

MasterMinder™ MLC

MultiLine Carrier Monitoring System

- Simple to install and operate
- Provides the most comprehensive information
- Arguably the best and most widely used system in Australia



Computerised, automatic monitoring and testing system for emergency luminaires and signs

Note: Computer and printer optional extras

New Zealand as an advanced caring society requires the provision of emergency lighting in buildings likely to be occupied by the public. This lighting and associated illuminated exit signs must provide a level of illumination and indicate exits to allow the evacuation of people from the danger areas in case of fire.

The Australian standard AS/NZS2293 for emergency lighting consisting of part 1 & part 2.

All equipment used must satisfy the requirements of part one. Part 2 requires battery discharge every 6 months, testing and recording of test results of this safety equipment. The 6 monthly testing requires the full discharge of the power batteries, which restores their level of charge and prolongs their life. It also tests that lamps, and components are operational.

Manual testing, particularly in large installations is quite impractical as it would require very many people to simultaneously observe each light and sign at the expiry of the test cycle to verify that it fulfilled the required duration of illumination.

The testing personnel do not, usually, have the expertise to establish the cause of unit failure. Thus they often replace units unnecessarily with unnecessary costs to the user.

The cost of equipment and installation of an emergency lighting system is significant and its continuous 100% operational readiness literally vital.

To overcome these problems and help to provide the safety and legal requirements for emergency lighting, Famco have designed the MasterMinder computer controlled testing and monitoring system. This system is now also available in "wireless" form as the Multiline Carrier (MLC) MasterMinder.

The MLC MasterMinder system was originally designed in answer to the demand of building owners and consultants to fit the MasterMinder monitoring system into existing buildings, where the installation of communication cable is difficult.

The MLC - MasterMinder system, due to its simplicity is also eminently suitable for new installations.

The MLC MasterMinder consists of a System Control Unit (SCU5 with integral modem) a device the size of a telephone which is only connected to the building's power supply via Intelligent Transponder Units (ITUs) placed in distribution boards. The SCU has a port for connection to a computer.

The Famco FMX series exit signs and emergency self contained luminaires are also connected only to the building's power supply.

The SCU has a POLL button and a liquid crystal display screen. When the POLL button is pressed momentarily the SCU polls all the emergency exit signs on the installation and either reports that all are ok or displays the numbers of failed lamps or faulty units on the screen.

At this stage a computer and printer can be connected and a report produced, showing the types, locations, lamp type and other stored relevant data and type of fault, if any.

A printed list can be produced of all faulty units with the fault details and given to a maintenance person. After the lamps are replaced or faults remedied a press of the POLL button confirms that the work was done correctly and the installation is in complete operational state. A printed record of this state can be provided.

The installation procedure of the MLC is even simpler than the standard MasterMinder system.

Famco MasterMinder/MLC emergency lights and signs are installed wherever they are required, and as stated above, connected to the power supply essential to operate lamps and charge the batteries.

At commissioning a hand held Famco Infra Red Transmitter (IRT) is used to number each sign or emergency luminaire unit, by pointing the IRT at the unit, and pressing the numbering button.

The unit selected lights up briefly, twice, to indicate that it has received its ID number.

In large installations it may be necessary to install two or more Famco Intelligent Transponder Units (ITUs) in all final distribution boards.

This is usually achieved very economically by using disused existing wires such as telephone, P.A, trunks or utilising a new figure 8 pair, dropped into the cable shaft.

On commissioning, or at any time prior to a test, the system can be commanded to execute a 'LEARN' routine. This results in the fully automatic selection of an optimum communication path between each emergency unit in the installation and the SCU.

The system can be checked at any time daily, weekly or monthly by pressing the POLL button. One obvious advantage of this arrangement is that the tester is present to see the immediate report.

A computer can also be used to perform regular polling and collect data for later viewing.

A computer is used for programming the

The units and the SCU have non volatile memories which will retain programs and data and unit ID up to 40 years!

After a test, data is presented giving the following information:

- Voltage at each unit at start of test.
- Voltage at each unit at end of test or when illumination ceases.
- Indicate each unit's float or boost charge state.
- Duration of light output if unit fails to achieve programmed test time.
- Report on each unit PASS or FAIL in achieving light output of programmed test time.

No other system, known to us, provides the comprehensive installation analysis nor does it as fast and as clearly as the Famco MasterMinder - standard or MLC system.

The features of the Famco MLC MasterMinder system include:

- MLC (Multiline Carrier) technology using existing wiring.
- Up to 4095 Famco FMX emergency luminaires or signs (units) can be controlled by an SCU on one network.
- Famco FMX emergency units can be added or removed in the system, at will.
- Full 16-bit CRC error checking for high reliability.
- RISC microcontroller in every fitting is used for highest reliability and noise immunity.
- Remote IR (infra-red) numbering
- Automatic network routing
- Central Unit (SCU4/SCU5) has on-board learning algorithms to automatically create routing table at commissioning.
- Amber LED on each fitting will flash if unit is faulty.
- ITUs allow "hopping" of signal through many mediums - eg redundant phone line to mains line).

