Wiring Recommendations

The following notes are intended as a guide for the installer to aid effective and trouble free operation of the equipment installed. These recommendations are in addition to the relevant standards and not a substitute. If in doubt please contact our technical help department on 01384 458651.

1.0 General Notes

The cables chosen, cable paths and the installation must conform to the following standards:

(i) The latest IEE Regulations

(ii) BS5839 Part 1: 2002 Fire Detection and Fire Alarm Systems for Buildings - Code of Practice for System Design, Installation commissioning and maintenance.

(iii) BS7273 Part 1: 2000 Code of Practice for The Operation of Fire Protection Measures; Part 1 - Electrical Actuation of Gaseous Total Flooding Extinguishing Systems (where applicable)

All cables must be Meggered core to core, cores to earth and resistance measured end to end on all combinations ***before*** any devices are fitted. (See relevant commissioning instructions for further details.)

Some types of cable are mechanically fragile and easily damaged. Follow the manufacturer's instructions carefully.

Do not install the panel, repeater panels, any field equipment or any cabling closer than 10m to any equipment that emits radio frequencies.

Make notes on the drawings and related paperwork as you proceed.

2.0 Conventional Systems - Zones

The maximum number of detectors per zone for each product is detailed in the relevant Product Application Guide.

The minimum cable size to be used is 1.5mm. The maximum cable length per zone is 600m.

Never run PA, power or data conductors within the same sheath.

Cable spurs are not permitted.

Keep cable runs and devices at least 30cm away from fluorescent lights, 3 phase cables and heavy duty machinery.

Cable runs should be segregated from mains voltage by 30cm and when necessary, should cross power cables at 90 degrees.

Ensure correct polarity is maintained throughout all wiring.

3.0 Alarm Circuit Wiring

Refer to 1.0 General Notes.

NOTE*: Volt drop must always be calculated.*

Minimum cable size 1.5mm^2. The cable chosen should be used exclusively for alarm circuits.

Never run PA, power or data cables within the same sheath.

Cable spurs are not permitted.

Keep cable runs and field devices at least 30cm away from fluorescent lights, 3 phase power cables and heavy machinery.

Cable runs should be segregated from mains voltage by 30cm and when necessary, should cross power cables at 90 degrees.

Ensure correct polarity is maintained throughout all wiring.

All devices fitted must be polarised and suppressed.

4.0 Analogue Systems - Loops

NOTE*: The detection loops carry communication data and therefore the wiring standard is very important.*

Refer to 1.0 General Notes.

The cable chosen should be used exclusively for the loop circuits. A loop design calculation must be carried out at the design stage to identify the maximum practical loop length.

Functional earth continuity must be maintained throughout the loop. Both ends of the functional earth conductor must be connected to the functional earth bond connector in the panel.

The loop must be completely free of earth faults.
Never use multicore cable or run loops within the same sheath as PA or power cables.

The system should be wired as a complete loop but cable spurs are permitted within the limitations of BS 5839 part 1.

Keep cable runs and devices at least 30cm away from fluorescent lights, 3 phase cables and heavy duty machinery.

Ensure the supply to any device does not fall below 17 volts.

Cable runs should be segregated from mains voltage by 30cm and when necessary, should cross power cables at 90 degrees.

Powerful radio transmission signals can affect data communications.

Ensure correct polarity is maintained throughout all wiring and each core is labelled.

Clearly label each circuit e.g. loop 1 out, loop 1 in, alarm 1, door release, etc.

Isolators should be located for easy access.
Leave dust covers on detectors until the system is fully commissioned.

Be methodical when addressing devices. Where possible, number devices following the cable run. Label each device as it is numbered and mark the detection layout drawings as you go.

5.0 RS485 Data Communications (Analogue Panel Repeater & Network Communications)

Refer to 1.0 General Notes.

The Precept [en] repeater and analogue panels network and repeaters communicate using RS485 transmission (except HP900 panel network). The cables used for these applications must be suitable for EAI RS-485 applications. The number of conductors depends on the application.

The cable chosen should be used exclusively for the data circuits.

Screen continuity must be maintained throughout. The screen connection must be made at each panel in accordance with the details provided in the appropriate product manual.

Never use multicore cable or run data within the same sheath as PA or power cables.

