

MORLEY



IAS

FIRE SYSTEMS

ZXr-A
ZXr-P

Document No. 996-144 Issue 02

**operation &
installation
manual**

Table of Contents

1	INTRODUCTION	3
1.1	NOTICE	3
1.2	WARNINGS AND CAUTIONS	3
1.3	NATIONAL APPROVALS	3
2	DESCRIPTION	4
3	INSTALLATION	4
3.1	MOUNTING THE REPEATER TO THE WALL	5
3.1.1	<i>Using the Bezel Kit</i>	5
3.1.2	<i>Direct Mounting</i>	6
3.2	FITTING THE LABEL INSERTS	6
3.3	INSTALLATION WIRING	7
3.3.1	<i>DC Power</i>	7
3.3.2	<i>RS485 Communications</i>	8
3.4	ADDRESS SETTING	9
3.5	COMMISSIONING	10
3.6	PRELIMINARY CHECKS	10
3.7	POWERING THE REPEATER	10
3.8	CONTRAST ADJUSTMENT	10
4	OPERATION AND CONTROLS	11
4.1	LIQUID CRYSTAL DISPLAY	11
4.2	LED INDICATORS	11
4.3	CONTROL PUSHBUTTONS AND KEY SWITCH	12
4.3.1	<i>Test Key (ZXr-A Only)</i>	12
4.4	BUZZER	13
4.5	SPECIAL LCD MESSAGES	13
5	SPECIFICATIONS	14

Table of Figures

FIGURE 1 - BACK BOX FIXING AND APERTURE DIMENSIONS	5
FIGURE 2 - EARTH CONNECTIONS	5
FIGURE 3 - REPEATER ENCLOSURE FIXING DIMENSIONS	6
FIGURE 4 - LABEL INSERT LOCATIONS	6
FIGURE 5 - EXTERNAL WIRING TERMINATION POINTS	7
FIGURE 6 - SAFETY EARTH TERMINATION POINT	7
FIGURE 7 - RS485 RE-LEGEND LABEL POSITION	8
FIGURE 8 - TYPICAL RS485 PERIPHERAL LINK ARRANGEMENT	8
FIGURE 9 - TERMINATION JUMPER POSITIONS	8
FIGURE 10 - CONTRAST ADJUST BUTTON	10

Table of Tables

TABLE 1 - ADDRESS SWITCH SETTINGS	9
TABLE 2 - LED FUNCTIONS	11
TABLE 3 - CONTROL KEY FUNCTIONS	12
TABLE 4 - ZXr-A / ZXr-P REPEATERS SPECIFICATIONS	14

1 Introduction

1.1 Notice

- The material and instructions covered in this manual have been carefully checked for accuracy and are presumed to be correct. However, the manufacturer assumes no responsibility for inaccuracies and reserves the right to modify and revise this document without notice.
- These instructions cover the operation and installation of the ZXR-A / ZXR-P Repeaters. Refer to the Fire Alarm Control Panel (FACP) Manuals for instructions on powering up, operating and programming the system. ZXR-A / ZXR-P Repeaters can be used on systems installed with ZXR4B / ZXR5B repeaters and there are no known compatibility issues.

1.2 Warnings and Cautions



These instructions contain procedures to follow in order to avoid injury and damage to equipment. It is assumed that the user of this manual has been suitably trained and is familiar with the relevant regulations.



All equipment is to be operated in accordance with the appropriate standards applicable



This panel is CE Marked to show that it conforms to the requirements of the following European Community Directives:

- Electromagnetic Compatibility Directive 89/336/EEC (and the amending directive 92/23/EEC)
- Low Voltage Directive 73/23/EEC



- The ZXR-A / ZXR-P Repeaters have been designed to comply with the requirements of EN54-2:1997, when used as a secondary display.



EN54-2 12.5

Integrity of transmission paths:

The peripheral link does not provide the required transmission path integrity.

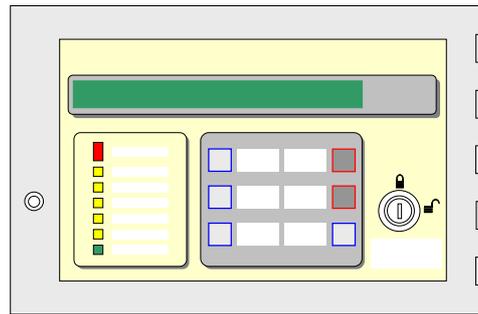
- The ZXR-A / ZXR-P Repeaters are connected to the FACP via the "Peripheral Loop" 2-wire RS485 communications circuit.
- Refer to the FACP installation manual for further information and for recommended cables.

