



Vigilant MX4428 Fire Alarm System

The Vigilant MX4428 is an intelligent fire alarm system, incorporating Tyco MX TECHNOLOGY to provide advanced, analogue addressable fire detection. It features support for MX VIRTUAL multi-sensor analogue addressable detectors, the MX DIGITAL protocol for communications with analogue loop devices, distributed "responder loop" architecture and powerful programmability.

Features & Options

- MX VIRTUAL multi-sensor analogue addressable detectors
- SMARTSENSE and MX FASTLOGIC (fuzzy logic) detection algorithms
- Heat-enhanced photoelectric smoke and CO fire detectors
- Heat detectors programmable as rate-of-rise or fixed temperature only
- Also compatible with Multi-Protocol Responder (MPR) and Series 130 detectors and modules
- MPR supports "Filtrex" and high sensitivity laser smoke detectors
- Compatible with wide range of collective detectors including Intrinsically Safe types
- Complies with AS 4428.1 and NZS 4512
- LCD Firefighter Facility (FF) and optional zone LEDs
- LCD zone description text with optional point text for each detector
- Event logging to internal history file and printer
- Printer logging includes zone text and optional point text
- Remote repeater panels, colour graphics displays
- "Tandem" mode for remote control panel access
- High level EWIS, BMS interface
- Multi-panel networking available

- Programmable outputs for Warning System, External Alarm (strobes & bells) and Ancillary Control
- Flow switch monitoring and remote testing
- AS 1668 air-handling smoke detection and control
- Powerful, field-programmable logic equations and timers
- Built-in clock/ calendar with automatic daylight saving adjustment
- Comprehensive test facilities
- Automatic system self-tests
- Automatic battery connection and capacity tests
- Integral charger (2.5A, 6A, 12A)
- 19" rack format cabinets

MX Detection Technology

MX VIRTUAL multi-sensor analogue addressable detectors utilise dual sensors (photoelectric and heat, or CO and heat) to allow the best detection mode for a situation to be selected without having to physically change detectors. Detection modes may include:

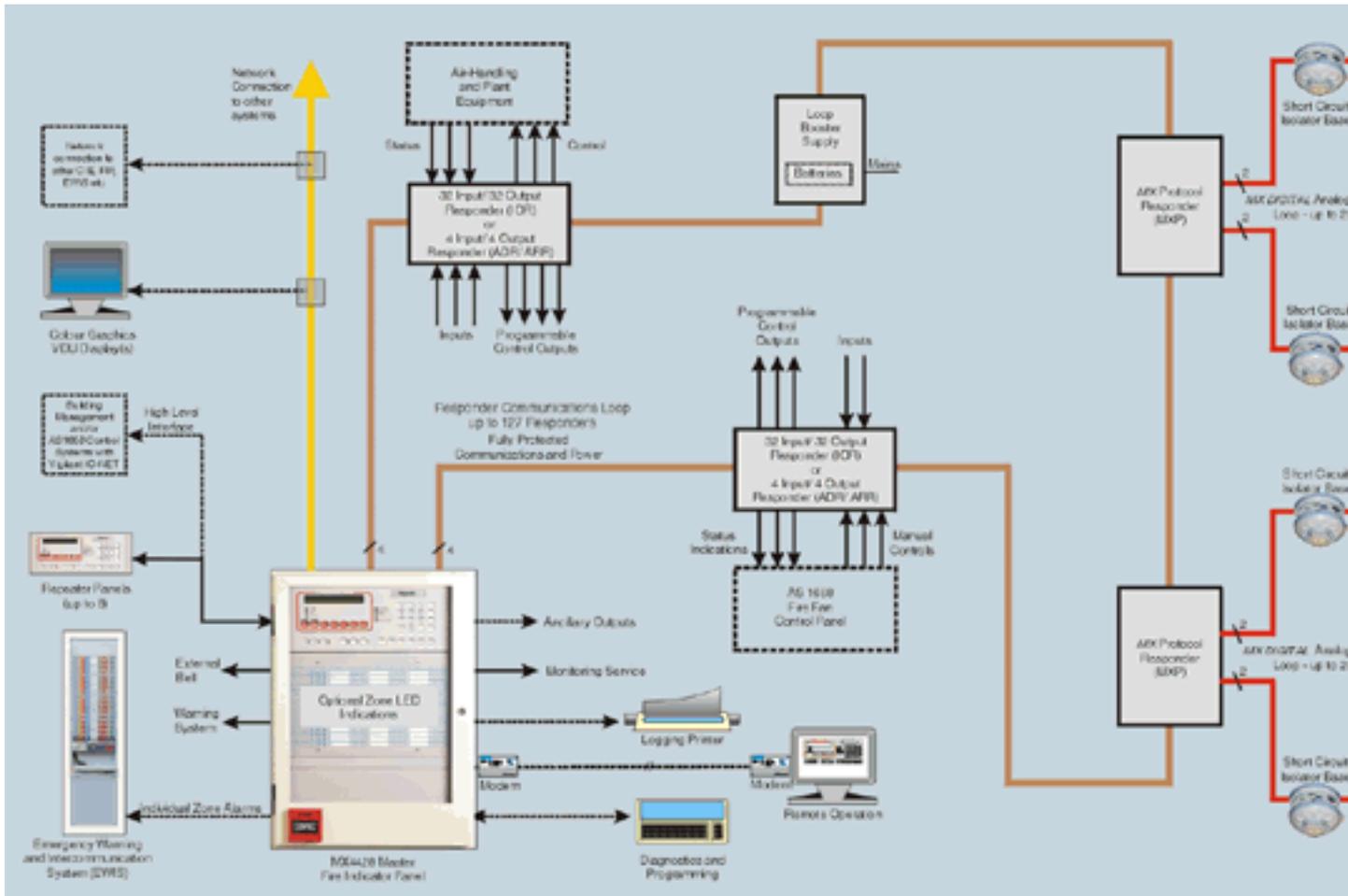
- Smoke/ CO detection only
- Heat-enhanced smoke/ CO detection only
- Smoke/ CO plus heat detection
- Heat-enhanced smoke/ CO plus heat detection
- Heat-only detection can be fixed temperature, or also include rate-of-rise.

For specific applications, ionisation smoke and heat-only detectors are also available.

SMARTSENSE or MX FASTLOGIC detection algorithms can be programmed for each detector to allow the detection capabilities of the system to be further optimised.

Up to 200 MX devices (detectors and addressable input/ output modules) may be connected to the MX detection loop, which terminates at an MX Protocol (MXP) responder.

The MX DIGITAL communications protocol used on this loop is designed to provide high reliability and fault resistance, with operation possible over many cable types. This often permits system upgrades using existing cable. The loop configuration ensures that communications continues in the event of a loop open circuit fault condition. Short circuit isolator detector bases may be fitted to divide the loop into segments, so that a loop short circuit fault will only affect devices in the same loop segment as the fault. A wide variety of addressable modules and detector bases enable devices such as manual call points, clean contact inputs and outputs, and collective detector circuits to be connected to the loop.



