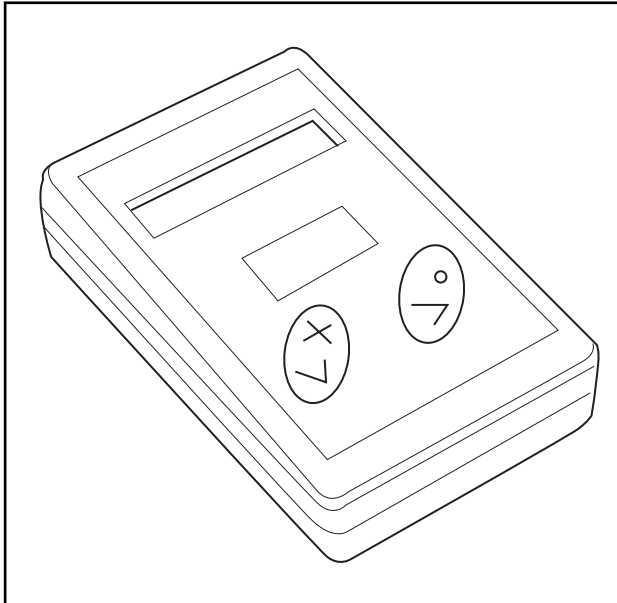


# Intellem Infra-Red



**Emergency Lighting Test System**

**User Manual**

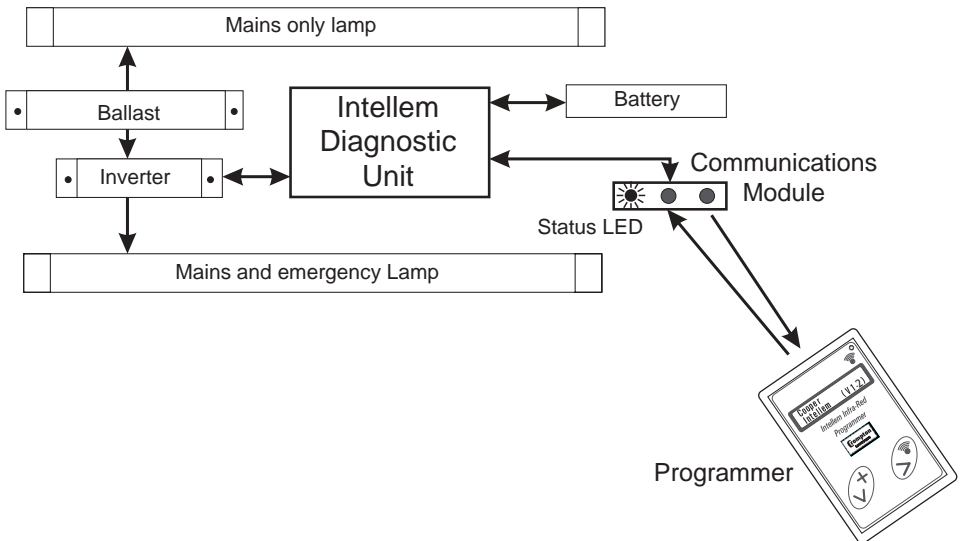
## Introduction

The **Cooper Intellem System** is designed to allow an emergency luminaire to monitor its battery status throughout its life and to conduct periodic checks on its operation by switching off the mains supply to simulate an emergency.

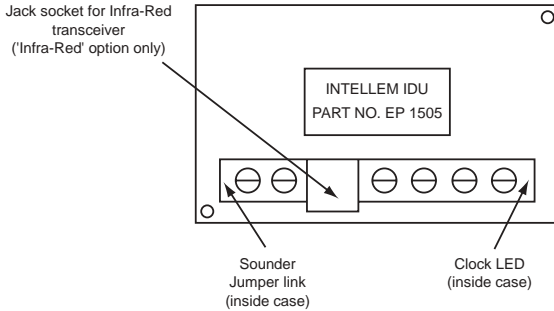
The '**Intellem Self-Check**' system uses a **diagnostic unit** incorporated into the luminaire and will provide basic functions, however with the addition of an infra-red transceiver module within the luminaire and a hand held programmer (Intellem Infra-Red), remote setting and checking of various parameters can be undertaken, increasing the flexibility of the system.

