GE
Security

FP1200, FP2000 and KSA1200 series fire panels, repeaters and emulators

Installation manual

Version 8-1 / September 2005

GE imagination at work

Aritech and Kilsen are GE Security brands.

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1 INTRODUCTION

1.1 Overview

This manual explains how to install FP1200, FP2000 and KSA1200 series analogue addressable fire panels, repeaters and emulators. The manual is intended as a guide only and is not to be used to replace any local building and/or wiring codes.

Addititional information may be found in the following manuals:

- FP1200, FP2000 and KSA1200 series interconnection & wiring guide.
- FP1200, FP2000 and KSA1200 series network configuration guide.
- FP1200, FP2000 and KSA1200 series installation and commissioning guide.
- FP1200, FP2000 and KSA1200 series user guide.

2 GENERAL INFORMATION

2.1 Product codes

2.1.1 Fire panels

Panel	Zone cards (max.)	Loops (max.)	Detectors per loop (max.)	Default detector	Internal printer	Cabinet size (mm)	Batteries (max.)	Weight (kg)
FP1200-00	0	2A / 4B	64	Apollo	No	365x444x112	7 Ah **	8
FP1200-01	0	2A / 2B	64	Sentrol	No	365x444x112	7 Ah **	8
FP1200-02	0	2A / 2B	64	Sentrol	No	365x444x112	7 Ah **	8
FP1216	1 x ZE2016	2A / 2B	126 / 128 *	Sentrol	No	365x444x112	7 Ah **	8
FP1216EN	1 x ZE2016	4A / 4B	126 / 128 *	Sentrol	No	440x444x125	17 Ah	9
FP1216N	1 x ZE2016	4A / 4B	126 / 128 ***	Sentrol	No	444x444x125	17 Ah	9
FP1264	1 x ZE2064	4A / 4B	126 / 128 *	Sentrol	No	440x444x125	17 Ah	9
FP1264N	1 x ZE2064	4A / 4B	126 / 128 ***	Sentrol	No	444x444x125	17 Ah	9
KSA1204	1 x ZE2064	4A / 4B	126 / 128 ***	Sentrol	No	444x444x125	17 Ah	9
FP2416	1 x ZE2016	4A / 8B	126 / 128	Sentrol	Yes	609x441x109	17 Ah	11
FP2464	1 x ZE2064	4A / 8B	126 / 128	Sentrol	Yes	609x441x109	17 Ah	11
FP2432	2 x ZE2016	4A / 8B	126 / 128	Sentrol	No	609x441x109	17 Ah	11
FP24128	2 x ZE2064	4A / 8B	126 / 128	Sentrol	No	609x441x109	17 Ah	11
FP2864	4 x ZE2016	8A / 8B	126 / 128	Sentrol	Yes	804x441x109	17 Ah	15
FP28255	4 x ZE2064	8A / 8B	126 / 128	Sentrol	Yes	804x441x109	17 Ah	15
KSA1208	4 x ZE2064	8A / 8B	126 / 128	Sentrol	Yes	804x441x109	17 Ah	15
FB2400	0	8A / 8B	126 / 128	Sentrol	No	609x441x109	17 Ah	11
FB2800	0	8A / 8B	126 / 128	Sentrol	No	804x441x109	17 Ah	15

Weight indicated excludes batteries.

* Only with ZE2016 otherwise 64

** If a network card is used the maximum size battery is 3 Ah

*** FP12xxN – the number of devices per loop for the Kilsen KAL210 protocol are 125 detectors plus 125 I/O modules. The Kilsen KAL210 protocol is the default protocol for Spain.

2.1.2 Repeater / emulator panels

Panel	Zone cards (max.)	Internal printer	Cabinet size (mm)	Connected to FP1200 / 2000	Voltage source	Weight (kg)
FR1200	0	No	365 x 444 x 112	NC2011 / NC2051	230 VAC	8
FR2000	0	No	365 x 444 x 112	NC2011 / NC2051	230 VAC	8
FR1264N	1 x ZE2064	No	444 x 444 x 125	NC2011 / NC2051	230 VAC	9
FR2032	2 x ZE2016	No	609 x 441 x 109	NC2011 / NC2051	24 VDC	11
FR20128	2 x ZE2064	No	609 x 441 x 109	NC2011 / NC2051	24 VDC	11
FR2064	4 x ZE2016	Yes	804 x 441 x 109	NC2011 / NC2051	24 VDC	15
FR20255	4 x ZE2064	Yes	804 x 441 x 109	NC2011 / NC2051	24 VDC	15
FBP700-D	0	No	240 x 320 x 60	LON2000	24 VDC	1.5
FBP700-S	0	No	240 x 320 x 60	LON2000	24 VDC	1.5
FR716LED	0	No	240 x 320 x 60	LON2000	24 VDC	1.5
FR724LED	0	No	397 x 290 x 64	LON2000	24 VDC	3
FR748LED	0	No	240 x 320 x 60	LON2000	24 VDC	1.5
FRD700	0	No	240 x 320 x 60	LON2000	24 VDC	1.5
FRL700	0	No	240 x 320 x 60	LON2000	24 VDC	1.5
RP732LED	0	No	397 x 290 x 64	LON2000	24 VDC	3
RP772LED	0	No	240 x 320 x 60	LON2000	24 VDC	1.5
RP724LED	0	No	240 x 320 x 60	LON2000	24 VDC	1.5
UN2011	0	No	290 x 145 x 80	NC/NE2011	230 VAC	1.5

Weight indicated excludes batteries.

2.1.3 Modules

Module	Description	Compatibility						
		FP1200 FP1216	FP1216EN FP1216N FP2416 FP2432 FP2864	FP1264 FP1264N KSA1204 FP2464 FP24128 FP28255 KSA1208	FB2x00	FR1200	FR2000/ 2032/ 2064	FR20128/ 20255
LC2002	Loop driver extension		•	•	•			
LC1502	Loop driver extension Kilsen KAL210 protocol		•	•	•			
LON2000	LON protocol converter	•	•	•	•	•	•	•
MOD2000	Modem	•	•	•	•		•	•
NC2011	Network card - RS485	•	•	•				
NC2051	Network card - optical	•	•	•	•	•	•	•
NE2011	Network extension card - RS485	•	•	•	•	•	•	•
NE2051	Network extension card – optical	•	•	•	•	•	•	•
PR2000 / PR2011	Internal printer (40 column impact printer)		•**	•**			•*	•
RB2016	16 programmable relay board	•	•	•	•			
SD2000	4 input/8 output sounder board (VDS Common I/O board)				•			
VdS2000	German sounder board			•	•			
ZE2016	16 zones LED extension		•				•	
ZE2064	64 zones LED extension			•***				•

* Excludes the FP1200 series of fire panels

** Option on FP2416/2464, FP2864/28255, FR20255 and KSA1208 only

*** Not applicable to the FP1264

2.1.4   Module variations

Board	Product used in	Variation
FEP1200	FP12xx	FEP1200 – 0 x Auxiliary inputs 28-pin eprom – no jumper selection required (Aritech protocol standard).
FEP1200K	FP12xx/FP12xxN/KSA1204	FEP1200K – 0 x Auxiliary inputs 32-pin eprom supports Kilsen KAL210 protocol. Jumper selection AB or KC for Aritech 2000 protocol. Jumper selection AC for Aritech 900 protocol. Jumper selection KB for Kilsen KAL210 protocol.
FEP2000	FP2xxx/FB2x00	FEP2000 – 4 x Auxiliary inputs 28-pin eprom – no jumper selection required (Aritech protocol standard).
FEP2000K	FP2xxx/FB2x00/KSA1208	FEP2000K – 4 x Auxiliary inputs 32-pin eprom supports Kilsen KAL210 protocol. Jumper selection AB or KC for Aritech 2000 protocol. Jumper selection AC for Aritech 900 protocol. Jumper selection KB for Kilsen KAL210 protocol.
FC1200	FP12xx & FR12xx	FC1200 – 1 x DB9 port, Real Time Clock without battery backup
FC1200N	FP12xx/FP12xxN/FR12xx/KSA1208	FC1200N – 2 x DB9 port, Real Time Clock with battery backup
FC2000*	FP2xxx	FC2000 – 2 x DB25 ports, Real Time Clock with battery backup
FC2011**	FP2xxx/FB2x00/FR20xx/KSA1208	FC2011 – 2 x DB9 or DB25 ports, Real Time Clock with battery backup
LCD1200	FP12xx/FR12xx/FP12xxN/KSA1204	LCD1200 – LCD backlight
LCD2000	FP2xxx/KSA1208	LCD2000 – LCD backlight
LCD2011	FR2xxx	LCD2011 – LCD backlight

* FP2000 based panels contain a DB25 converter.

** Some FP2000 based panels contain a DB9 to DB25 converter.

2.1.5   Software

Software Package	Description
PCM2000	Maintenance manager
PCC2000	FPConfig – configuration software (up/download)

2.2 Design specifications

The 1200/2000 series fire panels are designed to comply with the requirements of EN54-2 (control and indicating equipment) and EN54-4 (power supply equipment).

The panels have the following options with requirements according to EN54-2:

- Output to fire alarm devices
- Output to fire alarm routing equipment (according to DIN VDE0833)
- Output to fire protection equipment (according to VdS-directive)
- Delays to outputs
- Coincidence detection
- Alarm counter
- Fault/disablements from addressable points
- Output to fault warning routing equipment
- Standardised input/output interface (according to DIN 14661)
- Test condition
- Total loss of power supply (optional)

3 MOUNTING INSTRUCTIONS

3.1 FP1200 and KSA1204 panels

3.1.1 Panel dimensions

Figure 1: FP1200 and KSA1204 panel dimensions
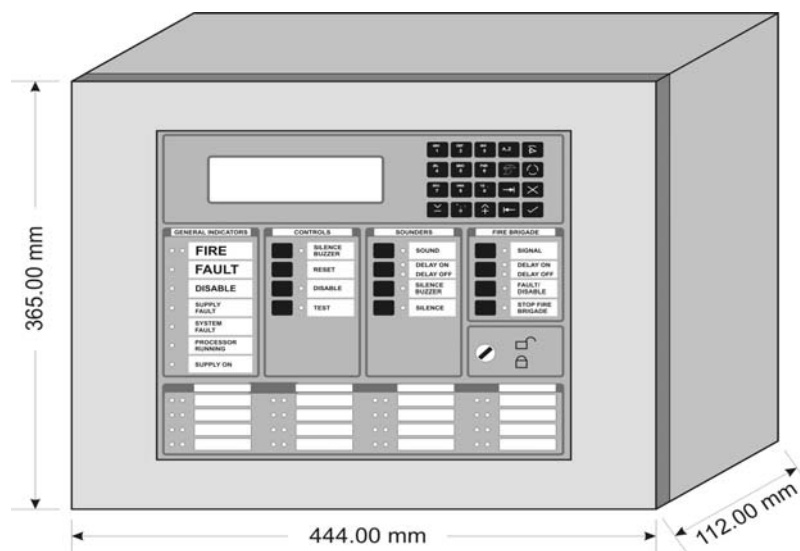
FP12xx/FR1200/FR2000:	365 X 444 X 112 mm (H x W x D)
FP1216EN/FP1264:	440 X 444 X 125 mm (H x W x D)
FP1216N/FP1264N/KSA1204	444 x 444 x 125 mm (H x W x D)

✎ *Panel appearance may differ from illustration.*

3.1.2 Mounting instructions

Figure 2: FP1200 and KSA1204 top/bottom cable entries
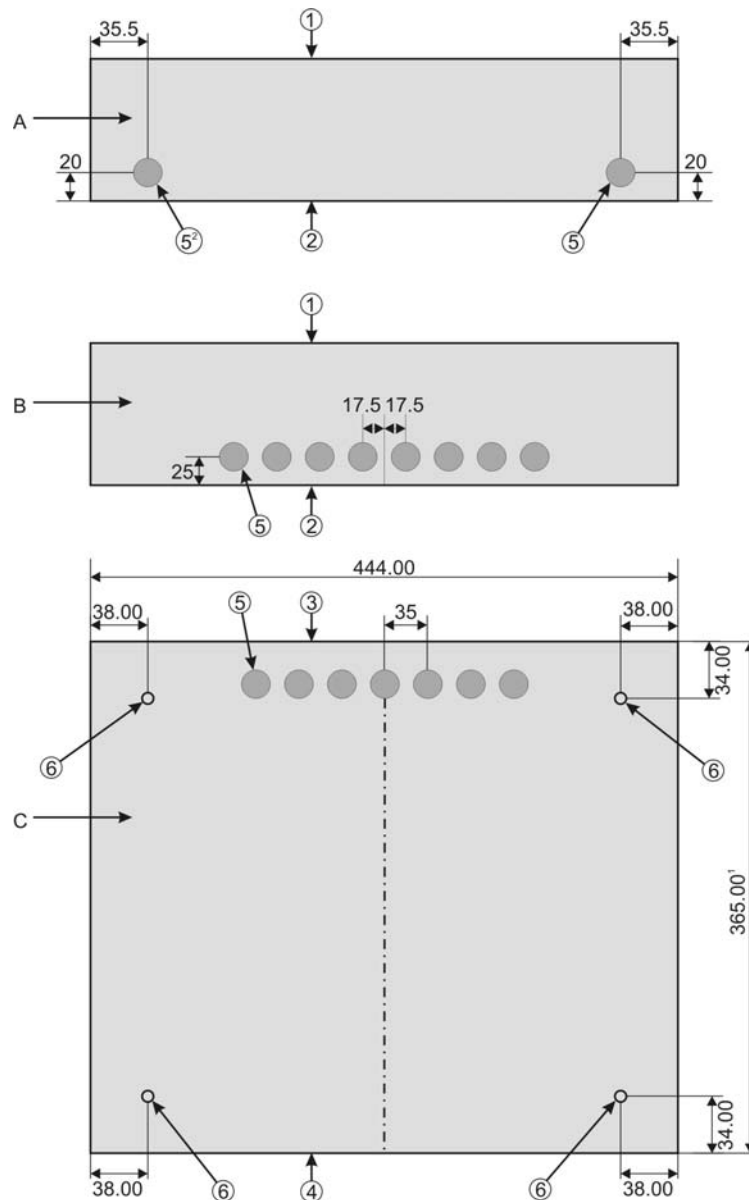
1. Panel front	A. Bottom view
2. Rear mounting surface	B. Top view
3. Panel top	C. Rear panel view
4. Panel bottom	[1] 440 mm for the FP1216EN & FP1264
5. Cable entries 20 mm	[2] Not applicable to FP1216EN & FP1264
6. Mounting holes 5 mm	

⚠ *Mains wiring (230 V) must enter the cabinet from the right bottom hole in the cabinet only. Top entry violates IEC950 safety requirements and will cause EMC problems.*

Mains wires must not be routed past the electronic modules in the rear of the panel. It must be kept as short as possible and routed directly to the mains input.