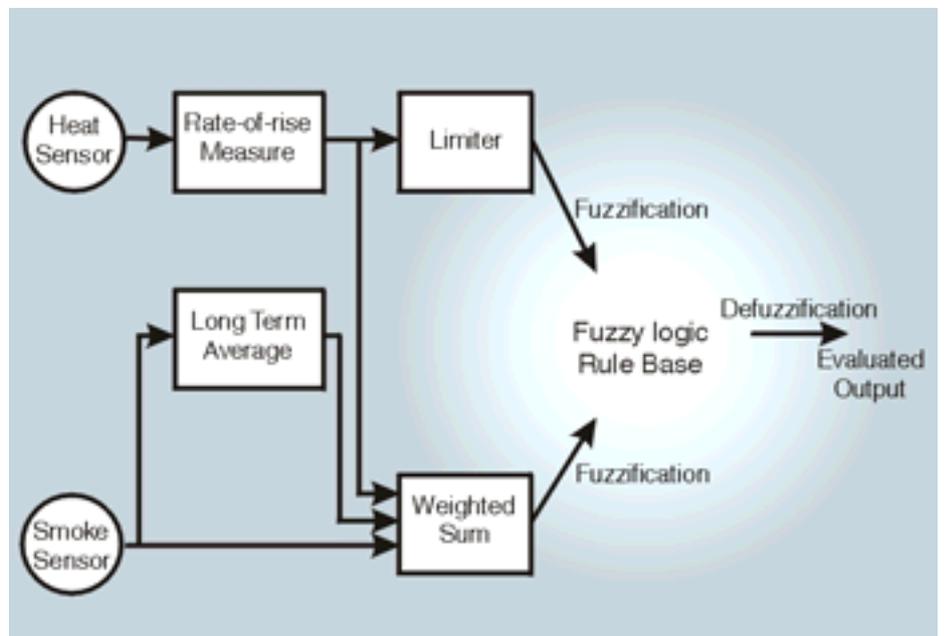
Detection Algorithms

SMARTSENSE is a field-proven, reliable detection algorithm, providing unwanted alarm reduction, compensation for ambient conditions and a wide range of programmable sensitivity settings.

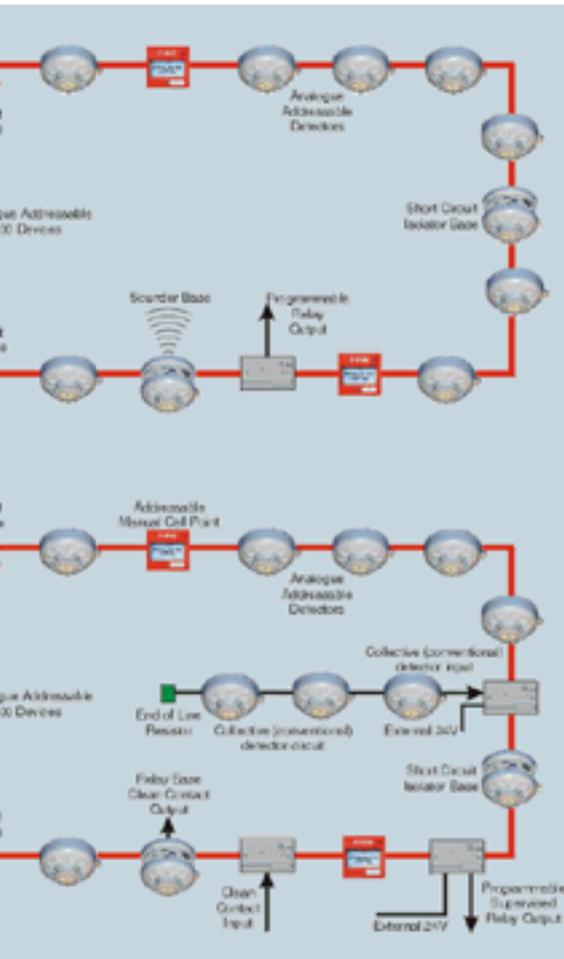
MX FASTLOGIC is a “fuzzy logic” based algorithm applied to photoelectric smoke and heat enhanced smoke detection, and designed to differentiate between the smoke and temperature patterns of real fires and typical causes of unwanted alarms.

