (or equivalent).

22.3 Conventional Zone Line Cables

Zone expansion board 4580 and Multipurpose I/O unit 3361, recommended cable is Brooks BAC0898 1.5 mm^2 or equivalent. Refer to Table 15 below.

22.4 Alarm Device Cables

Alarm devices (OWS, strobes, external sounders, etc.), recommended cable is Brooks BAC0898 1.5 mm^2 twin TPS or equivalent unless fire rated cables required.

When feeder line is required, use suitable multi core twisted pair cable 1.5mm^2. Refer to Table 15 below

Note: Addressable Alarm devices e.g. 3379, 4477, etc. are connected directly on the COM loop.

22.5 Other Equipment Cables

Intrinsically safe equipment for hazardous areas, RIL, MDH, etc, recommended cable Brooks BAC0898 1.5 mm^2 twin TPS or equivalent.

The maximum cable length and maximum COM loop current, are dependent on the number and type of loop units and the type of cables used. The cable length for the COM loop is the total cable length from the CIE and returning back to CIE thus completing the loop.

Since the COM loop cable length is dependent on the number of units and their current consumption the figure in the table is for the maximum number of COM loop units i.e. 255 units and 350mA.

Table 15 below summarises the different cable types required and the maximum cable length allowed.

Table 15 Summary of Recommended Cables

Connection type	Cable type	Conductive surface area	Resistance/km	Cable length
Com Loop	Twisted pair	1.5mm^2	11.9 Ω/km	1300m
Conventional Zone	Flat pair	1.5 mm^2	11.9 Ω/km	1000m
		1mm^2	24 Ω/km	650m
Alarm Devices	Flat pair	1.5 mm^2	11.9 Ω/km	1000m
		1mm^2	24 Ω/km	650m
Display Units (RS485)	CAT5 for data	0.5 mm^2	0.5 mm^2	1200m
	Twisted pair for power	1-1.5 mm^2	1-1.5 mm^2	1200m
Other cables	Flat pair	1mm^2	24 Ω/km	650m

23 FT128 cable length calculation

23.1 COM Loop Cable Length

On the COM loop, up to 255 COM loop units can be connected (i.e. address 1-255). The cable length and maximum COM loop current are dependent on the number and type of loop units and cable type, see Figure 57 page 165. Brooks recommends 1.50 mm^2, twisted pair cable or equivalent for the COM loop. Brooks BAC0898 is available in the following size reels:

Reel Length (meters)	Brooks Part Number
100	BAC0898
200	BAC0898/200
250	BAC0898/250
500	BAC0898/500

The cable specifications for these 1.5mm^2 twisted cables are:

- DC Cable Resistance: 11.9 Ω/Km per conductor at 20°C.
- Cable capacitance: 50pF/m at 1MHz.

Generally, the **maximum allowed loop current is 350mA** while the maximum allowable loop resistance is 42.3Ω.

This maximum loop current should be taken into account when calculating the maximum loop cable length. Either use the graph in Figure 57 “COM Loop Current Consumption vs. Cable Length” page 165 or use this equation that represents the graph to calculate the cable length.

Calculations of the maximum allowable distance from the control unit to the furthest end or the total COM loop distance are based on the above specifications. Note that these calculations do not take into account device loading along the loop.

Excel sheet

An Excel spreadsheet 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 maximum current consumption for the COM loop units.

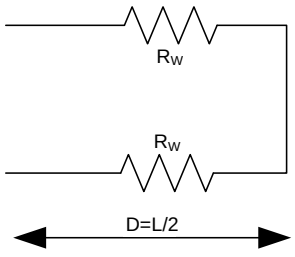
Example:

A fire alarm manufacturer (Panasonic) specifies a maximum allowable loop resistance of 42.3Ω. What is the maximum allowable distance from the control unit to the last device if Brooks BAC0898 stranded, un-coated copper wire was used? How does this change if the temperature is increased to 80°C?

$R_{max} = 42.3\ \Omega = 2R_W\ \Omega$

$R_W = R_u D\ \Omega$

$R_{max} = 42.3\ \Omega = 2R_u D\ \Omega$



Given that,

$R_u = 11.9\,\Omega/1000m = 0.0119\ \Omega/m$

$T_{ref} = 20°C$

Therefore, the maximum allowable distance

$$D = \frac{R_{max}}{2R_u} = \frac{42.3}{2(0.0119)} = 1777\ m$$

If the temperature was raised to 80°C, we would expect that the resistance would also increase. The relationship between resistance and temperature is given by,

$$R = R_{ref}[1 + \alpha_{cu}(T - T_{ref})]$$

Where,

R = Resistance per unit

R_{ref} = Resistance per unit at a reference temperature

Coefficient of copper $\alpha_{cu} = 0.00323$

T = Actual temperature

T_{ref} = Reference temperature

Hence, calculating for this gives:

$$R = 0.0119[1 + 0.00323(80 - 20)]\ \Omega/m = 0.0142\ \Omega/m$$

Therefore, the new distance would be:

$$D = \frac{42.3}{2(0.0142)} = 1489\ m$$

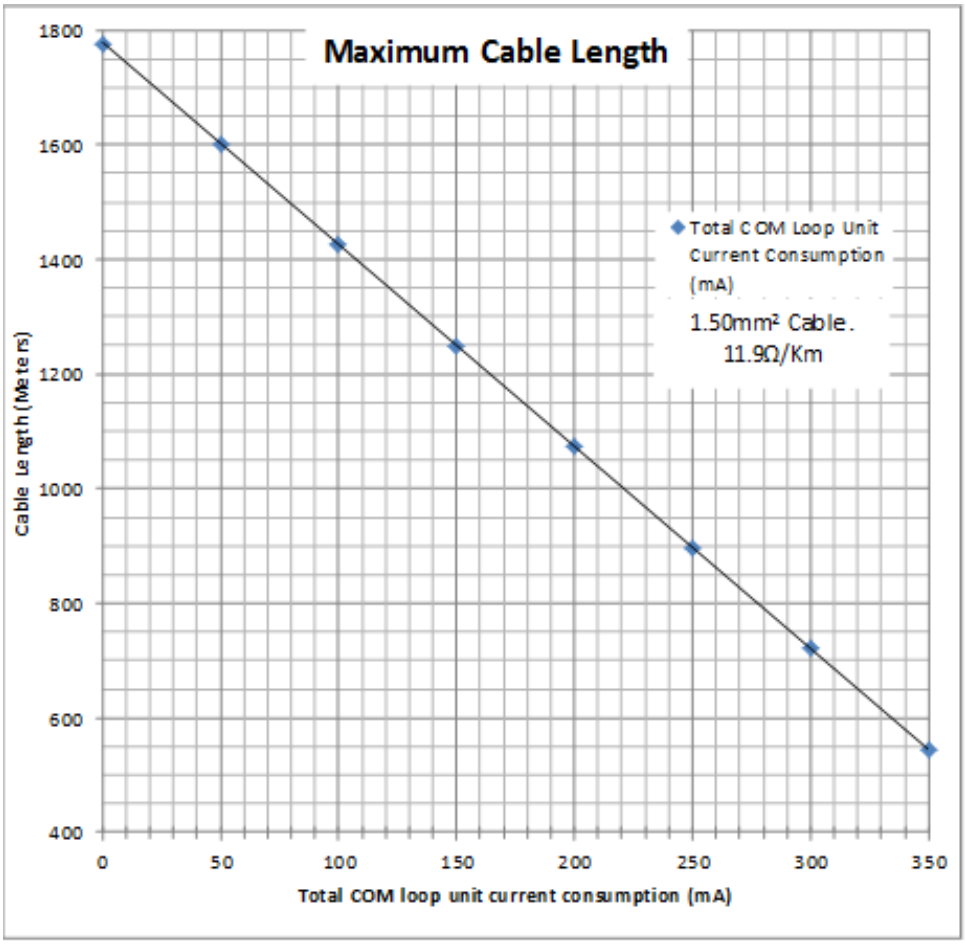


Figure 57 COM Loop Current Consumption vs. Cable Length

The total COM loop unit current consumption is increased as the number of units are added to the loop. Refer to “Current Consumption” page 168 as details are given as to how much current is consumed by each unit as they are added to the loop. Use the FT128 current calculation spread sheet to calculate the expected total current consumption before using this graph in Figure 57.

23.2 Cable Length Calculations for 1728 and 1736

Up to 8 display units type 1728 and/or 1736 can be connected (if 4552 module is fitted) depending on the cable (type and length) being used.

Brooks recommendations:

Cable type Brooks BAC0898 1.5 mm^2 twisted pair for the 24V supply and for RS485. However other twisted pair cables with minimum 0.5 mm^2 can be used for RS485 e.g. category 5 (CAT5) cables, normal CAT5 cable resistance is 188Ω/Km (ensure cable resistance < 500 Ω / Km). RS485 cable length **must not** exceed 1200 metres.

In order to reduce noise immunity due to noisy environment, it is recommended to use CAT5 with shield and terminate the shield in the CIE

Note: End of line resistor on the last unit is 120 Ω, this must be set in the last unit using jumper link in the unit, refer to the Technical Manual for 1728 and 1736.

For ease of calculation, it is recommended to use 2 pairs of Brooks BAC0898 twisted pair cable for 24VDC supply and RS485.

See Table 16 page 167, this should be the benchmark against other alternative cables if other cables are used.

Wire resistance for this cable (R_u), is approx. 11.9 Ω / Km at 20°C.

The current consumption of these units are given in Table 16 page 167. Typically, calculations are based on their “Active State”. For the External Presentation Unit 1728 to continue working under worst case scenario, i.e. mains failure and system is relying only on the back-up battery. The battery voltage should not drop below 12VDC and should still be able to deliver the active current consumption (88mA). Here is an example to calculate the cable distance from the CIE to the last 1728 unit under these conditions (assuming that only 1728 units are connected and Brooks cable BAC0898 was used

Current consumption of each 1728, I_{unit}	=	0.088 A
Voltage of 1728 in "Active State", V_{act}	=	12 V
Number of units required	=	8
Nominal battery voltage, V_{batt}	=	24 V
Maximum allowable battery voltage drop, V_{drop}	=	V_{batt} - V_{act}
	=	24-12 V
	=	12 V
Total current consumption for 8 units, I_{total}	=	8x0.088 A
	=	0.704 A
Allowed cable resistance, $R_{allowed}$	=	V_{drop}/I_{total} Ω
	=	12/0.704 Ω
	=	17.05 Ω
R_u, for BAC0898 1.5mm^2 twisted pair wire resistance was given as	=	11.9 Ω/Km
The maximum cable length for 8 units, L	=	$R_{allowed}$ (Ω) / R_u (Ω/Km) Km
	=	17.05/11.9 Km
	=	1.432 Km

Note: The total length of the cable must be limited to 1200 metres although the calculation result is 1432 metres.

Table 16 Distance away from CIE that Display Units can be located.

Cable Type	BAC0898				SMA2704			
	Wire Resistance Ru at 20° C		**11.9**	**Ω/Km**	**Wire Resistance Ru at 20° C**		**21**	**Ω/Km**
	c.s.a. of cable = 1.5mm²				c.s.a. of cable = 1mm²			
Unit	**1728**		**1736**		**1728**		**1736**	
I_{unit} (A)	0.088		0.079		0.088		0.079	
V_{batt} (V)	12		12		12		12	
No. of units	Allowed cable resistance $R_{allowed}$ (Ω)	Max. distance from CIE, D (metres)	Allowed cable resistance $R_{allowed}$ (Ω)	Max. distance from CIE, D (metres)	Allowed cable resistance $R_{allowed}$ (Ω)	Max. distance from CIE, D (metres)	Allowed cable resistance $R_{allowed}$ (Ω)	Max. distance from CIE, D (metres)
8	17.05	1200	18.99	1200	17	812	19	904
7	19.48	1200	21.70	1200	19	928	22	1033
6	22.73	1200	25.32	1200	23	1082	25	1200
5	27.27	1200	30.38	1200	27	1200	30	1200
4	34.09	1200	37.97	1200	34	1200	38	1200
3	45.45	1200	50.63	1200	45	1200	51	1200
2	68.18	1200	75.95	1200	68	1200	76	1200
1	136.36	1200	151.90	1200	136	1200	152	1200

Table 16 was tabulated based on the calculation example given previously under the same conditions described above. This pre-calculated table serves as a quick estimate for the cable length to the number of Display Units that can be used depending on the selected cables.

If a cable with a reduced conductor area is used, the wire resistance (Ω / Km) will be higher and the possible cable length will be shorter. The display units RS485 bus uses RS485 communications standard. Therefore, the maximum distance from the CIE for any number of Display Units should not exceed 1200 metre even though calculations show otherwise.

24 Current Consumption

An Excel spread sheet is available from Brooks Australia to calculate the total current consumption of the CIE and the battery capacity required. The spread sheet will return your expected current consumption, cable length, battery capacity etc. based on the COM loop cable resistance (Ω/km) and the specific units expected to be connected to the COM loop.

The 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 length, etc. See drawing F784-01, F784-02 and chapter “FT128 cable length calculation” page 164.
- To check if the battery capacity is sufficient.

The current consumption is normally shown at nominal voltage (24 V_{DC}) in **Normal state** (quiescent) and in **Alarm state** (active). When the mains fail, the voltage of the battery back-up can be 21– 27 V_{DC}[156].

See also Section “Power Supply”, page 171.