3.1.3 Panel layout

Figure 3: FP1200 and KSA1204 panel layout
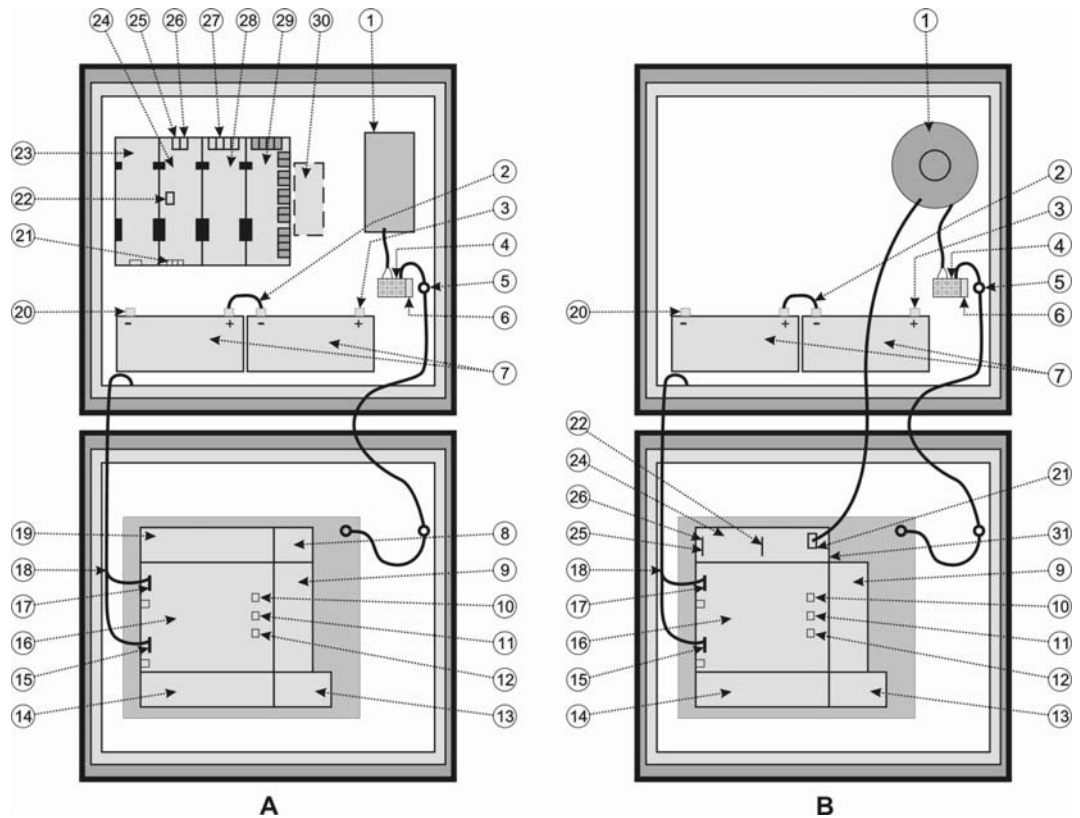
- ▪ **A.** FP1216EN / FP1264 / FP1216N / FP1264N / KSA1204
- ▪ **B.** FR1200 & FR2000

1. Transformer
2. Battery link
3. Battery terminal (+) (red)
4. Mains terminal block
5. Earth stud
6. Main fuse and switch
7. Batteries 12V (2x) (optional)
8. Zone matrix display board (bottom) (optional)
9. Common LED board
10. Service commission mode select
11. Non-volatile memory lock
12. Memory back-up battery jumper
13. Numeric keypad
14. LCD display
15. Current loop terminals
16. Host CPU board

17. DB9 port
18. RS232 and current loop routing of wires
19. ARCNET network card (top) (optional)
20. Battery terminal (-) (black)
21. Battery and power supply connection terminals
22. Modem (MOD2000) power supply terminals
23. Front-end processor board
24. Power supply board
25. Fault relay connections
26. Auxiliary power connections
27. Loop 1-4 terminal connections
28. 2 Loop driver board
29. Sounder relay board
30. Modem (MOD2000) (optional)
31. ARCNET network card (bottom) (NC2011)

3.2 FP2000 and KSA1208 panels

3.2.1 Panel dimensions

Figure 4: FP2000 and KSA1208 panel dimensions (cabinet size A)
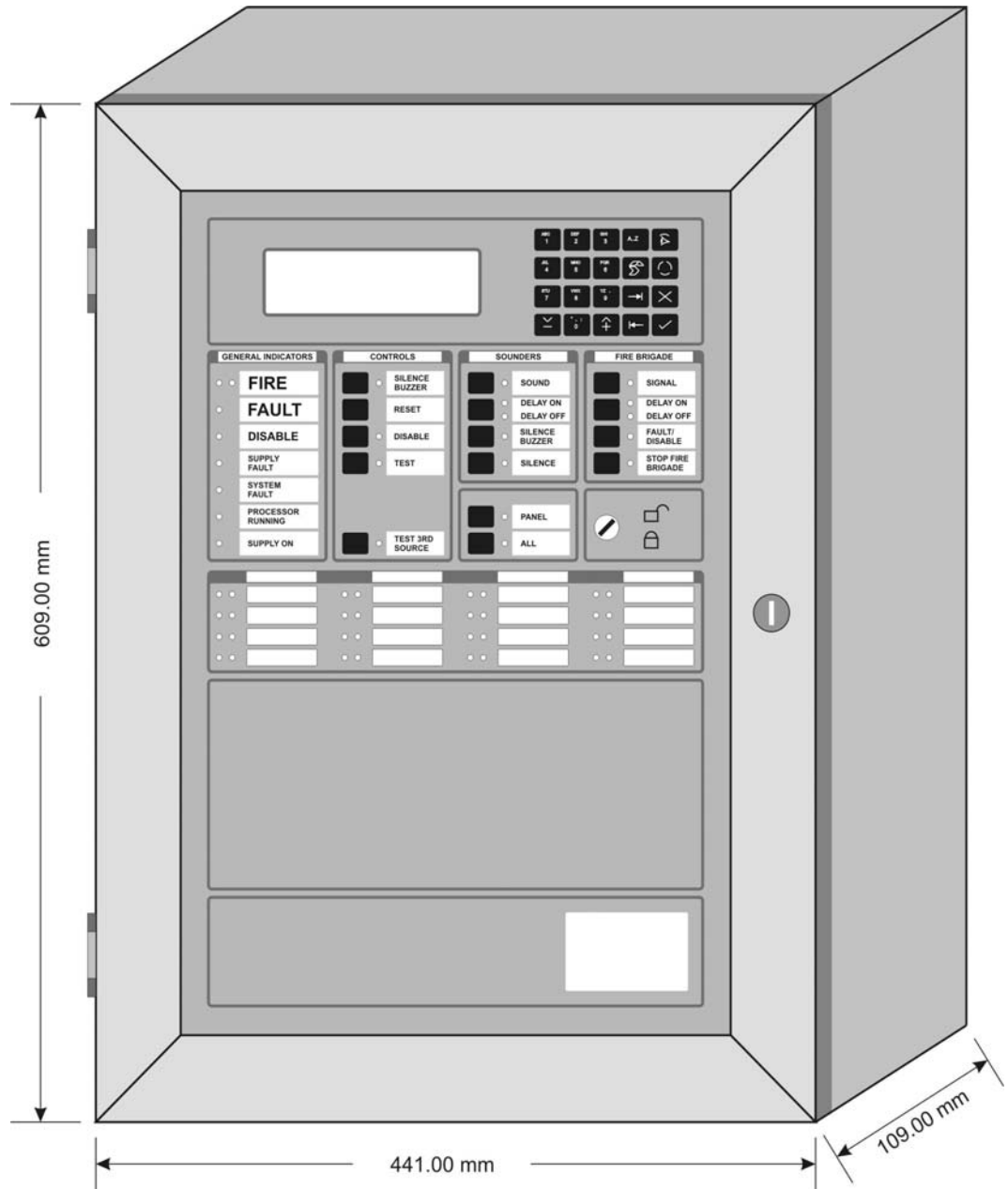
Cabinet size B   804 x 441 x 109 mm (H x W x D)

Cabinet size C   473.5 x 441 x 109 mm (H x W x D)

✎   *Panel appearance may differ from illustration.*

3.2.2 Mounting instructions

Figure 5: FP2000 and KSA1208 mounting instructions
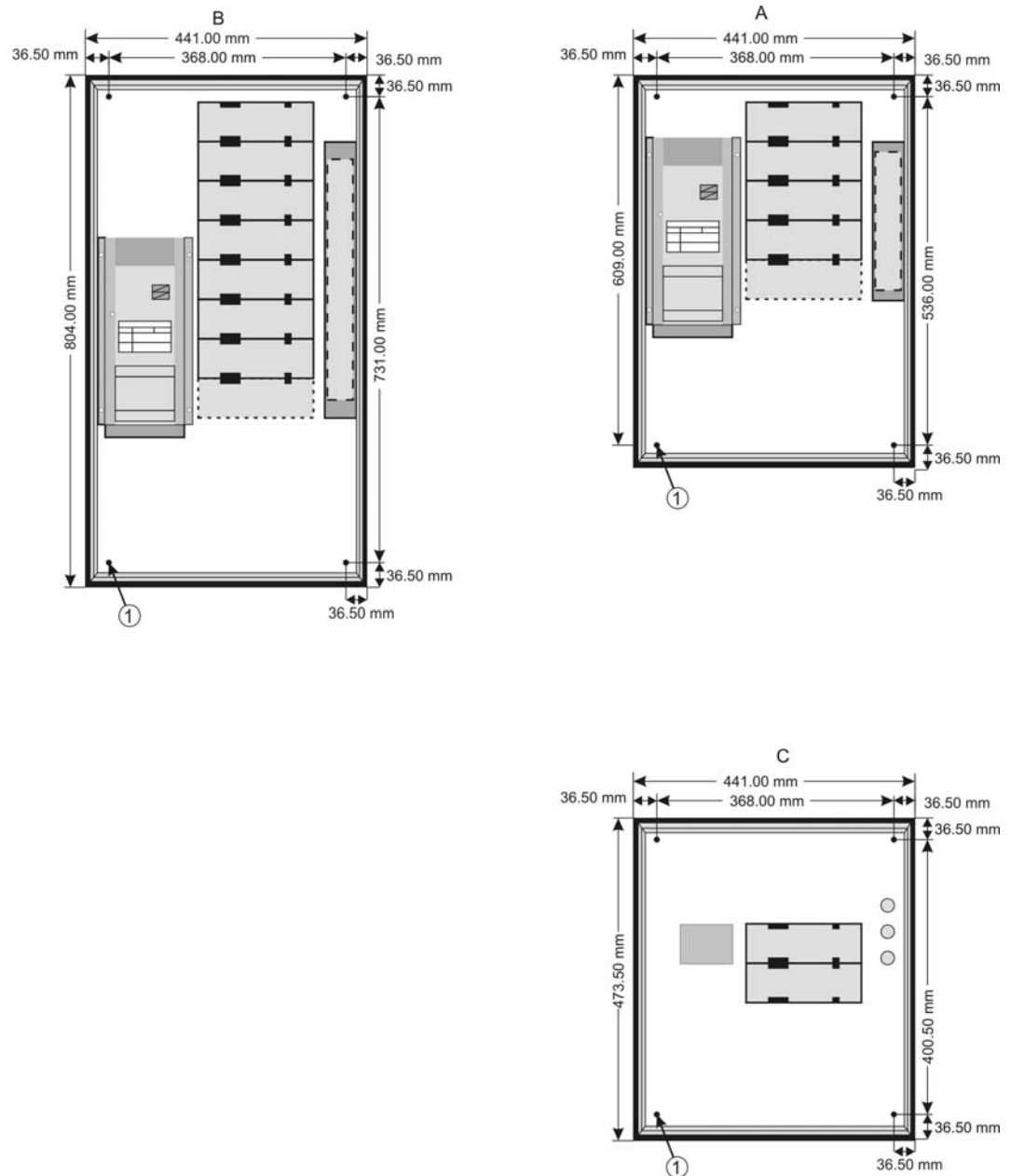
A. Cabinet size A   **C.** Cabinet size C

B. Cabinet size B   **1.** 4 x 5 mm mounting holes

See Figure 2 for location of 5 mm mounting holes.

Five x 20 mm holes are provided for cable entry at the top and bottom of the panel (see Figure 6).

The total panel weight equals: 11 kg for size A cabinet (excluding batteries)

15 kg for size B cabinet (excluding batteries)

9 kg for size C cabinet (excluding batteries)

Figure 6: FP2000 and KSA1208 cable entries
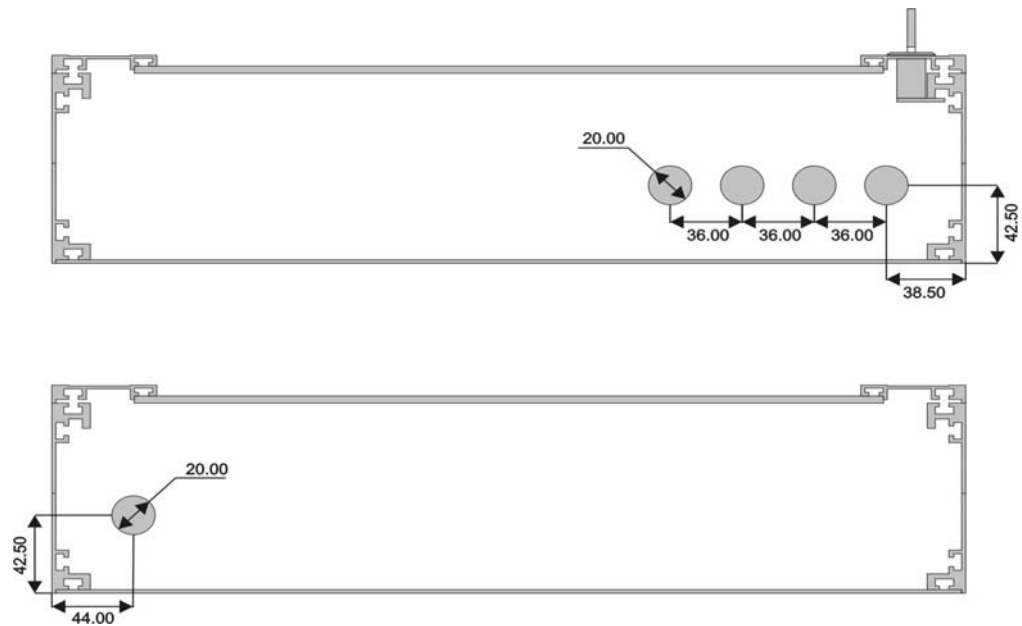
⚠️ *Mains wiring (230 V) must enter the cabinet from the left bottom hole in the cabinet only. Top entry violates IEC950 safety requirements and will cause EMC problems.*