In either system, the current status of the emergency luminaire is indicated by a status LED on the outside of the fitting, attention being drawn to alarms by the LED flashing and by an audible indication every minute which can be disabled if required.

This manual outlines the operation of both the Self-Check diagnostic unit and the full Infra-Red system, it is recommended that Intellem Infra-Red users read and understand the concepts behind the Self-Check module, if details of stand alone operation are needed, these can be found in the supplementary instruction leaflet.



## Diagnostic Unit ( Intellem Self-Check )



The Intellem Diagnostic Unit contains circuitry to check battery voltage, battery charge current and operation of the lamp during emergency mode.

Battery voltage and battery charge current are monitored continuously during normal mains operation, and if either falls outside set values an alarm is indicated. Operation of the emergency lamp is checked whenever mains is absent and the luminaire is in emergency mode. If the lamp does not operate correctly, an alarm is indicated which continues when mains is restored, until corrective action is taken.

The Intellem simulates a mains failure on a regular basis by interrupting the unswitched LIVE line. A short **function test** lasts for 5 minutes and serves as a quick check that the lamp and inverter module are operational. A **duration test** lasts 1 or 3 hours and checks both the lamp circuit and the battery. These tests occur every 28 days and on a 12-test cycle. Tests 1-11 are 5-minute 'function' tests. Test 12 is a full 'duration' test.

If required, the sounder can be silenced by removing the link, for use in quiet areas, the LED will continue to show if a fault exists.

The stand alone Intellem Self-Check will test 28 days from switch on with a 12 hour offset. Intellem Infra-Red can program tests for any time of day and any day of the week up to 28 days in advance to suit user requirements, and offers additional features.

The unit contains a **24 hour clock** and a **days counter** which sequences from 1 to 28. The days referred to should not be confused with days of the month. Tests will always commence at the same time and on the same day of the week.

## Intellem Infra-Red System

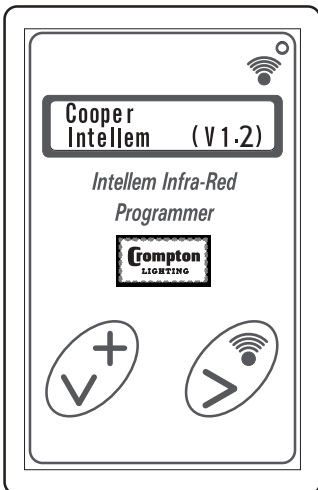
The Intellem Infra-Red system consists of the diagnostic module as used in the Intellem Self-Check system and the communication and indication unit which are located in the luminaire, and a separate hand-held programmer. This system allows the user to do the following -

- Initialise the Intellem system without physically accessing the luminaire.
- Read the operational status or fault condition of the luminaire.
- Set and read the self test module's clock & days counter.
- Set and read the time and day when the next test will occur.
- Read the test number and the time and day when last test was conducted.
- Temporarily silence or turn on the luminaire's warning sounder.
- Instigate function or endurance tests.
- Change the test sequence (weekly function tests etc.) - advanced settings

### The Programmer

The Programmer consists of a hand-held case with a two line alpha-numeric display and two push buttons. The infra-red transmitter and receiver are located on the top edge of the case and should be directed toward the luminaire as with a TV remote.

The left hand button is used to scroll down through the screens ( v ) and to increment numbers ( + ) on the display where applicable. The right hand button ( > ) is used to act on flashing prompts to move onto further screens or send commands and to step from one numeric field to the next . Either button may be used to turn on the unit or to exit from static screens.



An LED shows when the programmer is sending data or commands to the luminaire.

Inside the battery compartment, a DIP switch allows the user to select various options to tailor to more specific needs (See 'DIP Switch Settings') and a reset button is accessible to completely clear all data in the handset should that be required.

After more than 4 minutes of inactivity, the programmer will turn itself off, all settings being saved.

