



Folknoll Group Ltd.

DISABLED REFUGE EVC



3-ZONE REFUGE EVC SYSTEM MANUAL

ISSUE

VERSION	DATE	DESCRIPTION
V1.00	02.11.2018	Original

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1 INTRODUCTION

This document is the Folknoll Group Ltd 3-Zone Refuge EVC System Manual.

1.1 WHAT IS A DISABLED REFUGE EVC SYSTEM

A disabled refuge is a relatively safe area where people can gather in emergencies to await rescue. A disabled refuge EVC is an emergency voice communication system that enables persons in a refuge to communicate with building management in the event of an emergency. The purpose of the refuge EVC is to help coordinate rescue by providing information, instruction and reassurance to refuge users.

1.2 FOLKNOLL 3-ZONE REFUGE EVC

For sites with 3 or less refuge areas, we offer our cost-effective 3-zone refuge EVC system. Installation costs are reduced without compromising functionality by building the system controller and a battery backed PSU into single steel enclosure.

1.1.1 Fire-Resistant Cabling

Terminals are provided within all equipment for cable termination and space is allowed for glanding of larger fire-resistant cable types to comply with BS requirements.

1.1.2 Choice of Outstations

Any of our range of refuge outstations can be used in conjunction with our 3-zone refuge systems, offering a range of vandal resistance, IP rating and DDA compatibility to suit your site.

1.1.3 3-Zone Master Station

Our 3-zone master station is a specially designed minimalist panel for our 3-zone EVC with individual illuminated buttons for each outstation and input for remote enable.

1.1.4 3-Zone Controller with Battery Backed PSU

Our 3-zone controller and battery backed system PSU is built into a single steel enclosure. The system is usually supplied with backup batteries capable of providing at least 24 hours of quiescent operation and 30 minutes of alarm operation.

1.1.5 Audio Path Testing and Reporting

Folknoll Disabled Refuge EVC systems offer audio path monitoring and reporting. Audio tones are generated by outstation speakers and detected by outstation microphones. This signal received is verified to test the electrical and mechanical audio path. If a fault is detected it is reported on the master station.

Audio path testing can be triggered by external devices e.g. timers or BMS. A fault output is available to activate external devices or management systems.

1.1.6 Third Party Interfaces

Folknoll offer closing contact, serial and IP interfaces for integration with third-party systems, e.g. BMS, alarm gathering, etc. helping to provide an integrated solution for your needs.

1.2 ABOUT US

We are a UK based company with over 30 years of design and manufacturing experience. All of our products and systems are designed for toughness, reliability, easy installation, simple configuration, straightforward operation and low maintenance. As original manufacturer, all of our product ranges can be customised to suit your application. Including custom engraved panels, additional features and special systems.

Please contact us for further information about our wide range of products and services and find out how we can provide a solution for you.

2 3-ZONE REFUGE EVC INSTALLATION

Mount equipment and pull the required cables, please refer your system drawings or the drawing below as appropriate. Terminate the cables but do not power up, (please refer to section 3 3-Zone Refuge EVC Connections).

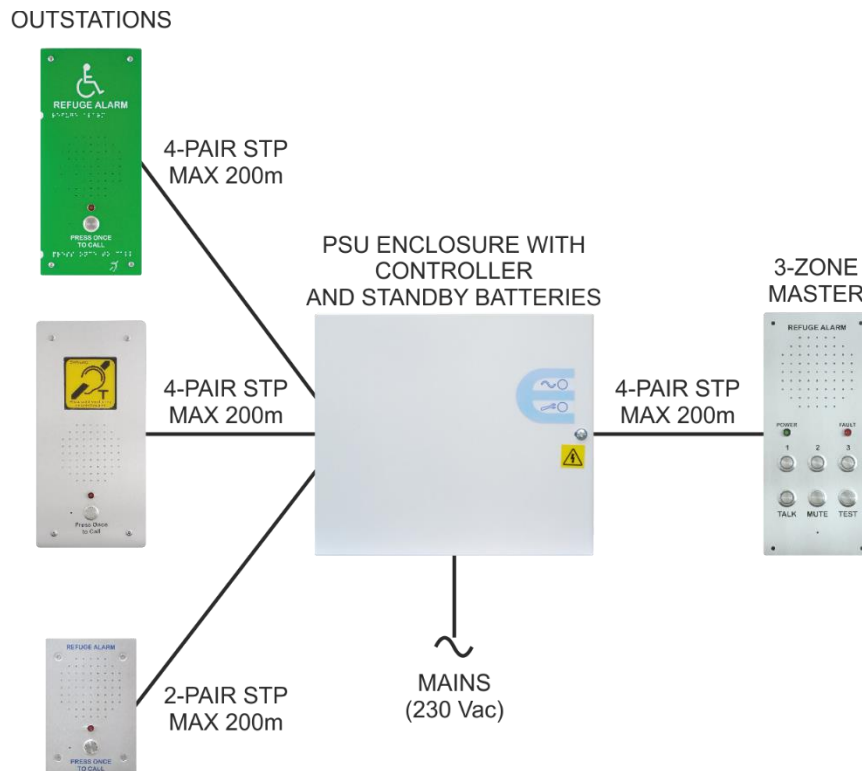


Figure 1 Typical 3-Zone System

A refuge EVC is usually part of a fire safety system and must be installed in accordance with current regulations and standards.