Mains wires must not be routed past the electronic modules in the rear of the panel. It must be kept as short as possible and routed directly to the mains input connected to the power supply (PS2000)

3.2.3   Fire panel layout

Figure 7: FP2000 and KSA1208 panel layout

1. Numeric keypad
2. Common LED board
3. LCD Display and backlight board
4. Host processor board
5. Current loop terminal connections
6. RS232 ports (DB9connectors) (port 1-front; port 2-back)
7. DB9-DB25 adapter (with modem)
8. Front-end processor board
9. FEP power supply board
10. 2 Loop driver board (x2)
11. Sounder relay board
12. Auxiliary inputs terminal connections
13. Loop 1-4 terminal connections
14. Terminal connections sounder board
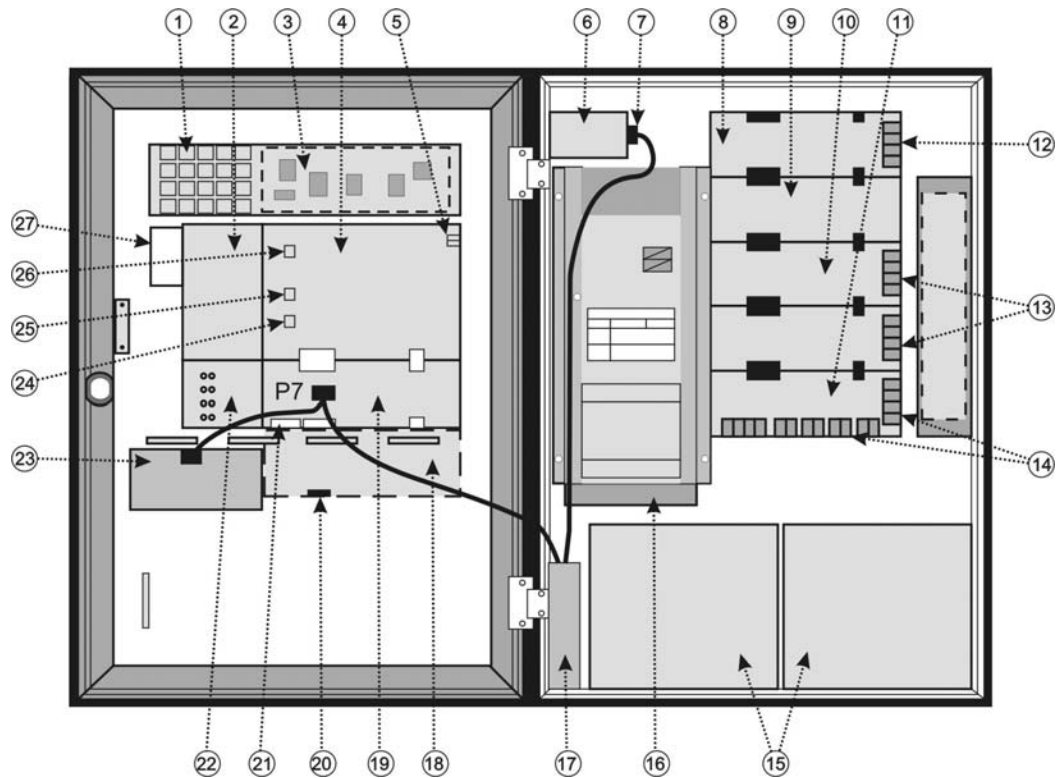
15. 2 x battery
16. Power supply and battery charger
17. Modem (optional)
18. Optional ARCNET network card
19. Host power supply board
20. Bus-termination card
21. DIP switch
22. Zone matrix display board
23. Optional internal printer (PR2000)
24. Service/commission mode switch
25. Non-volatile memory lock
26. Memory back-up battery jumper
27. Optional third source battery

3.2.4 Repeater panel layout

Figure 8: Repeater panel layout
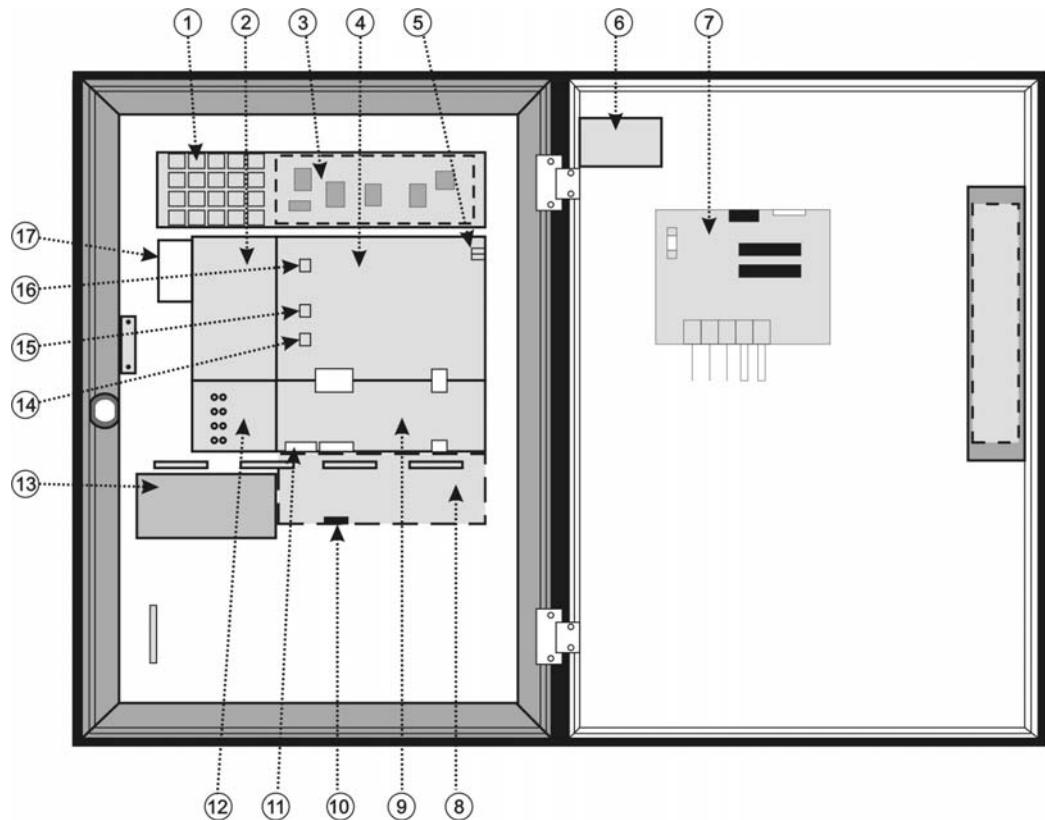
1. Numeric keypad	**10.** Bus-termination card
2. Common LED board	**11.** DIP switch
3. LCD Display and backlight board	**12.** Zone matrix display board
4. Host processor board	**13.** Optional internal printer (PR2000)
5. Current loop terminal connections	**14.** Service/commission mode switch
6. RS232 ports (DB9 connectors) (port 1-front; port 2-back)	**15.** Non-volatile memory lock
7. 24 VDC power supply	**16.** Memory back-up battery jumper
8. Optional ARCNET network card	**17.** Optional third source battery
9. Host power supply board	

✎ *See Figure 3 for FR2000 layout.*

4 LOOP DESIGN

✐ *Information in this section applies to FP1200, FP2000, KSA1200 and FB2000 panels.*

4.1 Typical configuration

The fire panel accepts the following loop configurations.

Figure 9: Class A return loop
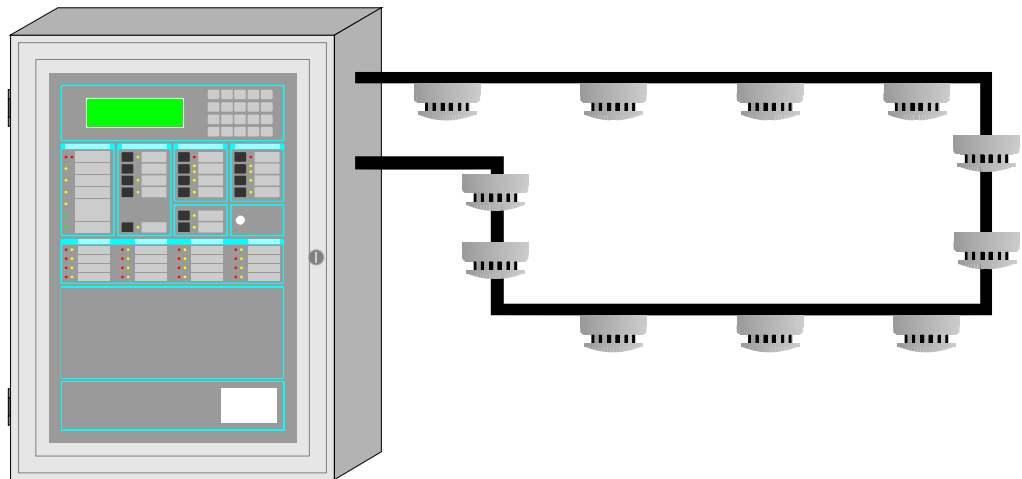
Figure 10: Class A return loop with tee offs
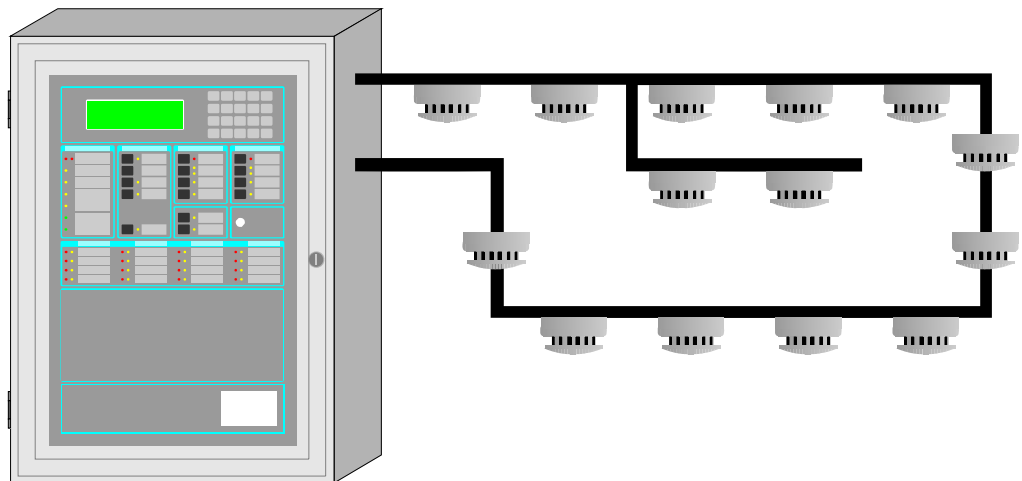
Figure 11:Class B Single direction loop (star configuration)
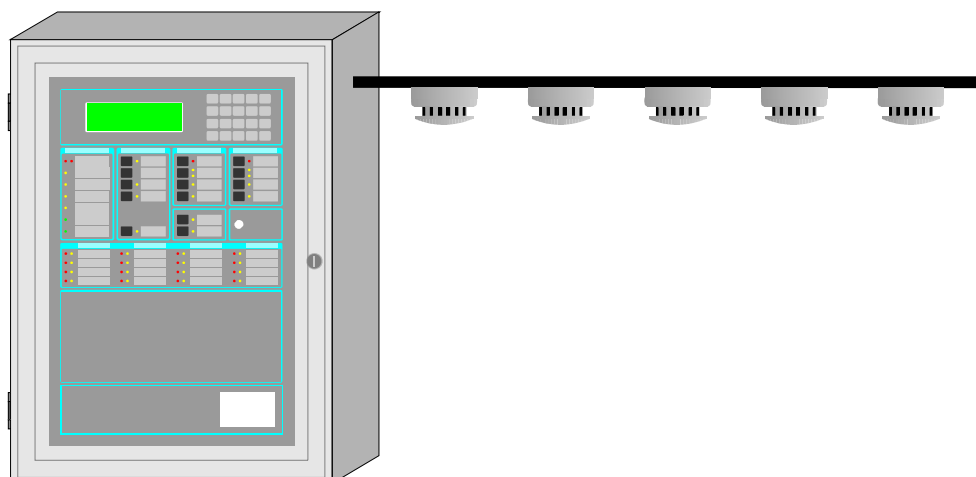
Figure 12: Class B single direction loop with tee offs
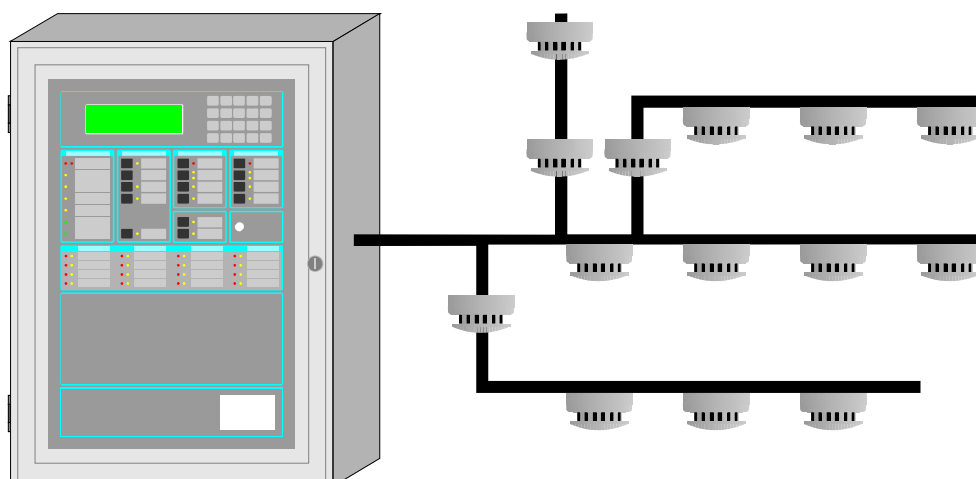
The maximum number of detectors that may be used over a cable distance of 2 km is:

- 125 (Kilsen KL700A series detectors)
- 126 (Aritech 900 series detectors)
- 128 (Aritech 2000 series detectors)

For combinations of fire sensing devices, monitoring controllers and input/output devices, the maximum number of addressable units must be calculated.

For further details please refer to your detector installation manual.

EN54 specifies that a short circuit or an interruption in a detection circuit cannot prevent the indication of a fire alarm from more than 32 fire detectors and/or manual call points. Therefore, when more than 32 detectors are connected to one loop, an isolator should be placed at least at every 32 devices. In that case, a class A configuration (no Tee Offs) should always be used.