A network should be wired as a complete ring.

Keep cable runs and devices at least 30cm away from fluorescent lights, 3 phase cables and heavy duty machinery.

Cable runs should be segregated from mains voltage by 30cm and when necessary, should cross power cables at 90 degrees.

Powerful radio transmission signals can affect data communications.

Ensure correct polarity is maintained throughout all wiring and each core is labelled.

5.1 Precept [en] Repeaters

These require 3-core shielded cable for EIA RS-485 applications. The maximum total length for repeater communications is 2000m.

Suitable cable types are: -

Alpha 3492C (2 pair)	Belden 8132 (2 pair)
Alpha 6222C (2 pair)	

or equivalent.

5.2 Voyager, Discovery, Nexus and R3 Repeaters and Networking

These require single pair shielded cable for EIA RS-485 applications. The maximum total length for the repeater or panel network is 2000m. Suitable types are: -

Alpha 6412 (Single pair)	Belden 9841 (Single pair)
Alpha 3492C (2 pair, 1 unused)	Belden 8132 (2 pair, 1 unused)
Alpha 6222C (2 pair, 1 unused)	Belden 3106A (single pair)

or equivalent.

5.3 HP900 Repeaters

These require twin pair shielded cable for EIA RS-485 applications. The maximum distance between repeaters is 1200m. Suitable types are:

Alpha 6413 (2 pair)	Belden 9842 (2 pair)
Alpha 3492C (2 pair)	Belden 8132 (2 pair)
Alpha 6222C (2 pair)	Belden 3107A (2 pair)

or equivalent.

5.4 HP900 Networking

This requires special twisted pair communication cables. Suitable types are:

Cable type	Conductor size	Maximum distance
Belden 85102, single twisted pair, stranded 9/29 unshielded, plenum.	1.3mm/16	2700m
Alpha 1899C / Belden 8471, single twisted pair, stranded 9/29 unshielded, non plenum.	1.3mm/16	2700m
Level IV 22AWG, twisted pair, typically solid and unshielded.	0.65mm/22	1400m
JY (St) 2x2x0.8, 4 wire helical twist, solid and shielded.	0.8mm/20.4	900m

5.5 CB200 Repeaters

These require 2-core shielded cable for EIA RS-485 applications. The maximum total length for repeater communications is 2000m.

Suitable cable types are: -

Alpha 6412 (Single pair)	Belden 9841 (Single pair)
Alpha 3492C (2 pair, 1 unused)	Belden 8132 (2 pair, 1 unused)
Alpha 6222C (2 pair, 1 unused)	Belden 8102 (2 pair, 1 unused)

or equivalent.

Do not use any cable types other than those listed or their direct equivalent.

Warning: The data cables are suitable for data transmission. It is the responsibility of the installer to ensure that the cable type and installation offer sufficient integrity for the application. This is particularly important when using cause effect programming between networked panels. For guidance see BS5839 part 1.

6.0 Extinguishing System Actuator / Solenoid Circuits

Refer to 1.0 General Notes.

NOTE*: Volt drop must always be calculated.*

The cable chosen should be used exclusively for actuator/solenoid circuits.

Never run PA, power or data conductors within the same sheath.

Cable spurs are not permitted.

Keep cable runs and field devices at least 30cm away from fluorescent lights, 3 phase power cables and heavy machinery.

Cable runs should be segregated from mains voltage by 30cm and when necessary, should cross power cables at 90 degrees.

Ensure correct polarity is maintained throughout all wiring.

Solenoids should be polarised and suppressed.

7.0 Auxiliary Circuits

Refer to 1.0 General Notes.

NOTE: *Volt drop must always be calculated.*

The cable chosen should be used exclusively for alarm circuits.

Never run PA, power or data cables within the same sheath.

Keep cable runs and field devices at least 30cm away from fluorescent lights, 3 phase power cables and heavy machinery.

Cable runs should be segregated from mains voltage by 30cm and when necessary, should cross power cables at 90 degrees. .

All inductive devices powered from the 24V DC supply must be polarised and suppressed.

Appendix

i Other Relevant Documentation

CELCAL Volt Drop and Battery Calculation Software
BS5839 part 1
BS7273
IEE Regulations (BS7671: 1992)