aritech

1200C-2000C Fire Alarm Control Panel, Repeater, and Black Box Installation Manual

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Manufacture

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CE

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2006/66/EC (Battery Directive): This product contains a battery that cannot be disposed of as unsorted municipal waste in the European Union. See the product documentation for specific battery information. The battery is marked with this symbol, which may include lettering to indicate cadmium (Cd), lead (Pb), or mercury (Hg). For proper recycling, return the battery to your supplier or to a designated collection point. For more information see: recyclethis.info.

Contact information and product documentation

For contact information or to download the latest product documentation, visit firesecurityproducts.com.

Content

Important information

Introduction

This is the installation manual for Aritech FP1200C-2000C addressable fire control panels, repeaters, and emulators. Read these instructions and all related documentation entirely before installing or operating this product.

All 1200C-2000C control panels are designed to comply with the requirements of European standards EN 54-2 for control and indicating equipment, and EN 54-4 for power supply equipment)

For further details on EN 54 compliance and for a complete list of CPD-compliant control panels in this range, see “**Appendix E: Product compliance**” on page 40.

Product compatibility

All models are compatible with Aritech fire detectors and manual call points. Compatibility with third-party products cannot be guaranteed. Consult your local supplier for further information.

Support

For assistance installing, operating, maintaining, and troubleshooting this product, please contact your local supplier.

Limitation of liability

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Product symbols

The following symbols are used on the product.

This symbol indicates that caution is necessary when operating or maintaining the device or control close to where the symbol is placed.

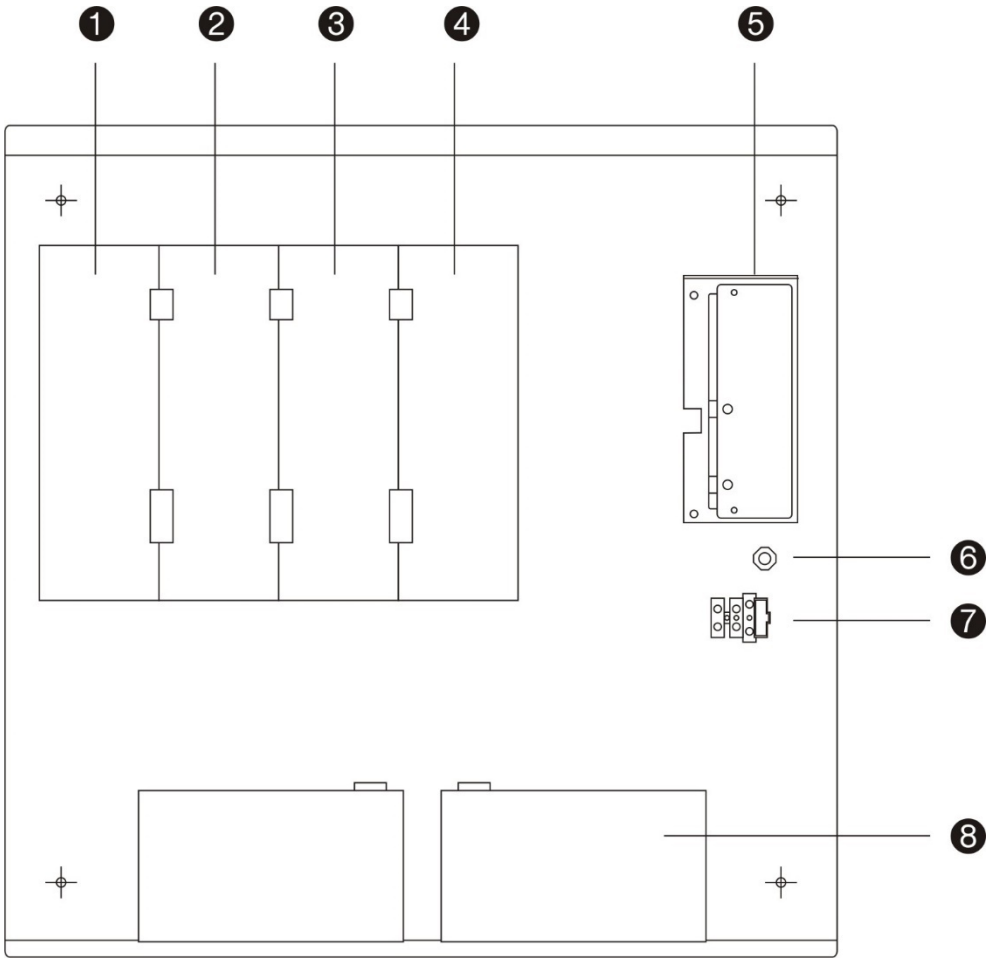
This symbol indicates that the installation manual should be consulted when operating or maintaining the device or control close to where the symbol is placed.

Installation and commissioning

WARNING: This product must be installed and maintained by qualified personnel adhering to the CEN/TS 54-14 standard (or the corresponding national standard) and any other applicable regulations.

Cabinet layout for 1200C control panels

Figure 1: Typical cabinet layout for 1200C control panels

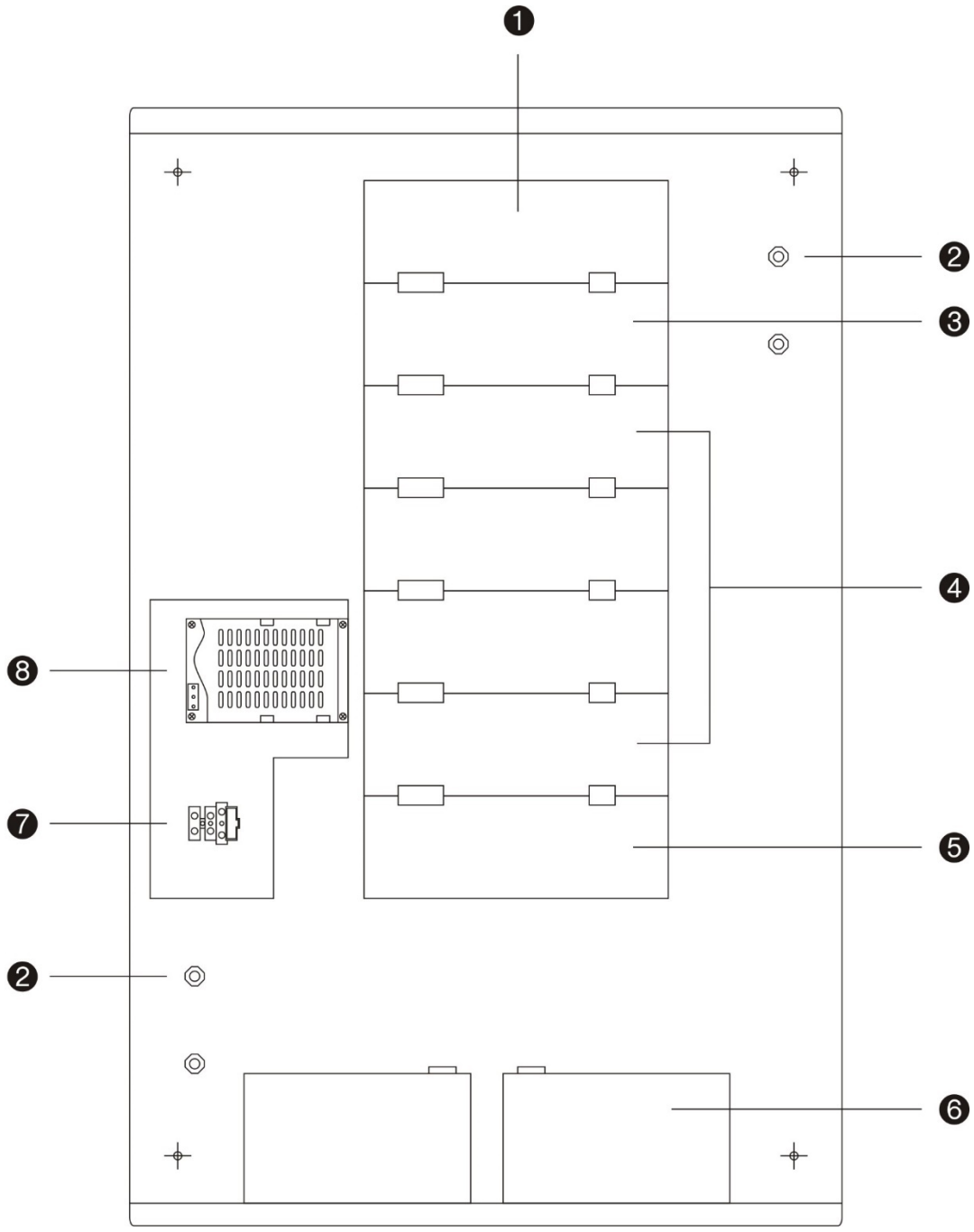


1. FEP2000N mains controller module
2. PS1200N power supply interface module
3. LC1502 loop module
4. SD2000 common I/O module
5. PS2000N power supply unit
6. Earth stud
7. Fuse terminal block
8. 12V batteries

For detailed module information for all control panels see “Appendix A: Modules” on page 34