✎ *EN54 specifies that in case of a system fault, not more than 512 fire detectors and/or manual call points and their associated mandatory functions shall be affected. Taking this into consideration, the amount of detectors per panel should be limited to 512.*

4.2 Suitable cable types

The maximum serial cable resistance must be no more than 100 ohm and the maximum loop capacitance in parallel with this should not exceed 1uF.

✎ *A calculation should be performed for each loop to ensure that the minimum required loop voltage is maintained in the presence of the expected load conditions. Loop load calculation software is available from GE to automate these calculations.*

5 FIELD CONNECTIONS

5.1 Loop, output and input connections

5.1.1 FP1200 and KSA1204 panels

Figure 13: Position of inputs, loops and relay connections (FP1200 and KSA1204 panels)
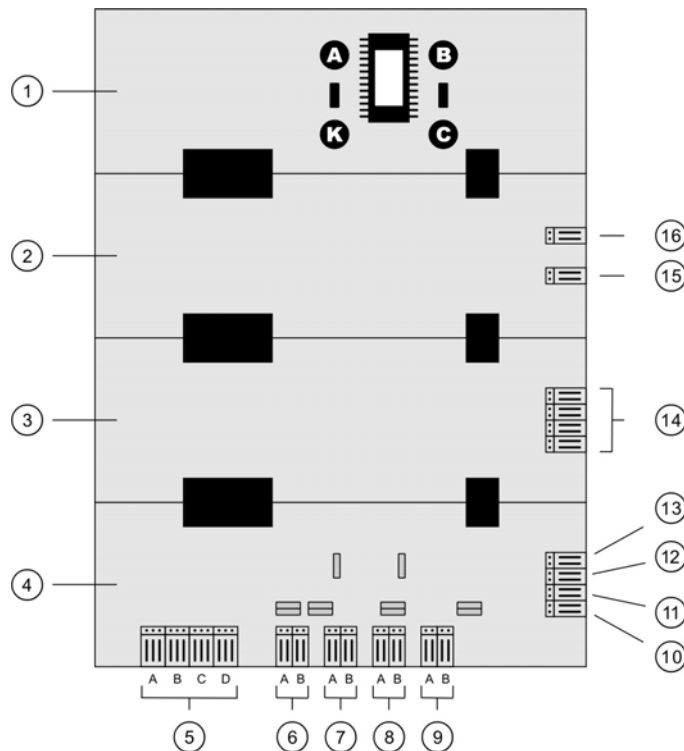
AB. Aritech 2000 protocol selection.
AC. Aritech 900 protocol selection.
KB. Kilsen KAL210 protocol selection.
KC. Aritech 2000 protocol selection.

1. Front end processor (FEP) board (see 2.1.4 Module variations)
2. Power supply board
3. Loop driver
4. Sounder board
5. Programmable relays (FP1216/64 only)
6. Fault routing (FP1216/64 only)
7. Fire protection
8. Fire routing
9. Fire alarm devices
10. General input (FP1216/64 only)
11. Fault routing return input (FP1216/64 only)
12. Fire protection return input (FP1216/64 only)
13. Fire brigade return input (FP1216/64 only)
14. 2 x class A loops or 4 x class B loops
15. Auxiliary power
16. Fault relay

5.1.2 FP2000 and KSA1208 panels

Figure 14: Position of inputs, loops and relay connections (FP2000 and KSA1208 panels)
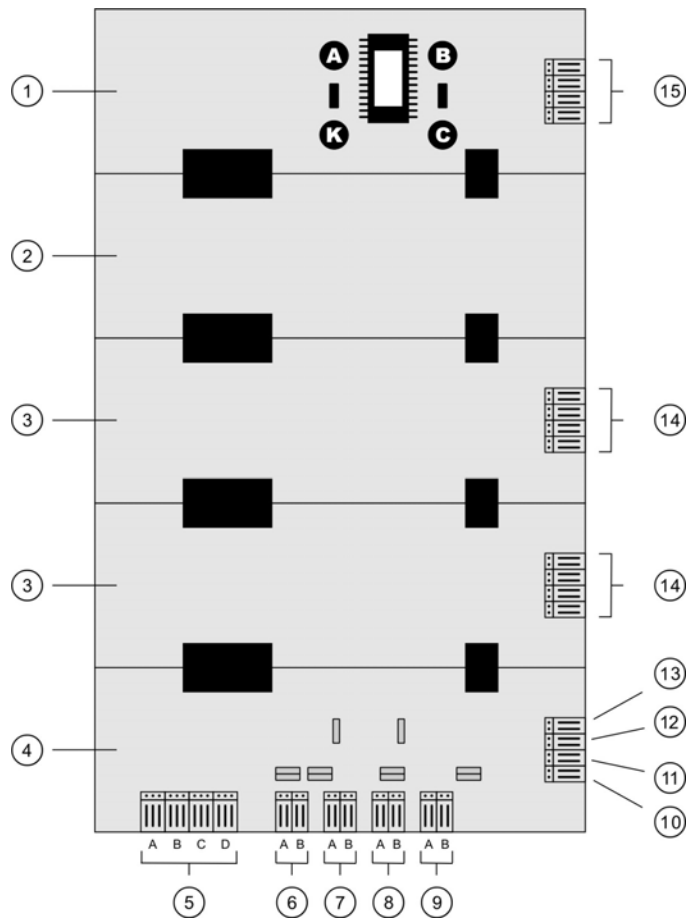
AB. Aritech 2000 protocol selection.
AC. Aritech 900 protocol selection.
KB. Kilsen KAL210 protocol selection.
KC. Aritech 2000 protocol selection.

1. Front end processor (FEP) board (see 2.1.4 Module variations)

2. Power supply board

3. Line driver

4. Sounder board

5. Programmable relays

6. Fault routing

7. Fire protection

8. Fire routing

9. Fire alarm devices

10. General input

11. Fault routing return input (VdS mode only)

12. Fire protection return input (VdS mode only)

13. Fire brigade return input (VdS mode only)

14. 2 x class A loops or 4 x class B loops

15. 4 Auxiliary inputs

5.2 Connections

5.2.1 Loop connections

By default the panel is configured in a class A set-up (*see chapter 4*).

Figure 15: Class A loop connection
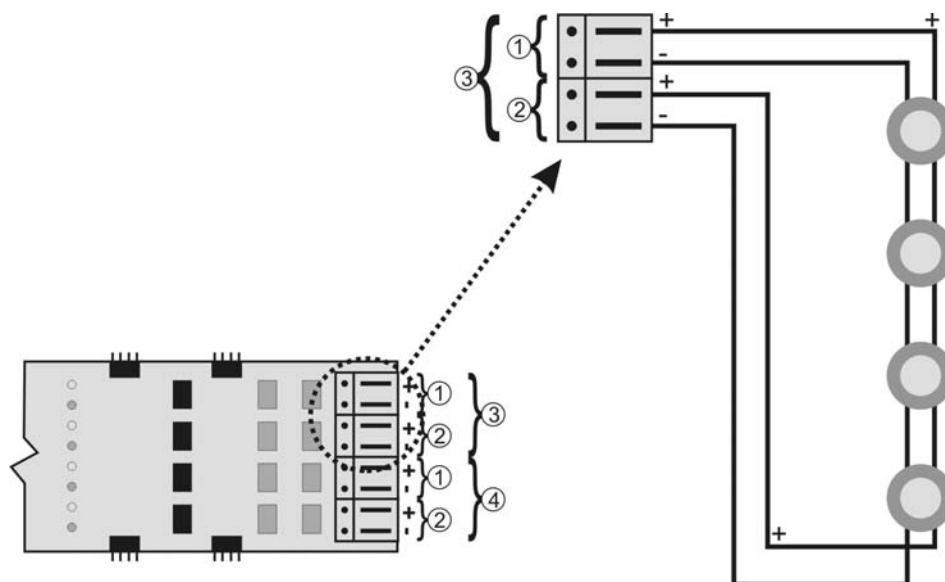
1.	Forward	**3.**	Loop 1
2.	Return	**4.**	Loop 2

When class B operation is required, the A-jumpers should be removed to double the amount of loops. The B-jumpers should be put in. If 8 A class loops are in use and the B-jumpers are put in only the first 8 loops will be operational.

Figure 16: Location of loop card jumpers
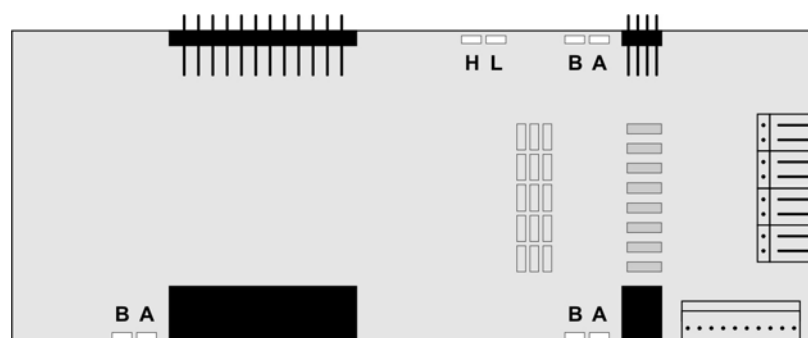
A. Jumper selection for class A loops

B. Jumper selection for class B loops

H. Jumper selection for Aritech 900 / 2000 protocol

L. Jumper selection for Kilsen KAL210 protocol

✍ *H and L jumpers not included on LC2002 loop card.*

Figure 17: Class B loop connection
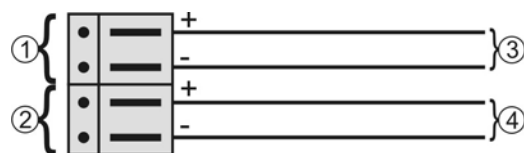
1.	Forward	**3.**	Loop 1
2.	Return	**4.**	Loop 2

Note:

- The forward and return of each class A loop used must be linked in the correct polarity
- Isolators are polarity dependant (see Detector Installation and Commissioning Manual)
- Preferably loop boards must be configured for class A
- A and B loops can be combined in the following way:

  a) Configure as class A.

  b) Class B loops are connected as below.

Figure 18: Class AB loop connection
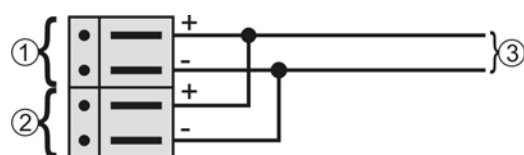
1.	Forward	**3.**	Loop 1
2.	Return		

- The maximum of loops (either A or B) in one panel is limited to eight.
- All loop cards in a panel must be configured in the same way (either A or B).

Loop devices

FP2000 and KSA1208 analogue addressable fire panels are fully compatible with the following product ranges:

- Aritech 900 range of detectors and manual call points, as well as with the
- Aritech range of monitoring controllers and input/output devices.
- Aritech Intrinsically Safe range of fire detectors.
- Aritech 2000 range of detectors, manual call points and input/output devices.
- Kilsen KL700A range of detectors and devices (manual call points, input modules, I/O modules, output modules, zone monitor units, loop sounders and isolators).

See section 2.1.4 and section 8 for the host power supply DIP-switch settings for the different protocols supported.

For further details on on any device, refer to the appropriate installation and commissioning manual.

5.2.2 Programmable relay

Each of the four programmable relays has a change over contact. The relay is shown in the NORMAL state. A red LED indicates the state of the relays.

Figure 19: Programmable relay connections
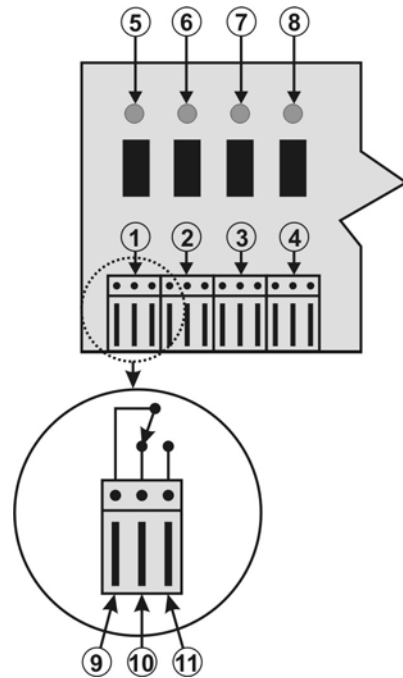
1. Programmable relay 4 (OUT8)
2. Programmable relay 3 (OUT7)
3. Programmable relay 2 (OUT6)
4. Programmable relay 1 (OUT5)
5. Output 8 switched LED indication
6. Output 7 switched LED indication
7. Output 6 switched LED indication
8. Output 5 switched LED indication
9. Common (C)
10. Normally closed (NC). Relay shown in normal state.
11. Normally open (NO)

5.2.3   Supervised outputs A

These outputs provide 24 VDC when active. A red LED displays the state of the outputs. (See section 2 for technical information on these outputs.)

Figure 20: Supervised relay output's connection on SD2000 common I/O board
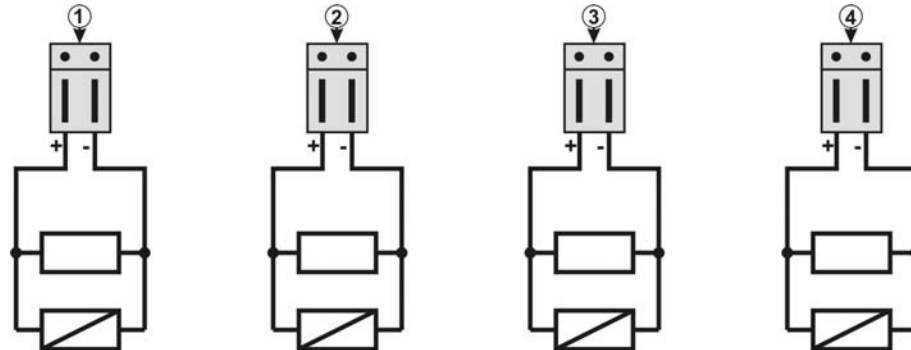
1. Fault routing (OUT4)

- Termination resistor - 3k3
- Polarity non-reversed
- Active in normal position

2. Fire protection device (OUT3)

- Termination resistor - 3k3
- Polarity non-reversed

3. Fire routing device (OUT2)

- Termination resistor - 3k3
- Polarity non-reversed

4. Fire alarm device (OUT1)

- Termination resistor - 3k3
- Polarity non-reversed

5.2.4 Relay outputs B

OUT1 / OUT2 / OUT3

Two configurations are available. The configuration is determined by jumper settings. An LED indicates the state of the output (LED ON = output active).