Both algorithms provide:

- Detector pre-alarm sensing for early warning of a potential alarm.
- Compensation for soiling and changes in ambient conditions.
- Logging “detector dirty alert” when compensation limits are about to be exceeded, to allow maintenance to be scheduled.
- Heat sensor can be programmed to act independently as a Heat Detector



MX FASTLOGIC



MX4428 System Configuration

Responder Loop Design

Central to the MX4428 system is the proven "Responder Loop" architecture, which allows intelligent responders to be either distributed at selected locations around the protected premises, or located centrally at the FIP. Analogue addressable loop wiring and other inputs and outputs are terminated at these responders, which in turn are connected by the 4-wire responder loop to the FIP.

The responder loop is fully protected: a partial or complete break, or short, anywhere on the loop is detected and isolated automatically at the adjacent responders. All system operations are fully maintained even in the presence of the fault condition. This design offers many benefits:

- Cable concentration at the master FIP is greatly reduced.
- Installed cost is lower because the loop design requires less wiring than conventional methods.
- Compatibility with many existing conventional and analogue addressable systems, providing a ready upgrade path.
- Ideal suitability as a main panel upgrade with old sub-panels connecting via responder inputs.
- High-integrity communications is fully supervised and protected by redundant paths.
- Loop fault sensing and isolation is provided at every responder.
- Intelligent diagnostics identifies location of faults rapidly.
- Expansion and alterations are easily accommodated with minimal additional wiring.

- Responder Loop Boosters permit virtually unlimited loop length.
- No additional multicore wiring is required for AS 1668 controls, but optional use of dedicated IO-NET (PLC) system is also possible.

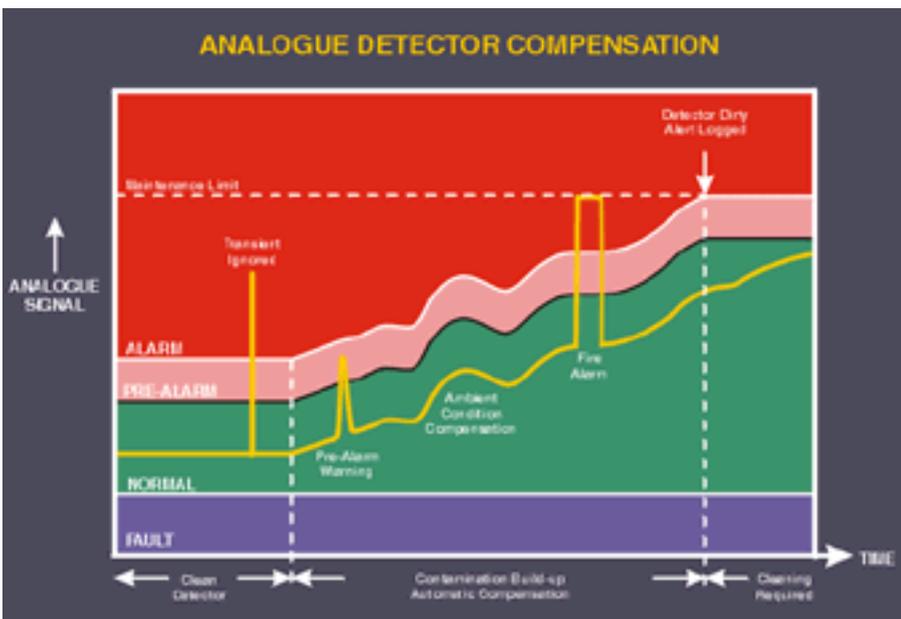
Easily Expanded

The built-in display capabilities of the MX4428 are comprehensive. Input devices are grouped in up to 528 zones, and zone alarms are displayed on the LCD and optional printer complete with programmable description text. Zone LED displays may also be fitted. Point text provides additional display expansion with individually programmable LCD and printer text for each addressable point.

The number of points to be monitored can be readily increased by adding responders to the responder loop. This loop can support up to 16 MXP Responders or 32 MPRs, equating to 3,200 analogue addressable points (using MXP Responders). Multi-panel networking allows system expansion beyond this using a comprehensive range of network compatible products for alarm annunciation, communications and control (see separate datasheet). Remote repeater displays, mimics, colour graphic computer displays and a logging printer may be connected to any system and interfaces to EWIS and BMS are available.