## Commissioning

Refer to the luminaire instruction leaflet for details of mains supply connections and the supplementary Intellem instruction leaflet for powering up procedure. After connection of the battery negative lead, the **clock LED** on the module should pulse at 1 second intervals indicating that the unit is operational. The **luminaire status LED** will initially show **reset alarm** (see 'Alarm / Status Indications'). The alarm signal will be terminated by sending either time or next test data to the luminaire -

**It is important therefore that the user fully programs the current and test time in each case.**

### Programming the system

Program the system in the following logical sequence.

#### 1) Set Current time in handset

If the clock display on the programmer is inaccurate, referring to 'Flowcharts / Navigating the Menus', set the correct time and day in the programmer. Choose a convenient day number using the 28-day calendar below, normally 1-7.

	Week 1	Week 2	Week 3	Week 4
Monday	1	8	15	22
Tuesday	2	9	16	23
Wednesday	3	10	17	24
Thursday	4	11	18	25
Friday	5	12	19	26
Saturday	6	13	20	27
Sunday	7	14	21	28

#### 2) Set testing regime in handset (optional)

The default testing sequence is to the European standard EN50172 **you are recommended to use this**, however, should a different regime be required, it should be set at this stage (see 'DIP Switch Settings' - extra functions). BS5266 is available as an option and custom test regimes may also be made up, but these should be used with caution. Please contact Cooper Lighting and Security if in doubt.

Once set up the programmer will retain its parameters allowing luminaires to be sequentially programmed.

### **3) Send time to luminaire**

Once you have set the time and day, transmit to the luminaire. If transmission is successful the luminaire will beep and the programmer will display an accepted message.

Optionally, receive time from luminaire. This is useful to check the above operation.

### **4) Set up and transmit next test data to luminaire**

Referring to 'Flowcharts/Navigating the Menus', set the "Next test" time and day. Choose the day number using the 28-day calendar above, with respect to the current day programmed into the handset. After exiting the set up screens, transmit the data to the luminaire.

Optionally, receive next test data from luminaire, to check the above operation.

Repeat steps 3 and 4 with each luminaire, after successful completion, the system is fully programmed to your requirements.

## **Interrogating tests and other functions**

### **Interrogating details of Last Test**

Select the appropriate screen and send an "AutoTest Last>" command to the luminaire.

Three pieces of information are returned.

- (i) Test time (that test ended)
- (ii) Test day
- (iii) Test number in sequence.

The test number allows you to work out the duration of the test, depending on the test regime. For example, using EN50172, test 3 was a 5-minute test, test 12 was a 3-hour test etc.

### **Starting a long duration test immediately**

Transmit a "ManTest Full>" command to the luminaire.

If the test is accepted by the luminaire, the luminaire will enter emergency mode for 3 hours (unless changed to 1 or 2 hours in a custom test regime) and then revert back to normal operation automatically.

If there has been a power-cut of 15 minutes or more within the last 24 hours, the luminaire will only allow a 5 minute test to be performed, to save the battery. This will be indicated on the programmer's display.

**Important:** No test will be allowed in these circumstances for safety reasons.

- (i) just powered up on battery
- (ii) mains failure
- (iii) already in auto test
- (iv) not charging alarm
- (v) low battery alarm

The status of the luminaire can be read using the programmer (see next section)

### **Starting a short function test immediately**

This function is useful as a quick test of emergency operation, particularly after a fault has been rectified.

Transmit a "ManTest Short>" command to the luminaire.

Keep the programmer pointing at the luminaire to receive confirmation. If the test is accepted by the luminaire, the luminaire will enter emergency mode for 10 seconds and then revert back to normal operation automatically. A useful bar-graph type countdown display on the programmer will show test progress.

**Important:** A short test will not be allowed in the following circumstances.

- (i) just powered up on battery
- (ii) mains failure
- (iii) not charging alarm
- (iv) low battery alarm

### **Changing the status of the Sounder**

The audible alarm may be silenced by the programmer on a temporary basis by sending a "Sounder Off>" command. After one week the sounder will reinstate automatically. If required the sounder can be restored earlier, using the programmers "Sounder On>" command.