Figure 21: Two configurations for relay outputs 1-3 B
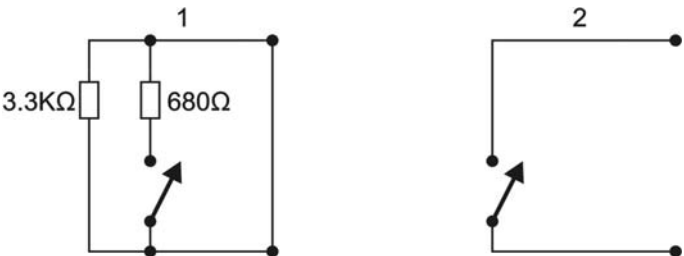
Outputs	CONFIG. 1	CONFIG. 2		
Sounders (OUT1)	J12 in J13 out	J12 out J13 in	✍	J18 out J19 out
Fire brigade (OUT2)	J2 in J3 out	J2 out J3 in	✍	J18 out J19 out
Fire protection (OUT3)	J4 in J5 out	J4 out J5 in		

Position shown: outputs not active.

OUT4

The configurations for OUT4 are shown below (failsafe). The switch is **closed** when there is a fault and **open** when there is a fault. The LED is ON when there is no fault.

Figure 22: Two configurations for relay output 4 B
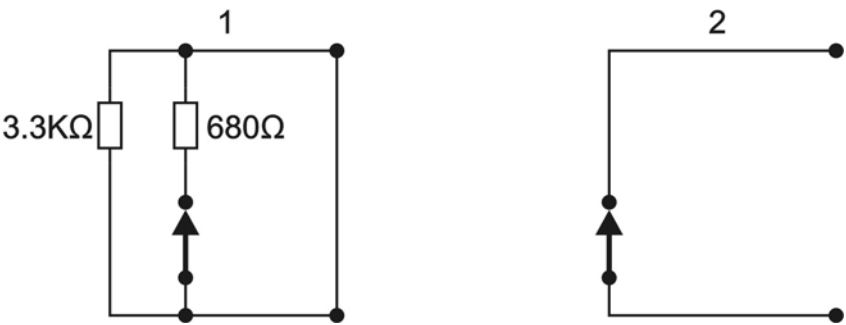
Outputs	CONFIG. 1	CONFIG. 2
Fault routing (OUT4)	J6 in J7 out	J6 out J7 in

Figure 23: Location of jumpers on SD2000 sounder board
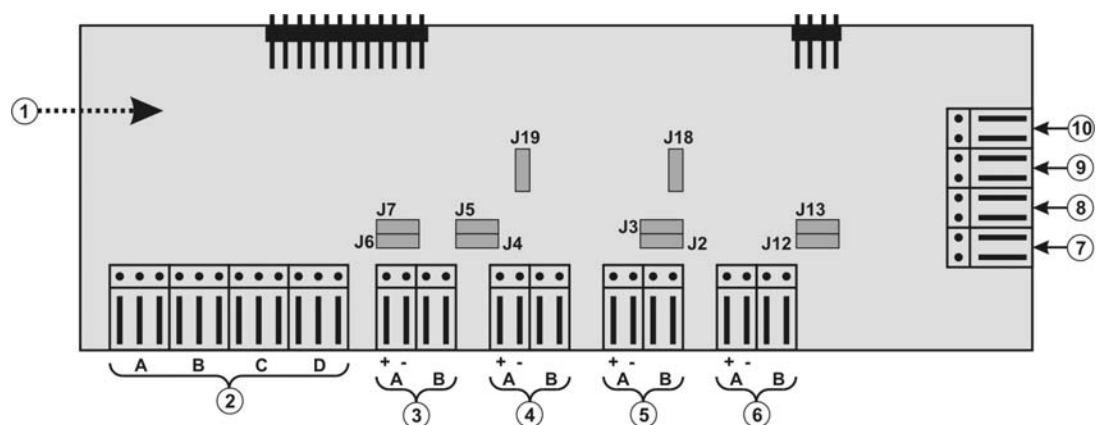
1. SD2000 sounder board
2. Programmable relays (A = OUT8, B = OUT7, C = OUT6, D = OUT5)
3. Fault routing (OUT4)
4. Fire protection device (OUT3)
5. Fire routing device (OUT2)
6. Fire alarm device (OUT1)
7. General input (IN8)
8. Fault routing fault input (VdS mode only) (IN7)
9. Fire protection fault input (VdS mode only) (IN6)
10. Fire routing feedback input (VdS mode only) (IN5)

5.2.5   Supervised inputs IN5 - IN8

In EN, NEN and EP operation mode these inputs have no dedicated function and are freely programmable through I/O logic.

The function of these inputs is determined by the operation mode of the panel (see section 9).

Figure 24: Supervised inputs connections IN5 - IN8
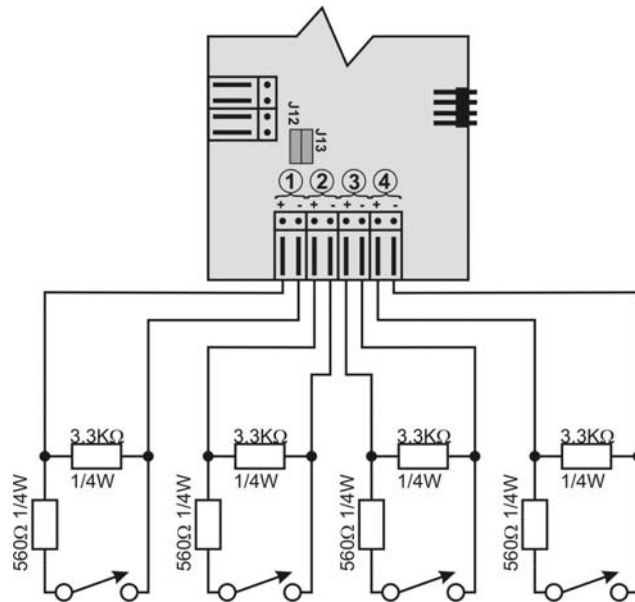
1. General input (IN8)

2. Fault routing fault input (VdS mode only) (IN7)

3. Fire protection fault input (VdS mode only) (IN6)

4. Fire routing feedback input (VdS mode only) (IN5)

5.2.6 Auxiliary inputs (FEP board)

Four auxiliary inputs are provided on the FEP board. Each input is opto-isolated and independent of polarity. These inputs are not supervised and can be used through I/O programming.

Figure 25: Auxiliary inputs (FEP board)
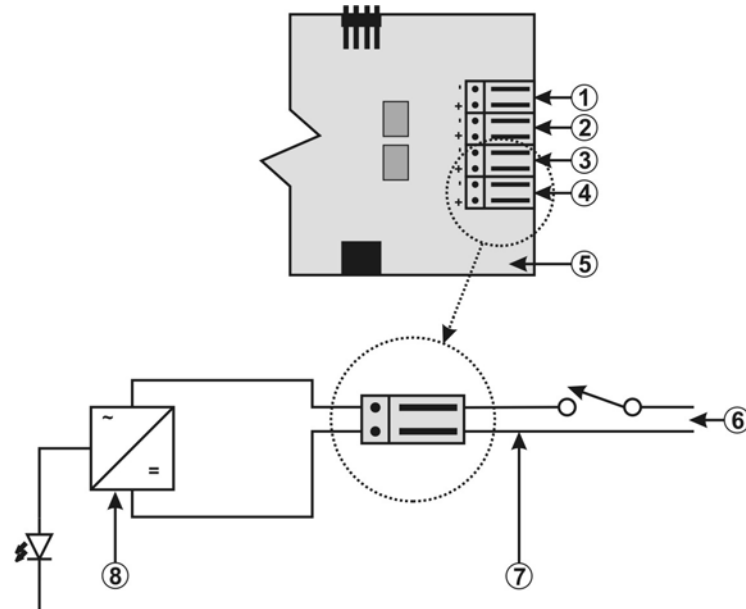
1. Auxiliary input 1 (IN1)
2. Auxiliary input 2 (IN2)
3. Auxiliary input 3 (IN3)
4. Auxiliary input 4 (IN4)
5. Section of FEP board
6. 20-28 VDC or 10-15 VAC
7. Field wiring
8. Fire panel input

5.2.7   Connection of dual tone siren AS263/AS264

The dual-tone siren can be connected on Sounder (OUT1) and Fire Brigade (OUT2) in the following way:

Figure 26: Dual tone siren connections
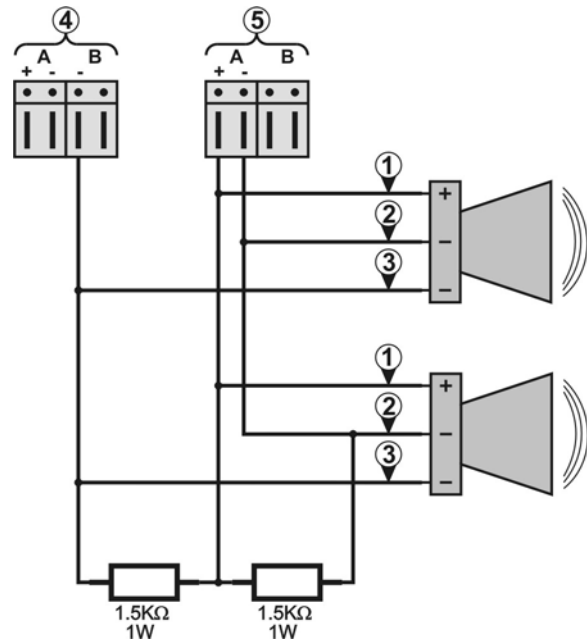
1.	Common	**4.**	OUT2
2.	Sound	**5.**	OUT1
3.	Sound		

Set jumpers as follows: J2-B, J3-B, J18-A, J19-A

✍   *This set-up should only be used when operation mode is "EP" (see section 9).*

5.3 Communication port connections

✎ *Current loop capability is not included in panel firmware V8 and later - even if the terminals are present on the PCB.*

5.3.1 Current loop

A current loop output is provided as a standard feature on the FP2000 fire panels. The current loop is used to drive up to 15 fireman's panels and conventional repeaters. Each fireman's panel / repeater has its own unique address, by means of resistor settings at that panel.

✎ Refer to the appropriate installation manual for the correct settings.

The location of the current loop terminal connections is shown in Figure 3 & Figure 7.

The connections between the FP2000 fire panels and the FM800 Series fireman's PCBs and FR800 series repeater are as shown below.

Figure 27: Current loop terminal connections
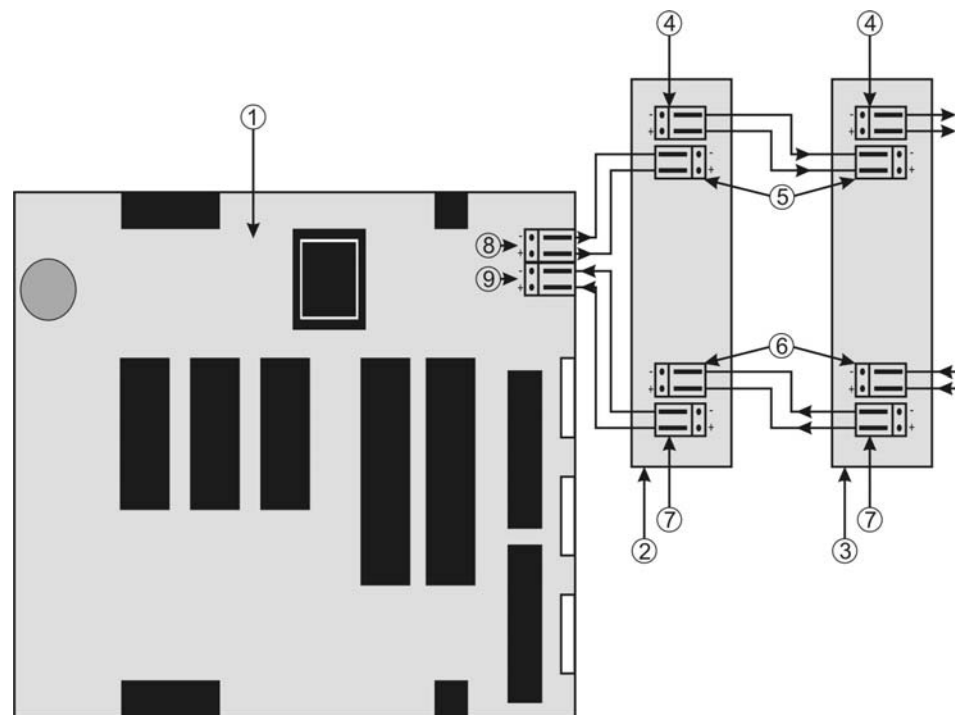
1. Host CPU board	**6.** TX in
2. Repeater 1	**7.** TX out
3. Repeater 2	**8.** TX
4. RX out	**9.** RX
5. RX in	

✎ *To route the current loop wires inside the cabinet see section 3.*

5.3.2   RS232 ports

The two RS232 ports are provided with DB9 or DB25 male connectors. The location of the connectors is shown in Figure 3 & Figure 7. The signals at both the connectors are as indicated on the panel side of Figure 28. When connecting the null-modem cable, the pins on both sides of the cable must be connected as shown in the following schematics.