FIRE RESISTANT CABLING MAY BE REQUIRED E.G. FT120 OR FIRETUFdata, PLEASE REFER TO SECTION 9 APPENDIX A FIRETUF CABLES

In a standard 3-Zone system there is a single controller with battery backed PSU, which provides control and power to the entire system. All devices are “star” wired to the controller, the controller is connected to mains. Mains should be by a competent and authorised electrician according to local and site regulations.

2.1 3-ZONE SYSTEM CABLING RULES

- Cables to outstations without induction loops should be 2-pair 22AWG STP or above
- Cables to outstations with induction loops should be 4-pair 22AWG STP or above
- Cables to the master station should be 4 pair 22AWG STP or above
- No termination resistors are required
- Assuming FIRETUFdata cable is used the maximum length of cable between each outstation and the system controller is 200m
- Assuming FIRETUFdata cable is used the maximum length of cable between the master station and the system controller is 200m

3 3-ZONE REFUGE EVC CONNECTIONS

All connection is via terminal block located within the equipment. Folknoll's design has allowed sufficient room for glands for larger fire-resistant cables types to comply with BS requirements.

3.1 3-ZONE OUTSTATION CONNECTION

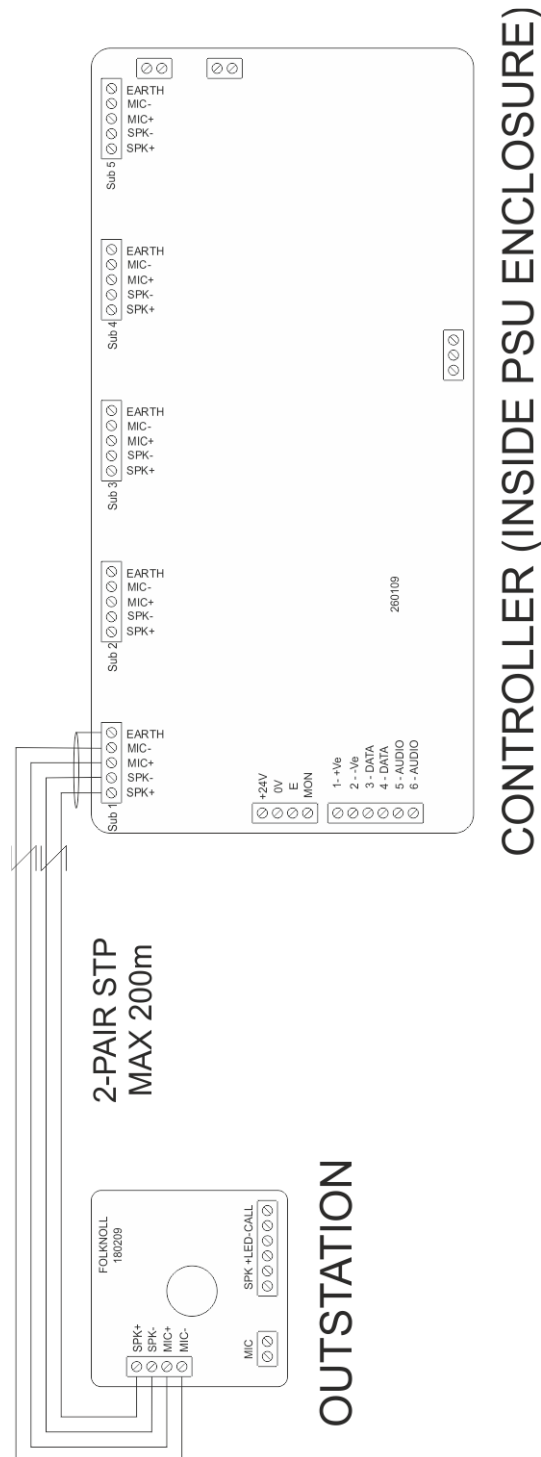


Figure 2 Typical 3-Zone Outstation Connection

3.2 3-ZONE OUTSTATION WITH LOOP

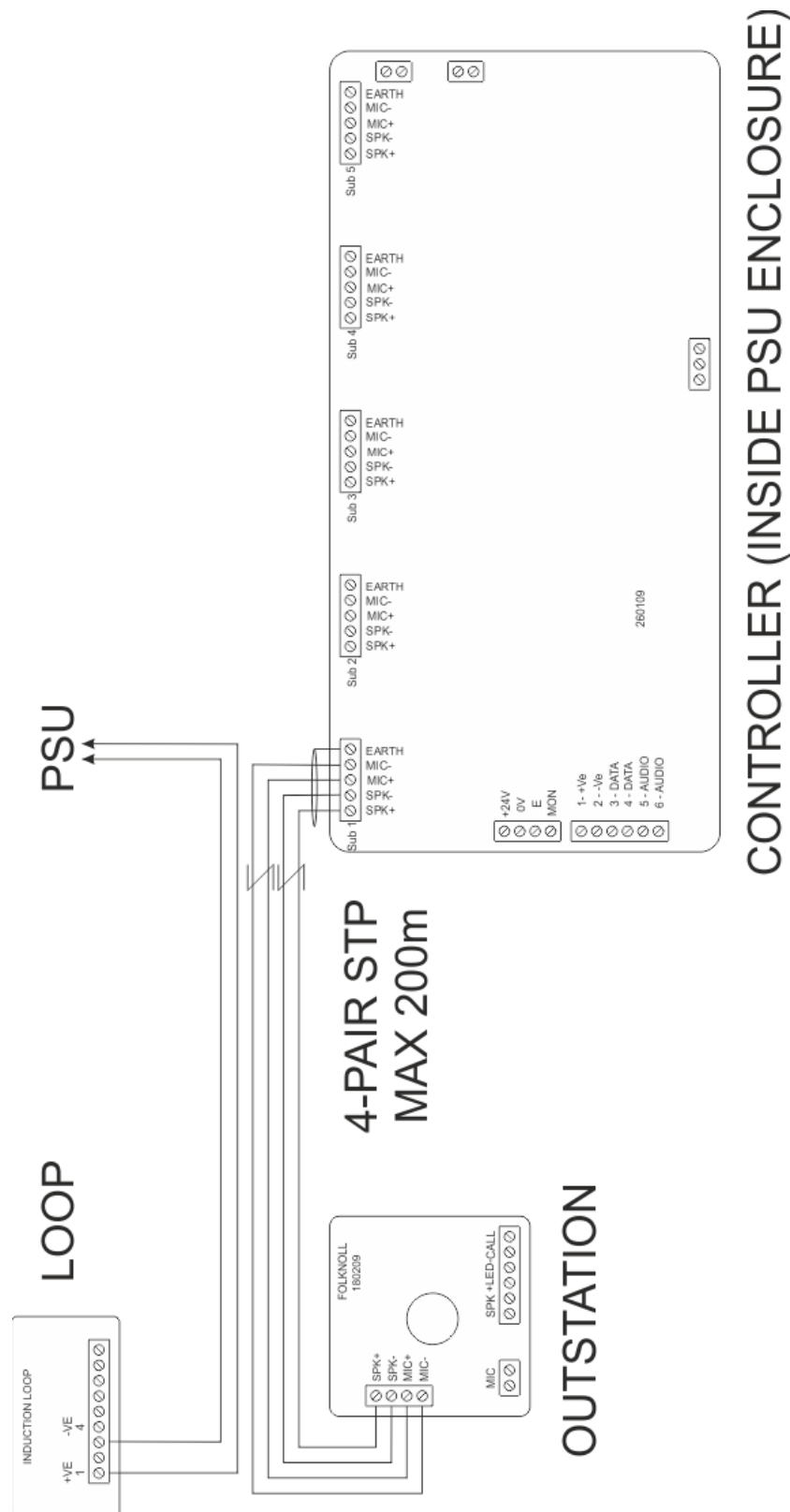


Figure 3 Typical 3-Zone Outstation with Induction Loop Connection

USUALLY 4-PAIR CABLE IS USED WITH LOOP POWER PAIRS DOUBLED UP

3.3 3-ZONE MASTER STATION CONNECTION

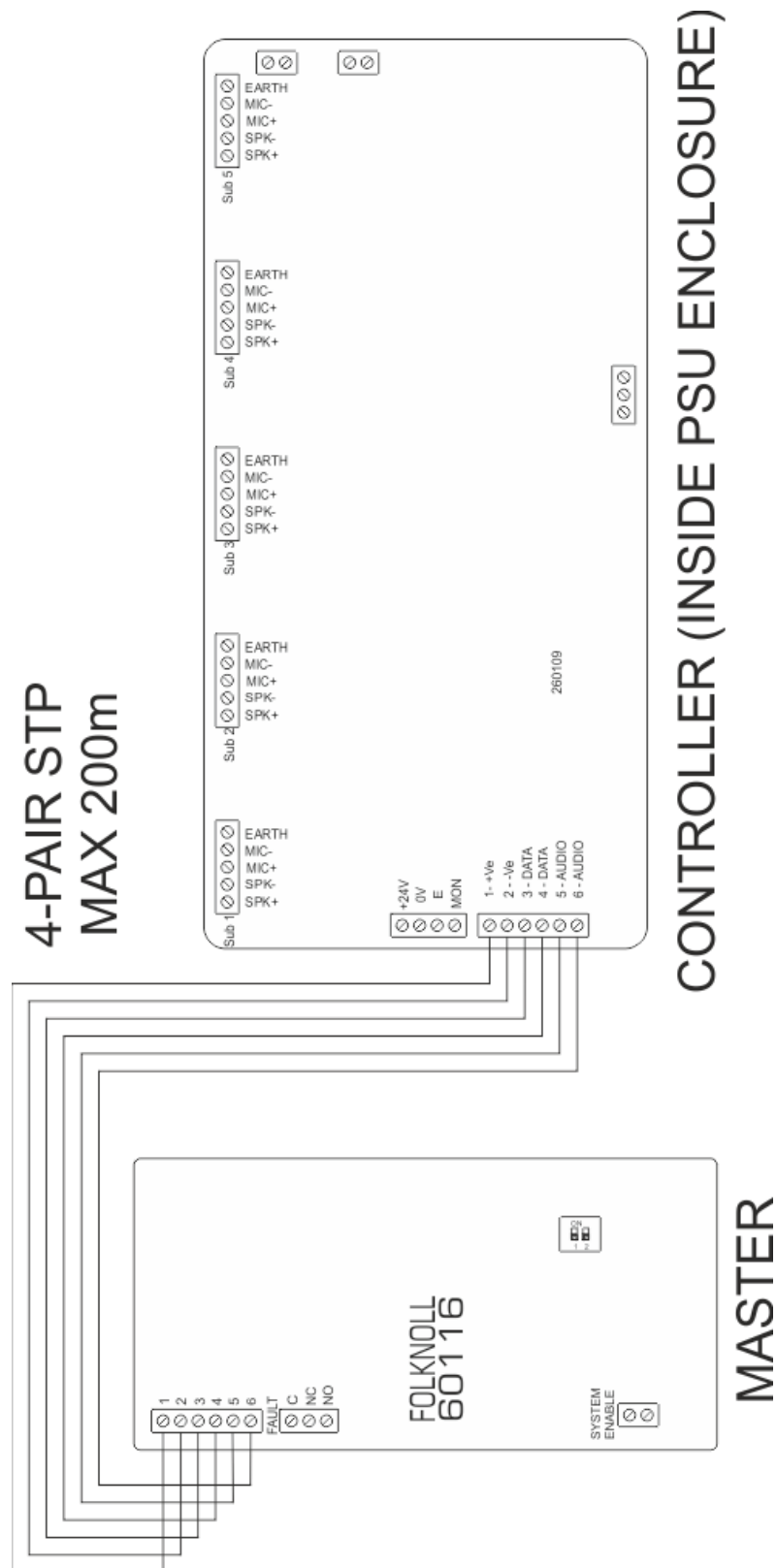


Figure 4 Typical 3-Zone Master Connection

USUALLY 4-PAIR CABLE IS USED WITH POWER PAIRS DOUBLED UP