Cabinet layout for 2000C control panels

Figure 2: Typical cabinet layout for 2000C control panels

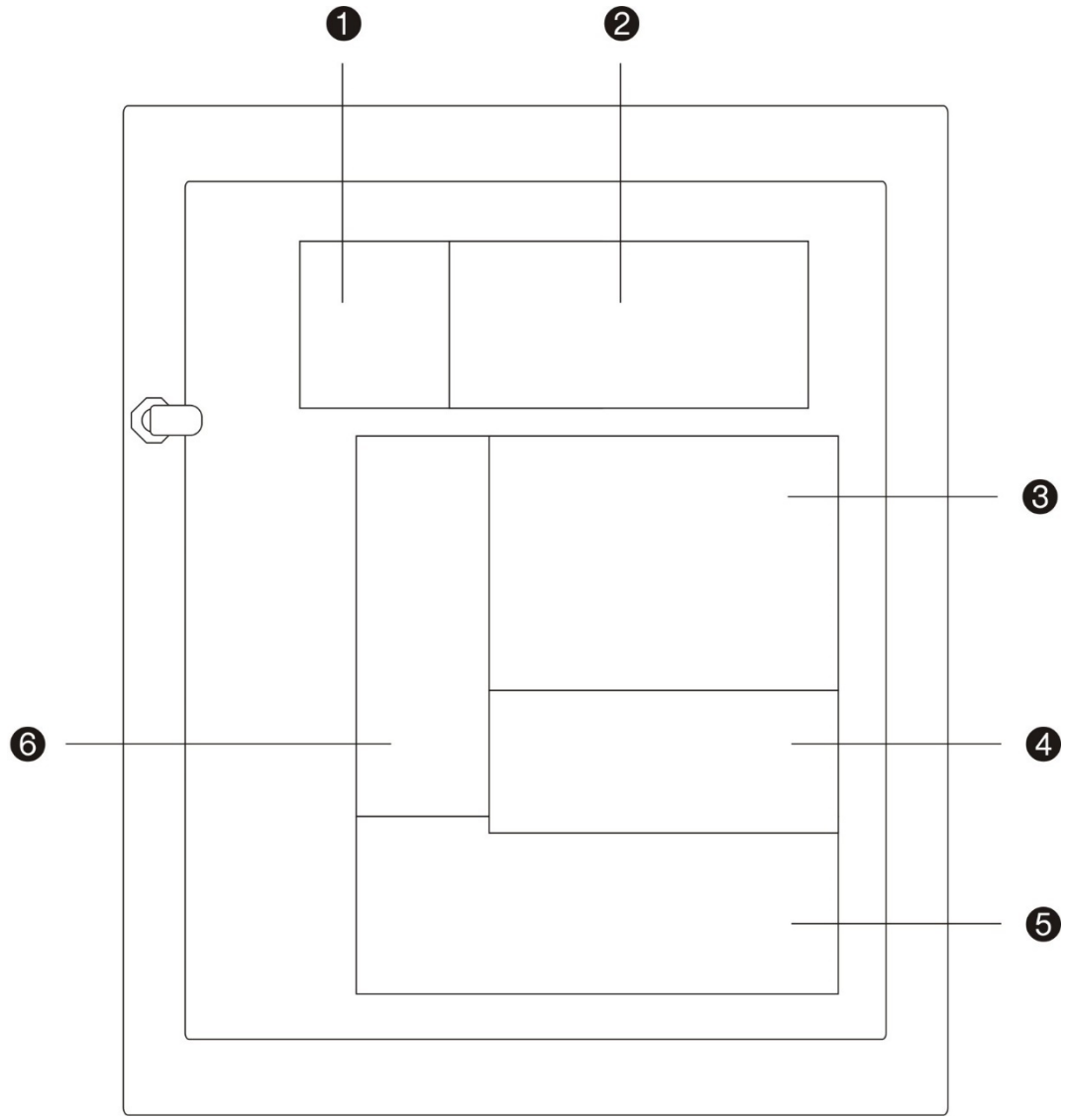


1. FEP2000N mains controller module
2. Earth studs
3. PS1200N power supply interface module
4. LC1502 loop modules
5. SD2000 common I/O module
6. 12V batteries
7. Fuse terminal block
8. PS2000N power supply unit

For detailed module information for all control panels see “Appendix A: Modules” on page 34.

Inside door layout for 1200C-2000C control panels

Figure 3: Typical inside door layout for 1200C-2000C control panels



1. KP2000 keypad module
2. LCD1200 LCD screen
3. FC1200N or FC2012 host CPU module
4. NC2011 or NC2051 network module (optional)
5. ZE2016 or ZE2064 zone LED module
6. HDIS2000N or HDIS2000-F LED display module

For detailed module information for all control panels see “Appendix A: Modules” on page 34.

General installation and connection guidelines

Where to install the control panel

Make sure the installation location is free from construction dust and debris, and immune to extreme temperature ranges and humidity (see “Technical specifications” on page 31 for more information on the operating temperature and relative humidity specifications).

Allow for enough floor and wall space so the panel can be installed and serviced without any obstructions. The cabinet should be mounted so that the user interface is at eye level.

Recommended cables

Recommended cables for your fire system are shown in the table below. For more detailed information on cable characteristics and requirements see **“Appendix D: Cable specifications**” on page 38.

WARNING: Failure to use the recommended cable may impact system performance.

Table 1: Recommended cables

Cable	Cable description	Maximum cable length
Mains cable	3 x 1.5 mm	N/A
Loop cable	Shielded, twisted pair cable	2 km
RS-485 network cable	CAT5	800 m
Fibre optic network cable	ST duplex 50/125, 62.5/125, or 100/140	1.7 km (see note below)
LON network cable	CAT5	1.5 km
RS-232 serial communication cable	7-way RS-232 null modem cable with full handshaking	12 m

Note: Under ideal conditions the maximum distance between nodes is 1.7 km, but an optical power budget calculation should be performed to determine the correct maximum distance for each site.

Installing or replacing control panel modules

WARNING: Always back up site data before installing or replacing modules.

When control panel modules are replaced or additional modules installed, the control panel automatically reconfigures and all site data is lost. Always back up site data before installing or replacing modules.

Connecting the LC1502 loop module

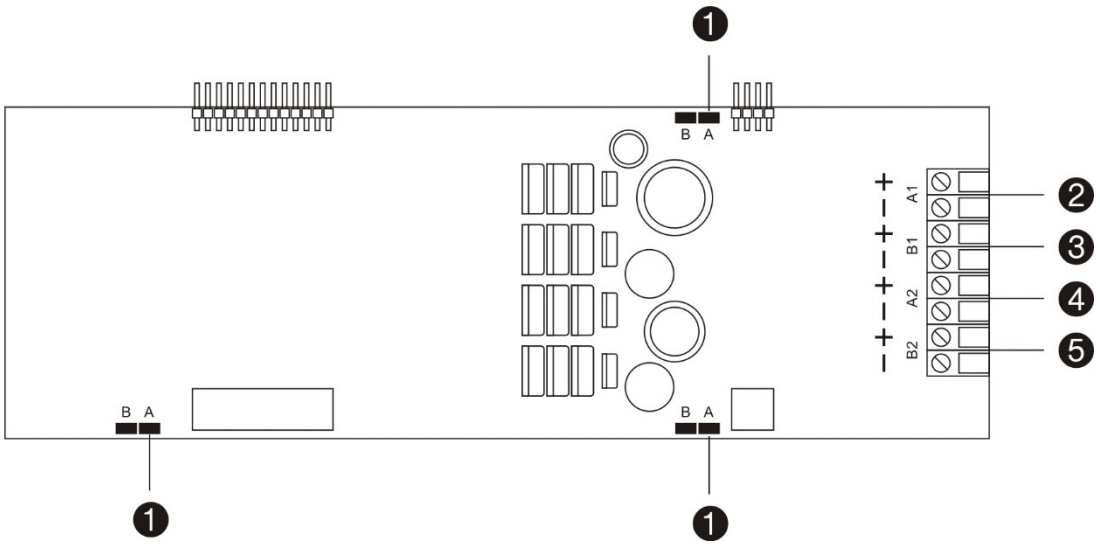
The LC1502 loop module allows for the connection of up to two Class A loops or up to four Class B loops.

The maximum number of loop modules that can be installed will depend on the control panel model – see “Appendix C: Maximum zones and loops” on page 37 for more information.

A calculation should be performed for each loop to ensure that the minimum required loop voltage is maintained for the expected load conditions.

The LC1502 module is located in the cabinet box, between the PS1200N module and the SD2000 (or VDS2000) module.

Figure 4: LC1502 loop module



1. Loop Class configuration jumpers A and B
2. Class B loop 1 or Class A loop 1 out
3. Class B loop 2 or Class A loop 1 return
4. Class B loop 3 or Class A loop 2 out
5. Class B loop 4 or Class A loop 2 return

Note: For EN 54 compliance an isolator must be installed after every 32 devices.

Loop Class configuration

Configure the loop Class using jumpers A and B on the loop module (Figure 4 above). All three A/B jumpers must be configured for each loop module. When more than one loop module is installed jumper configuration must be the same for all modules.

- Select jumper A for up to two Class A loops for each loop module
- Select jumper B for up to four Class B loops for each loop module

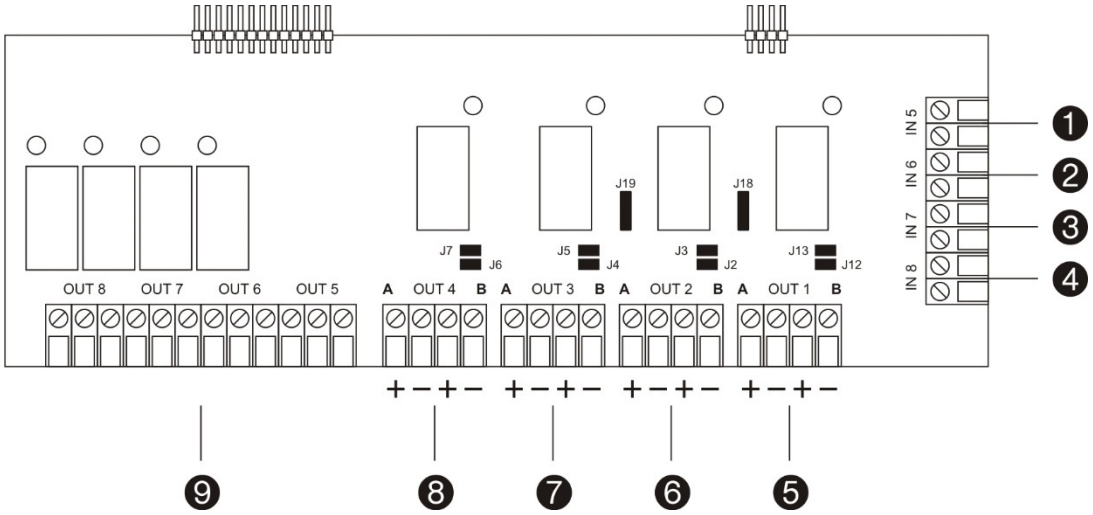
Connecting the SD2000 common I/O module

The SD2000 common I/O module provides the common inputs and outputs for the control panel.