1.3 National Approvals

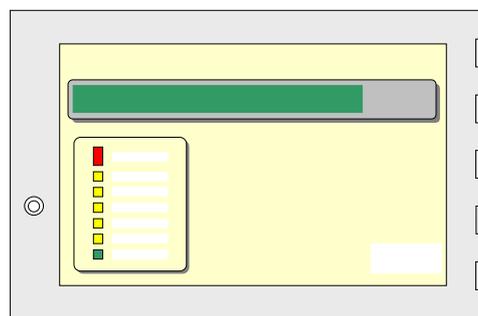
This equipment must be installed and operated in accordance with these instructions and the appropriate national, regional and local regulations specific to the country and location of the installation. Consult with the appropriate Authority Having Jurisdiction (AHJ) for confirmation of the requirements.

2 Description

- The Remote Repeater provides an extension to the operation of the Fire Alarm Control Panel (FACP). Both types of Repeater show (repeat) the operational state of the FACP using the 2x40 LCD and the LED indicators.
- The ZXr-P Passive Repeater will only show (repeat) the operational state of the FACP.
- The ZXr-A Active Repeater will show (repeat) the operational state of the FACP and can control the FACP using the SOUND ALARMS, SILENCE / RESOUND, MUTE BUZZER, ACCEPT and SYSTEM RESET functions.
- The Repeaters are connected to the FACP via the Peripheral Bus RS485 data link. The FACP supervises the ZXr-A Active Repeater. A Fault will be indicated, at the FACP, if communications is lost with the Repeater.
- The ZXr-A / ZXr-P Repeaters are compatible with the ZX1e, ZX2e, ZX5e and older ZX Range of Fire Alarm Control Panels¹.
- An optional Bezel Kit, containing back box and bezel, is available for pre-installation (P/N 002-600-002).
- The ZXr-A has in-built self-test functions that can be invoked using the buttons. The LCD contrast can be adjusted on both repeaters.



ZXr-A (Active Repeater)



ZXr-P (Passive Repeater)

3 Installation



Ensure that the operating ambient temperature is in the recommended range +5°C to +35°C and that the relative humidity is between 5% and 95%. DO NOT locate the repeater where it may be exposed to high levels of moisture, vibration or shock.



This equipment contains transient protection devices. Although no system is completely immune to lightning transients and interference, for these devices to function correctly, and to reduce susceptibility, this equipment MUST be earthed correctly. As with all solid-state devices, this system may operate erratically or can be damaged if subjected to lightning induced transients. The use of overhead or outside aerial wiring is not recommended due to the increased susceptibility of nearby lightning strikes.

- The installation process consists of 4 steps, as follows:
 1. Mount the Bezel Kit (if required) OR fix the enclosure to the wall (if Bezel Kit is not required)
 2. Fit the label inserts
 3. Install and connect the wiring and set the repeater's address
 4. Perform the commissioning checks



Before attempting to install the ZXr repeater, remove it from the packaging and inspect for any damage that may have occurred during transit. In the unlikely event that damage has occurred, DO NOT install the repeater but return it to the supplier using the original packaging.

¹ ZX Series comprises ZX1e, ZX2e, ZX5e, ZX1, ZXa, ZXe and ZXMi-EN. Does not include ZX50.

3.1 Mounting the Repeater to the Wall

- The ZXr repeater should be wall mounted in a position that allows clear visibility of displays and easy access to operating controls. The height above floor level should be chosen such that the LCD is just above normal eye level (approximately 1.5 metres).
- DO NOT site the ZXr repeater where there would be restricted access to the internal equipment and cabling / wiring connections.

3.1.1 Using the Bezel Kit

- The Bezel Kit is supplied with a dedicated back box that has three fixing holes on the rear wall and two fixing holes on each side. This procedure covers the use of the rear fixing holes but can be applied to the side fixings.
- Make a recess in the wall large enough for the back box to be inserted easily and without unnecessary force. Allow for space required for cable entry into the back box. With the bezel still attached to the back box, offer the assembly to the recess to check for correct depth and clearance. Repeat this process until the correct depth and clearance have been achieved.
- Support the bezel / back box assembly in the desired position in the recess and mark the three screw fixing positions (X) as shown opposite. Remove the assembly from the recess. Using an appropriate sized drill bit, drill and plug the three holes to take up to No. 8 (4mm) wood screws. Alternatively, use the side fixing holes (Y).