4 3-ZONE REFUGE EVC COMMISSIONING

4.1.1 System Controller Addressing

The 3-zone system only has one controller and its addressing is factory set, no commissioning required.

4.1.2 Fault Monitoring

The 3-zone master station is fitted with a fault monitoring circuit. Fault monitoring is factory disabled for shipping and installation. After the Disabled Refuge EVC system is installed and ready to power up, fault monitoring should be enabled by setting both PCB dip switches to on. The monitoring circuit will report power fail until power is applied, press the **MUTE** button to silence the alarm.

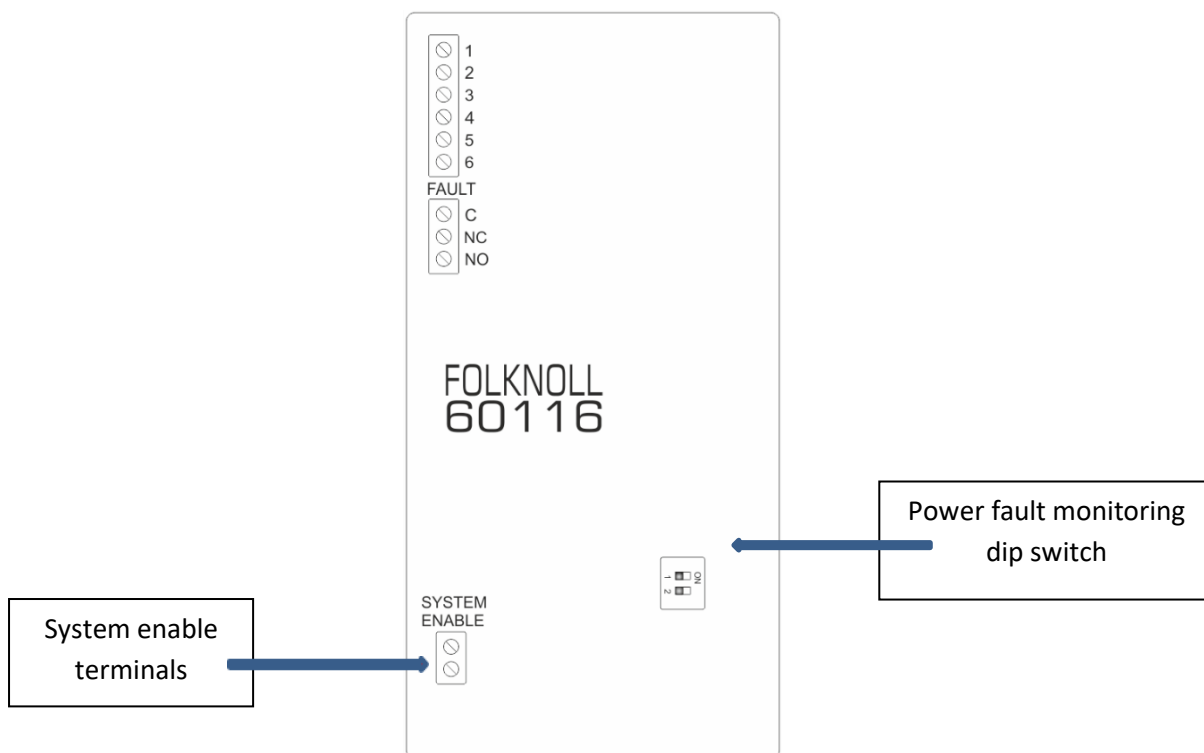


Figure 5 Master Station PCB

4.1.3 Master Station Controls Enable

The master station is supplied fitted with a link between the **SYSTEM ENABLE** terminals to enable the master station controls.