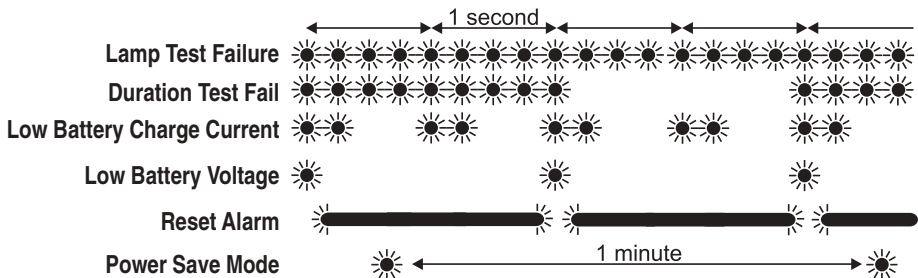
### **Reading the operating or fault status of the luminaire**

By using the "Read status>" function, detailed information regarding the current condition of the luminaire, details of a fault, and whether the sounder is turned on or off, can be downloaded. This function is described in detail in the next section.

## Alarm / Status Indications

The current condition of the luminaire is denoted by its status LED and sounder, 7 states are shown as in the following table.

STATUS	LUMINAIRE LED	SOUNDER
Mains on system OK	CONSTANT	OFF
Emergency operation	OFF	OFF
Lamp test failure	RAPID FLASHING (4 per s)	ON (each minute)
Duration test fail	RAPID FLASHING alternate 2 secs	ON (each minute)
Low charge current	DOUBLE FLASH (2 flashes then gap)	ON (each minute)
Low battery voltage	SINGLE FLASH (every 2 s)	ON (each minute)
Reset Alarm	SHORT INTERRUPTION every 2 secs	OFF
Power Save Mode	SINGLE FLASH ( every minute )	SHORT BIP (each min.) (OFF before first mains power up)



By selecting “Read status>” on the handset, the user is prompted in more detail than with the LED only, as to the current operating mode of the luminaire. The first line of the display shows the status of the luminaire and the second, whether the sounder has been disabled or otherwise.

STATUS	PROGRAMMER DISPLAY	
Battery first connected	No mains wired	Sounder disabled / enabled
Mains on - system OK	Normal Operation	Sounder disabled ...
Mains off - emergency operation	Supply Failed	Sounder disabled ...
Manual Test in operation	Manual test	Sounder disabled ...
Automatic Test running	Programmed test	Sounder disabled ...
Lamp Test failure	Lamp/invert.fail	Sounder disabled ...
Duraion test fail	Short battery life	Sounder disabled ...
Low charge current	Not charging	Sounder disabled ...
Low battery voltage	Batt.low voltage	Sounder disabled ...
Reset Alarm	Mem/time reset	Sounder disabled ...
Power Save Mode	No display - Communications not possible	

## Troubleshooting

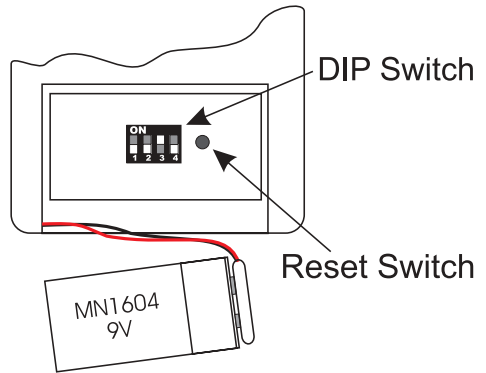
Battery first connected -	The initial state of the Intellem luminaire after the battery has been connected, but before mains power has been applied.
Lamp test failure -	Detected during any period of emergency operation. The inverter is not driving the lamp correctly. This could be caused by a faulty lamp, battery or inverter or bad connections between them (i.e. lamp base).
Duration test fail -	The luminaire has not completed a full duration test. It is most likely that the battery pack no longer has sufficient capacity.
Low charge current -	Detected at any time during mains operation. The battery is not being charged correctly. This could be caused by a faulty battery, faulty charge circuitry within the inverter module or a disconnected battery lead.
Low battery voltage -	Detected at any time during mains operation. The battery voltage has dropped below a prescribed limit dependant on the number of cells. The battery is failing to hold charge or is receiving insufficient charge (charge current failure will take precedence).
Reset alarm -	The diagnostic unit has no programmed data. Generally this will occur when the unit is powered for the first time to warn the user to program the system. This could also show that either the battery has been disconnected or that a prolonged (> 7 days) mains power loss has occurred and the battery is exhausted.
Power Save Mode -	The inverter has shut down because of operation beyond rated duration. Memory contents are being retained and <b>no infra-red communications are possible.</b>