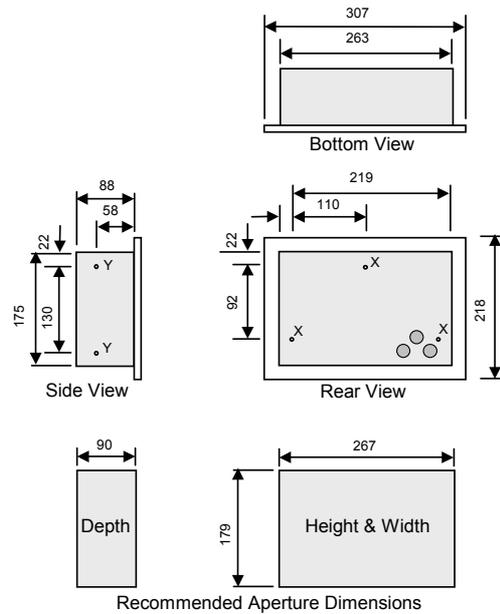


Figure 1 - Back Box Fixing and Aperture Dimensions

- Prepare all required knockouts and fit cable glands as required (Refer to Wiring Installation Section).

! To avoid distortion of the back box when preparing knockouts, place the appropriate back box face on a supporting surface (e.g. work bench).

- Orientate the bezel / back box assembly correctly, off it to the recess, then feed the cables through the glands and take up any excess slack. Secure the assembly in position using appropriate sized screws – do not use countersunk-headed screws. To avoid distorting the back box, do not over tighten.
- Prepare the repeater for fitting by removing the appropriate knockouts as required. Insert one of the supplied cable grommets into the upper knockout on the rear wall of the repeater (this knockout is required / used for an earth connection).
- Correctly orientate the repeater, hold the door open and off the repeater to the installed bezel / back box assembly. Feed all cables through the prepared knockouts and full insert the repeater into the bezel / back box aperture. Use the four M4 SEM screws supplied in the kit to secure the repeater to the assembly (for location of the repeater mounting holes, refer to the Direct Mounting instructions below).
- Connect the free end of the back box earth lead to the earth connector provided on the inside of the repeater enclosure (top left corner). Use a suitably sized cross-headed screwdriver to tighten at the earth point. Ensure good connection is made.

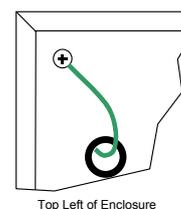


Figure 2 - Earth Connections

3.1.2 Direct Mounting



To ensure that the repeater electronics remain clean and undamaged, it is recommended that the front door of the enclosure be covered before the enclosure is fixed to the wall. Keep the cover in place until the repeater is ready for commissioning.



To prevent distortion, the repeater enclosure **MUST** be mounted on a surface that is as flat as possible. If the wall is not flat use appropriate packing pieces to level it up.

- The drawings opposite show the enclosure fixing dimensions in millimetres. Fixing holes are 5mm in diameter.
- Mark the position of the fixing holes. Using an appropriate sized drill bit, drill and plug three holes in the mounting surface.
- Prepare the knockouts required for cable access.
- Using three 5mm screws (do not use countersunk headed screws), fix the enclosure to the mounting surface.

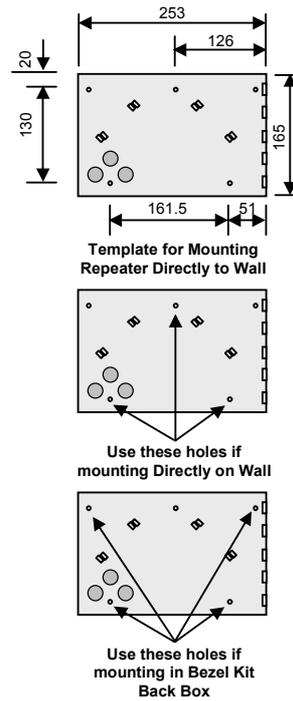


Figure 3 - Repeater Enclosure Fixing Dimensions

3.2 Fitting the Label Inserts



Disconnect ALL power and open the repeater door.



The repeater is supplied with legends in one or more languages. Select the appropriate language set.