If an external enable, e.g. from a fire alarm system, is required this link is removed and the external system connected to these terminals. Before commissioning this system, the third-party enable must be activated or overridden.

4.1.4 Initial Power Up

Please refer to section 5 3-Zone Refuge Master Operation to familiarise yourself with the layout of the master station panel.

When ready, power up the system. The master station power LED will illuminate and it will report a fault until configuration has been completed, see section 4.1.5 Outstation Configuration below.

4.1.5 Outstation Configuration

The system is configured by pressing the **TEST** button. When the fault LED stops flashing and the sounder is silent the system is fully configured. No further commissioning is required.

4.1.6 Volume and Microphone Gain Adjustment

Outstation microphone gain and speaker volume are factory set and should not be adjusted during commissioning. If adjustment is required please contact Folknoll.

5 3-ZONE REFUGE MASTER OPERATION

For the purposes of this manual we will refer to the person or persons using the system from a refuge area as the user, and the persons operating the system from the master station as the operator.

THIS SYSTEM SHOULD BE OPERATED IN ACCORDANCE TO THE RELEVANT STANDARDS AND REGULATIONS

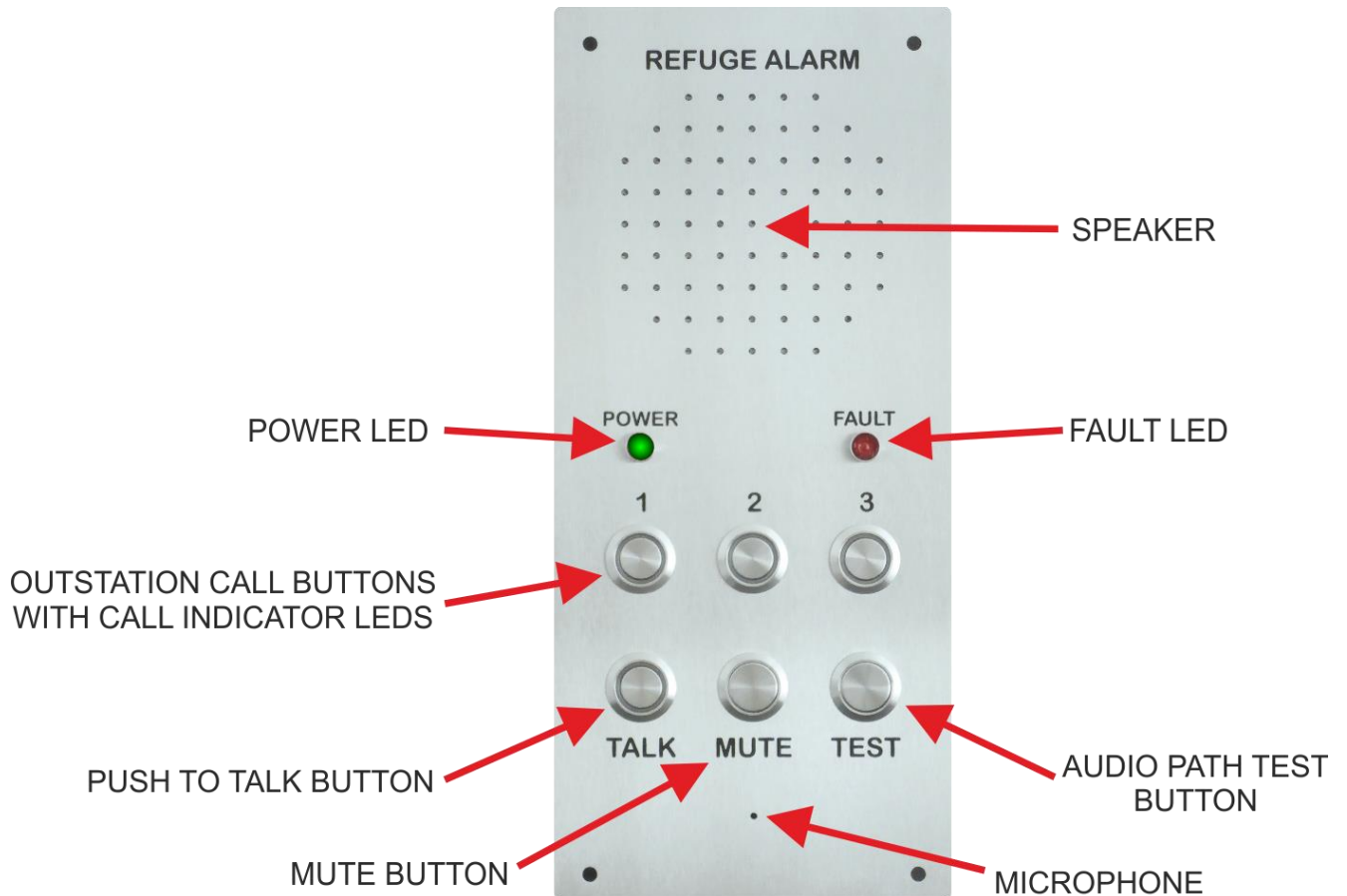


Figure 6 Master Station Panel

5.1 ENABLE THE MASTER STATION CONTROLS

Ensure the master station controls are enabled. If fitted, override the third-party system enable. This will should happen automatically in the event of a fire or other emergency. If required by local procedures ensure that the master station controls are disabled after use.