Table 17 FT128 and CIE Options Current Consumption

CIE Units	**Normal State** (quiescent) (mA)	**Alarm State** (active) (mA)
Control unit FT128 (backlight off/on) [157]	51/109	67/125
8 zones expansion board 4580 (PCB 2B) [158]	22.2	22.2
8 zones expansion board 4580 (PCB 3A) [159]	15	15
8 relays expansion board 4581	15	15
Inputs / outputs expansion board 4583, no units connected	15	15
RS485 transceiver (communication module for display units) 4552	14	14
Web-server 1598	60	65

The Control Unit current consumption shown above are measured using only backup batteries i.e. no mains.

[156] However, there will be a voltage in the system down to a battery voltage of approx. 15 V before it switches off in order to avoid damaging the batteries.

[157] Control unit only, i.e. the COM loop units' current consumption and other connected external equipment's current consumption are not included.

[158] Add 3.5 mA (quiescent) and 12 mA (activated) respectively, for each Zone Line Input used.

[159] 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.)

Table 18 COM Loop Output Units Current Consumption

COM loop units (input / display units)	**Normal state** (quiescent) (mA)	**Alarm state** (activated) (mA)
Analogue heat detector 3308 + Analogue base 3312[160]	0.3	2.3
Analogue heat detector, enclosed 3309[160]	0.2	1.7
Analogue multi detector 4400 + analogue base 3312	0.3 [161]	1.3 [162]
Analogue smoke detector 4401 + analogue base 3312	0.3 [161]	1.3 [162]
Analogue multi detector 4300 + Analogue base 3312[160]	0.3	2.3
Analogue smoke detector 4301 + Analogue base 3312[160]	0.3	2.3
Addressable manual call point with isolator 4433 / 4439	1.6	2.7
Addressable manual call point 3333 / 3339	2	5
Alarm Acknowledge Facility (AAF)	2	5
Addressable Short Circuit Isolator 4370	2.2	2.2
Analogue base with isolator 4313 [163]	≤ 1.3	≤ 1.3
Addressable multipurpose I/O unit 3361	2.2	max. 12 [164]
Addressable 2 voltage outputs unit 3364[165]	≤6	≤6
(Addressable) External power supply 3366AU	≤15	≤15
Addressable siren 4477	1.8	≤10
Addressable sounder base 3379	0.75	max 2.5 [166]
Addressable beacon 4380	1.7	5
Light indicator 4383	1.5	4
I/O matrix board 4582 [167]	max. 6	max. 6
AS1668 Fan control application board [168]	6	6
Zone control application board [168]	6	6

Note: On the COM loop, up to 5 sensors / detectors can have their LEDs lit at the same time even if more alarm points are activated.

[160] Remote LED current consumption BARIL: add 1 mA when Analogue base with isolator 4313 is used instead of Analogue base 3312.

[161] Plus 0.025 mA if green polling LED is used.

[162] Plus 0.5 mA if external indicator (RIL) is used.

[163] Detector not included.

[164] Only if the input In0 is used as a Zone Line Input, else approx. 2.2 mA.

[165] External 24VDC power supply also required, e.g. the 3366AU unit.

[166] High sound output option = 4.5 mA

[167] Must be plugged in an application board

[168] Requires 24VDC

Table 19 Other Units Current Consumption

Other Units	**Normal State** (quiescent) (mA)	**Alarm State** (activated) (mA)
Routing equipment (Fire brigade TX / Fault Tx)	See foot note [169]	See foot note [169]
Alert Annunciation Unit (AAU) 1736[170]	**26**@24V / 48@12V	**42**@24V / 79@12V
External Presentation Unit (EPU) 1728 [170]	**26**@24V / 48@12V	**42**@24V / 88@12V
Alarm devices (sounders, etc.)	0	Sounder type current
Occupant Warning System (OWS) 60W [171]	118	3100
Magnetic door holder	Approximately 80	0

As more loop devices are added, they are summarised in the “Summary of loop units” providing information for total quiescent and maximum consumption in the “Properties for NMAST loop” dialog box. See Figure 58 for steps to access the information from EBLWin under their respective loops.