AS 1668 Air-Handling

The MX4428 accommodates AS 1668 air-handling controls using its Input/Output Responders (IOR) and analogue loop input/output devices. Compact and economical Fire Fan Control Panels may be constructed using IORs to monitor manual control switches and operate status indicators. Remote programmable outputs interface to remote air-handling units. No extra FIP interface wiring is required to collect zone alarm conditions because these are already available to the MX4428's output logic programming. All AS 1668 signals are carried by the FIP's protected loop communications. Alternatively, MX4428 may be connected to an IO-NET system for AS 1668 control. This separates the AS 1668 communications and programmable logic from the FIP, while maintaining many of the advantages described above.

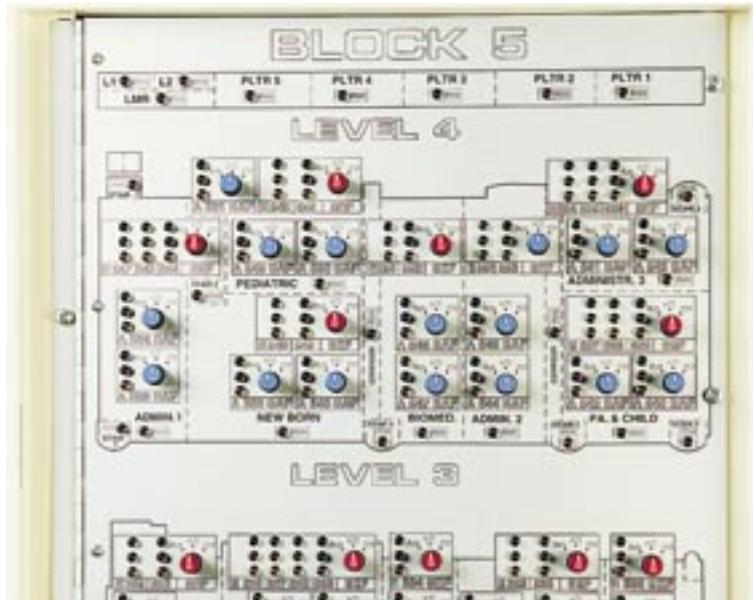


MX4428 19" Rack Mounting System

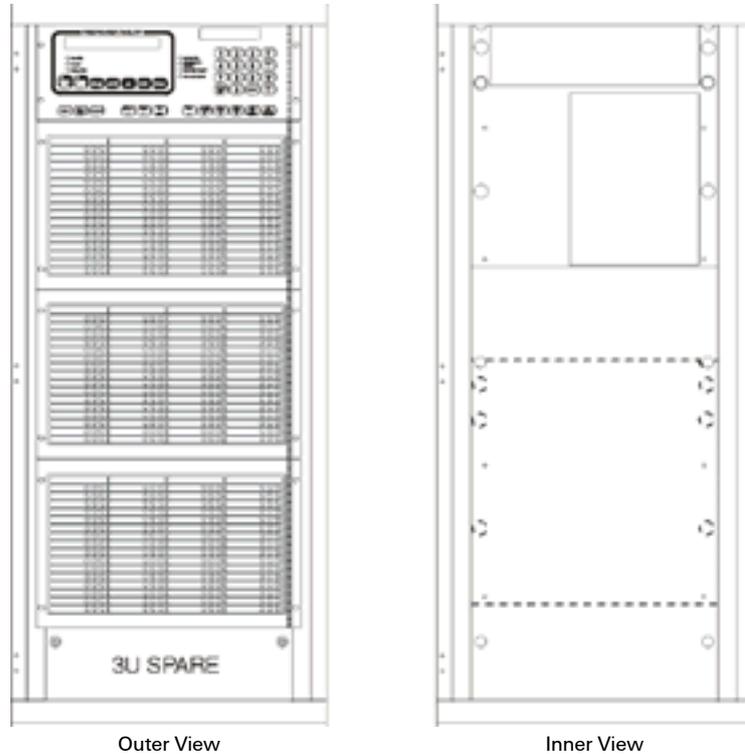
MX4428 cabinets are in "19 inch" rack format. In addition to the standard 15U cabinet, four larger cabinet heights in two depths allow systems to be assembled as required. A 4U inner door contains the user keypad and FF incorporating the LCD. A 7U display extender door holds multiples of 64 zone LED indications. A variety of other inner doors and 19 inch rack modules are available including blank doors and panels, modules for mounting AS 1668 controls, gas flooding system zone controls, warning system controls, and alarm signalling equipment. Custom designed graphic mimic diagrams may also be mounted in the inner door position. 450mm(H) x 460mm(W) gearplates allow the mounting of standard equipment internally: Main board, Power Supplies, Responders, Loop Booster, I/O Responder complete with termination boards. Other gearplate options include a blank gearplate for mounting other types of equipment, and larger size gearplates for the larger cabinets.