- At position A (see opposite), insert the LED legends label. Fold the perforated line (the fold rests against the side of the door). Ensure correct orientation.
- At position B, insert the push button legends label. Fold the perforated line (the fold rests against the side of the door). Ensure correct orientation. This label is not used on the ZXr-P.
- At position C, insert the MORLEY-IAS logo legend label. Ensure correct orientation.

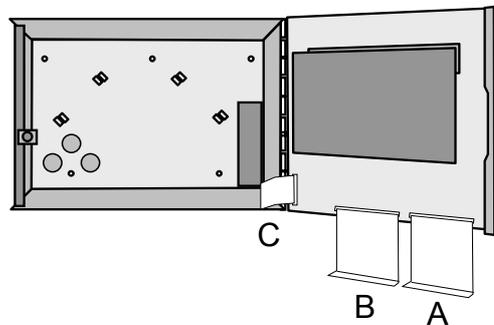


Figure 4 – Label Insert Locations

3.3 Installation Wiring



For further information on recommended cable types, refer to the relevant FACP Installation Manual.

3.3.1 DC Power



Only terminate the repeater power cables at the FACP or external source after ALL pre-commissioning checks have been performed. Only connect power cables when the system power is OFF.

- The ZXr-A / ZXr-P Repeaters must be supplied with DC Power from an approved and compatible regulated 24-Volt DC Power Supply, suitable for Fire Protection use.
- If dc power is supplied from the FACP, do not exceed the maximum AUX current rating or the battery standby conditions in quiescent or alarm conditions (refer to FACP specifications).
- Connect the DC Power to the 28V IN (18-32V dc) and 0V IN terminals, from the previous repeater, peripheral, FACP or external source.
- If required the DC Power Supply can be daisy chained on to the next unit on the loop. Connect 28V OUT and 0V OUT to next repeater or peripheral. Ensure that the correct size of cable is used to maintain the required DC Supply Voltage at the furthest unit
- DO NOT connect any wires to the POWER FAIL and 0V terminals.

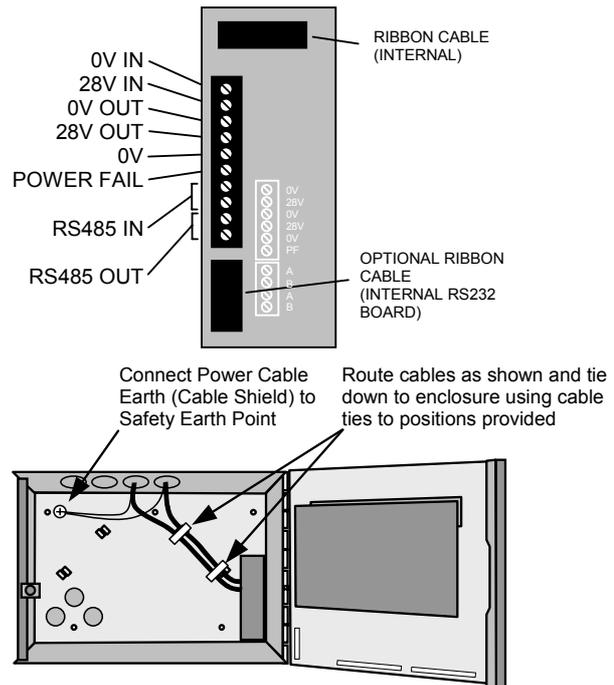


Figure 5 – External Wiring Termination Points



The terminal designations are clearly marked on the Connection Board.



The enclosure **MUST** be connected to a safety earth.

- Connect the safety earth wire to the safety earth point. This is clearly marked on the inside top left of the enclosure rear wall (see diagram opposite).

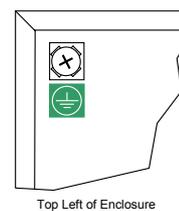


Figure 6 – Safety Earth Termination Point



Take care not to inadvertently connect the 'A' & 'B' RS485 terminals to the DC Power Supply.

Otherwise, damage may occur to the RS485 input of the Repeater and / or to RS485 Interface Circuit in the FACP or other unit.

3.3.2 RS485 Communications



Before commencing installation of the RS485 communications wiring, check to which type of panel the repeater is to be connected.

If the repeater is to be connected to a ZX² Series FACP, peel off and affix the supplied re-legend label over the text on the Termination PCB (see opposite).