The SD2000 module is located in the rear cabinet and is the last module in the group. It is connected to the LC1502 module.

Note: This module is not included with French or German control panels.

Figure 5: SD2000 common I/O module

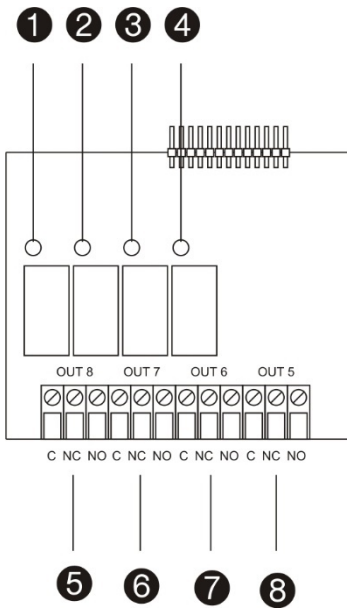


1. IN5 fire routing return input (VdS mode only)
2. IN6 fire protection fault input (VdS mode only)
3. IN7 fire routing fault input (VdS mode only)
4. IN8 general input
5. OUT1 fire alarm equipment output
6. OUT2 fire routing equipment output
7. OUT3 fire protection equipment output
8. OUT4 fault routing output
9. OUT5 to OUT8 programmable relays 1 to 4

Programmable relays

The common I/O module has four programmable relays. Each relay has common (C), normally closed (NC), and normally open (NO) contacts.

Figure 6: Common I/O module programmable relays



1. OUT8 programmable relay 4 LED
2. OUT7 programmable relay 3 LED
3. OUT6 programmable relay 2 LED
4. OUT5 programmable relay 1 LED
5. OUT8 programmable relay 4
6. OUT7 programmable relay 3
7. OUT6 programmable relay 2
8. OUT5 programmable relay 1

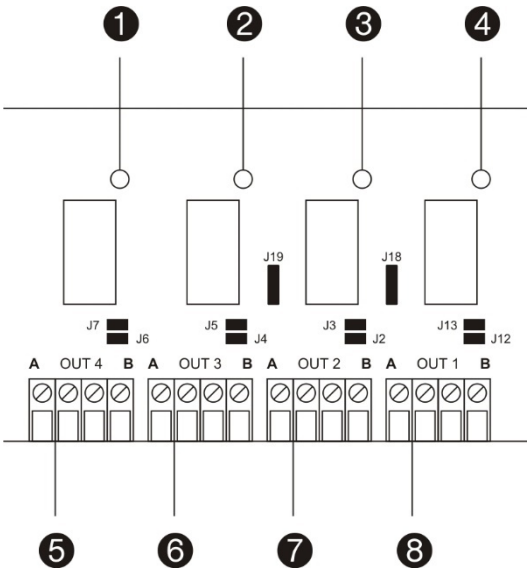
Class A loop supervised outputs

For Class A loops the common I/O module provides four supervised outputs:

- Fire alarm equipment output (OUT1)
- Fire routing equipment output (OUT2)
- Fire protection equipment output (OUT3)
- Fault routing output (OUT4)

All outputs supply 24 VDC when active.

Figure 7: Common I/O module supervised outputs for Class A loops



1. OUT4 fault routing output LED
2. OUT2 fire routing equipment output LED
3. OUT3 fire protection equipment output LED
4. OUT1 fire alarm equipment output LED
5. OUT4 fault routing output
6. OUT3 fire protection equipment output
7. OUT2 fire routing equipment output
8. OUT1 fire alarm equipment output

Table 2: Supervised output specifications for Class A loops

Output	Output number	termination	Polarity	Behaviour
Fire alarm equipment	OUT1	3K3Ω	Non-reversed	
Fire routing equipment	OUT2	3K3Ω	Non-reversed	
Fire protection equipment	OUT3	3K3Ω	Non-reversed	
Fault routing	OUT4	3K3Ω	Non-reversed	Active in normal position

Class B loop relay outputs

For Class B loops the common I/O module provides four relay outputs:

- Sounder output (OUT1)
- Fire brigade output (OUT2)
- Fire protection equipment output (OUT3)
- Fault routing output (OUT4)

Two relay configurations are available for each output. The relay behaviour is configured using jumpers J2 to J7, J12 to J13, and J18 to J19 on the module PCB.

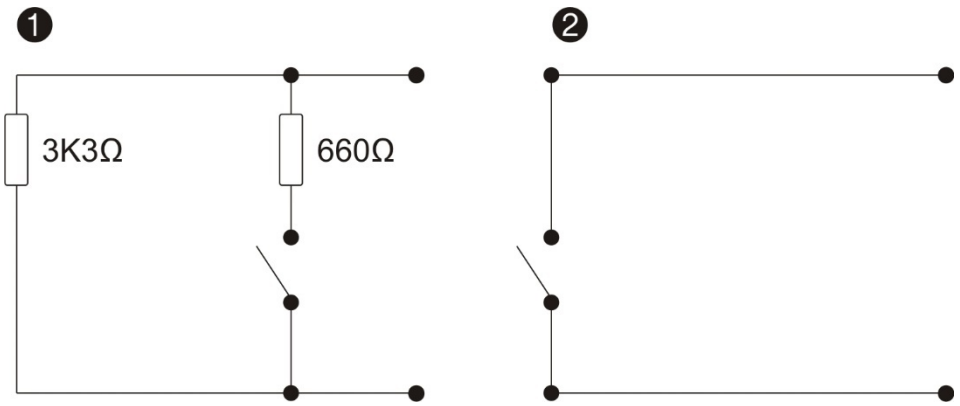
Configuration of outputs 1 to 3

Jumper configuration options for relay outputs 1 to 3 are shown below.

Jumper configuration options for relay outputs 1 to 3 with Class B loops

Output	Output number	Option 1	Option 2	Comments
Sounder	OUT1	J12 IN	J12 OUT	J18 OUT
		J13 OUT	J13 IN	J19 OUT
Fire brigade	OUT2	J2 IN	J2 OUT	J18 OUT
		J3 OUT	J3 IN	J19 OUT
Fire protection equipment	OUT3	J4 IN	J4 OUT	
		J5 OUT	J5 IN	

Figure 8: Jumper configuration options



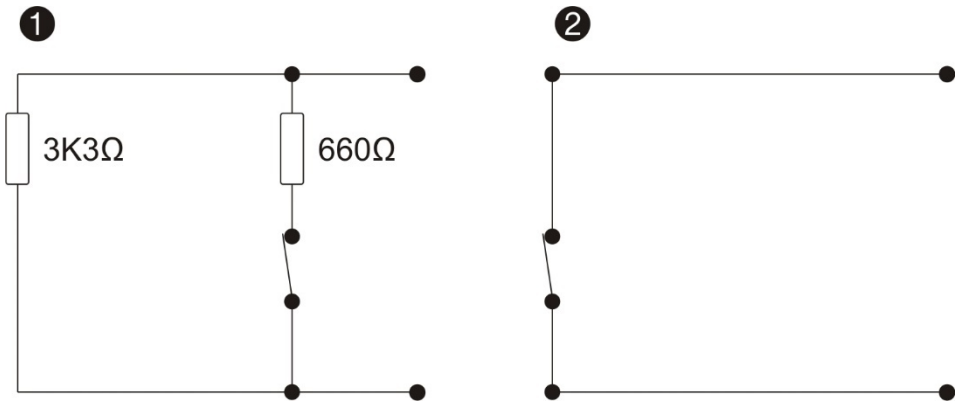
Configuration of output 4

Jumper configuration options for relay output 4 are shown below. The switch is closed when there is a fault and open when there is no fault.

Jumper configuration options for output 4 with Class B loops

Output	Output number	Option 1	Option 2	Comments
Fire routing	OUT4	J6 IN	J6 OUT	
		J7 OUT	J7 IN	

Figure 9: Jumper configuration options



Supervised inputs

The common I/O module has four inputs.

Input function for EN, NEN, and EP modes

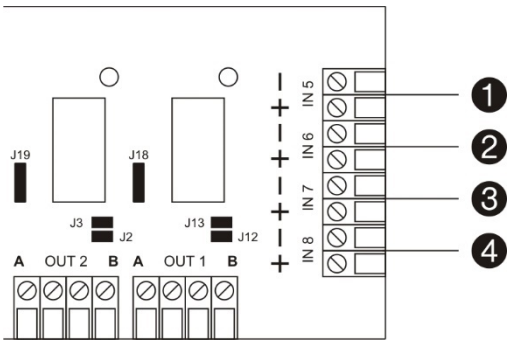
In EN, NEN, and EP mode the four inputs have no dedicated function and are freely programmable using I/O logic.