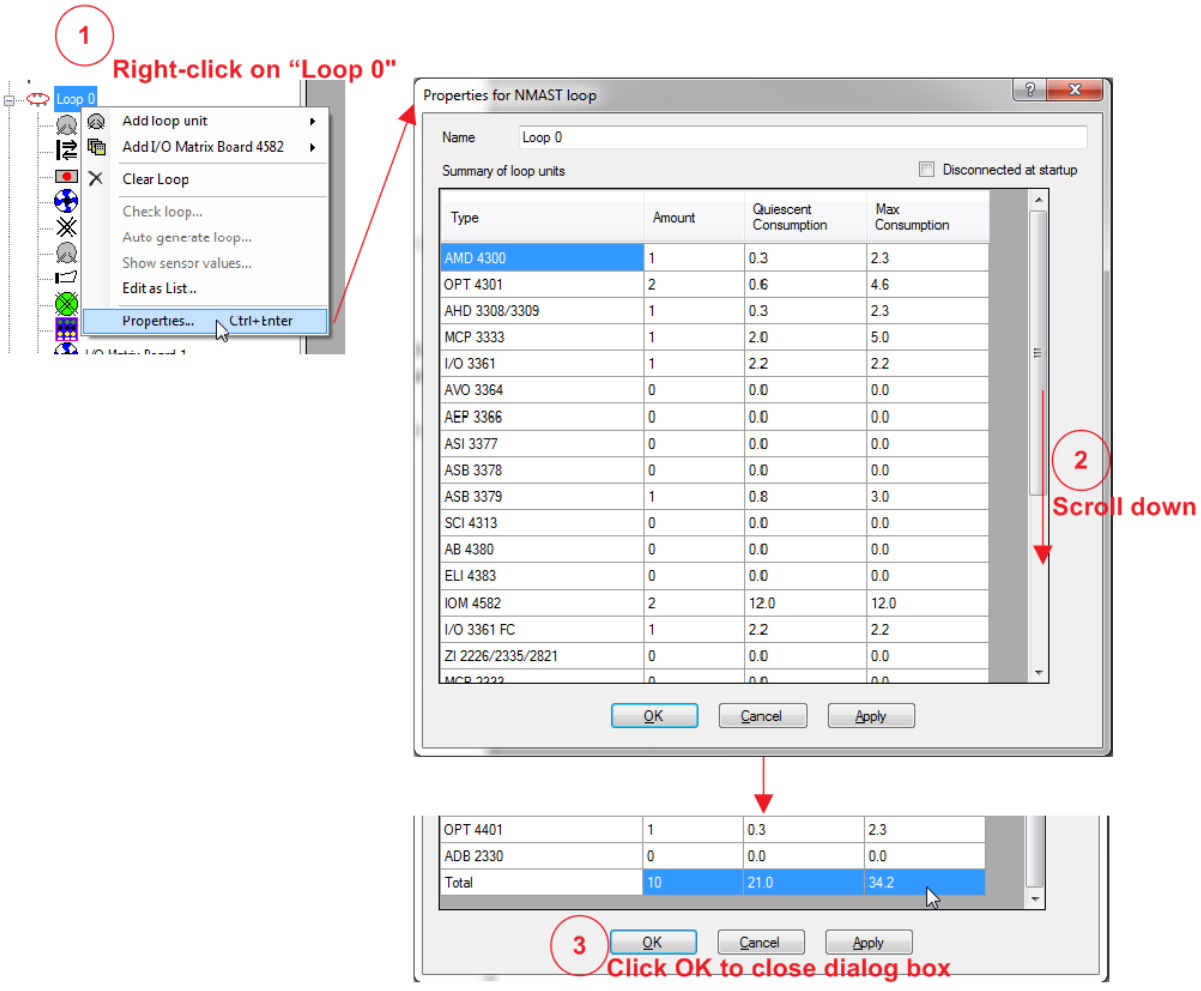


Figure 58 Access Summary of Loop Units with Current Consumption in EBLWin

[169] Quiescent and alarm current must be added correctly for each brigade unit e.g. Romtec, Tyco ASE, etc. Separate power supply and batteries may be required.

[170] Totally up to **eight** 1736 and/or 1728 units might be used.

[171] OWS must be powered from a separate power supply and battery backup.

25 Power Supply

Main power source

FT128 control unit is normally powered by 40W[172] Switching Power Supply, 230 V_{AC} / 24 V_{DC} ±1%, 1.8 A).

Standby power source

In case of mains failure i.e loss of 230 V_{AC}, FT128 will be powered by back-up batteries, i.e. two Sealed Lead-Acid batteries, 12V, 7-17 Ah.[173] See chapter “Current Consumption Calculations” page 173 and Table 17, Table 18 and Table 19.

The batteries and the switch mode power supply are connected to the Main board (4556), which also handles the charging of the batteries.

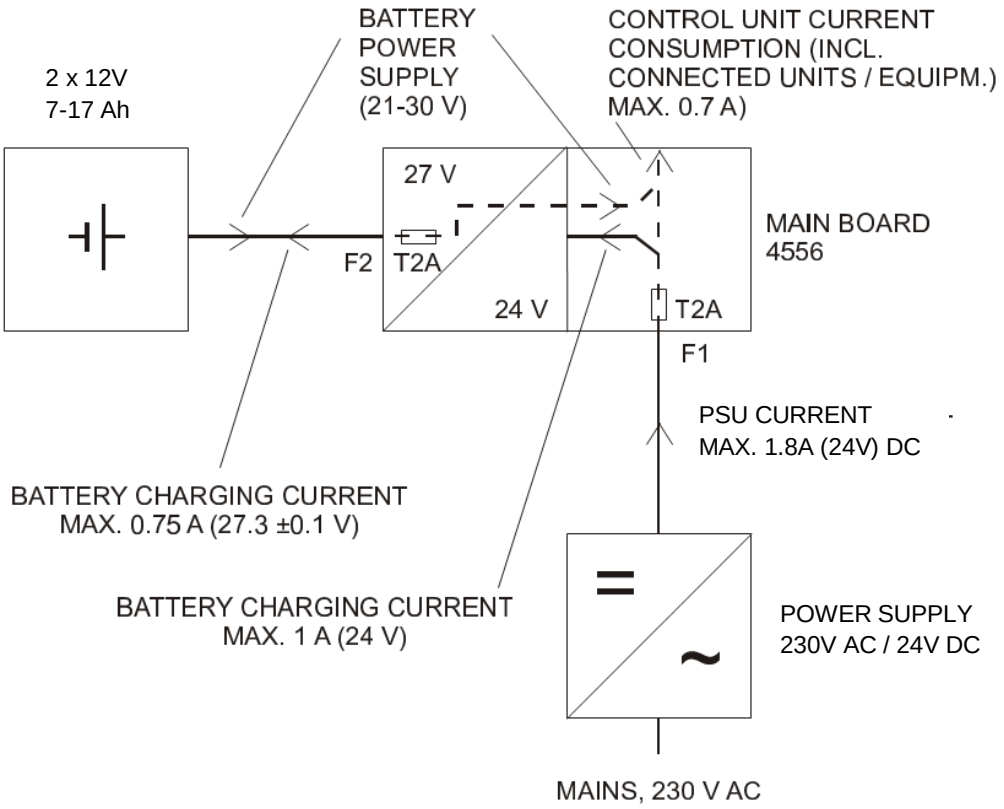


Figure 59 FT128 Power Supply Block Diagram.

In Figure 59, in the battery block, there is a slow blow glass fuse rated at 2A (3AG) in series between the two batteries see also drawing F702A.

FT128 is a very flexible system. The number and type of loop units, the number and type of display units, ext. equipment, etc. can vary from one control unit to another.

25.1 Charger Functions

According to **AS7240.4, section 5.3.1 b)**, *the charger shall be designed and rated so that a battery discharged to its final voltage can be recharged to at least 80% of its rated capacity within 24 hours and to its rated capacity within another 48 hours.*

[172] The standard Meanwel 40W power supply has been obsoleted. Currently 75W power supply is used.

[173] 7 - 17 Ah is depending on manufacturer. Specified "Final voltage" must be 10.5 V. **NOTE!** The batteries have to be ordered separately.

25.1.1 Battery Charging Functions:

Battery charging is performed in two steps:

1. **Constant charging current.** The charging current is constant (fixed)[174] until the battery / charging voltage is 29 VDC.
2. **Constant charging voltage.** The charging voltage is reduced from 29V to a value between 27 and 27.6 VDC (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 recharged. 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 Battery Protection Functions

The battery charging will be turned off if the current from the power supply to the Main board 4556 exceeds 1.8 A, i.e. the FT128 current consumption exceeds 0.8 A. The battery charging will remain turned off as long as the FT128 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: DD-MM Time: HH:MM

Normally every 14th minute the battery voltage is checked. A battery voltage below 18.9 VDC will generate a fault[175] and the following fault message will be shown:

FAULT: Battery
Date: DD-MM Time: HH:MM

Note: Regarding this fault and the New Zealand convention, see chapter “FAULT: Battery´, page 125.

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 Ω will generate a fault and the following fault message will be shown:

FAULT: Low battery capacity
Date: DD-MM Time: HH:MM

Note: Regarding this fault and the New Zealand convention, see Section FAULT: Low Battery Capacity, page 125.

In case of mains failure (230 VAC), 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 V[176] and the CIE will shut down. When the mains power restores, the battery voltage will be checked and when it is at least 22VDC, the battery will be switched on and the CIE will work again.

[174] The charging current is **0.7** A (typical). (Very close to the end of the charging cycle it will lower.)

[175] In the New Zealand convention every 60 seconds and 24.4 V respectively.

[176] This is done in order to avoid damaging the batteries.

25.2 Current Consumption Calculations

The following calculations should be carried according to the application requirements of the related current standards, such as AS7240.2, AS1670.1, and AS1670.4.