Recommended Installation and Commissioning of MLC (Multi-Line Carrier) MasterMinder Monitoring System (Patent No: 695314)

Introduction

Like any system the MLC (Multi Line Carrier) must be installed to an established standard to ensure that it will fulfil its function.

We invite all installers to discuss the system requirements with us, before undertaking an installation.

Theory of operation

The MLC system utilises a 130kHz communications signal injected onto the mains cabling to communicate with the attached emergency luminaires.

Simple installations communicate between an SCU (Supervising Control Unit) directly to the emergency luminaires.

In complex installations ITUs (Intelligent Transponder Units) are added to facilitate communication. The SCU communicates with each ITU via a dedicated cable (see figure below). The ITUs utilise the signal injected onto the existing mains cabling to communicate with emergency luminaires. These fittings, each of which is uniquely numbered during commissioning, can be addressed individually, in groups, or as a total system from one or occasionally from several points. Each fitting, after being addressed, sends data back to the SCU via the mains cable and appropriate ITU.

Good design practice

Circuit isolation & communication

The emergency luminaires must be installed on dedicated circuits as required by good practice and AS/NZS2293. We enclose the relevant diagrammatic circuits and extracts to illustrate the code standards.

Note that there is a separate unswitched active, even for maintained luminaires that are permanently on (unswitched). This reduces the load on the unswitched active allowing for a larger number of emergency luminaires to be put on a single circuit, and also removes the risk of power factor correction capacitors adversely affecting data communication. This is the only way emergency luminaires can be manually tested without affecting

normal lighting and is a code requirement even with computer monitoring. The **neutral** on the dedicated emergency lighting circuit must not be shared with loads that produce excessive amounts of noise as this can interfere with data communications.

In new installations there would be no problem in wiring emergency luminaires on dedicated circuits. Existing installations are presumably wired the same way, ie. They have facilities to disconnect for testing and discharging emergency luminaires only by opening a dedicated circuit breaker/switch.

The MLC system has been designed to operate within the AS/NZS2293 established and recommended standards. In installations where the requirements of the standard are not met we offer a number of solutions to suit various situations.

Cable Reticulation and Connections

The Installer should install data cable to every distribution board on the site that will have emergency luminaires connected to it. The cable can be either radial from the SCU point or daisy chain from distribution board to distribution board, using new or existing redundant cable eg. phone cable, Figure '8'.

All emergency luminaires at a given distribution board should be connected to a dedicated circuit breaker(s) as shown on the diagram (Appendix B) and extract from AS/NZS2293 (Appendix A). It is preferable to place all emergency luminaires on a single phase and, where possible, on a single dedicated circuit at each final distribution board.

Each ITU must be connected as per the diagram in Appendix B.

On sites with very long distances between points eg. Separate buildings, or with more than 1000 emergency luminaires it may be necessary or practical to split the communication into more than one zone i.e. run it on more than one SCU, or have multiple testing points where a portable SCU and computer can be plugged in periodically for testing and diagnosis.

Scope of Works - Installation

The Installer is responsible for the following:

- Install the emergency luminaires as designed and agreed
- Install a 240V GPO at the SCU. Where a modern equipped SCU5 is required a dedicated telephone point must be provided.
- Install communication cable (or utilise existing redundant wiring) between the SCU and all switchboards supplying emergency luminaire circuits
- Where necessary install a number of GPOs and test points for multi point access
- Install ITUs as required (see above for installation instructions)..
- Provide a drawing showing the location of all emergency luminaires and ITUs
- Where necessary provide ladders or other means to gain safe access to emergency luminaires (also see below) to the commissioning person
- Provide ready access to all areas in which emergency luminaires are located. This includes access to relevant distribution boards ie. have key(s) or other means to have access to all areas where emergency luminaires, distribution boards, ITUs, SCU are installed, and accompany the commissioning person at all times
- Remove and reinstall emergency luminaires and ITUs if required
- Install additional ITUs if required
- Provide an assurance that the installation work is done correctly and is complete, to the commissioning person
- Conduct manual 2 hour test of all emergency and exit luminaires *unless commissioning takes place immediately after installation*
- Input data into the MasterMinder computer database if desired.