Input function for VdS mode

In VdS mode inputs 5 to 8 are allocated as follows:

- General input (IN8)
- Fault routing fault input (IN7)
- Fire protection fault input (IN6)
- Fault routing return input (IN5)

Figure 10: Common I/O module supervised inputs in VdS mode

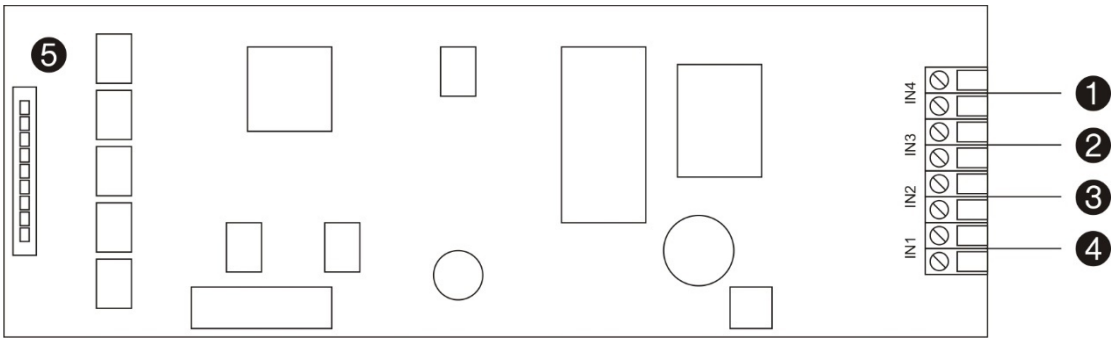


1. IN5 general input OR fault routing return input (VdS mode)
2. IN6 general input OR fire protection fault input (VdS mode)
3. IN7 general input OR fault routing fault input (VdS mode)
4. IN8 general input

Connecting the FEP2000N main controller module

The FEP2000N main controller module is located in the rear cabinet. It is the first module of the group and is connected to the PS1200N module.

Figure 11: Main controller module auxiliary inputs



1. IN4 auxiliary input 4
2. IN3 auxiliary input 3
3. IN2 auxiliary input 2
4. IN1 auxiliary input
5. FC1200N or FC2012 host CPU module connector

Connecting the NC2011 and NC2051 network modules

The NC2011 and NC2051 network modules enable a wide range of network topologies when networking 1200C-2000C control panels and repeaters.

The NC2011 and NC2051 modules are located on the inside of the control panel door (top layer) and connected to the FC1200N or FC2012 host CPU module.

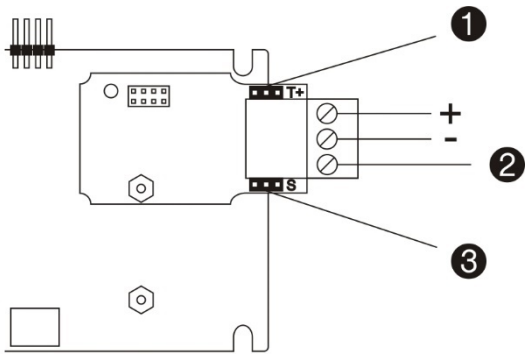
General information

All network nodes use the ARCNET protocol. Every node on the network must have a network module installed.

Where cabling runs between buildings or in high-noise or harsh environments a fibre-optic network should be used.

NC2011 network module for RS-485 networks

Figure 12: NC2011 network module



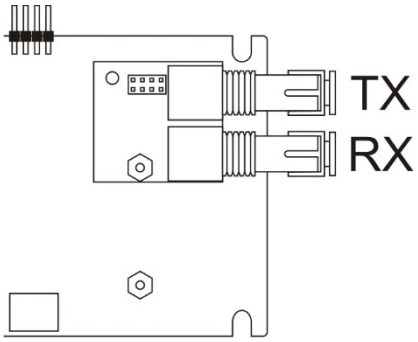
1. Termination jumper
2. Shield
3. Earth jumper

Table 3: NC2011 jumper configuration

Jumper	Setting	Description
Termination jumper (T+)	A	Not terminated
	B	Terminated
Earth jumper (S)	A	Not earthed
	B	Earthed

NC2051 network module for fibre-optic networks

Figure 13: NC2051 network module

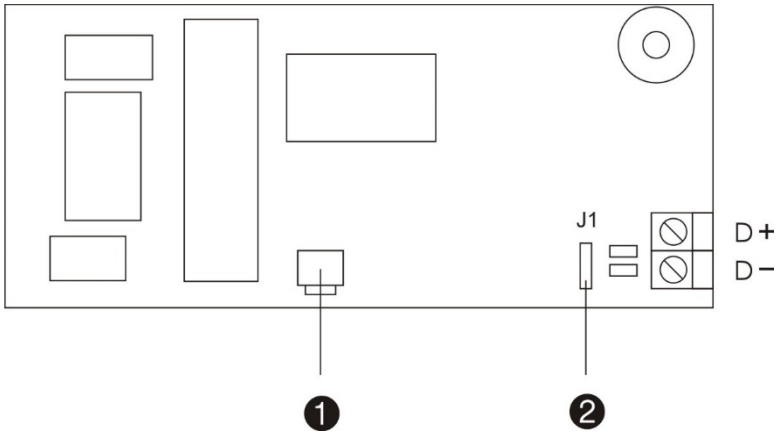


Connecting the LON2000 serial communication module

The LON2000 serial communication module allows serial communication between 1200C-2000C series addressable control panels and 700 series conventional control panels. It cannot be used with repeaters.

The module is installed onto the P13, 20-PIN male connector of the FC1200N or FC2012 host CPU module located on the inside of the control panel door.

Figure 14: LON2000 serial communication module



1. Service switch
2. Termination jumper (J1)

Termination

If a LON2000 serial communication module is installed into the first or last control panel of a LON network, then the termination jumper (J1) must be inserted to terminate the communication port.

Termination jumper (J1)	Description
Inserted	The serial communication port is terminated with 120Ω
Not inserted	The serial communication port is not terminated

Connecting the ZE2016 and ZE2064 zone LED modules

The ZE2016 and ZE2064 zonle LED modules are used to increase the number of visible zones for 1200C and 2000C control panels.

The maximum number of zone modules that can be installed will depend on the control panel model – see “Appendix C: Maximum zones and loops” on page 37 for more information.

The ZE2016 and ZE2064 modules are located on the inside of the control panel door and are connected to the HDIS2000N or HDIS2000-F LED display module.

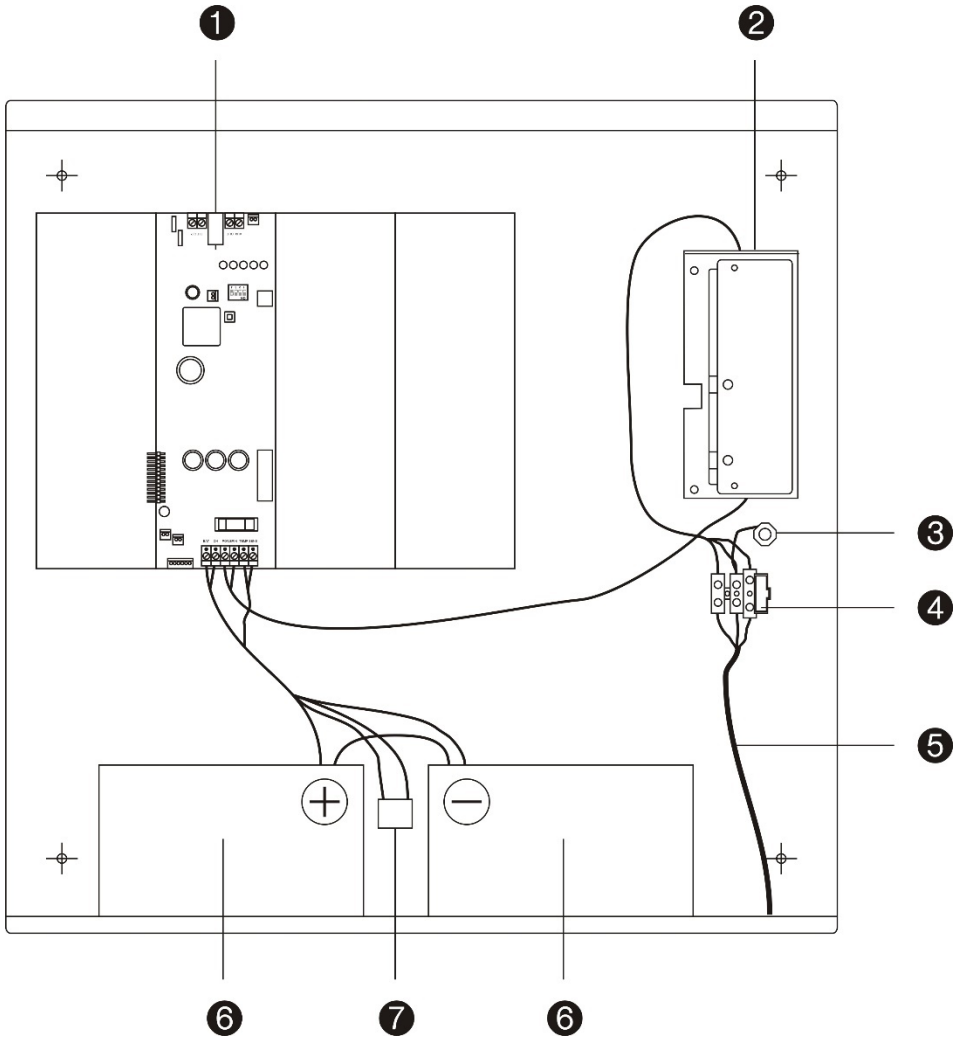
Caution: The ZE2016 and ZE2064 zone LED modules must not be installed together in the same control panel.