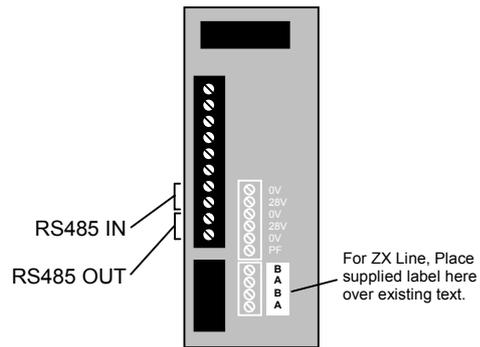


Figure 7 – RS485 Re-legend label Position

- Connect the RS485 serial communications wires from the FACP or previous repeater / peripheral to the RS485 IN (A and B) terminals.
- If required, continue to wire the remainder of the peripheral link by connecting the outgoing cable to the RS485 OUT (A and B) terminals.

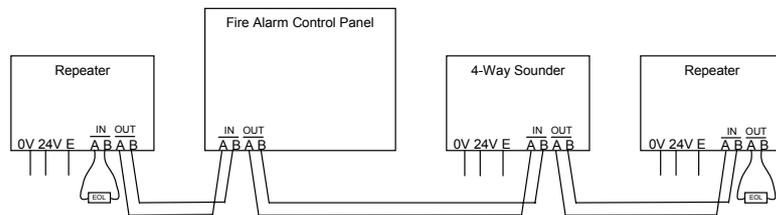


Figure 8 – Typical RS485 Peripheral Link Arrangement

- The maximum permitted length of the peripheral link is 1.2km (4000') – for further information, refer to the FACP Installation Manual.
- If the repeater is at the end of the line, set the Termination Jumpers on the repeater chassis assembly PCB to TERM ON position (JP2/4/6).
- If the repeater is not at the end of the line, set the Termination Jumpers to TERM OFF position (JP1/3/5).
- Setting the jumpers to TERM ON effectively places an EOL resistor as shown in Figure 8. DO NOT use the 150ohm EOL resistors supplied with the FACP RS485 card.

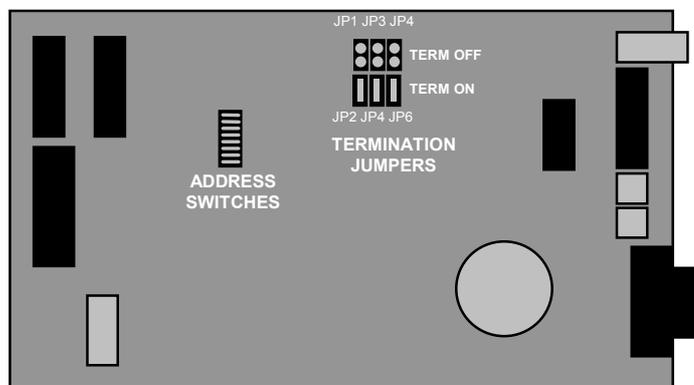


Figure 9 – Termination Jumper Positions



ALL external wiring must be screened and terminated, using suitable plastic glands, to satisfy local wiring codes. Route the cables alongside the DC Power cables and tie down to the back box using cable ties to the positions provided (refer to figure 5).

DO NOT connect the RS485 screen / drain wire to the safety earth point directly. The screen should only be connected to earth at one point – connect the other end of the screen to earth via a 2.2uF (non-polarised) capacitor. Refer to the FACP Installation manual for further details.

² ZX Series comprises ZX1e, ZX2e, ZX5e, ZX1, ZXa, ZXe and ZXMi-EN. Does not include ZX50.

3.4 Address Setting

- Set the repeater address in binary using the address switch on the repeater chassis assembly PCB. (See Figure 9 above).
- The address can be set in the range 1 – 126.
- It is not necessary to set an address for the ZXr-P (passive) repeater. The address can be set to 0 (all switch positions OFF). In this mode, the passive repeater will listen to the RS485 communications and will update its Liquid Crystal Display and LED with the appropriate information. However, if the repeater becomes disconnected from the RS485 link, the FACP will not report a fault condition.
- To report a fault condition at the FACP, in the event that a passive repeater becomes disconnected, set the passive repeater to an address in the range 1 – 126.
- Refer to Table 1 for address positions.
- When commissioned, use the panel 'Auto-Learn' function to learn / register the devices installed on the peripheral loop.