In order to avoid overloading the power supply, the battery capacity calculation must be performed as per AS1670.1 clause 3.16.4. The total FT128 current consumption (excluding battery charging current) has to be calculated.

Note: The batteries will not charge when fire alarm is activated in FT128.

Use the values in chapter "Current Consumption", page 168, to calculate the total system current i.e. alarm current I_A and quiescent current I_Q.

As per AS1670.1 Section 3.16.4, the battery capacity requirement shall be determined as follows:

$$C_{20} = 1.25 [(I_Q \times T_Q) + FC (I_A \times T_A)]$$

Where C_{20} = Battery Capacity in AH at 20h discharge rate at 15°C - 30°C

1.25 = Compensation factor for expected battery deterioration

I_Q = Total system quiescent current in Ampere

T_Q = Quiescent standby power source time, normally 24 hours for externally monitored systems and 72 hours for unmonitored systems

FC = Capacity de-rating factor, typically 2

I_A = Total system alarm current in Ampere

T_A = Alarm load standby power source time, normally 0.5 hour

Refer to Brooks spreadsheet to automatically calculate the battery capacity.

Comments regarding I_Q and I_A:

- I_Q has to be ≤ 0.7 A.
- I_A has to be ≤ 1.8 A.

Note: A "High current" fault (see above) will not be generated in this case since the battery charging is turned off as long as a fire alarm is activated.

25.3 Main Power Source (Power Supply)

The main power source is a Switching Power Supply which is an AC to DC converter from 230 V_{AC} to 24 V_{DC}, 1.8 A, i.e. **the total current consumption including maximum battery charging current must not at any time exceed 1.8 A**. Input voltage allowed is 176-264 V_{AC}. The output voltage is 24 V_{DC} with a tolerance of ±1%. [177]

25.4 Standby Power Source (Battery)

The standby power source is two 12V_{DC} batteries. Only batteries with a specified "Final voltage" of 10.5 V must be used.

As per AS1670.1 the required battery back-up time is 24 hours in normal state and 0.5 hour in alarm state.

[177] The output voltage is factory set to 24 V_{DC}. On the power supply is a potentiometer for output voltage adjustment (±10%) available. **Do not use this potentiometer** unless the output voltage is not 24 V.

26 S/W Versions

Due to continual development and improvement, different S/W versions can be found.

The S/W versions listed below are valid on the time this document was printed (the date of this document or date of revision).

New S/W can be downloaded "on site" except for the 458x boards.

Table 20 Software Versions

S/W for:	Latest version[178]	Required version[179]
4550; EBL128 system firmware	2.2.0	2.2.0
4580; 8 Zone Expansion Board PCB no. 9287-2B	1.0.5	1.0.2
4580; 8 Zone Expansion Board PCB no. 9287-3A	2.0.4	2.0.4
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
1728; Ext. Presentation Unit (EPU)	1.4.1	1.4.1
1736; Alert Annunciation unit (AAU)	1.4.1	1.4.1
EBLWin	2.2.0[178]	2.2.0
1098; Web-server II	2.2.0	2.2.0
1098; Web-server II (RTOS)	1.90	1.51

[178] The latest version can vary depending on the convention.

[179] 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 National Regulations / Requirements

When planning a fire alarm installation, national regulations, customer demands, etc. have to be followed.

FT128 is very flexible with 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.[180]

27.1 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[181]. Normally the same convention shall be used in all installations thereafter. 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 (under menu Tools | Options).

If the Most Recent Unit (MRU) check box is ticked, the MRU file will open when EBLWin is launched. The default COM port to communicate with the CIE can also be changed to suit your available PC port.

Note: To change convention, a Level 2 special password is required. Access is via the menu, Advanced functions | Level 2. Also note that the convention will be changed only for the open installation.

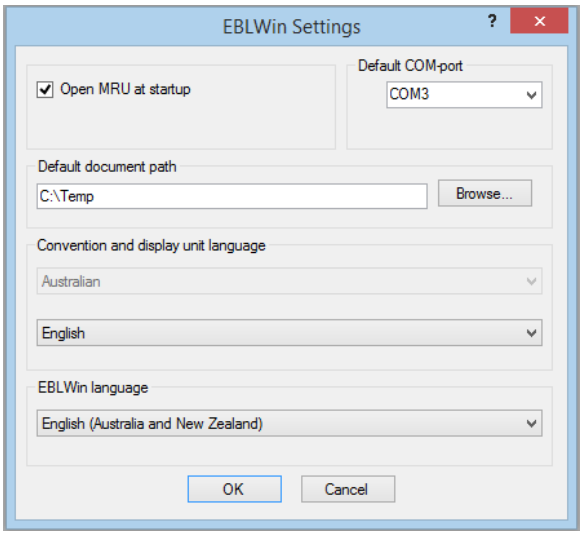


Figure 60 EBLWin Settings Dialog Box

27.2 Language

The language for the text shown in the FT128 display (alarms, faults, menus, etc.) is dependent on which binary file (*.bin) has been downloaded (normally in conjunction with the S/W download).

The binary file (*.bin) for the selected language / convention shall be downloaded via EBLWin (menu Tools | Download software…).

[180] Some of the SSD settings might then be a violation to the AS7240-2 or AS1670.1 standard. If this happens, a "Warning" will be displayed.

[181] Depending on convention, different default settings in EBLWin could be valid and also different functions in the system software EBL128.

28 Drawings / Connection Diagrams

All drawings and connection diagrams quoted in this manual are shown on Table 21. These drawings are subject to change without notice, as are other technical features and data, resulting from continual development and improvement.

Table 21 Drawing Lists

Item	Drawing No.	Issue	Description
1	F625	1	FT128 & FT512 General Arrangement
2	F665	8	Standard FT128 Block Wiring Diagram (BWD)
3	F667	1	FT128 Main & Expansion Boards Layout
4	F702A	5	NZ FT128 BWD with Mimic & Bulgin Keys
5	F702B	5	NZ FT128 BWD without Mimic & Bulgin Keys
7	F728	2	4580 - 8 Zone Expansion Board
8	F729	2	4581 - 8 Relay Expansion Board
9	F730	2	4582 - I/O Matrix board
10	F731	2	4583 - 5 Inputs 3 Outputs Expansion Board
11	F733	2	COM Loop Units Connection Diagram
12	F734	2	Web-Server II Connection Diagram
13	F735	2	3361 Addressable Multi-purpose Module
14	F737	2	3364 / 3366AU Connection Diagram
15	F779	1	WA ASE Connection Diagram
16	F780	3	FT128 Gas Module Connection
17	F784-1	0	COM Loop Cable Length & Specifications
18	F784-2	0	COM Loop Cable Length & Specifications

The above drawings will be available in a separate document, only three drawing are shown in this manual:

1. Drawing F264 General Arrangement for FT128
2. Drawing F625 Standard FT128 Block Wiring Diagram
3. Drawing F702A Standard FT128 Block Wiring Diagram for NZ