Connecting the mains power supply

Mains power should be sourced directly from a separate circuit breaker in the building electrical supply distribution board. This circuit should be clearly marked, have a bipolar disconnect device, and only be used for fire detection equipment.

Caution: Keep mains cables separate from other cabling to avoid potential short circuits and interference. Always secure mains cables to the cabinet to prevent movement.

Figure 15: Typical power supply connections for a 1200C control panel



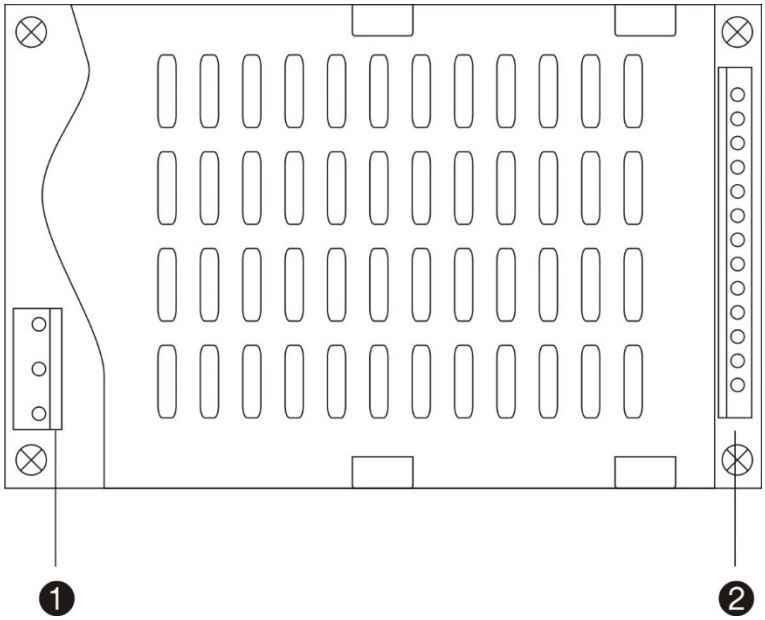
1. PS1200N power supply interface module
2. PS2000N power supply unit
3. Earth stud
4. Fuse terminal block
5. Incoming 230 VAC mains supply cable
6. 12V batteries
7. Temperature sensor

Note: Panel layout may differ from illustration.

PS2000N power supply unit connections

The PS2000N is the main power supply unit for 1200C-2000C control panels and complies with all EN 54 requirements when used with these products.

Figure 16: PS2000N layout and connections

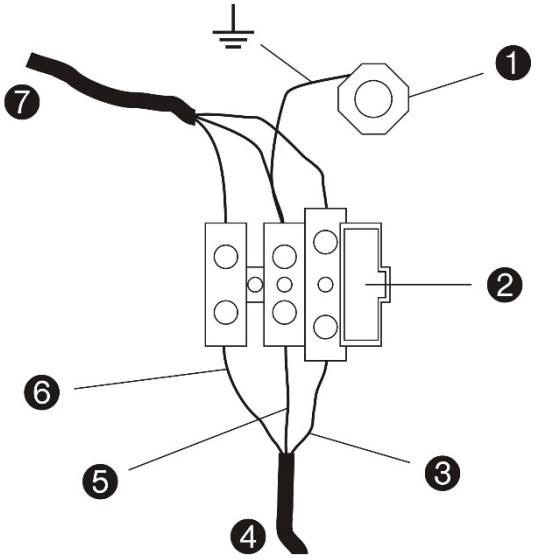


1. Fuse terminal block connector
2. PS1200N connector

Fuse terminal block connections

The 230 VAC mains power supply is connected directly to the fuse terminal block as shown below.

Figure 17: Fuse terminal block connections



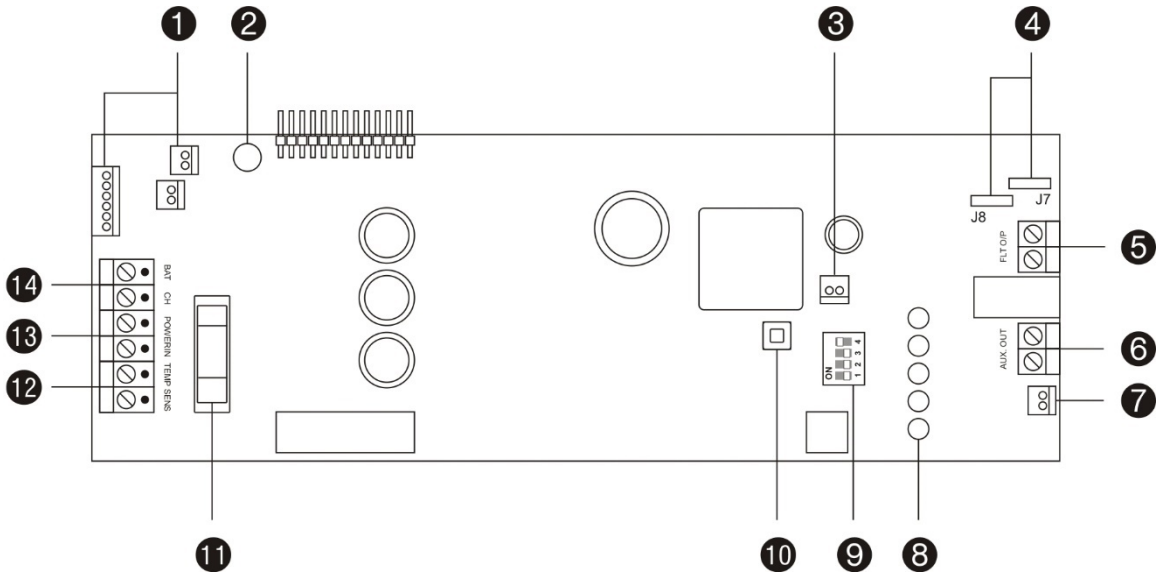
1. Earth stud
2. Fuse
3. Live wire
4. Incoming 230 VAC mains cable
5. Earth wire
6. Neutral wire
7. Cable connection to PS2000N power supply input

PS1200N power supply interface module connections

The PS1200N power supply interface module manages the control panel power requirements and distribution.

The PS1200N is located in the rear cabinet between the FEP2000N module and the LC1502 module.

Figure 18: PS1200N layout and connections

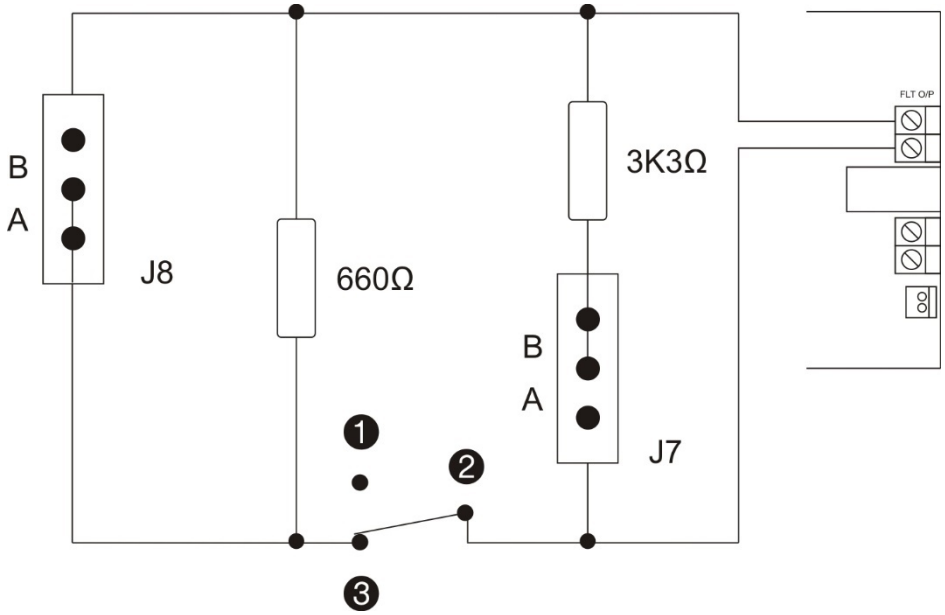


1. FC1200N or FC2012 host CPU module connector
2. Potentiometer (LCD screen contrast)
3. Modem power supply connector
4. Power supply fault relay output configuration jumpers J7 and J8
5. Power supply fault relay output
6. 24 VDC auxiliary output
7. Internal printer power supply connector
8. Power and fault monitoring LEDs
9. Battery selection DIP switch
10. Battery startup push button
11. 5A battery fuse
12. Temperature sensor connector
13. PS2000N PSU connector
14. Battery connector

Fault relay connection on the PS1200N

Configure the power supply fault relays using jumpers J7 and J8 beside the fault output (see Figure 18 on page 20).

Figure 19: PS1200N fault relay jumper configurations



1. Normally open (NO)
2. Common (C)
3. Normally closed (NC)

Note: Components shown are mounted onto the PS1200N PCB and do not represent field wiring.