5.2 INCOMING CALLS

An outstation user initiates a call by pressing **CALL** button on an outstation.

When a call is initiated

- The master station sounder will sound
- The button on the master station corresponding to the calling outstation i.e. **1**, **2** or **3**, will flash

5.2.1 To Accept an Incoming Call from an Outstation

Operators accept the incoming call by pressing the flashing button corresponding to the calling outstation.

When a call is accepted:

- The master station sounder will cease
- The button on the master station corresponding to the calling outstation will be illuminated (stop flashing)
- The operator will be able to hear the user

5.2.2 To Talk to a User

This system is a push to talk (PTT) system. To talk to a user the operator must press and hold the **TALK** button. Whilst the **TALK** button is held the operator will not be able to hear the user.

5.2.3 To Cancel an Incoming Call from an Outstation

To cancel an incoming call the operator should press the illuminated button corresponding to the calling outstation.

After the call is cancelled:

- The button on the master station corresponding to the calling outstation will no longer be illuminated
- The operator will not be able to hear the user

5.3 OUTGOING CALLS

5.3.1 To Make an Outgoing Call to an Outstation

To call an outstation the operator presses the button corresponding to the required outstation i.e. **1**, **2** or **3**.

Once the button has been pressed:

- The button on the master station corresponding to the outstation called will be illuminated
- The operator will be able to hear the user

5.3.2 To Talk to a User

This system is a push to talk (PTT) system. To talk to a user the operator must press and hold the **TALK** button. Whilst the **TALK** button is held the operator will not be able to hear the user.

IF AN OPERATOR INITIATES A CALL, THE OPERATOR MAY ANNOUNCE THEIR PRESENCE. E.G. SAY “HI THIS THE EVC OPERATOR CALLING” SO THAT THE USER KNOWS A CALL HAS BEEN MADE AND CAN RESPOND

5.3.3 To Cancel an Outgoing call

To cancel an outgoing call the operator should press the illuminated button corresponding to the called outstation.

After the call is cancelled:

- The button on the master station corresponding to the outstation will no longer be illuminated
- The operator will not be able to hear the user

5.4 ALL CALLS AND ANNOUNCEMENTS

An “All Call” is an announcement that can be heard by all users simultaneously, e.g. “the Fire Bridged has arrived please standby”.

5.4.1 To Make an All Call

The operator should ensure that no outstation calls are in progress i.e. none of the outstation buttons are illuminated. If necessary, any current calls should be cancelled.

To make an All Call the operator presses and holds the **TALK** button, makes the announcement, then releases the **TALK** button.

Whilst the **TALK** button is held, (and there are no current calls):

- The buttons on the master station corresponding to all configured outstations will be illuminated
- All configured outstations will broadcast announcements, (and other noises), picked up by the master station microphone

5.4.2 To Cancel an All Call

To cancel an All Call the operator releases the **TALK** button.

After the **TALK** button has been released:

- The buttons on the master station corresponding to all outstations will no longer be illuminated
- Announcements, (and other noises), picked up by the master station microphone will no longer be broadcast by all configured outstations

6 OUTSTATION OPERATION

Outstations have only one button, the **CALL** button, see below:



Figure 7 Example Outstations

6.1 CALLS TO THE OPERATOR

6.1.1 To make an Outgoing Call to an Operator

To contact the operator, the user presses the **CALL** button.

After **CALL** button has been pressed:

- The outstation LED will flash and a calling tone will sound
- When the operator accepts the call, the calling tone will stop and the LED will illuminate continuously
- The operator will usually announce themselves. E.g. "EVC operator, how can I help?"
- The user should wait for the operator to finish talking before answering. If the user interrupts the operator, the operator will not be able to hear the user

6.1.2 To Cancel an Outgoing Call

Outgoing calls are cancelled by the operator. There is no requirement for any user action.

6.2 CALLS FROM THE OPERATOR

6.2.1 To Accept an Incoming Call from an Operator

Incoming calls are controlled by the operator, user operation is not required.

When an operator makes a call to an outstation:

- The outstation LED illuminates continuously
- Usually the operator will usually announce themselves, e.g. "Hi, EVC operator here, can you hear me?"
- The user can talk to the operator when the operator has finished talking

6.2.2 To Cancel an Incoming Call

Incoming calls are cancelled by the operator. There is no requirement for any user action.

6.3 ALL CALLS AND ANNOUNCEMENTS

The operator may choose to make an “All Call” or announcement to all outstations. E.g. “This an announcement for all refuge users, the fire is under control please standby.”

All Calls are controlled by the operator, user operation is not required.

7 3- ZONE REFUGE EVC FAULTS

Faults are usually indicated by the master station sounder and fault LED activating for 2 short bleeps and one long bleep continuously.

Usually the sounder can be silenced by pressing the **MUTE** button.