Cabinet Features

- All-welded construction
- Cabinets available hinged left or right
- Modular system
- Standard components:
 - Gear plates
 - Inner doors
 - Blanking plates (1,2,3,4,5,6,7U)
- Optional components:
 - 1U document shelves available in two depths (120mm and 295mm)
 - ASE mounting plate
 - T-GEN occupant warning system fascia
 - Gas/Suppression control doors
- IP65 cabinet options available to special order



Fire Fan Control Panel
28U Typical MX4428 Rack 192 Zones maximum



MX4428 Rack Cabinet Specifications

| Cabinet Size | | 15U | 18U | 21U | 28U | 40U |
|----------------------------------|----------|---|-----|------|------|------|
| Number of extender inner doors: | Master | 1 | 2 | 2 | 3 | 3 |
| | Extender | 2 | 2 | 3 | 4 | 4 |
| Maximum number of LED displays: | Master | 64 | 128 | 128 | 192 | 192 |
| | Extender | 128 | 128 | 192 | 256 | 256 |
| Spare space at bottom: | Master | 4U | 0U | 3U | 3U | 15U |
| | Extender | 1U | 4U | 0U | 0U | 12U |
| Standard size gearplates (max.): | | 1 | 1 | 1 | 2 | 3 |
| Overall Height (mm): | | 750 | 885 | 1050 | 1330 | 1865 |
| Overall Width (mm): | | 550 | 575 | 575 | 575 | 575 |
| Overall Depth (mm): | | 211 (176 internal) 15U | | | | |
| | | 205 or 380 (135 or 310 internal) 18U, 28U, 40U | | | | |
| | | 350 (310 internal) 21U | | | | |
| Cabinet Material: | | 15U cabinet 1.2mm mild steel, other cabinets 1.6mm mild steel | | | | |
| Cabinet Finish: | | Baked epoxy powdercoat | | | | |
| Cabinet Colour: | | Cream Wrinkle BFF998CW (special colours available on request) | | | | |

Easy to Operate

Operation is straightforward with the MX4428's keypad and alphanumeric LCD. The 40 character, 2 line LCD zone control panel meets the AS 4428.1 "Firefighter Facility" (FF) requirements. It provides clear indication of the alarm location, including the zone number, the operated point or circuit number and a text description of the alarm zone. If the point text option is used, a unique text description of the analogue point that caused the alarm can also be displayed. Next and Prev keys allow easy scrolling through the 99 event zone alarm buffer, while all current alarms, faults and isolated zones can be separately recalled. An internal history log stores the previous 900 events, and these can be recalled to the LCD at any time. The optional easy-to-read English language printer output provides a 30 character text description of the zone or point, and a date/ time stamp to allow rapid tracing of events. The printer may be selected to log any or all of: zone events, circuit events, point events, keypad commands. "Tandem Mode" enables the panel keypad to be operated from a remote computer for diagnostic or remote monitoring purposes.