### To Cancel an Alarm Signal

Once corrective action has been taken, 'battery charge current' and 'voltage' alarms will reset automatically. 'Lamp test failure' alarm will be reset after a successful short manual test has been undertaken to check operation of the system. A duration test failure can only be cancelled by a successful full (3 hour) test. Applying mains to the luminaire changes the 'Battery first connected' indication to a 'Reset alarm' signal, which is in turn cancelled by programming the luminaire. Restoration of mains cancels 'power save' indication.

## DIP Switch settings

Access to the DIP switch is by removing the battery compartment cover and lifting out the battery (there is no need to disconnect the battery). Switches can be moved using a small screwdriver or similar. Take care not to inadvertently press the reset switch as this clears all data (settings, clock etc.).



**Switch 1 off, Switch 2 off**  
**Switch 1 on, Switch 2 off**  
**Switch 1 off, Switch 2 on**  
**Switch 1 on, Switch 2 on**  
**Switch 3, 4**

Standard Functions  
Extra functions enabled  
Read only mode operation  
Maintenance mode operation  
For expansion - not used at present

### Reset Switch

Press to clear memory of programmer. All default values will be restored and the clock cleared to 00:00 etc.

### Extra Functions - Switch 1 on, switch 2 off

Turning on this mode gives the user access to further screens which allow different testing regimes from the normal EN 50172 (5 minute test each 28 days and a 3 hour test each 12th test). The screens are accessed from Next Test Set and by answering 'Y' to the question 'Change test sequence'. At the 'Standard / Custom' screen, 'Standard' allows either EN50172 or BS5266 formats to be selected. By selecting 'Custom', the options are to execute a 5 min. function test every 7, 14 or 28 days, to use 1,2 or 3 hours as the duration test period and to perform this every 6 or 12 'months'. The test number can also be changed to bring forward the advent of a duration test. If the extra functions are enabled, extra screens will appear to prompt the user of the testing regime programmed into the luminaire or handset as appropriate.

Once the parameters have been changed, the switch can be reset to give normal operation, the handset remembering the settings, allowing continued operation with new user defaults for specific applications, without the option of changing them, in order to speed up the use of the programmer. The new test regime screens will continue to be displayed on switching on the handset (unless restored to EN50172) and when downloading from a luminaire which has different settings programmed.

## **Read only operation - Switch 1 off, switch 2 on**

Once all programming has been completed, read only mode can be selected and the handset safely given to anyone without any possibility of test data being corrupted. If read only mode is enabled the programmer can only interrogate the luminaire and not perform any programming operations. Selecting 'Time', 'Read Status', automatic test 'Last' and 'Next' will directly download the appropriate information from the luminaire. The test sequence screen will always be shown when downloading 'Next automatic test'.