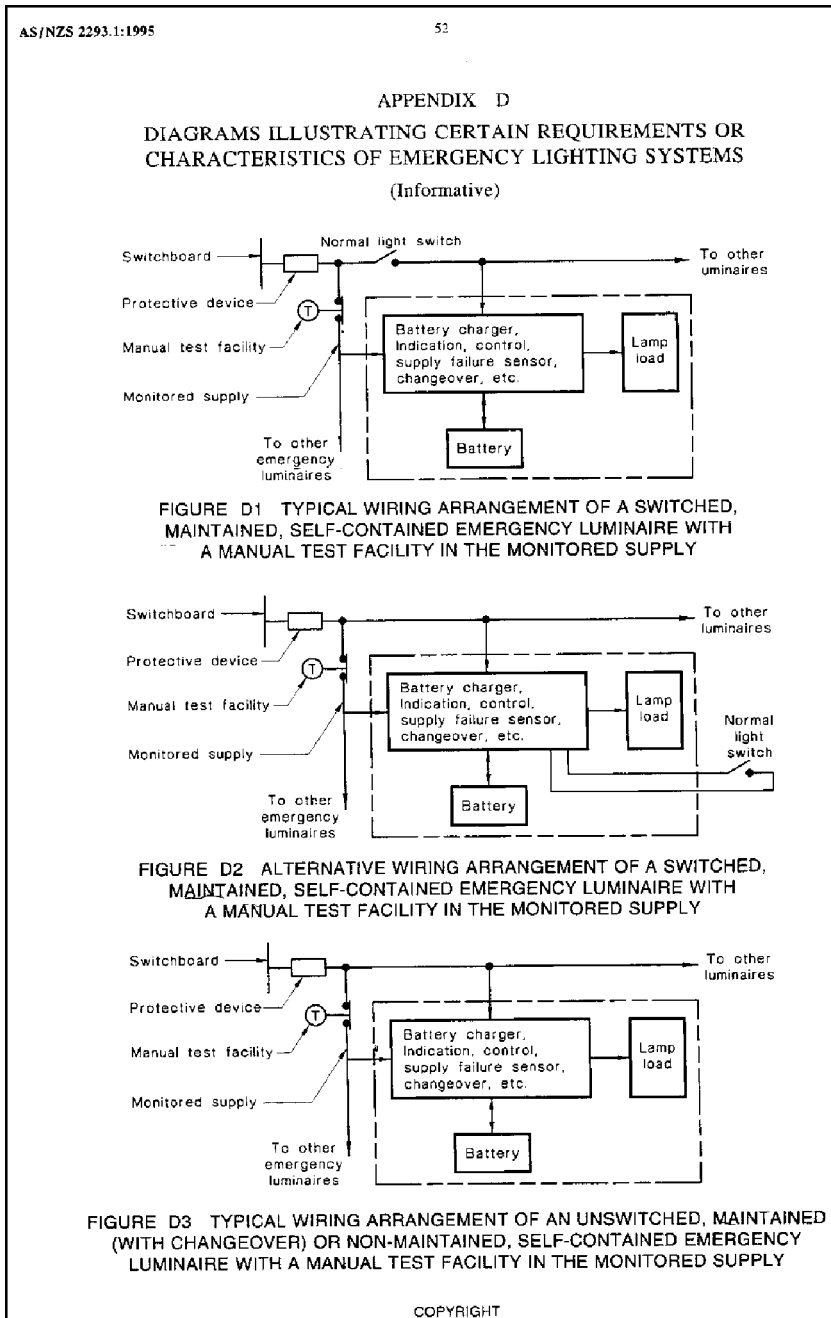
Commissioning

Antipodes LED will perform the commissioning tasks after receiving an assurance that the installation work is done correctly and an undertaking that if any additional work is required of Famco other than the commissioning outlined below it will be paid for by the organisation requiring the commissioning.

- The commissioning person, usually Antipodes LED or their trained representative numbers all the fittings, and, with the help of the installer ensures that all emergency luminaires are "found" on the installation (ie. the SCU communicates with them), Famco programs and performs a discharge test, collects data and gives copy of same to the Installer and/or owner and/or Consultant.
- Antipodes LED will carry out the work under normal conditions ie. mounting height of emergency luminaires reachable safely from a maximum 2.4m step ladder, during normal business hours after receiving adequate documentation and notice to arrange a starting time convenient to the Installer and Famco.
- Irrespective of the fault if any, even in a Famco fitting, Famco will not perform work above this height or in limited or difficult access situations nor pay any costs involved in accessing fittings so located.
- Famco will supply all replacement parts or fittings at no cost during the course of commissioning and the period of guarantee, provided they are not damaged or rendered defective by improper installation, use or procedure by others.
- A training session will be given at the time of commissioning. An operating manual and software will be provided.

Appendix A

Extracts from AS/NZS2293 - this has been applicable since 1979



Australian/New Zealand Standard AS/NZS2293 Section 4 Paragraph 4.2 states:

A requirement has been included for all emergency lighting systems to incorporate facilities for discharge testing which do not necessitate interruption of the supply to the normal lighting.

Also Section 4 Paragraph 4.4.1 states:

Automatic testing facilities:

Provision shall also be made for the manual initiation of a discharge test by any appropriate means.

Appendix B – ITU Installation