Control Panel Facilities

- LCD Control Panel (40 char. x 2 lines)
- Firefighter's controls (FF): Acknowledge, Reset, Isolate, Next, Previous, Warning System Isolate, External Bell Isolate.
- Recalls: Alarms, Faults, History (900 events), Zone Status, Point Status, System Status, Activating circuit/point, Search for detector % dirty.
- Alarm Zone functions: Zone Test, Zone Isolate, Zone Reset, One person detector "in situ" test (auto-reset).
- Ancillary Control Zone functions: Isolate, Reset, Relay Test.
- System functions: Battery Test, Warning System Test, External Bell Test, Lamp Test, System Test, Brigade Test, System Fault Reset.

- System and individual zone status indications.

Repeater display panels provide comprehensive remote display and control including: remote FF and/ or zone LEDs; display of activating circuit/ point; zone isolate, reset, test; warning system/ bell test; status recall of zones, system and history (refer to separate datasheet).

Fully Field-Programmable

For very straightforward applications, configuration of the MX4428 is automatic. For custom requirements, a laptop computer gives 2-level password-protected access to the MX4428's programming facility. System configuration programming provides a wide range of options including networking and operation of remote displays. Freely programmable circuit to zone mapping allows maximum flexibility for custom design of the LED display layout. Powerful control programmability is available through timers, Boolean logic expressions, variables and system state tokens. Virtually any monitoring and control function can be configured in the field using MX4428's programming facility. The programmed configuration can be printed for reference or checking, and may also be uploaded to disk for later downloading, if required. Site-specific configuration parameters are stored in nonvolatile EEPROM memory which remains protected even if the system's power supply is removed.

Programming Facilities

The following parameters can be programmed:

- Point functions:
 - Point Type
 - Algorithm (MX Photoelectric only)
 - Temperature enhancement (MX Photoelectric and CO only)
 - Heat type A, B, C, D (C, D MXP only)
- Alarm/ Pre-Alarm sensitivity
- Upper Tracking Limit
- Dirty Detector Alert Limit
- Output control
- 30 character text name
- Circuit functions:
 - Circuit to Zone mapping
 - Circuit enable/ disable
 - Input monitoring type
- Zone functions:
 - Normal - Ancillary control
 - Flowswitch - Latching/ Not
 - Dual hit - Zone type text
 - Master Alarm/ Indication only
 - Isolatable/ non-isolatable zones
 - Flow switch test relay
 - 30 character text name
- Output logic programming:
 - Variables - Timers
 - Boolean AND, OR, XOR, NOT
 - Relay to Ancillary mapping
 - Supervision enable/ disable
- System functions:
 - Time/ date - Configure
 - Upload - Download
 - Query/ help - Diagnostics
 - Recall History (900 events)
 - Analogue loop/ line (MPR only)
 - List all off-normal zones
 - Adjust global settings
 - Two Analogue default sensitivities
 - Flow switch delays
 - Automatic test times
- Repeater Panel Programming:
 - Zones to be displayed
 - Display or relay/ mimic driver
 - Global or local key functions
 - Internal or external power supply
 - Zone text download command



Control Panel Layout

Specifications

System Capacity

| | |
|-----------------------|---|
| Input Points: | Up to 3,200 depending on configuration. |
| Zone Indications: | Up to 528, freely assignable. |
| Programmable Outputs: | Up to 508 plus two FIP relays. |
| Responders: | Up to 127 addresses. MXP, MPR, IOR may count as more than one address. Up to 16 MXPs, 32 MPRs, depending on configuration. |
| Analogue Loop: | 2 wire loop, 2km max. O/C tolerant. S/C isolator bases/ modules available. |
| Repeater Panels: | Up to 8 (more without control, or by using network). |