ADDRESS	SWITCH POSITION							
	SW1:1	SW1:2	SW1:3	SW1:4	SW1:5	SW1:6	SW1:7	SW1:8
1	ON	OFF						
2	OFF	ON	OFF	OFF	OFF	OFF	OFF	OFF
3	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF
4	OFF	OFF	ON	OFF	OFF	OFF	OFF	OFF
5	ON	OFF	ON	OFF	OFF	OFF	OFF	OFF
6	OFF	ON	ON	OFF	OFF	OFF	OFF	OFF
7	ON	ON	ON	OFF	OFF	OFF	OFF	OFF
8	OFF	OFF	OFF	ON	OFF	OFF	OFF	OFF
9	ON	OFF	OFF	ON	OFF	OFF	OFF	OFF
10	OFF	ON	OFF	ON	OFF	OFF	OFF	OFF
11	ON	ON	OFF	ON	OFF	OFF	OFF	OFF
12	OFF	OFF	ON	ON	OFF	OFF	OFF	OFF
13	ON	OFF	ON	ON	OFF	OFF	OFF	OFF
14	OFF	ON	ON	ON	OFF	OFF	OFF	OFF
15	ON	ON	ON	ON	OFF	OFF	OFF	OFF
16	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF
Etc.								
126	OFF	ON	ON	ON	ON	ON	ON	OFF



ON OFF

Table 1 - Address Switch Settings

3.5 Commissioning

3.6 Preliminary Checks

- Carry out the following preliminary checks for EVERY repeater being commissioned prior to power up the system.
 1. Check that all cables brought into the repeater have been terminated correctly. All power and signal cabling and wiring must conform to the appropriate local regulation.
 2. Check that the address has been set correctly.

3.7 Powering the Repeater

- Power up the FACP and power up any Repeater that uses a local independent power supply.
- Check that the LCD shows the “System Normal” message. Adjust the contrast (see below) if required.
- To power down the Repeater, power down the FACP (including battery disconnection) and then power down any repeaters that use a local independent power supply. The repeater can be powered down first, but the FACP will then report a fault condition.

3.8 Contrast Adjustment

- The LCD contrast can be adjusted electronically to compensate for temperature and height.
- Open the enclosure door and then press and hold the contrast adjust pushbutton on the chassis assembly PCB (see opposite).
- Whilst the button is held down, the display will cycle through 11 pre-set contrast levels, numbered -5 to +5 (see sample LCD display below).
- Release the contrast adjust button when the desired contrast level is on the display. The repeater saves this setting in non-volatile memory so that it will be remembered even when power is removed.
- ZXr-P Only: When the button is released, the repeater will automatically enter a 30 second self test to check the LCD and LED Indicators.

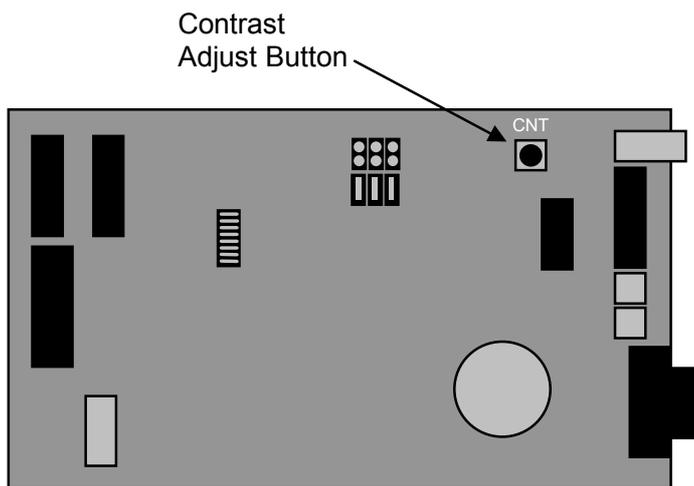
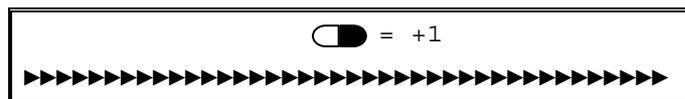


Figure 10 – Contrast Adjust Button



4 Operation and Controls

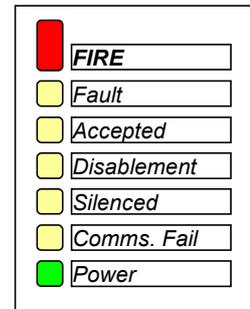
- The ZXr-A / ZXr-P Repeaters are equipped with a backlit 2x40 Liquid Crystal Display and LED Indicators to show the status of the Fire Alarm Control Panel (FACP) and the installation.
- In addition, the ZXr-A is equipped with a key operated switch and five CONTROL keys and a TEST key.
- The operation of the Repeater is as follows:

4.1 Liquid Crystal Display

- The operation of the liquid crystal display is identical to the display on the FACP.
- Under normal conditions it will simply show the time and date, together with a message to show that the detectors are working normally. The backlight is normally off. It will turn on for 30 seconds whenever a key is pressed. It will always turn on during a fire alarm condition.
- If any fault or fire alarm conditions occur, these will be displayed on the display. If several faults or fires have occurred, then these will be scrolled on the display.
- Refer to the FACP Manuals for information on the messages that are displayed.

4.2 LED Indicators

- The LED indicators (except DC Power) will be illuminated in response to signals from the FACP.
- The LED Indicators are a sub-set of the indicators on the FACP. The following table indicates the function of each LED indicator. Refer to the FACP Manuals for further information on the function and operation of each LED indicator and on the operation of the system.

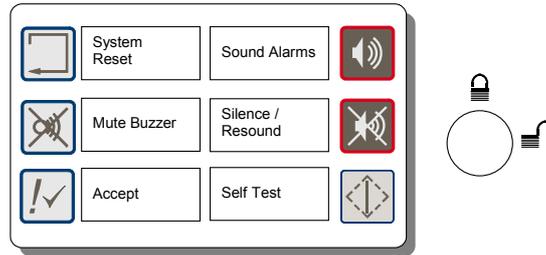


Indicator	Colour	Function
FIRE	Red	The panel has detected a fire alarm condition, or the 'Sound Alarms' key has been pressed.
Fault	Yellow	The panel has detected a fault.
Accepted	Yellow	A fault or fire alarm has been acknowledged and the internal buzzer silenced. <i>[After pressing the 'Mute Buzzer' or 'Accept' keys at either the FACP or the Repeater].</i>
Disablement	Yellow	Part of the system, either input or an output, has been disabled.
Silenced	Yellow	The sounder outputs have been silenced. <i>[After pressing the 'Silence / Resound' key at either the FACP or the Repeater].</i>
Comms. Fail	Yellow	The repeater has lost contact / communications with the FACP and is unable to update its LCD and LED indicators. The control buttons on the ZXr-A will not function during this condition.
Power	Green	ON: Indicates DC Power is present.

Table 2 - LED Functions

4.3 Control Pushbuttons and Key Switch

- The ZXr-A Repeater is equipped with five control keys for SOUND ALARMS, SILENCE / RESOUND, MUTE BUZZER, ACCEPT and SYSTEM RESET and a TEST key.
- To enable the control keys, insert the key and turn the lock (clockwise) to the 'Enable' position (open padlock).
- The operation of these keys is identical to the control keys on the FACP and is detailed in the following table.



Key Legend	Symbol	Function
Sound Alarms		Press to Turn on ALL Sounder Outputs (i.e. evacuate building manually).
Silence / Resound		Press to Turn off all activated sounders. Press again to re-activate the sounders.
Mute Buzzer		Press to silence the internal buzzer.
Accept ³		Press to accept a Stage 1 Investigation Delay Alarm
System Reset		Press to cancel all alarm conditions and reset the panel.
Self Test		Press to exercise the in-built test functions.

Table 3 – Control Key Functions



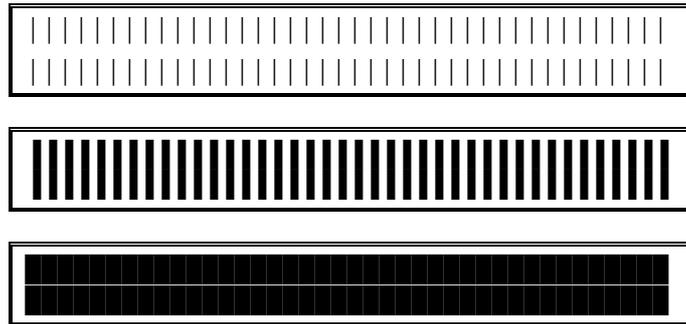
**It is recommended that the control key be not left in the active state.
Turn the key (anti-clockwise) and remove from the Repeater.**