The fault output is normally closed. The default setting for jumpers J7 and J8 is A. Configuration options are:

J7 (pins for position B connected on PCB)

- Position A = 3K3Ω
- Position B = 0Ω

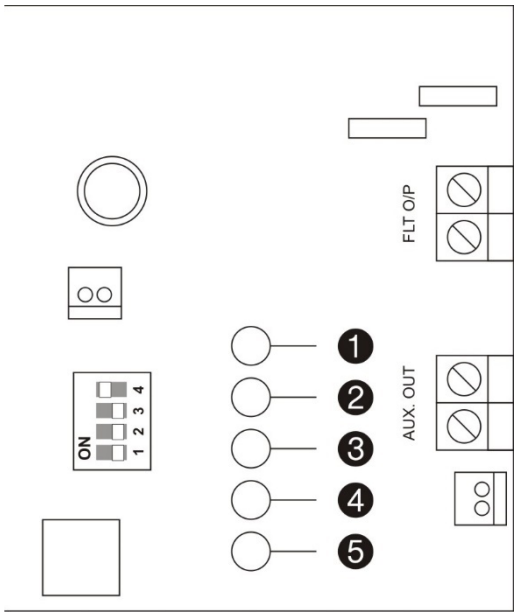
J8 (pins for position A connected on PCB)

- Position A = 660Ω
- Position B = 0Ω

Power and fault monitoring LEDs on the PS1200N

The PS1200N includes five LEDs for power and fault monitoring.

Figure 20: PS1200N power and fault monitor LEDs



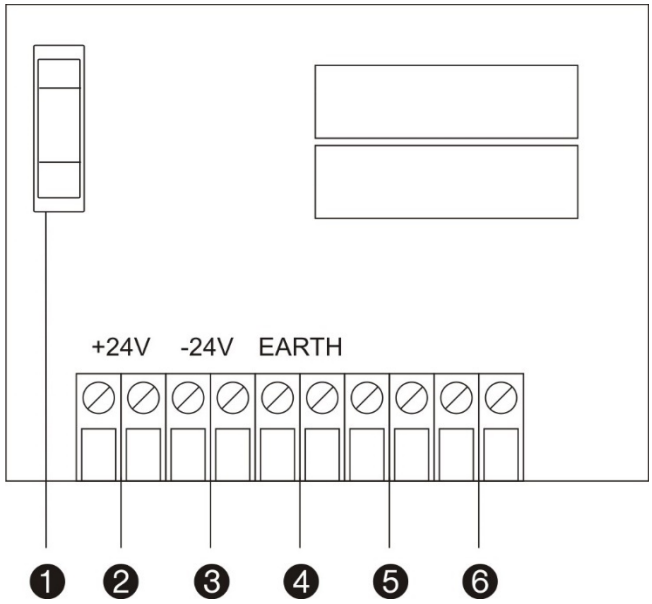
1. Power LED
2. Earth fault LED
3. Charger fault LED
4. Battery voltage fault LED
5. Battery circuit resistance fault LED

LED	Colour	Description
Power	Green	Indicates the power supply status and power source. If the LED is lit, then the is powered by the PS2000N power supply unit. If the LED is off, then the power is supplied by batteries or the module is without power.
Earth fault	Yellow	Indicates control panel earth faults. If the LED is lit, an earth fault has been detected.
Charger fault	Yellow	Indicates the general status of the battery charger. If the LED is lit, there is a fault with charging the batteries (incorrect voltage, temperature sensor connection fault, microcontroller error etc.)
Battery voltage fault	Yellow	Indicates battery voltage faults. If the LED is lit, the battery voltage is less than 21V, there are no batteries connected, or there is a short circuit at the battery terminals.
Battery circuit resistance fault	Yellow	Indicates the results of a battery circuit resistance test. If the LED is lit, the battery resistance is too high.

24 VDC power supply connections for repeaters

24 VDC power supply connectors for repeaters are located on the termination board.

Figure 21: 24 VDC power supply connections



1. Fuse
2. +24V connector
3. -24V connector
4. Earth connector
5. Charger fail (normally shorted input)
6. Mains supply fail (normally shorted input)

Connecting the batteries

The control panel requires two 12V, 7 to 45 Ah rechargeable sealed lead-acid batteries (see table below).

Batteries must be installed in series using the bridge provided and connected to the BAT CH terminals on the PS1200N power supply interface (see Figure 15 on page 17). Polarity must be observed. No other equipment may be connected to the battery terminals.

Table 4: Battery and battery installation

Battery	Battery location
12V - 7 Ah	Batteries are installed inside the control panel cabinet
12V - 7.2 Ah	Batteries are installed inside the control panel cabinet
12V - 12 Ah	Batteries are installed inside the control panel cabinet
12V - 17 Ah	Batteries are installed inside the control panel cabinet
12V - 18 Ah	Batteries are installed inside the control panel cabinet
12V - 24 Ah	Batteries must be installed externally
12V - 26 Ah	Batteries must be installed externally
12V - 45 Ah	Batteries must be installed externally

Note: 45 Ah batteries may not be used with FR1200 or FR2000 panels.

Once batteries are installed, the battery type must be set using the battery selection DIP switch. See “Charging batteries” below.

Charging batteries

In accordance with EN 54-4, installed batteries may be charged by the control panel. To ensure correct charging, the type of battery used must be set using the battery selection DIP switch on the PS1200N (see Figure 16 on page 18). DIP switch settings are shown in the table below.

Caution: Selecting an incorrect charge rate may damage batteries.

Table 5: Battery selection DIP switch configuration

1	2	3	4	Battery type	Charge rate at 27.3 VDC
OFF	OFF	OFF	ON	7 and 7.2 Ah	0.5 A
OFF	OFF	ON	OFF	12, 17, and 18 Ah	1 A
OFF	ON	OFF	OFF	24 and 26 Ah	1.5 A
ON	OFF	OFF	OFF	45 Ah	3 A

Note: If more than one DIP switch is ON the lowest charging rate will be used.

If the control panel indicates a Battery Test Fail error, then the batteries may need to be replaced. For more information see “Battery maintenance” on page 30. For battery life calculations see “Battery capacity calculation” on page 33.

Starting up on battery power

If mains power is not available the control panel may be powered up using battery power. To do this, press the battery startup button on the PS1200N power supply interface module (see Figure 18 on page 20).

Third-source power supply

An optional 9V PP3 battery may be installed as a third-source power supply. The third-source battery is connected to the FC1200N or FC2012 host CPU module.

Commissioning the control panel

FC1200N or FC2012 host CPU module configuration

Before starting up the control panel the FC1200N or FC2012 host CPU module must be configured as follows:

- Memory switch LOCKED
- Service Mode switch OFF

The memory should only be unlocked when prompted during the initial start-up procedure.

Commissioning checklist

Check the following before starting-up the control panel for the first time:

- Check the interior of the control panel for any loose cabling and for any damage that may have occurred during installation.
- Check that all harnesses are securely plugged into the correct connectors.
- Check that both the mains switch and the battery ON/OFF switch are off.
- Check that all mains and battery cables are connected correctly and that polarity has been observed.
- Check that the lithium battery on the host CPU module is enabled (jumper J5 – located above the battery – is inserted) and unlock the memory.
- Check that the control panel is well earthed at the earth terminals provided. The earth must be directly wired to the distribution board earth. This is required for safety and interference suppression.
- Check that all repeaters, network modules, and field devices are connected and that their addresses have been set correctly (where applicable).
- Check that the FC1200-FC2012 host CPU module has the Service Mode switch off and that the memory is locked.
- Check that any installed loop isolators use correct polarity.
- Check all field wiring with a multimeter for short circuits, continuity, and earth faults. If isolators have been used in the loop wiring, then one wire of the loop will not have continuity. Continuity, earth fault and short circuit must be checked between each isolator.

WARNING: Do not use a Megger on the loops as this may damage connected devices.

Commissioning procedure

Once all final checks have been completed the control panel may be commissioned. To do this, do the following:

1. Switch the mains power on at the power supply or connect the 24 V to the 24 V supply board.
2. The internal buzzer will sound and the control panel product code will be displayed on the LCD screen (with the revision of host firmware, firmware code and the creation date of the firmware). If this does not happen do not proceed. Check that the mains supply is present and that all fuses are correct.
3. Switch the battery On/Off switch to ON (230 V model only).
4. Check that the battery float voltage is between 27 and 28 V using a voltmeter (ensuring that the voltage remains stable for approximately 5 minutes). If the voltage is significantly less, then check the battery condition and possible overloads in the field.
5. If there are visible signs of the power supply overheating, then do not proceed. Disconnect batteries and all field wiring, and investigate the cause of the problem.
6. The control panel will now perform internal checks and any faults detected will be displayed on the LCD screen. The total number of faults is reported (on line 8). Use the scroll button to view the faults. See Table 6 below for a list of possible faults that may be reported.
7. Any faults reported should be fixed before proceeding. Use the Reset button to refresh the fault report.
8. Enable all loop devices (via the Setup menu or using a PC and configuration software).
9. Eliminate any alarms reported and ensure that no devices that should be active are reported as disabled.
10. Check all output relays for correct switching.
11. Configure your Panel ID.

Table 6: Common faults at first-time start-up

Fault type	Action required
Loop overload fault	Check the reported loop for short circuits.
Earth fault	Check all earth connections
Battery fail	Check battery charging
Sounders or fire brigade fault short or open circuit fault	Check that all supervised inputs are terminated correctly with a 3K3Ω resistor
Device fault	Check all devices and connections
Double address fault	Check all device addresses

Commissioning networks

Once the control panel has been commissioned correctly, the following steps are required to initialize and configure a network.

1. Configure the network setup (via the Setup menu or using a PC)
2. Investigate and fix all faults that are reported
3. Check the status of the systems on the ARCNET network that are configured to communicate with the repeater. Faults regarding communication with repeater node identification address should disappear when the ARCNET network is operational
4. Check all connections to panels by emulating them
5. Check panel fault reporting by switching off each panel one by one and checking that the missing panel is reported by the other panels in the network
6. Check fire and fault reporting
7. Check all that all network input and output devices are working correctly
8. Reset all repeaters and control panels

Basic configuration options

The protocol, operating mode, and language are selected via System Setup menu on the control panel LCD screen (System > Configuration > System Setup).