Physical

| | |
|----------------------|---|
| Cabinet Size (mm): | 15U 19" rack. 750H x 550W x 230D (incl. MCP). For larger rack mount cabinets see inside. |
| Cabinet Material: | 1.2mm mild steel (15U). Baked epoxy powdercoat finish: Cream Wrinkle BFF998CW. |
| Style: | Wall mounting. Outer door hinges on left (003 key lock) to access controls. Inner door hinges on right. |
| Shipping Weight: | 25kg (without batteries). |
| Responder Size (mm): | 240H x 180W x 50D (MXP, MPR, ADR-M). |
| Responder Material: | 1.0mm mild steel, galvanised finish. |
| Shipping Weight: | ADR-M, MPR: 1.3 kg, ARR-M, MXP: 1.4kg. |
| Temperature: | -5°C to 45°C operating. |
| Humidity: | Up to 95% RH (non-condensing). |

Power Supply (Master FIP and Loop Boosters)

| | |
|---------------------|--|
| Mains Supply: | 240Vac +6% -10%, 50Hz, 150VA. |
| Internal Battery: | 24V sealed lead-acid, capacity up to 40Ah. |
| Internal Charger: | 27.3V (nominal), 2.5A (6A or 12A options) regulated, temperature-compensated. |
| Battery Monitoring: | Charger high/ low, battery low/ fail. Supervision of battery connection and capacity. |

Inputs

| | |
|---------------------|--|
| ADR-M: | 20V nominal, collective detector circuits. |
| IOR: | Clean contacts, optionally supervised. |
| MXP (per MXP loop): | Up to 200 MX detectors and input/ output modules. Photoelectric smoke or CO combined with optional heat, ionisation smoke, heat (programmable for Type A, B, C or D), supervised hard contacts, VLC-800MX VESDA LaserCOMPACT. |
| MPR (per MPR loop): | Up to 99 photoelectric, laser, "Filtrex" or ionisation analogue smoke detectors, analogue heat detectors (programmable for Type A or B). Up to 99 input/output modules. |
| Other Inputs: | Supervised MCP at master & repeaters. |

Outputs

| | |
|---------------------------------------|---|
| Monitoring Service Relays: | Alarm (2), Fault, Isolated, Stand-by (power supply supervision). 2A, 30Vdc resistive. |
| FIP Relays: | Two relays (one relay 2A, 30Vdc resistive, with built-in supervision, other relay switched 24V, battery backed, 1.5A max.). Programmable for operation as External Bell, Warning System, or Ancillary output. Additional supervision modules available. |
| Responder Relays: I/O Responder: | Supervised, individually programmable: 1A, 30Vdc resistive. 2A Relays or 100mA, 28V transistor pulldown (1.1V). Programmable supervision. |
| Analogue Loop: Ancillary Supplies: | Addressable supervised relays: 2A resistive, 1A inductive, 30Vdc. 24V; battery-backed and non battery-backed, 1.5A max. each (can be expanded). |
| Display Mimic: | External Alarm LEDs or relays (100mA max.). |
| Other Outputs: | External Sounder (28V, 200mA max.). |

Detector Compatibility

The MX4428 is compatible with the Tyco MX and Series 130 ranges of analogue addressable detectors and modules. It is also compatible with the Olsen C7xA/ P7xA range of analogue addressable detectors for upgrades and retrofits.

In addition, it is compatible with hard contact devices and a wide range of "20 volt" industry-standard, collective detectors.

A full list of compatible devices is available on request.

APPROVED

The MX4428 is certified to Australian Standard AS 4428.1-1998: "Fire detection, warning, control and intercom systems - Control and indicating equipment, Part 1: Fire."

CSIRO ActivFire Listing No. afp-1446

The MX4428 complies with the New Zealand Standard NZS 4512:2003 "Fire Detection and Alarm Systems in Buildings".

FPA(NZ) Listing Number VF/117

Hong Kong Fire Services Department approved

Other approvals pending



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