4.3.1 Test Key (ZXr-A Only)

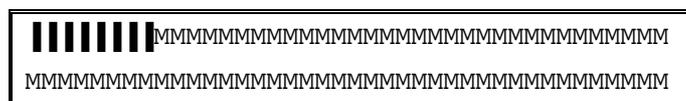
- On pressing the TEST key, the repeater will perform a self-test exercising the LCD and LED indicators. The test function will remain active for 30 seconds (or 30 seconds after last button press) after which, the repeater indications will return to show the current system condition.
- The LED Indicators will be illuminated in sequence.
- The LCD will show a series of vertical stripes at each character position growing in width. If one of the control keys is pressed, the display shows a letter of the alphabet corresponding to the key. Reset = R, Mute Buzzer = M, Accept = A, Sound Alarms = E and Silence / Resound = S.
- Examples are shown below:

³ The ACCEPT key is not used on ZX1, ZXa, ZXe and ZXMi-EN panels. Use the MUTE BUZZER key instead.

- Examples of LCD during display test:



- Example of LCD Test Display when Control Key pressed:



4.4 Buzzer

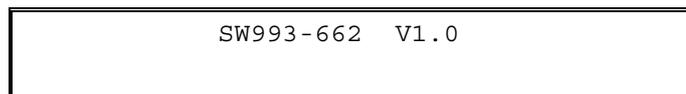
- The internal buzzer will sound to indicate alarm or fault conditions as follows:

FIRE ALARM – The buzzer will sound continuously
 FAULT – The buzzer will sound intermittently, 1 second ON, 1 second OFF

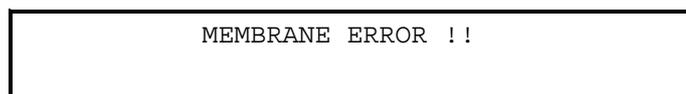
- In addition, the buzzer will emit a short beep whenever a control key is pressed.
- During “Communications Failure”, the buzzer will sound intermittently.

4.5 Special LCD Messages

- The LCD will show the software part number and version when communications is lost with the FACP and on power up of the repeater. For example:



- The LCD will show the following message if the wrong type of membrane / fascia label is fitted or if no membrane / fascia label is detected on power up. The following message is shown. The buzzer will also sound a fault condition.



5 Specifications

Criteria	Details
Mechanical	
Construction	Mild steel sheet enclosure with 3 mounting holes, 5 x 20mm knockouts in top and 3 x 20mm knockouts in rear wall. All displays and controls are carried on the enclosure door.
Dimensions	165.0mm (h) x 253.5mm (w) x 50.0mm (d)
Weight	1.7kg approx.
Terminals	External connections are made using screw terminals capable of accepting cable sizes between 0.5mm ² to 2.5mm ² (14-22AWG).
Environmental	
Climatic Classification	3K5, (IEC 721-2-3)
Operating Temperature	-5°C to +45°C (recommended +5°C to +35°C)
Humidity	5% to 95% R.H. non condensing
Height above sea level	2000m
Panel Sealing	IP30 (EN60529)
Vibration	EN60068-2-6, 10-150Hz at 0.981ms ⁻² (meets the requirements of EN54-2/4)
EMC	Emissions: EN50081-1. Immunity: EN50130-4
Safety	EN60950
Electrical	
Operating Voltage	18-32V dc
Quiescent Current	60mA @ 24V (Backlight off)
Alarm Current	90mA @ 24V (Backlight on), 100mA @ 18V
Maximum Fault Current	Absolute maximum = 600mA. Resetting thermal fuse – nominal 250mA.
Communications	RS485 2-wire serial communications link
Address Range	0, 1-126 (0 is unmonitored)
Controls and Indications	
Display	2 x 40 character liquid crystal display (LCD) with back light illumination
Status Indicators	LED Indicators for FIRE, FAULT, DISABLEMENT, ACCEPTED, SILENCED, COMMUNICATIONS FAILURE and POWER.
Push Buttons	Control keys for RESET, MUTE BUZZER, ACCEPT, TEST, SOUND ALARMS and SILENCE / RESOUND.
Buzzer	

Table 4 - ZXr-A / ZXr-P Repeaters Specifications

NOTES



© MORLEY-IAS. All rights reserved.
® The MORLEY-IAS Logo is a registered trademark.
MORLEY-IAS Fire Systems, Charles Avenue,
Burgess Hill. West Sussex. RH15 9UF. England.