Protocol and operating mode

The following protocols are supported:

- 900 series
- 2000 series

The following operating modes are supported:

- EN mode
- VdS mode
- NEN mode
- EP mode
- BS mode

Note: VdS mode is only available on control panels with a VDS2000 module installed.

Language groups

Each panel is shipped with one language group. A language group may include up to five languages.

Table 7: 1200C-2000C language groups

Group 0	Group 1	Group 2	Group 3	Group 4	Group 5
English	English	English	English	English	English
Dutch (Holland)	Polish	Danish	Lithuanian	Italian	Romanian
Dutch (Belgium)	Hungarian	Swedish	Estonian	Spanish	Greek
French	Czech	Norwegian	Latvian	Portuguese	Luxemburgish
German	Slovak	Finnish	Russian	Brazilian	English

LCD contrast

The LCD screen contrast can be adjusted using the potentiometer on the PS1200N power supply interface module (see “PS1200N power supply interface module connections” on page 20).

Maintenance

The following maintenance procedures should be performed. by qualified personnel adhering to the CEN/TS 54-14 standard and any applicable local authority laws.

Fire system maintenance

Your fire system must be regularly tested and serviced in order to ensure its reliable operation. The following maintenance routine is recommended.

Daily Verification

- Check that the panel indicates normal operation. If it does not, check that any fault indicated is recorded in the log book and reported to the maintenance personnel.
- Check that any fault warning recorded the previous day has received attention.

Quarterly Verification

- Check the log book entries and that any necessary action has been taken.
- Check the state of the batteries and corresponding connections.
- Visually inspect the fire panel for signs of moisture or other deterioration.
- Test the alarm, fault and ancillary functions of the fire panel.

Annual Verification

- Carry out the recommended daily and quarterly inspection and test routines.
- Check each detector for correct operation in accordance with the manufacturer's recommendations.
- Visually inspect all cable fittings and equipment to ensure that no damage has taken place.
- Visually inspect all electrical connections to make sure that they are securely fastened, that they have not been damaged and that they are appropriately protected.
- Visually inspect the manual call points, detectors and sounders to ensure that no structural or occupancy changes have affected their location requirements.

Cleaning the control panel

Keep the control panel clean inside and outside. Carry out periodic cleaning using a damp cloth for the outside.

Do not use products containing solvents to clean the unit. Do not clean the inside with liquid products.

Battery maintenance

Batteries must be replaced periodically as recommended by the manufacturer. The useful life of the battery is approximately 4 years. Avoid the total discharge of the batteries.

Battery test fail

When the control panel indicates that the battery test has failed, check the following:

- That the battery leads are in good condition
- That the battery leads are connected securely and correctly at the battery and at the panel
- That the control panel event log does not indicate a mains failure in the last twenty-four hours

If the leads are in good condition, all connections are correct, and the control panel continues to report that the test has failed twenty-four hours after the last mains failure, then the batteries should be replaced immediately.

Replacing batteries

To replace the batteries, do the following:

1. Disconnect and remove the existing batteries from the cabinet.
2. Install and connect the replacement batteries using the bridge provided. Observe correct polarity.

Always use the recommended replacement batteries (see “Connecting the batteries” on page 23).

Dispose of used batteries according the European regulations and/or instructions from local authorities.

Technical specifications

Mechanical and environmental specifications	
Dimensions (W x H x D Small cabinet Large cabinet	 445 x 445 x 120 mm 810 x 445 x 120 mm
Colour	RAL9016 Traffic White
IP rating	IP54
Operating temperature	−5°C to +40°C
Storage temperature	−20°C to +60°C
Loop specifications (2000 protocol)	
Maximum number of loops per panel	See “Appendix C: Maximum zones and loops” on page 37
Loop overload current	> 500 mA
Loop operating load	Max. 100 mA
Maximum number of addressable devices per loop	128 per 2 km of cable
Maximum number of addressable devices per panel including I/O devices, detectors and manual call points	1024
Maximum number of addressable detectors and/or manual call points per panel	512 (as defined by EN 54-2)
Loop specifications (900 protocol)	
Maximum number of loops per panel	See “Appendix C: Maximum zones and loops” on page 37
Loop overload current	> 500 mA
Loop operating load	Max. 100 mA
Maximum number of addressable devices per loop	126 per 2 km of cable
Maximum number of addressable devices per panel including I/O devices, detectors and manual call points	1008
Maximum number of addressable detectors and/or manual call points per panel	512 (as defined by EN 54-2)
Input and output specifications (SD2000/FEP2000N)	
SD2000 IN1 to IN4	3K3Ω termination
SD2000 OUT1 and OUT2 (loop Class A)	24 V / 0.8 A (max. supervision 5V)
SD2000 OUT3 and OUT4 (loop Class A)	24 V / 0.1 A (max. supervision 5V)*
SD2000 OUT1 to OUT4 (loop Class B)	3K3Ω / 680Ω switched output
SD2000 OUT5 to OUT8 max. switching current	2A at 24 VDC
SD2000 OUT5 to OUT8 max. power rating	60 W DC
FEP2000N IN1 to IN4	15 VAC or 20 to 28 VDC / 3 A

Power supply			
	FR1216C	**FR2064C**	**All other panels**
Input	230 VAC (+10%, -15%), 50 Hz (±10%)	21 to 28 VDC	230 VAC (+10%, -15%), 47 to 63 Hz
	50 VA	24V standby battery	200 VA
	21 to 28 VDC		21 to 28 VDC
	24V standby battery		24V standby battery
Output	Aux. Power: 19 to 28.8 VDC 100 mA (max.)		Aux. Power 19 to 28.8 VDC 1 A (max.)
	Modem: 5 VDC (±0.1V) 75 mA (max.)		Battery charge: 27.3 VDC at 20°C, 36 mV/°C
	Battery charge: 27.6 VDC (±0.2V) at 25°C, 300 mA (max.)		
Supervised	Mains fail Battery disconnect Battery flat Flat battery cut-out Earth fault Auxiliary supply fault	Mains fail Charger fail	Input voltage Earth fault Charger fault Battery loss Battery fault
Mains fuse	T 0.8A 250V	T 1A 250V	T 2A 250V
Maximum current (primary input)	250 mA	0.3 A (no options installed)	1A
Maximum output ripple voltage	±300 mV		±300 mV
Fault relay (subject to jumper configuration)	Maximum switching current: 2A at 24 VDC Maximum power rating: 50 W		Maximum switching current: 2A at 24 VDC Maximum power rating: 50 W

Current requirements							
Status	**System**	**Aux.**	**Printer**	**Modem**	**Loops***	**Sounders**	**Total**
Standby	200 mA	1 A	100 mA	200 mA	340μA per device	0	< I max a. 1 A
Alarm	200 mA + 10 mA per zone card	1 A	100 mA	200 mA	340μA per device plus 80 mA per loop	200 mA	< I max b. 4 A

* Do not exceed 250 mA per loop.

Supplementary electrical information		
	FR1200C-2000C	FP1200C-2000C
I min	250 mA	250 mA
I max. a	1 A	1 A
I max. b	3.5 A	4 A
Ri max	0.5Ω	0.5Ω
Battery voltage (final)	21 V	21 V
Battery voltage (fully charged)	27.3 V at 20ºC (36mV/ºC)	27.3 V at 20ºC (36mV/ºC)
Batteries	7 Ah to 26 Ah	7 Ah to 45 Ah

* Do not exceed 250 mA per loop.

Battery capacity calculation

Battery capacity is calculated with the following formula:

C = (Standby current × Standby time) + (Alarm current × Alarm time)

Calculation example for 24 hours standby time and 30 minutes in alarm:

System data:

- 1 x zone module
- 250 mA at FEP2000N auxiliary output
- 1 x internal printer (not supplied)
- No modem
- 2 x loops with 100 devices per loop
- 100 mA at SD2000 sounders output

Status	System	Aux.	Printer	Modem	Loops*	Sounders	Total
Standby	200 mA	0.25 A	100 mA	0	340μA × 100 × 2 = 68 mA	0	618 mA
Alarm	200 mA + 100 mA = 300 mA	0.25 A	100 mA	0	340μA × 100 × 2 + (80 mA × 2) = 228 mA	100 mA	978 mA

C = (0.618 A × 24 Hrs) + (0.978 A × 0.5 Hrs) = 15.312 Ah.

Closest value is 18 Ah.

Appendixes

Appendix A: Modules

Installed modules will vary depending on panel model and region. For a complete listing of panel/module configurations see page 35.

Standard modules

The following modules are installed in all control panels:

- HDIS2000N or HDIS2000-F LED display module
- FC1200N or FC2012 host CPU module
- KP2000 keypad module (excluding black boxes)
- LCD1200 LCD screen

A selection of the following modules may also be installed:

- ZE2016 or ZE2064 zone LED module
- FEP2000N main controller module
- LC1502 loop module (except repeaters)
- SD2000 common I/O module or VDS2000 VdS interface module
- PS1200N power supply interface module
- PS2000N power supply unit
- PSDC2000 24V power supply interface module
- NC2011 RS-485 network module
- NE2011 RS-485 network extension module
- LON2000 serial communications module

Optional modules

In addition to the above the following optional modules may also be installed if required:

- NC2051 fibreoptic network module
- NE2051 fibreoptic network extension module
- MOD2000 modem
- RB2016 relay module

Module location

The following table indicates the installation location for each module.