Figure 28: DB9 (panel side – female) to DB9 (PC side – female) connection
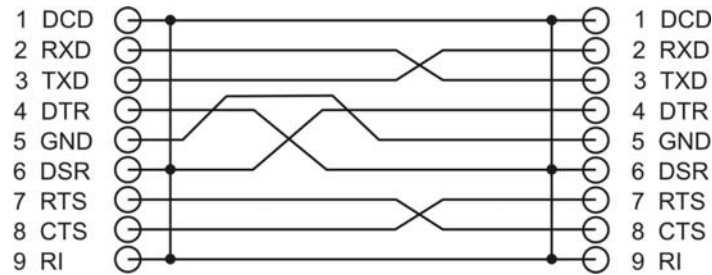
Figure 29: DB9 (panel side – female) to DB25 (PC side – female) connection
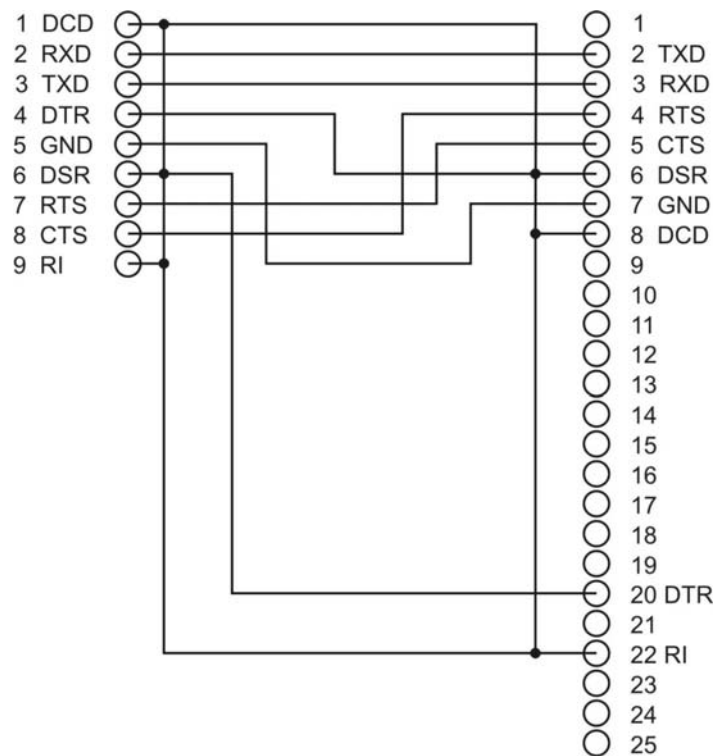
✍   *To route the RS232 cable inside the cabinet see section 3.*

5.4 Power supply connections

⚠️ *During installation the 230 VAC should be fed directly from a separate group in the distribution board. This group should have a bi-polar disconnect device with overload protection. It must be clearly marked, readily accessible and only be used for detection equipment. The recommended mains cable is 3 x 1.5mm²*

5.4.1 24 VDC power supply (FR2000 panels)

Figure 30: 24 VDC power supply connections (FR2000 panels)
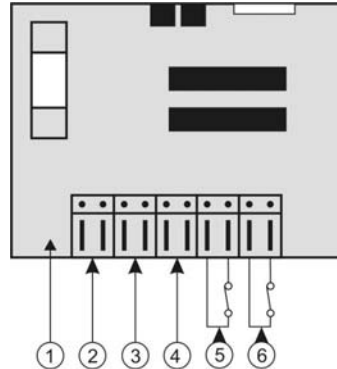
1. 24 VDC termination board
2. +24 VDC
3. −24 VDC
4. Earth
5. Charger fail (normally shorted input)
6. Mains fail (normally shorted input)

5.4.2   230 VAC power supply (FP1200 and KSA1204 panels)

5.4.2.1   Mains to mains terminal block connection

Figure 31: Connecting mains to mains terminal block (FP1200 and KSA1204 panels)
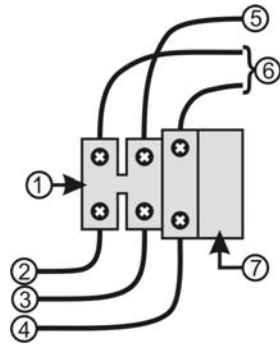
1. Mains terminal block

2. Neutral

3. Earth

4. Live

5. To earth stud on panel

6. To transformer

7. Mains disconnect with fuse

A mains terminal block with fuse is provided for connecting the panel to the mains. Please note the polarity of live, mains and earth.

During installation, the 230 VAC should be fed directly from a separate group in the distribution board. This group should have a bi-polar disconnect device, be clearly marked and only be used for fire detection equipment.

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

5.4.2.2   Power supply connections

Figure 32: Power supply and fault relay connections (FP1200 and KSA1204 panels)
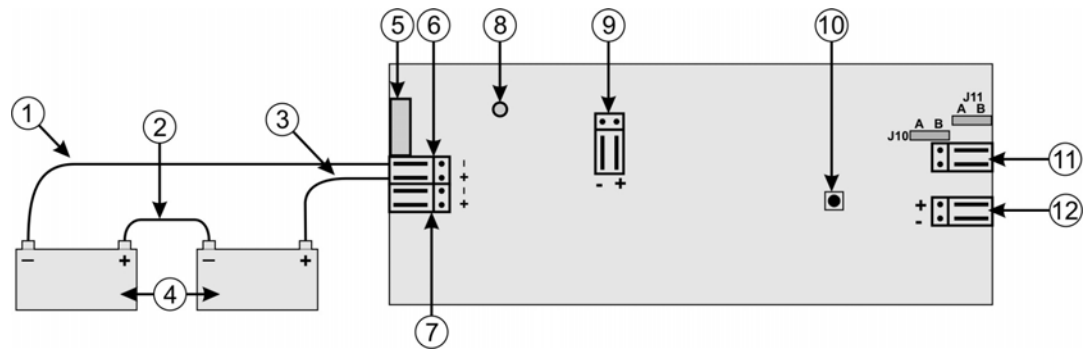
1. Black
2. Link
3. Red
4. 12 V Batteries
5. Host CPU connection
6. BAT connection
7. V in connection
8. VR3 LCD contrast adjuster
9. Modem (MOD2000) connection
10. Start-up button (required for start up without mains connection)
11. Fault relay output
12. Auxiliary output

⚠ *Observe correct polarity when connecting battery!*

5.4.2.3   Power supply fault relay connections

1. Ensure that the mains power is disconnected before opening the unit.

2. Connect the fault relay.

3. Route the wires away from sharp edges and corners and fix them into position.

Figure 33: Power supply fault relay connections (FP1200 and KSA1204 panels)
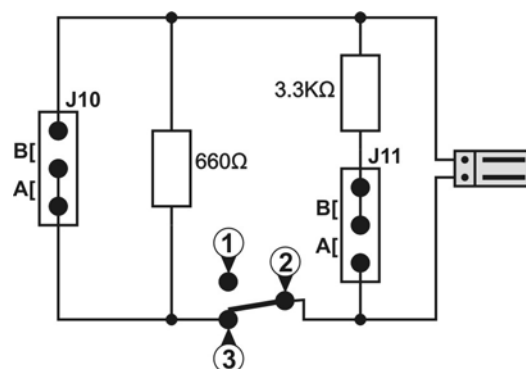
✎   *All components shown are mounted on the PS1200 board.*

1. Normally open (NO)

2. Common (C)

3. Normally closed (NC)

Fault output (NC) (jumpers default position = A)

J10 (pins for position A connected on PCB)

  ▪ Position A = 660Ω
  ▪ Position B = 0Ω

J11 (Pins for position B connected on PCB)

  ▪ Position A = 3.3kΩ
  ▪ Position B = 0Ω

5.4.3   230 VAC power supply (FP1200 and KSA1204 panels)

Figure 34: Power supply / transformer connections (FP1200 and KSA1204 panels)
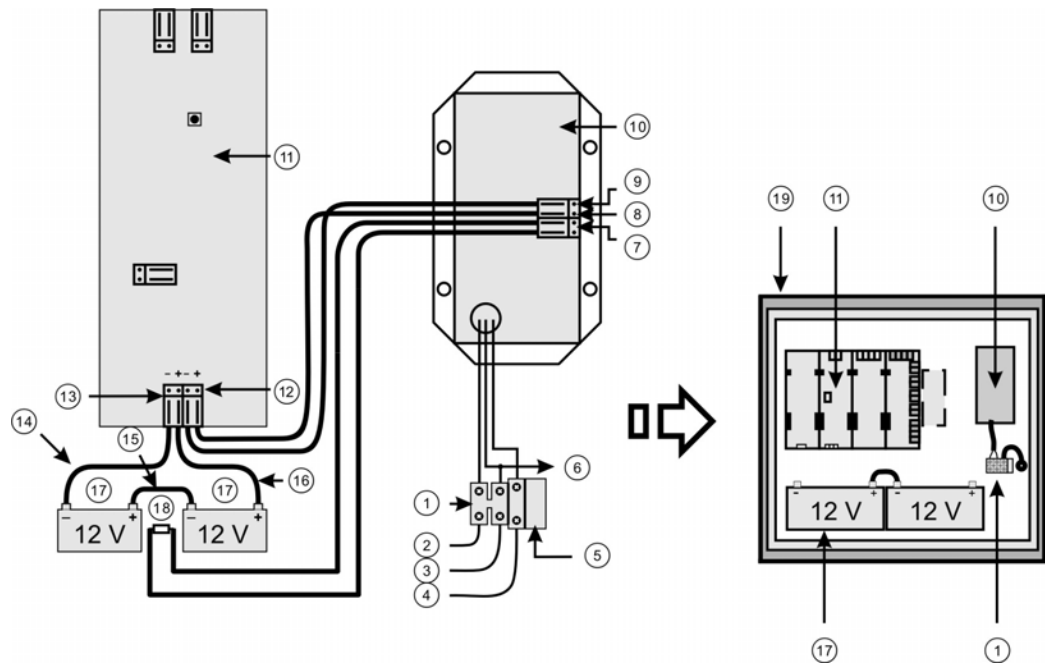
1. Mains terminal block
2. Neutral
3. Ground
4. Live
5. Mains switch with fuse
6. To ground stud on panel
7. Temperature compensation terminal
8. +V out
9. –V out
10. Transformer (TRF1200)
11. Power Supply (PS1200S77)
12. V in
13. Bat
14. Black wire
15. Battery connection wire
16. Red wire
17. 12 V Batteries
18. Battery charging temperature compensation thermistor
19. Location of power supply / batteries in cabinet

5.4.4 230 VAC power supply (FP2000 and KSA1208 panels)

Figure 35: 230 VAC power supply connections (FP2000 and KSA1208 panels)
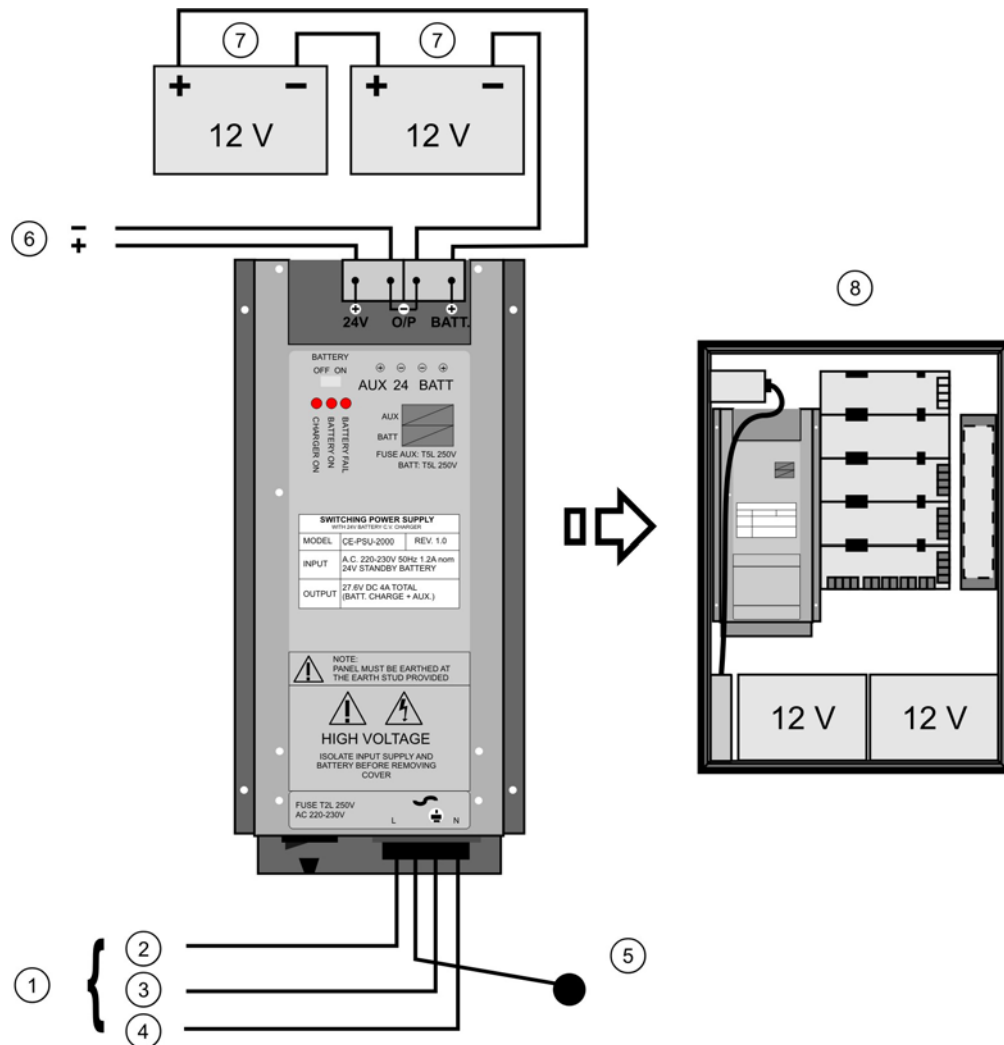
1. **1.** 230 VAC
2. **2.** Live
3. **3.** Neutral
4. **4.** Earth
5. **5.** To M5 earth stud mounted on back panel
6. **6.** 24 VDC power to ancillary fire panel equipment
7. **7.** 12 V batteries (installed in base of cabinet)
8. **8.** Location of power supply / batteries in cabinet

The Direct Online power supply PS2000 has been designed according to EN54-4. A mains switch (on the bottom) is provided, as well as a battery ON/OFF switch. Three LED's on top of the power supply indicate the following:

- Charger On
- Battery On
- Battery fail

On top there is a 24 volt auxiliary output for other fire panel equipment.

As part of the building installation, the 230 VAC should be derived directly from a separate group in the distribution board. This group should have a bi-polar disconnect device, clearly marked and only used for fire detection equipment.

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

Two 12 V batteries have to be put in series and connected to the battery terminals. No other equipment may be connected to the battery terminations.

The PSU-2000 is designed for use in FP2000 and KSA1208 fire panel housing only.

An optional third source battery (9V, PP3) can be installed as a third source of power.

The location of the third source battery is shown in Figure 7.

✍   *See section 3 for cabling information.*

5.5 Installing a modem

The installation of the MOD2000 modem is described below. The modem is provided with a bracket for wall mounting. To install this bracket, please refer to Figure 3, Figure 7 and Figure 36.

1. Remove the protective cover from the double-sided self-adhesive tape on the rear-mounting surface of the bracket supplied with the modem.

2. Position the mounting bracket inside the fire panel as shown in Figure 3 and Figure 7 and fix it into position using the double-sided self-adhesive tape.

3. Before connecting the modem to the fire panel ensure that the battery and the mains power are isolated.

4. Carefully read the modem User's Manual. To connect the modem to the fire panel and telephone line, refer to Figure 3, Figure 7 and Figure 36.

5. Connect the green earth wire leading from the modem to the earth stud inside the fire panel. Please note that the modem and associated circuitry are only protected if this connection is made.

6. Connect the power harness leading from the modem to the power supply. Observe correct polarity. Please note that if the connector leading to the internal printer is not used. It must be tied down using the mounting studs provided inside the fire panel.

7. Connect the RS232 input on the modem to the serial port (DB9 connector).

8. Connect the telephone line to the modem protection board (use the telephone cable adapter supplied if required).

9. Slide the modem into the bracket inside the panel and fix all cables in position using the hardware supplied (P-Clips and nuts). Ensure that the modem cannot slide out of the bracket.