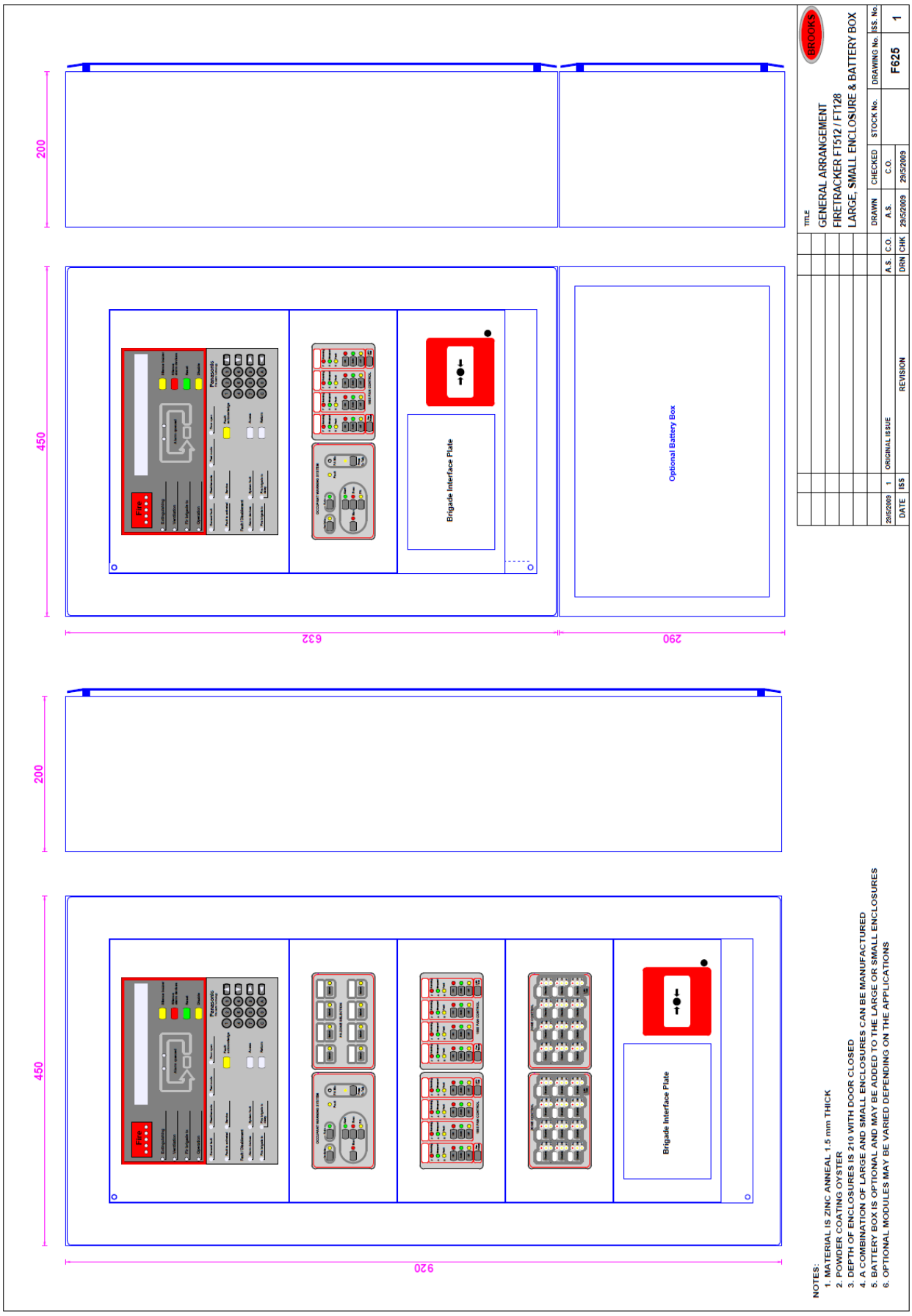
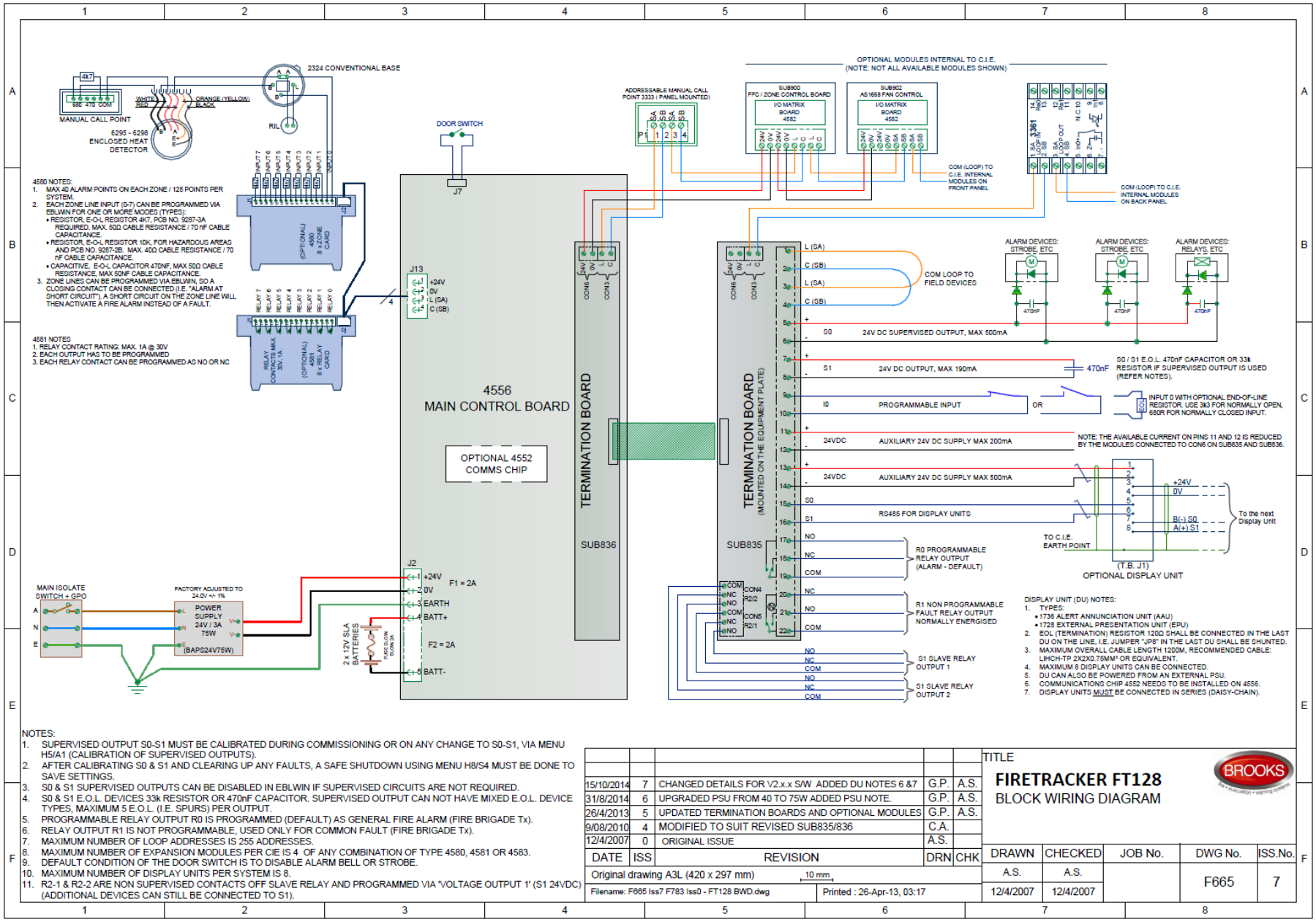