Table 8: 1200C-2000C module installation location

Module	Installation location
HDIS2000N or HDIS2000-F	Inside the cabinet door (bottom layer)
FC1200N or FC2012	Inside the cabinet door (top layer)
KP2000	Inside the cabinet door (bottom layer)
LCD1200	Inside the cabinet door (top layer)
ZE2016 or ZE2064	Inside the cabinet door (bottom layer)

Module	Installation location
FEP2000N	Inside the cabinet box
LC1502	Inside the cabinet box
SD2000	Inside the cabinet box
PS1200N	Inside the cabinet box
NC2011	Inside the cabinet door (top layer)
NC2051	Inside the cabinet door (top layer)
LON2000	Inside the cabinet door (top layer)
RB2016	Inside the cabinet box

Installed modules for fire panels, repeaters, and black boxes

The modules installed in each control panel are listed in the following tables. These listings exclude the HDIS2000, FC1200-FC2012, KPD2000, and LCD1200 modules.

Table 9: Fire panel modules

Panel	Modules					
FP1216N	ZE2016	FEP2000N	PS1200N	LC1502	SD2000	PS2000N
FP1264N	ZE2064	FEP2000N	PS1200N	LC1502	SD2000	PS2000N
FP28255C	ZE2064	FEP2000N	PS1200N	LC1502	SD2000	PS2000N
FP2864C	ZE2016	FEP2000N	PS1200N	LC1502	SD2000	PS2000N

Regional variants:

- German panels have a VDS2000 module instead of the SD2000 module
- French panels do not have the SD2000 module
- Danish and Swedish panels have the LON2000 module

Table 10: Repeater and global repeater modules

Panel	Modules					
FR1216N	ZE2016	---	PS1200	---	NC2011	NE2011
FR1264N	ZE2064	---	PS1200	---	NC2011	NE2011
FR20255N	ZE2064	---	PSH2000	PSDC2000	NC2011	NE2011
FR2064N	ZE2016	---	PSH2000	PSDC2000	NC2011	NE2011
FRG20255N	ZE2064	FEP2000N	PS1200N	PS2000N	NC2011	NE2011
GR2064C	ZE2016	---	PS1200N	PS2000N	NC2011	NE2011

Table 11: Black box modules

Panel	Modules					
FB2800C	FEP2000N	PS1200N	LC1502	PS2000N	NC2011	NE2011

Appendix B: Dimensions and weights

Two cabinet sizes are available:

Cabinet size	Dimensions (mm)	Colour
Small	445 x 445 x 120	RAL9016 (Traffic White)
Large	810 x 445 x 120	RAL9016 (Traffic White)

Cabinet use for each type of control panel is as follows:

Table 12: 1200C-2000C dimensions and weights

Control panel	Cabinet size	Weight (kg)
FP1216C	Small	9
FP1264C	Small	9
FR1216C	Small	9
FR1264C	Small	9
FP2864C	Large	15
FP28255C	Large	15
FR2064C	Large	15
FR20255C	Large	15
FRG20255C	Large	15
GR2064C	Large	15

Note: Weight is approximate and excludes batteries

Appendix C: Maximum zones and loops

The maximum number of zones and zone modules, loops and loop modules for each panel are shown in the table below.

Table 13: 1200C-2000C maximum zones and loops

Control panel	Maximum number of zones	Maximum number of zone modules	Maximum number of loops	Maximum number of loop modules
FP1216C	16	1 x ZE2016	4A / 8B	2 x LC1502
FP1264C	64	1 x ZE2064	4A / 8B	2 x LC1502
FR1216C	16	1 x ZE2016	N/A	N/A
FR1264C	64	1 x ZE2064	N/A	N/A
FP2864C	64	4 x ZE2016	8A / 8B	4 x LC1502
FP28255C	255	4 x ZE2064	8A / 8B	4 x LC1502
FR2064C	64	4 x ZE2016	N/A	N/A
FR20255C	255	4 x ZE2064	N/A	N/A
FRG20255C	255	4 x ZE2064	N/A	N/A
GR2064C	64	4 x ZE2016	N/A	N/A

Note: For control purposes the absolute maximum number of zones is 255.

Appendix D: Cable specifications

Mains power cable

The recommended mains cable is 3 x 1.5 mm² (live, neutral, earth).

Loop cable

A twisted pair cable is required to ensure data integrity. Shielded, fireproof cable is highly recommended. If shielded cable is used, then cable shield continuity should be observed.

Maximum cable length	2 km (cable Ø 1 mm)
Maximum cable capacitance	300 nF / km
Maximum total resistance	100Ω

RS-485 network cable

The recommended cable is CAT5 with a characteristic impedance of 100 Ω.

Note: If the total cable length for the network exceeds 800 m and / or 32 nodes, we recommend the use of fibre-optic cabling.

End-of-line termination resistors need to be used to match the cable characteristic impedance to prevent reflections

Maximum cable length (bus and dual bus topology)	800 m
Maximum number of nodes (bus and dual bus topology)	32

When shielded cable is used, shields must be earthed at one point only. The shield of the cable must be continued between nodes using the terminal provided on the card.

Fibre-optic network cable

The recommended fibre-optic cable is a straight tip (ST) duplex with a fibre width of 50/125, 62.5/125 or 100/140 µm.

Fibre-optic networks may use more than 32 nodes. The maximum distance between nodes under ideal conditions is 1.7 km, but an optical power-budget calculation should be performed to determine the correct maximum distance for each site.

LON network cable

The recommended cable is CAT5 with a characteristic impedance of 100 Ω.

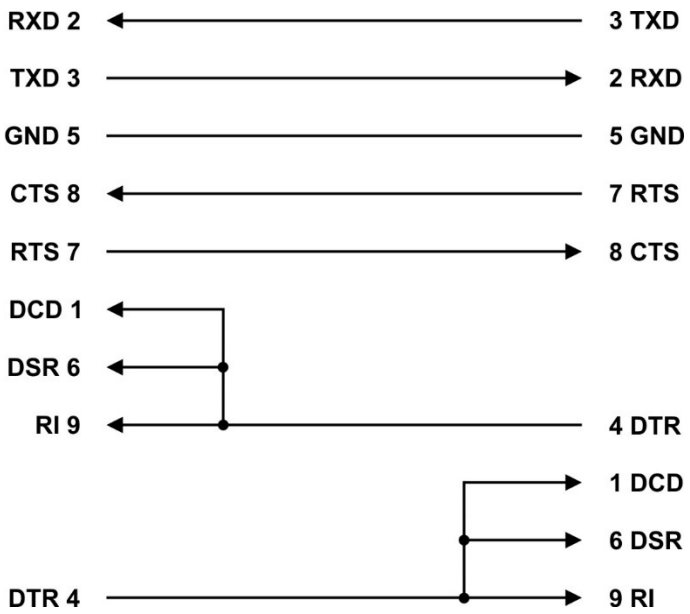
Maximum cable length between nodes is limited. End-of-line termination resistors need to be used to match the cable characteristic impedance to prevent reflections. The use of stub wiring is not recommended.

Maximum cable length (bus topology)	1.5 km
Maximum number of nodes (bus topology)	32

RS-232 null modem cable

A 7-way null modem cable with full handshaking is used to connect the control panel to a PC. The figure below shows the required DB9 control panel to PC (female to female) cable configuration. The cable length should not exceed 12 m.

Figure 22: Null modem cable configuration



Output connections from addressable, supervised units

We recommend that shielded cable be used for all output connections from addressable, supervised units. Cable characteristics are as follows:

Maximum output resistance	30Ω
Maximum output capacitance	120 nF
Maximum recommended cable length	500 m

Appendix E: Product compliance

EN 54-2 compliance for 1200C-2000C control panels with the SD2000 module

Control panels with the SD2000 module installed have the following options with requirements according to EN 54-2:

Table 14: EN 54-2 options with requirements with the SD2000 module

Clause	Description
7.8	Output to fire alarm devices
7.9	Output to fire routing equipment
7.10	Output to fire protection equipment
7.11	Delay to output
7.12	Dependency on more than one alarm signal
7.13	Alarm counter
8.4	Total loss of the power supply
9.5	Disablement of addressable points
10	Test

EN 54-2 compliance for 1200C-2000C control panels with the VDS2000 module

Control panels with the VDS2000 module installed have the following options with requirements according to EN 54-2:

Table 15: EN 54-2 options with requirements with the VDS2000 module

Clause	Description
7.8	Output to fire alarm devices
7.9	Output to fire routing equipment (+ VDE0833)
7.10	Output to fire protection equipment (+ VdS requirements)
7.11	Delay to output
7.12	Dependency on more than one alarm signal (+ VDE0833)
7.13	Alarm counter
8.4	Total loss of the power supply
8.9	Output to fault routing equipment
9.5	Disablement of addressable points
10	Test

Control panels with the VDS2000 module also allow for:

- Interface to FBF
- Interface to FAT
- interface to FSK
- interface to Hauptmelder
- interface to EMZ

European regulations for construction products

This section provides a summary on the declared performance according to the Construction Products Regulation (EU) 305/2011 and Delegated Regulations (EU) 157/2014 and (EU) 574/2014.

For detailed information, see the product Declaration of Performance (available at firesecurityproducts.com).

Table 16: Regulatory information

Certification	CE
Certification body	1134
Manufacturer	Carrier Manufacturing Poland Spòlka Z o.o., Ul. Kolejowa 24, 39-100 Ropczyce, Poland. Authorized EU manufacturing representative: Carrier Fire & Security B.V., Kelvinstraat 7, 6003 DH Weert, Netherlands.
Year of first CE marking	09
Declaration of Performance number	360-3315-0299
EN 54	EN 54-2:1997+A1:2006 EN 54-4:1997+A1:2002+A2:2006
Product identification	See model number on product identification label
Intended use	See the product Declaration of Performance
Declared performance	See the product Declaration of Performance