10. Restore battery and mains power to the fire panel and turn the modem power switch the ON.

Figure 36: Modem MOD2000 interconnection diagram
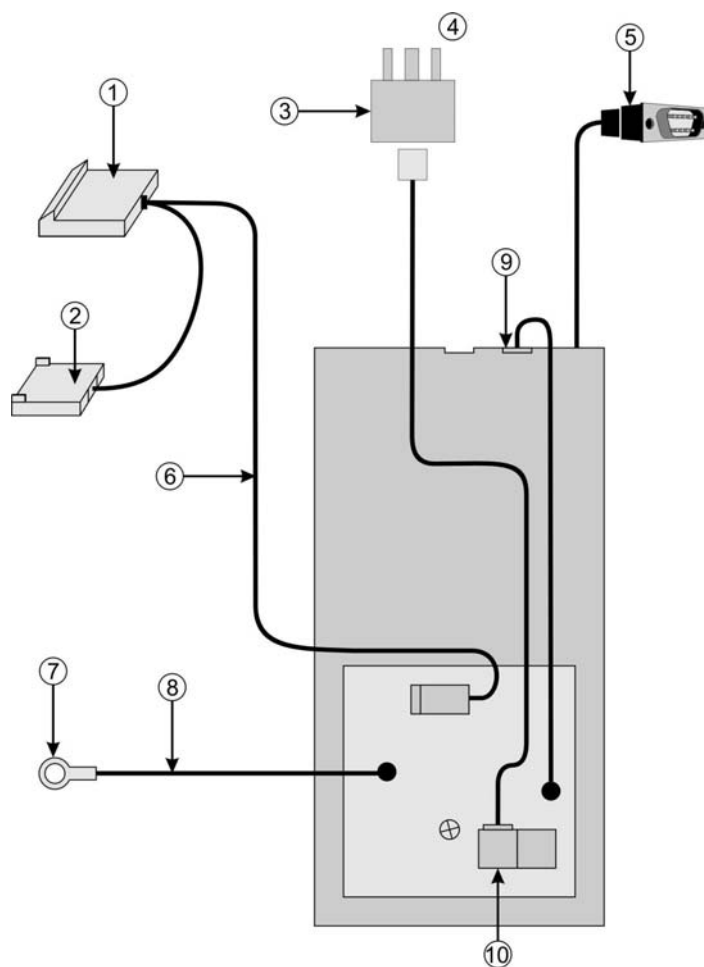
1. To 5 V on power supply (modem terminal)

2. 5 V to printer (not used – fixed in position to prevent contact)

3. Telephone line adapter (if required)

4. To telephone line

5. To Ser2 (DB9 connector)

6. Power harness

7. To earth

8. Green

9. Line

10. Line connector

5.6 Network connections

5.6.1   NC2011/NC2051 ARCNET network cards

The NC2011 and NC2051 are interface cards required to network FP2000 Series fire panels and FR2000 Series repeaters/emulators. All network nodes communicate via the ARCNET protocol, using RS485 electrical (NC2011) or optical medium (NC2051). Every node on the network must have a network card installed as a standard. The PCB is delivered with the necessary washers, nuts and spacers to allow for proper mounting. All repeaters/emulators are supplied with a standard NC2011 (RS485) network card.

For more information refer to the Network Configuration Guide.

Figure 37: Network interface and associated connection
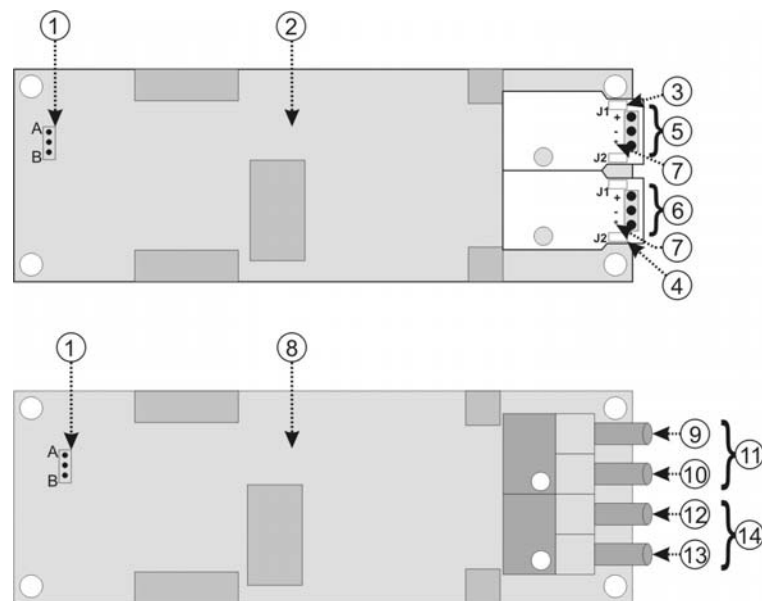
1.	Repeater mode selection	8.	NC2051 (Optical)
2.	NC2011 (RS485)	9.	TX – Transmit A
3.	Jumper J1 –Termination end of line (see Figure 38)	10.	RX – Receive A
4.	Jumper J2 – Earth connection (see Figure 38)	11.	Optical fibre connection channel A
5.	Channel A	12.	TX – Transmit B
6.	Channel B	13.	RX – Receive B
7.	Screen	14.	Optical fibre connection channel B

5.6.2   NE2011/NE2051 ARCNET network extension cards

The NE2011 (RS485) and NE2051 (Optical) are network interface modules that are mounted directly on the NC2011 or NC2051 network card. The modules provide the user the ability to implement a wide range of network topologies when networking FP2000 Series fire panels and FR2000 Series repeaters/emulators. The modules are delivered with the necessary washers, nuts and spacers to allow for proper mounting.

✎   *For more information refer to the Network Configuration Guide.*

Figure 38: NE2011 network extension module
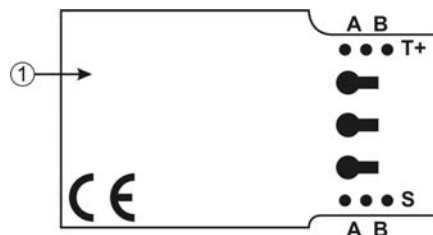
1. NE2011

T+. Termination (A-side: Not terminated, B-side: Terminated)

S. Screen (A-side: Not earthed, B-side: Earthed)

5.6.3   Serial communication network (LON2000)

✎   *This module may not be used with any type of repeater.*

The LON2000 interface module can be used on the following:

- FP2000 series panels
- FP1200 series panels
- KSA1200 series panels
- FB2000 series panels
- UN2011 range

See section 2.1.2 for a complete list of compatible products.

The LON2000 interface module provides the hardware platform compatible products to communicate to the FP700 range of serial communication interfaces.

The FC1200/2011/1200N board has a 20-pin male connector pin on which the LON2000 board must be mounted. The PCB is delivered with the necessary washer, nut and spacer to allow for proper mounting.

Figure 39: Mounting position of LON2000 board
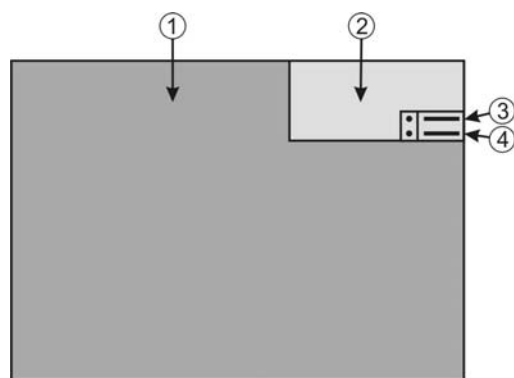
1. **1.** FC1200N/2011
2. **2.** LON2000
3. **3.** Data + (D+)
4. **4.** Data - (D-)

Figure 40: LON port PCB connections
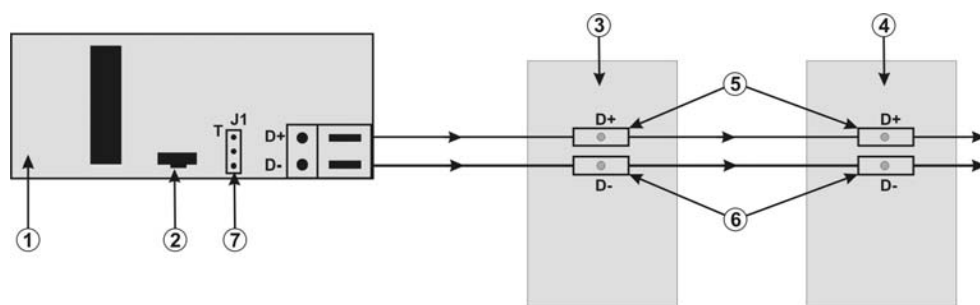
1. **1.** LON2000
2. **2.** Service switch
3. **3.** LON device
4. **4.** LON device
5. **5.** Data + (D+)
6. **6.** Data - (D-)
7. **7.** Termination

Jumper in terminated (T) position: serial communication port is terminated into 120Ω

Jumper removed: serial communication port is not terminated.

If a LON2000 interface board is used in the first or last panel of a LON network, the jumper has to be set to (T) (terminated).

5.7 LCD contrast

5.7.1   FP2000 and KSA1208 panels

The LCD display may be set to obtain maximum contrast by adjusting the viewing angle of the LCD display. This viewing angle is set by adjusting potentiometer VR 1 located on the LCD display and backlight board.

Figure 41: Adjustment of the LCD viewing angle
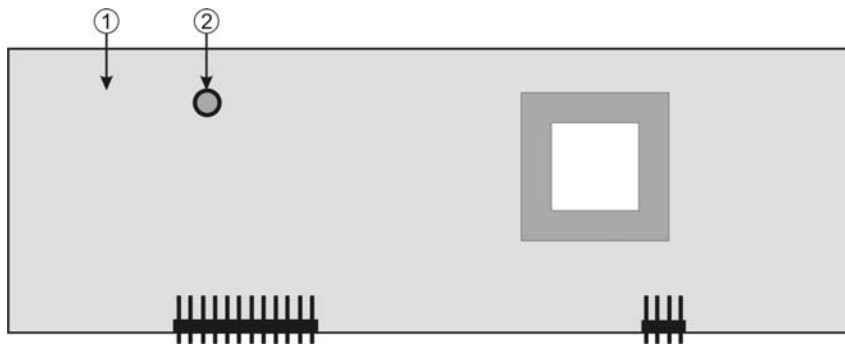
1. LCD display and backlight board

2. VR1 (LCD contrast control)

5.7.2   FP1200 and KSA1204 panels

Adjust the viewing angle of the LCD display to obtain the maximum contrast by the potentiometer VR3 (contrast) which is located on the power supply board (see Figure 32).

6 COUNTRY DEPENDENT SELECTIONS

6.1 Language selection

FP1200 and KSA1204 panels

Language selection is software selectable (see section 9).

FP2000 and KSA1208 panels

The DIP switch on the inside of the panel is used to select the language (see section 8). DIP switches SW1, SW2 and SW3 determine the language.

6.2 Language inserts

Inserts are available in several languages and need to be slipped into the inside of the panel.

6.3 Operation mode

NEN, EN, VdS or EP mode of operation is selectable. The operation of sounder, fire brigade outputs and inputs from fire brigade, fire protection and fault routing are influenced by these settings (see section 10).

7 COMMISSIONING

7.1 Before switching on

1. Visually check the fire panel for any damage that might have occurred during installation. In particular, check for loose pieces that could have fallen in the electronics.

2. Check that all harnesses are securely plugged into the correct plug positions on the printed circuit boards.

3. Ensure that both the mains switch and the battery on/off switch are in the OFF position.

4. Enable the lithium battery by linking the jumper J5 (located above the battery on the host CPU board) to the ON position.

5. Unlock the memory.

6. Set the panel to service mode (this prevents any output from switching during commissioning).

7. Connect the main supply to the power supply input terminals or connect the 24 V to the 24 V supply board.

8. Connect the batteries to the battery terminals of the power supply. Observe correct polarity!

9. Connect the repeaters (Fireman's panels) to the current loop terminals. For detail refer to the FM800 Installation, Configuration and Detailed Operation Manual.

10. Connect the network card (if necessary) - for detail refer to the Network Configuration Guide.

11. Ensure that the fire panel is well earthed at the earth terminals provided. The earth must be directly wired to the distribution board earth. This is required for reasons of both safety and interference suppression.

12. Ensure that all field devices are connected and that their addresses are correctly set.

✎   *Loop isolators must have the correct polarity wired.*

13. Use a multimeter to check all field wiring 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.

⚠   *Do not megger the loops as this will damage connected devices.*

14. Connect all field wiring to the fire panel. The service switch ON will prevent outputs from switching.

15. Ensure that NO loose bare wiring exists in the fire panel cabinet. This can cause damage to the electronics.

7.2 Procedure for switching on

1. Switch the main 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 product code will be displayed on the LCD screen along with the revision of host firmware, firmware code and the creation date of the firmware. If this does not occur DO NOT proceed. Check that the mains supply is present and that the fuses are good.

3. Switch the battery On/Off switch to the ON position (230 V model only).

4. Check that the battery float voltage is 27.6 V. If the voltage is significantly less, then check:

   - Are the batteries flat?
   - Are there possible overloads in the field?

5. If there are visible signs of the power supply overheating, then do not proceed. Disconnect the field wiring and batteries, and eliminate the cause of the problem.

6. The fire panel will perform internal checks. Any failures occurring will be reported on the LCD screen. Observe the total number of faults reported on line 8 of the LCD screen. It is expected to have at least two faults reported:

   - Memory unlocked.
   - Service switch ON.

7. Use the scroll up key key to view the faults existing.

8. All faults (except for the two above) should be eliminated before proceeding further. Use the [RESET] button to obtain a new fault report each time. Possible faults that can occur on switch ON are:

   - Loop overload- check the affected loop for short circuits.
   - Earth fault - check/eliminate the fault.
   - Battery fail - check battery charging.
   - Sounders or fire brigade short circuit or open circuit - check 3K3 termination resistors on all supervised inputs.
   - Specific device faults - check device.
   - Double address - note address of device and check.

9. Enable the loop devices of the FP2000 fire panel in one of three methods:

   - Individually manually using the Device Set-up Menu.
   - Set default using the System Default Set-up.
   - Program by means of a laptop computer using the RS232 port.

10. Eliminate any fire alarms and communications alarms reported.

11. Investigate all devices that are reported Disabled.

12. Check all output relays for correct switching.

13. Configure your Panel ID.

IF A NETWORK IS INSTALLED:

1. Configure network set-up with one of two methods:

   - Manually using LCD menus.
   - Program by means of a laptop computer using the RS232 port.