## **Maintenance Mode - Switch 1 on, switch 2 on**

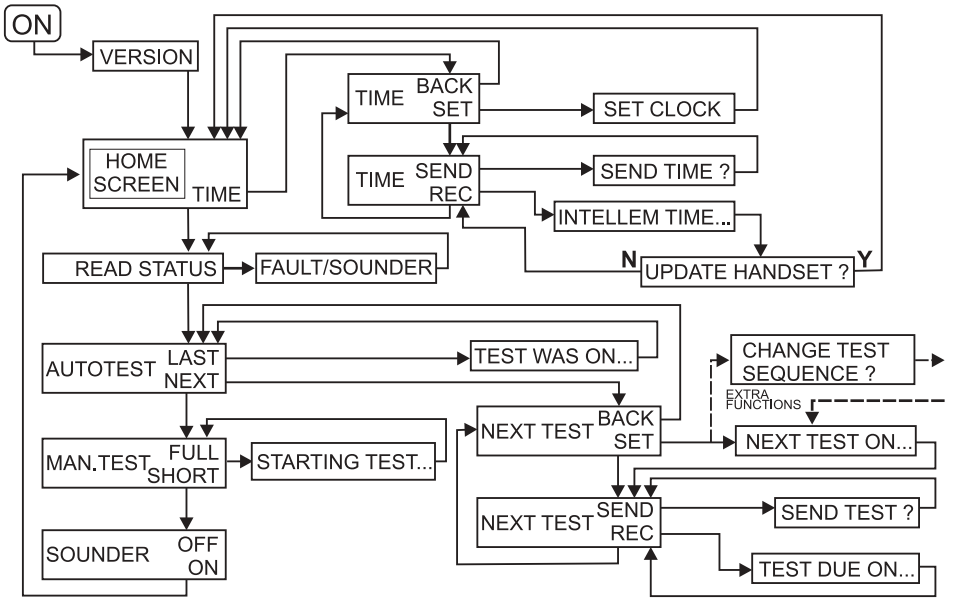
Again, after programming, 'Maintenance Mode' can be selected, this being ideal to pass to an operator to check which fault has occurred in a luminaire by using "Read Status". The option to silence (for 1 week) or re-instate the sounder is also available in this mode.

## **Flowcharts / Navigating the menus**

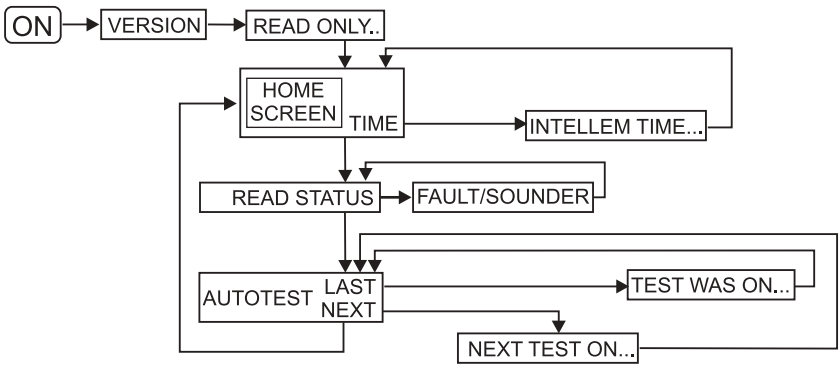
The Intellem Infra-Red programmer has over 30 screens which are accessed using two buttons. The left hand key is used to scroll down to the next display or to increment the value currently being edited. The right hand button is used to select the screen or operation shown, or to step through values on some screens. Where a 'program luminaire' operation is accessed, the right hand button is effectively a 'send' key.

Either key can be used to switch on the programmer or to exit from static displays.

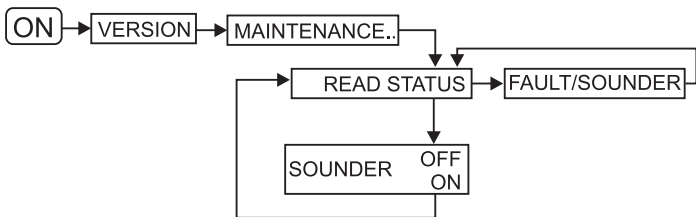
The following page shows the relationship between the screens for each of the operating modes.



**Normal Operation**



**Read Only Mode**



**Maintenance Mode**

## **Features - Self Check**

- Fault Indication is via an indicator LED which replaces the charge LED on a normal emergency luminaire, constant or off shows normal operation with or without mains. Fault states are all indicated with a noticeable flashing of the LED, the flash rate shows the type of fault (battery charge current, battery voltage, lamp and total power failure) or mode of operation. A sounder warns every minute if a fault state exists to attract attention. The sounder can be disabled if required by removing the on-board link.
- Battery voltage and charge current are monitored continuously during mains operation. Lamp, inverter and battery condition are checked during emergency operation.
- Emergency operation is simulated for 5 minutes every 28 days to test functionality. A battery duration test of 3 hours occurs every 12th test.
- 28 day cycles are used so that tests always occur on same day of the week.
- Luminaire can be upgraded to Infra-Red system with the addition of a communications module.