Any faults should be reported, managed and repaired according to local regulations and procedures.

7.1 AUTOMATIC SYSTEM TEST

The system automatically monitors and reports faults so from time to time the system may report faults. Please refer to section 7.4 Fault Indications for a list of fault indications.

7.2 AUDIO PATH TEST TRIGGERED MANUALLY

A full audio path test can be triggered manually by pressing the **TEST** button on the master station. The system will test each outstation in turn and report any errors found.

**DURING TESTING OUTSTATIONS WILL GENERATE AUDIO TONES
TESTING SHOULD BE TIMED TO MINIMISE INCONVENIENCE**

7.3 AUDIO PATH TEST TRIGGERED EXTERNALLY

A full audio path test can be triggered externally, e.g. by a BMS. The system will test each outstation in turn and report any errors found.

**DURING TESTING OUTSTATIONS WILL GENERATE AUDIO TONES
TESTING SHOULD BE TIMED TO MINIMISE INCONVENIENCE**

7.4 FAULT INDICATIONS

Sounder	Power LED	Fault LED	Additional Indications	Fault
2 short bleeps followed by 1 long	OFF	2 short flashes followed by 1 long	N/A	Mains power fail, system powered by backup battery
2 short bleeps followed by 1 long	ON	2 short flashes followed by 1 long	System just powered up	System not configured, press the TEST button
N/A	N/A	N/A	Master station does not respond to button presses	Master controls disabled
2 short bleeps followed by 1 long	N/A	2 short flashes followed by 1 long	N/A	Outstation fails audio path test
Continuous tone	N/A	N/a	Outstation button flashes	Outstation disconnected

Fig 7:1 Table of System Fault Messages

7.4.1 Mains Power Fault

- The master station will continuously emit 2 short bleeps and one long bleep
- The master station fault LED will continuously give 2 short flashes and one long flash

The system will continue to operate from its standby power supply.

If fully charged the system will operate for at least 24 hours in standby and at least 30 minutes of alarm active.

The sounder can be silenced by pressing the **MUTE** button.

The mains supply should be restored as soon as possible.

IF THE POWER IS NOT RESTORED THE STANDBY BATTERIES WILL DISCHARGE AND THE SYSTEM WILL NOT OPERATE

7.4.2 Master Station Disabled

- The master station will not respond to button press

To rectify the fault, override the remote controls enable, if fitted, or check the enable link please refer to section 4.1.3 Master Station Controls Enable.

7.4.3 Audio Path Fault

Audio path tests are performed if the **TEST** button is pressed or when triggered by the external timer or management system. If an outstation fails an audio path test:

- The master station will continuously emit 2 short bleeps and one long bleep
- The master station fault LED will continuously give 2 short flashes and one long flash
- The sounder can be silenced by pressing the **MUTE** button

The fault should be reported / repaired according to the local fault reporting procedure.

THE OUTSTATION INDICATED MAY NOT BE OPERATIONAL UNTIL THE FAULT IS RECTIFIED

8 3-ZONE REFUGE EVC MAINTENANCE

This section gives a generic guide to the routine maintenance and testing of Folknoll Disabled Refuge EVC systems. Local maintenance, testing and repair procedures should be implemented according to local regulations, procedures, site conditions, risk assessment, and equipment installed.

Disabled Refuge EVC systems are usually only used in the event of an emergency. Faults and other issues that develop may not be discovered until an emergency arises and the system is required. It is important that routine maintenance and frequent testing is carried out to ensure that the system is fully operational.

8.1 ROUTINE MAINTENANCE

Folknoll Disabled Refuge EVC systems require minimal maintenance. The systems are robustly designed and have low wear as they are only used in emergency. The only parts to require regular maintenance are the PSU standby batteries.

8.1.1 Standby Batteries

The PSU backup batteries should be replaced as the battery manufacturer advises or at least every 2 years.

8.2 VISUAL INSPECTION

Disabled Refuge EVC systems are usually located in 'public' areas and depending on location can be open to abuse. The frequency of visual inspections should be determined by local regulations, procedures, site conditions and risk assessment.

8.2.1 Outstations

System outstations should undergo frequent visual inspections to check:

- Outstations and signage are clearly visible and accessible by disabled persons, e.g. not hidden by posters, or behind a large object such as a roll cage, located in a restricted area
- Outstations show no signs of physical damage e.g. water ingress, impact
- Outstations show no signs of other forms of abuse e.g. chewing gum in the microphone hole
- Outstations show no signs of any other forms of damage that might affect visibility, access or operation

8.2.2 Master Station

The master station should undergo frequent visual inspections to check:

- The master station and any signage are clearly visible and accessible by disabled persons, e.g. not hidden by posters, or behind a large object such as a roll cage, in a restricted area.
- The master station shows no signs of physical damage e.g. water ingress, impact
- The master station shows no signs of other forms of abuse e.g. chewing gum in the microphone hole
- The master station shows no signs of any other forms of damage that might affect visibility, access or operation

8.2.3 Controller / PSU / Cables

Any control equipment and exposed cable routes should undergo regular visual inspections to check:

- All control equipment and exposed cable routes show no signs of physical damage e.g. water ingress, impact
- All control equipment and exposed cable routes show no signs of other forms of abuse
- All control equipment and exposed cable routes show no signs of any other forms of damage that might affect operation

8.3 FUNCTIONAL TESTING

The system should undergo frequent functional testing to ensure that the system is ready for emergency operation.