Figure 61 FT128 General Arrangement



NOTES:
1. SUPERVISED OUTPUT S0-S1 MUST BE CALIBRATED DURING COMMISSIONING OR ON ANY CHANGE TO S0-S1, VIA MENU H5/A1 (CALIBRATION OF SUPERVISED OUTPUTS).
2. AFTER CALIBRATING S0 & S1 AND CLEARING UP ANY FAULTS, A SAFE SHUTDOWN USING MENU H8/S4 MUST BE DONE TO SAVE SETTINGS.
3. S0 & S1 SUPERVISED OUTPUTS CAN BE DISABLED IN EBLWIN IF SUPERVISED CIRCUITS ARE NOT REQUIRED.
4. S0 & S1 E.O.L. DEVICES 33k RESISTOR OR 470nF CAPACITOR. SUPERVISED OUTPUT CAN NOT HAVE MIXED E.O.L. DEVICE TYPES, MAXIMUM 5 E.O.L. (I.E. SPURS) PER OUTPUT.
5. PROGRAMMABLE RELAY OUTPUT R0 IS PROGRAMMED (DEFAULT) AS GENERAL FIRE ALARM (FIRE BRIGADE Tx).
6. RELAY OUTPUT R1 IS NOT PROGRAMMABLE, USED ONLY FOR COMMON FAULT (FIRE BRIGADE Tx).
7. MAXIMUM NUMBER OF LOOP ADDRESSES IS 255 ADDRESSES.
8. MAXIMUM NUMBER OF EXPANSION MODULES PER CIE IS 4 OF ANY COMBINATION OF TYPE 4580, 4581 OR 4583.
9. DEFAULT CONDITION OF THE DOOR SWITCH IS TO DISABLE ALARM BELL OR STROBE.
10. MAXIMUM NUMBER OF DISPLAY UNITS PER SYSTEM IS 8.
11. R2-1 & R2-2 ARE NON SUPERVISED CONTACTS OFF SLAVE RELAY AND PROGRAMMED VIA 'VOLTAGE OUTPUT 1' (S1 24VDC) (ADDITIONAL DEVICES CAN STILL BE CONNECTED TO S1).

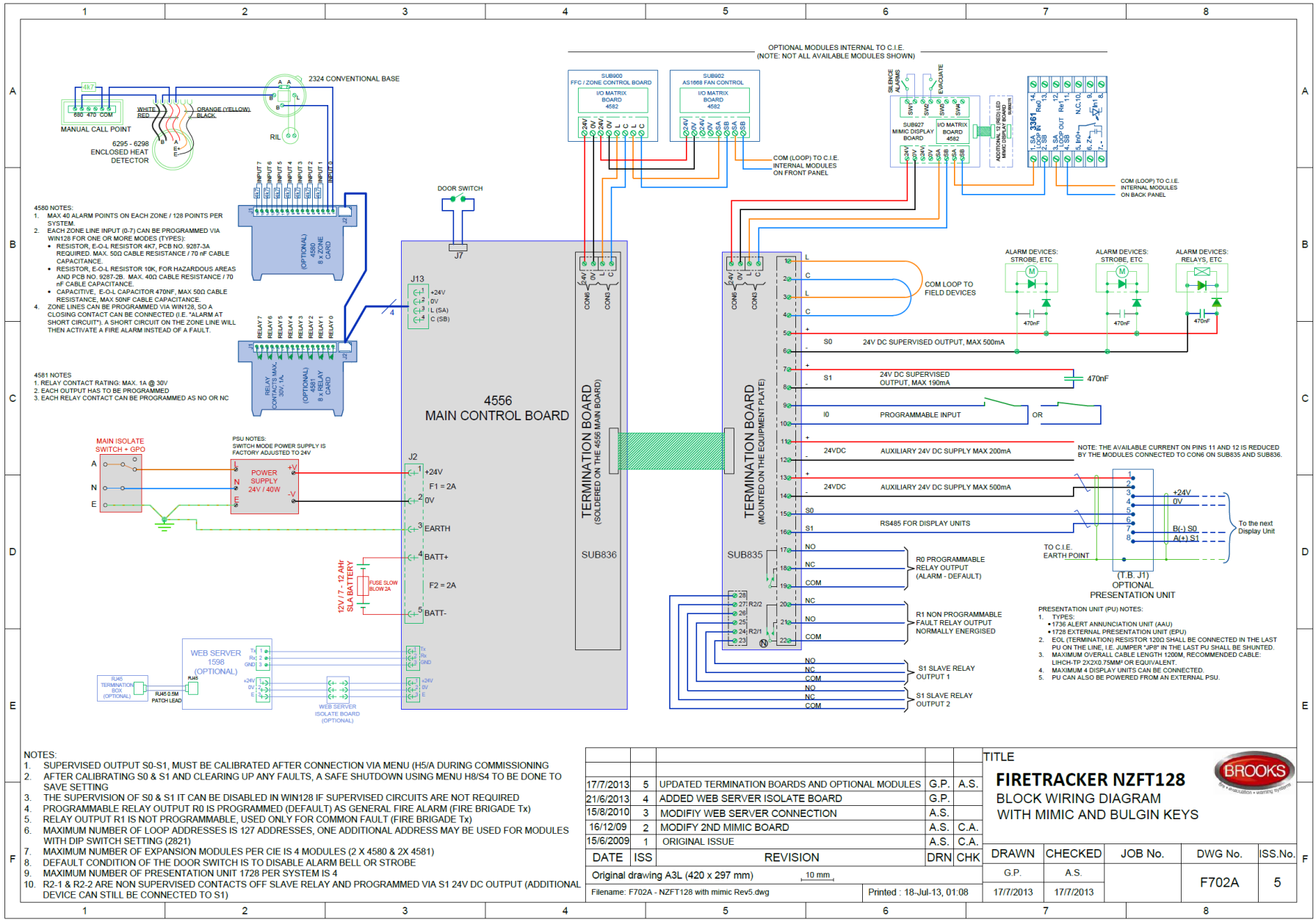
DATE	ISS	REVISION	DRN	CHK
15/10/2014	7	CHANGED DETAILS FOR V2.x.x S/W ADDED DU NOTES 6 &7	G.P.	A.S.
31/8/2014	6	UPGRADED PSU FROM 40 TO 75W ADDED PSU NOTE.	G.P.	A.S.
26/4/2013	5	UPDATED TERMINATION BOARDS AND OPTIONAL MODULES	G.P.	A.S.
9/08/2010	4	MODIFIED TO SUIT REVISED SUB835/836	C.A.	
12/4/2007	0	ORIGINAL ISSUE	A.S.	