## **Features for Infra-Red above Self-Check**

- No need to physically access the luminaire to commission - uses hand held programmer with 2 line LCD and menu driven selection of operations for ease of use. Programmer has 4 levels of operation - read only, maintenance, basic and advanced.
- Luminaire status can be read and displayed by the programmer. May also program luminaire with time & day and offsets of next test. Can read luminaire time & day, last test number, day and time, next due test data and testing regime. Luminaire sounder may be silenced or re-instated by the programmer. Full duration tests are able to be instigated manually. 10 second tests can be started for spot checks accompanied by a countdown display on programmer.
- Advanced operation allows different testing regimes - function test each 7, 14 or 28 days, duration test of 1, 2 or 3 hours each 6 or 12 months. Test number can be changed to bring forward duration test.
- Uses an unobtrusive Infra-Red transceiver module contained in the luminaire or an external ceiling mounted unit.

## **Safety Features - Self-Check**

Intellem has built in intelligence to help preserve the life of lamps and battery and ensure simple, reliable testing. The features continue into the programmer to reduce the danger of improper programming.

- Following more than 15 minutes of emergency operation, if a scheduled test is due to occur within the next 24 hours, it will be postponed for one day. Future tests will be as scheduled. Manually initiated duration tests are reduced to 5 minutes in the same circumstances.
- For emergency operation beyond rated duration, when the emergency lighting module cuts off to save the battery, the Intellem Diagnostic Unit will go into power-save mode, reducing LED and sounder usage (and cutting infra-red data transfer). The Intellem is capable of keeping time and programmed data for at least 7 days in this mode. Any alarm signals which have occurred will continue once power is restored.
- If the Intellem does completely lose power, e.g. long power-cut or battery is disconnected, once power is restored a memory/time alarm will be indicated, prompting the user to reprogram.

## **Additional Safety Features - Infra-Red**

- ‘Handshaking’ between the luminaire and the handset is used to confirm to the user that data has been successfully transferred. Communications errors will be indicated on the LCD.
- The programmer can be used in ‘read only’ mode to avoid inadvertent changes allowing less skilled persons to perform checks on the functionality of lighting systems. Maintenance mode can be selected on the programmer, giving limited functionality for fault diagnostics. (see DIP switch settings)
- The user is prompted before sending data or updating handset time to avoid inadvertent programming.
- Any non-standard test regimes programmed into the luminaire or handset are reported by the programmer even if extra functions are disabled.
- The sounder automatically reinstates after 1 week (when turned off using programmer) to remind the user of a luminaire fault. The LED always indicates the condition of the luminaire.
- DIP switches and reset switch are within the programmer’s battery compartment to avoid inadvertent operation.

## Programmer Specification

<b>Size</b>	90mm (W) X 145mm (L) X 43mm (H) maximum.
<b>Weight</b>	approx. 235g (inc. battery)
<b>Housing</b>	ABS
<b>Power Source</b>	Alkaline Manganese 9V MN1604 (PP3 size)
<b>Current Consumption</b>	approx. 2.5mA when operational (not transmitting) approx. 30 $\mu$ A when sleeping.
<b>Estimated battery life</b>	over 1 year with normal use.
<b>Reserve supply</b>	over 1 hour when sleeping up to 30 seconds when operational
<b>Low battery voltage</b>	approx. 8V (programmer continues to operate to 6.5V)
<b>Display</b>	High contrast 2 line 16 character alphanumeric display.
<b>Microprocessor</b>	8K CMOS operating at 4.0MHz
<b>Real Time Clock</b>	Accurate to approx. 2 seconds per day
<b>Infra-Red range</b>	Approximately 5m

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