2. Investigate all panel and repeater faults that are reported.

3. Check 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 the panel off.

6. Check fire and fault reporting.

7. Once all of the above is correct, then:

   - Switch the service switch to OFF
   - Check all network I/O for correct functioning
   - Switch the memory lock switch to locked

8. Reset the repeaters and panels.

8 APPENDIX A: DIP SWITCH SETTINGS AND SOFTWARE CONFIGURATION

8.1 DIP switch settings on host PSU board (FP2000 and KSA1208 panels)

DIP switch settings on host power supply board are shown in the following table (ON = upper position / OFF = lower position).

SW1	SW2	SW3	SW4	SW5	SW6	SW7	SW8	OPTION					
								Protocol					
						ON	OFF	Aritech (900 Series) (see protocol selection note below)					
						OFF	OFF	Aritech (2000 Series) (see protocol selection note below)					
								Mode					
			OFF	OFF	OFF			EN Operation					
			OFF	OFF	ON			VdS Operation					
			OFF	ON	OFF			NEN Operation					
			OFF	ON	ON			EP Operation					
			ON	OFF	OFF			BS Operation					
								Language Groups					
								0	1	2	3	4	5
OFF	OFF	OFF						English	English	English	English	English	English
OFF	OFF	ON						Dutch (Holland)	Polish	Danish	Lithuanian	Italian	Romanian
OFF	ON	OFF						Dutch (Belgium)	Hungarian	Swedish	Estonian	Spanish	Greek
OFF	ON	ON						French (Belgium)	Czech	Norwegian	Latvian	Portuguese	Luxemburgish
ON	OFF	OFF						German	Slovakian	Finnish	Russian	Brazilian	English
ON	OFF	ON						English	English	English	English	English	English
ON	ON	OFF						English	English	English	English	English	English
ON	ON	ON						English	English	English	English	English	English

Note that:

- VdS-mode is only supported if a VdS2000 module is fitted.
- The language group depends on the software installed at time of purchase.

Protocol selection for software v9-0 (and later)

Protocol selection for panel software v9-0 (and later) is via jumper selection on the FEP board. DIP switches 8 and 9 have no function.

9 APPENDIX B: SOFTWARE SELECTABLE OPTIONS

9.1 Software selectable options (FP1200 and KSA1204 panels)

OPTION					
Protocol					
Aritech (900 Series) (see protocol selection note below)					
Aritech (2000 Series) (see protocol selection note below)					
Mode					
EN Operation					
VdS Operation					
NEN Operation					
EP Operation					
BS Operation					
Language Groups					
0	1	2	3	4	5
English	English	English	English	English	English
Dutch (Holland)	Polish	Danish	Lithuanian	Italian	Romanian
Dutch (Belgium)	Hungarian	Swedish	Estonian	Spanish	Greek
French (Belgium)	Czech	Norwegian	Latvian	Portuguese	Luxemburgish
German	Slovakian	Finnish	Russian	Brazilian	English
English	English	English	English	English	English
English	English	English	English	English	English
English	English	English	English	English	English

Note that:

▪ The language group depends on the software installed at time of purchase.

Protocol selection for software v9-0 (and later)

Protocol selection for panel software v9-0 (and later) is via jumper selection on the FEP board.

10 APPENDIX C: OPERATION MODES

Mode	EN	VdS*	NEN	EP
Sounders:				
Sound	Resound (level 2)	Resound (level 2)	Resound (level 2)	Sound (level 2)
Silence	Silence (level 2)	Silence (level 2)	Silence (level 1)	Silence (level 2)
Delay	Allowed	Allowed	Not allowed	Allowed
			1 min. time-out Fire Brigade signal time-out stopped by silence bell	
Fire Brigade				
Signal	No	No	No	Signal (level 2)
Stop	No	No	No	Stop (level 2)
Delay	Allowed	Allowed	Allowed	Allowed
VdS inputs				
input 5	Logic	Logic	Logic	Logic
input 6	Logic	Logic	Logic	Logic
input 7	Logic	Logic	Logic	Logic
input 8	Logic	Logic	Logic	Logic

VdS-mode is only applicable to a fire panel fitted with a SD2000 module. A fire panel fitted with a VDS2000 module will have different settings.

11 TECHNICAL SPECIFICATIONS

11.1 General specifications

Loop capacity

Every loop PCB (LC2002/LC1502) can be configured as two class A loops or four class B loops. (Except FP1200-00 2A/4B or 4A/4B; FP1200-01 2A/2B; FP1200-02 2A/2B).

Maximum addressable devices **per loop:**

- 126 for Aritech 900 system
- 128 for Aritech 2000 system
- 250 for Kilsen KAL210 protocol (125 KL700A detectors and 125 KAL400 I/O devices)

Maximum addressable devices **per panel:**

- 1008 for Aritech 900 system
- 1024 for Aritech 2000 system
- 2000 for Kilsen KAL210 protocol

Maximum loops per panel:

- 8 loops (FP2000 and KSA1208 panels)
- 4 loops (FP1200 and KSA1204 panels)

Loop current:

- Loop overload: >500 mA
- Loop operating load: 100 mA maximum

Zone capacity

- 16 or 64 zones (expandable to 32/128, 48/192 or 64/255 zones in cabinet size B)
- 255 zones for control purposes

LCD screen

- Backlit alphanumeric 8 x 40 character LCD

LED indicators

General LED indicators	
Fire	2 x red LED
Fault	1 x amber LED
Disable	1 x amber LED
Supply fault	1 x amber LED
System fault	1 x amber LED
Processor running	1 x green LED
Supply on	1 x green LED
Control LED indicators	
Silence buzzer	1 x amber LED
Disable	1 x amber LED
Test	1 x amber LED
Third source test	1 x amber LED
Sounder LED indicators	
Sound	1 x red LED
Delay on	1 x amber LED
Delay off	1 x amber LED
Fault / disable	1 x amber LED
Silence	1 x amber LED
Fire brigade LED indicators	
Signal	1 x red LED
Delay on	1 x amber LED
Delay off	1 x amber LED
Fault / disable	1 x amber LED
Stop fire brigade	1 x amber LED
Zone monitoring LED indicators	
Fire	16/64 x red LEDs (expandable to 32/128, 48/192 or 64/255)
Fault	16/64 x amber LEDs (expandable to 32/128, 48/192 or 64/255)
Network facility LED indicators	
All	1 x amber LED
Panel	1 x amber LED

Keyboard

1, 2, 3, 4, 5, 6, 7, 8, 9, 0, A .. Z

General control keys

- Silence buzzer
- Reset
- Disable
- Test
- Third source test

Sounder control keys

- Sound
- Delay On/Delay Off
- Disable
- Silence

Fire brigade control keys

- Signal
- Delay On/Delay Off
- Disable
- Stop fire brigade

Network facility control keys (excludes FP1200 panels)

- All
- Panel

Control key switch

Prevents unauthorised resetting and programming of the fire panel.

Tamper switch (FP2000 and KSA1208 panels only)

Fitted to the inside of the fire panel door to record any entry to the cabinet.

Third source (FP2000 and KSA1208 panels only)

Test button and LED to test total loss of power supply.

Communication ports

- Refer to module variation table for serial port configuration. Serial ports can be used for set-up, upload/download, internal printer (where applicable), graphics, remote operation/graphic package.
- 1 x current loop (to connect repeaters and fireman's panels)

Current Loop

- Maximum 15 devices
- Maximum 1 km between 2 current loop devices
- Aritech FM800 / FR800 - German fire brigade panel (according to DIN 14661) can be connected.
- Cable capacitance max. 150 nF

11.2 Panel specifications

11.2.1   Standard Outputs

Standard Outputs (All standard outputs are located on the sounder board.)	FP1x00 & FP1216 (SD1200 board used)	FP1216EN & FP1264/2xxx & FP1216N / FP1264N / KSA1204 (SD2000 board)
OUT1: Output to alarm devices (Sounders)	A: 24 V – 100 mA supervised* (Supervision at 5V max.) B: 3K3/680 Ohm switched output	A: 24 V - 0.8 A supervised (Supervision at 5 V max.) B: 3K3/680 Ohm switched output
OUT2: Output to fire routing equipment (Fire brigade)	A: 24 V – 100 mA supervised* (Supervision at 5 V max.) B: 3K3/680 Ohm switched output	A: 24 V - 0.8 A supervised (Supervision at 5 V max.) B: 3K3/680 Ohm switched output
OUT3: Output to fire protection equipment	A: 24 V – 100 mA supervised* (Supervision at 5 V max.) B: 3K3/680 Ohm switched output	A: 24 V - 0.1 A supervised (Supervision at 5 V max.) B: 3K3/680 Ohm switched output
OUT4: Output to fault warning routings equipment	A: 24 V – 100 mA supervised* (Supervision at 5 V max.) B: 3K3/680 Ohm switched output	A: 24 V - 0.1 A supervised (Supervision at 5 V max.) B: 3K3/680 Ohm switched output
OUT5 – OUT8: 4 programmable relays (Three terminals each: C - NO – NC)	Maximum switching current: 2 A @ 24 VDC Maximum power rating: 60 W DC	Maximum switching current: 2 A @ 24 V DC Maximum power rating: 60 W DC

The maximum specified current of 100 mA for Output 1 and Output 2 can be exceeded as long as the total current drawn by the outputs (1-4) is limited to 400 mA.

11.2.2   Standard Inputs

Standard Inputs	FP/FR12xx / FR2000 (FP1216 only; FP1200 optional SD1200 board used)	FP1216EN / FP1264 / FP12xxN / KSA1204 (SD2000 board)	FP/FR2xxx / KSA1208 (FP2xxx / KSA1208 only – SD2000 board used)
Sounder card	4 x supervised inputs (inputs 1-4) 3.3 kOhm termination	4 x supervised inputs (inputs 1-4) 3.3 kOhm termination	4 x supervised inputs (inputs 1-4) 3.3 kOhm termination
FEP board (FP2xxx and FB2x00 only)			4 x auxiliary inputs 15 VAC or 20-28 VDC 3 mA

11.2.3   Power Supply Characteristics

Power Supply Characteristics	FP/FR12xx & FR2000	FP1216EN & FP1264	FP/FR2xxx / KSA1208	FR2032/20128 FR2064/20255
Input	230 VAC (+10%, -15%) 50 Hz (±10%) 50 VA 21 – 28 VDC 24 V standby battery	230 VAC (+10%, -15%) 50 Hz (±10%) 220 VA 21 – 28 VDC 24 V standby battery	230 VAC (±15%) 50 Hz (±10%) 200 VA 21 – 28 VDC 24 V standby battery	21 – 28 VDC 24 V standby battery
Output	Aux. Power: 19-27.5 VDC, 100 mA (max) Modem: 5 VDC (±0.1V), 75mA (max) Battery charge: 27.6 VDC (±0.2 V) @ 25 °C, 300 mA (max)	Aux. Power: 19-27.5 VDC, 100 mA (max) Modem: 5 VDC (±0.1V), 75mA (max) Battery charge: 27.6 VDC (±0.2 V) @ 25 °C, 1.6 A (max)	Auxiliary Voltage: 20.5-28 V 27.6V DC battery charge voltage, 4A total (battery charge and aux. with or without batteries.)	
Supervisory	- Mains fail - Battery disconnect - Battery flat - Flat battery cut-out - Earth fault - Auxiliary supply fault	- Mains fail - Battery disconnect - Battery flat - Flat battery cut-out - Earth fault - Auxiliary supply fault	- Mains fail - Battery disconnect - Battery flat - Flat battery cut-out	- Mains fail - Charger fail
Fuses	AC fuse – 0.8 A, 250 V, T (20 mm STD fuse)	AC fuse – 2 A, 250 V, T (20mm STD fuse)	AC fuse – 2 A (20 mm STD fuse) Battery and Aux. Output fuse – 5 A (20 mm STD fuse)	Fuse – 1 A (20 mm STD fuse)
Maximum current drawn from the primary input	250 mA	1 A	1 A	0.3 A (no options installed)
Maximum output ripple voltage	± 300 mV	± 300 mV	± 300 mV	
Fault Relay (Configuration depended on jumper setting – refer to section 6.4.2.2.)	Maximum switching current: 2A @ 24VDC Maximum power rating: 50 W	Maximum switching current: 2A @ 24VDC Maximum power rating: 50 W	-	-

11.2.4   Panel Operation

Battery operation - Normal operation (No mains power)	FP12XX	FR1200/FR2000	FP1216EN / FP1264 / FP12xxN / KSA1204
Current required by system	200 mA (max)	200 mA (max)	200 mA (max)
Loop current - 2 loops - 127 devices/loop @ 340 µA/device (DP951) - 250 devices/loop @ 340 µA/device (Kilsen KAL210 protocol	86 mA	0 mA	86 mA
Auxiliary current	0 mA	0 mA	0 mA
Total normal current	286 mA	200 mA	286 mA

Battery Operation - Alarm Operation (No mains power)	FP12XX	FR1200/FR2000	FP1216EN / FP1264 / FP12xxN / KSA1204
Normal current (as above)	286 mA (max)	200 mA (max)	286 mA (max)
Extra loop current (20 x LED @ 4 mA)	80 mA	0 mA	80 mA
Sounders (Sounder board: Outputs 1-4)	200 mA	0 mA	200 mA
Total alarm current	566 mA	200 mA	566 mA

Normal Operation	FP2416/2464 & FP2432/24128	FP2864 / FP28255 / KSA1208
Mains load (maximum)	200 VA	200 VA
Total output current (27.6 V)	4 A	4 A
Battery capacity I_{AUX} = 0 (72H standby)	36 AH	58 AH
Battery capacity (maximum)	68 AH	68 AH
Required battery charging current (Maximum battery capacity)	3.05 A	3.05 A
Current required by system (I_{SYS})*	0.5 A	0.8 A
Available auxiliary current	0.45 A	0.15 A

Alarm Operation	FP2416/2464 & FP2432/24128	FP2864, FP28255
Mains load (maximum)	200 VA	200 VA
Total output current (27.6 V)	4 A	4 A
Required battery charging current (Maximum battery capacity)	0 A	0 A
Current required by system	0.6 A	1 A
Available auxiliary current	3.4 A	3 A

*I_{SYS} calculated at 252 x 900 series ionisation detectors (FP2416/64) 1008 x 900 series ionisation detectors (FP2864/255)

Charging current based to charge batteries up to 80% in 24 hours at 75% efficiency

11.2.5   Environmental

Environmental	FP/FR12xx & FR2000	FP1216EN & FP1264 & FP1216N / FP1264N / KSA1204	FP/FR2xxx / KSA1208
Enclosure protection	IP54	IP54	IP54
Temperature	Operational: -5 ℃ to +40 ℃ Storage: -20 ℃ to +60 ℃	Operational: - 5 ℃ to +40 ℃ Storage: -20 ℃ to +60 ℃	Operational: - 5 ℃ to +40 ℃ Storage: -20 ℃ to +60 ℃

FP1200, FP2000 and KSA1200 series installation manual

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