Original drawing A3L (420 x 297 mm) 10 mm
Filename: F665 Iss7 F783 Iss0 - FT128 BWD.dwg
Printed : 26-Apr-13, 03:17

TITLE
FIRETRACKER FT128
BLOCK WIRING DIAGRAM

DRAWN	CHECKED	JOB No.	DWG No.	ISS.No.
A.S.	A.S.		F665	7
12/4/2007	12/4/2007			

Figure 62 FT128 Standard Block Wiring Diagram



NOTES:
1. SUPERVISED OUTPUT S0-S1, MUST BE CALIBRATED AFTER CONNECTION VIA MENU (H5/A DURING COMMISSIONING
2. AFTER CALIBRATING S0 & S1 AND CLEARING UP ANY FAULTS, A SAFE SHUTDOWN USING MENU H8/S4 TO BE DONE TO SAVE SETTING
3. THE SUPERVISION OF S0 & S1 IT CAN BE DISABLED IN WIN128 IF SUPERVISED CIRCUITS ARE NOT REQUIRED
4. PROGRAMMABLE RELAY OUTPUT R0 IS PROGRAMMED (DEFAULT) AS GENERAL FIRE ALARM (FIRE BRIGADE Tx)
5. RELAY OUTPUT R1 IS NOT PROGRAMMABLE, USED ONLY FOR COMMON FAULT (FIRE BRIGADE Tx)
6. MAXIMUM NUMBER OF LOOP ADDRESSES IS 127 ADDRESSES, ONE ADDITIONAL ADDRESS MAY BE USED FOR MODULES WITH DIP SWITCH SETTING (2821)
7. MAXIMUM NUMBER OF EXPANSION MODULES PER CIE IS 4 MODULES (2 X 4580 & 2X 4581)
8. DEFAULT CONDITION OF THE DOOR SWITCH IS TO DISABLE ALARM BELL OR STROBE
9. MAXIMUM NUMBER OF PRESENTATION UNIT 1728 PER SYSTEM IS 4
10. R2-1 & R2-2 ARE NON SUPERVISED CONTACTS OFF SLAVE RELAY AND PROGRAMMED VIA S1 24V DC OUTPUT (ADDITIONAL DEVICE CAN STILL BE CONNECTED TO S1)

DATE	ISS	REVISION	DRN	CHK
17/7/2013	5	UPDATED TERMINATION BOARDS AND OPTIONAL MODULES	G.P.	A.S.
21/6/2013	4	ADDED WEB SERVER ISOLATE BOARD	G.P.	
15/8/2010	3	MODIFIY WEB SERVER CONNECTION	A.S.	
16/12/09	2	MODIFY 2ND MIMIC BOARD	A.S.	C.A.
15/6/2009	1	ORIGINAL ISSUE	A.S.	C.A.

Original drawing A3L (420 x 297 mm) 10 mm
Filename: F702A - NZFT128 with mimic Rev5.dwg
Printed : 18-Jul-13, 01:08

TITLE
FIRETRACKER NZFT128
BLOCK WIRING DIAGRAM
WITH MIMIC AND BULGIN KEYS

DRAWN	CHECKED	JOB No.	DWG No.	ISS.No.
G.P.	A.S.		F702A	5
17/7/2013	17/7/2013			

Figure 63 NZFT128 Block Wiring Diagram for NZ

29 Revision History

29.1 Revision History Table

Issue	Date	Description	Written By	Checked By
Panasonic	11/06/2010	Original Panasonic manual	J. Pattersson	A.S.
Rev 1	20/02/2012	Update the original MEW01351 Rev 1 document to suit AU & NZ market	A. Shenouda	E.T. / A.S.
Rev 1.1	30/05/2012	Update drawing F765 and F738, update section 6.4 & 6.5	Edwin Thein	A.S.
Rev 2.2	12/08/2015	Update to include S/W V2.2.0 and make minor corrections.	E.T. / A.S.	A.S.

29.2 Software Revision 2.2.0 Modifications

29.2.1 New common features and additions

- **Local Alarm Acknowledgement Unit 4445**

  The module is the Panasonic version of Brooks AAM, in EBLWin the module is called “Local Alarm Acknowledgement Unit” LAAU.

  Note: Brooks AAM (AAFC in EBLWin) has been moved to the obsolete loop unit section in EBLWin.

- **Zone Groups**

  This is new control expressions that can be used to group unlimited number of zones into one zone group. A single zone can be a member in only one zone group. Maximum of 30 zone groups can be defined in a system. The new control expressions for zone groups are as follow:

  - PreWarningZoneGroup (Zone Group, No. of alarms)
  - FireAlarmZoneGroup (Zone Group, No. of alarms)
  - HeavySmokeAlarmZoneGroup (Zone Group, No. of alarms)
  - FirstAlarmInZoneGroup (Zone, Zone Group)

- **Pulse on 3361 and 3364**

  The “Pulse” and “Delayed pulse” (defined in output signal period) can now be programmed for the outputs of 3361 and 3364. The pulse width should be fixed for 7 seconds.

- **Selectable fire alarm types for Zone Line Inputs**

  In previous revisions, all fire alarms from a Zone Line Input via 3361 or 4580 are treated as a normal fire alarm (type A). In V2.2.0, the Zone Line Input can be programmed in EBLWin V2.2.0 to one of the following five different alarm types:

  Smoke (B)

  Heat (B)

  MCP (A)

  Other (A)

  Other (B)

29.2.2 New or modified features in EBLWin only

- Fault latching in the Australian convention is set as default in system properties.
- If the CIE time differs more than 60 minutes to the time shown in the PC, a dialog box will display when logon is performed. Via this dialog box, the PC time can be used to update the CIE time.
- A user that is defined to have access to Web-server (not the CIE) can have a password containing between 6 and 10 alphanumeric characters.

29.2.3 New or modified feature in system software EBL only

- Output without a control expression are considered to be non-existent in the system. In previous versions, an output with no control expression could be manually controlled from the menu system, fan control or via EBLnet. In V2.2.0, an output with no control expression is considered to be non-existent and cannot be controlled in any way.

  If an output is to be only manually controlled, it must have a never-true control expression similar to “TimeChannelActivated” (Always off).
- If an input is set to “Not used”, or if an output has no control expression, the supervision fault is not generated even if the “Supervised” check box in EBLWin is checked.

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