8.3.1 User Call Check

For each outstation check the following:

- A call to the master station can be initiated by the outstation user
- The master station responds correctly and the master station operator can accept the call
- The outstation user can be clearly heard by the master station operator
- The master station operator can be clearly heard by the outstation user
- The call can be cancelled by the master station operator

8.3.2 Operator Call Check

For each outstation check the following:

- A call to the outstation can be initiated by the master station user
- The outstation user can be clearly heard by the master station operator
- The master station operator can be clearly heard by the outstation user
- The call can be cancelled by the master station operator

8.3.3 All Call Check

For each outstation check the following:

- An all call can be initiated by the master station user
- The master station operator can be clearly heard by the outstation user
- The all call can be cancelled by the master station operator

8.3.4 Standby Operation Test

Disconnect the mains supply and check the following:

- The master station reports power fail
- The sounder can be silenced by pressing the master station **MUTE** button
- The system is still operational (check that calls can be made)

Restore the mains supply and check the following:

- The master station no longer reports mains fail

- The system is still operational (check that calls can be made)

8.3.5 Standby Time Test

If required by local regulations or procedures test the standby time by disconnecting the mains supply

- From time to time check the system is still operational (check that calls can be made)
- Observe the time taken for the system to fail, check that this complies with regulations and procedures
- Check the PSU disconnects the batteries when the voltage reaches 19V to prevent full discharge

THIS TEST SHOULD NOT BE CARRIED OUT ON A LIVE SYSTEM BECAUSE: THE SYSTEM WILL FAIL AT SOME POINT. WHEN THE POWER IS RESTORED THE STANDBY TIME WILL BE REDUCED. EITHER OF THESE CONDITIONS MAY VIOLATE SITE OPERATION CONDITIONS AND REQUIRE CLOSURE OF THE SITE

8.3.6 Audio Path Test Check

To verify that the system responds correctly in the event of an audio path test failure,

- Cause a fault by covering an outstation microphone or disconnecting an outstation speaker circuit
- Trigger and audio path test by pressing the **TEST** button or activating the external input
- Check that the master station reports the audio path fail correctly

8.3.7 Automatic Audio Path Testing

- Monitor the systems at the time testing is to commence
- Check audio path testing is initiated

9 APPENDIX A FIRETUF CABLES



CIRCUIT INTEGRITY ALARM CABLE

Zero Halogen, Low Smoke (OHLS®) cable, maintaining circuit integrity when exposed to fire. Meeting the Enhanced category of BS 5839-1:2002. Manufactured to BS 7629-1. Tested and approved by LPCB and BASEC.

FT120 has been specially designed to meet the Enhanced requirements detailed in BS 5839-1:2002, Clause 26.2e. It therefore meets the PH120 class, and additionally meets the requirements for integrated water spray and mechanical shock also described in Clause 26.2e, and detailed in BS 8434 Part 2:2003:

60 mins - fire and mechanical impact, followed by
60 mins - fire, mechanical impact and water

FT120 achieves the Enhanced performance, whilst retaining all the advantages associated with a pliable cable. These include:

- Lower termination costs
- No special tools or training
- Ease of handling and installation
- Available in long lengths
- Twisted core construction to improve signal clarity
- Suitable for use in Zone 1 and Zone 2 hazardous areas

FT120 achieves the Enhanced performance by application of state of the art materials technology, providing advanced resistance to fire and heat, enabling the maintenance of circuit integrity through this most onerous testing protocol.

Construction

Conductors:	Solid or stranded plain annealed copper wire.
Insulation:	Enhanced silicone rubber.
Binder:	Enhanced close weave glass tape.
Conductor (earth):	Solid or stranded tinned annealed copper.
Electrostatic screen:	Enhanced aluminium/polyester laminated tape.
Sheath:	Enhanced Thermoplastic Zero Halogen, Low Smoke (OHLS®) compound.

Physical Characteristics

Voltage rating (Uo/U):	300/500V.
Operating temp:	-40°C to +90°C (The cable should not be flexed when either the ambient or cable temperature is below 0°C).
Min. bending radius:	6 x overall diameter of cable.

Standards Achieved

Circuit integrity:	BS 5839-1:2002 Clause 26.2e Enhanced. BS 8434-2:2003. BS EN 50200 PH120. BS 6387 C, W & Z.
Flame propagation:	BS EN 60332-1, BS EN 60332-3.
Acid gas emission:	IEC 60754, BS EN 50267.
Smoke emission:	BS EN 61034

Cable ref.	No. of cores	Conductor Class	CSA mm ²	Protective earth conductor CSA mm ²	Nominal overall diameter mm	Approx. nett weight kg/km
FTPLUS2EH1.5	2	1	1.5	1.5	8.6	130
FTPLUS3EH1.5	3	1	1.5	1.5	9.0	135
FTPLUS4EH1.5	4	1	1.5	1.5	10.1	170
FTPLUS2EH2.5	2	1	2.5	2.5	9.9	175
FTPLUS3EH2.5	3	1	2.5	2.5	10.6	200
FTPLUS4EH2.5	4	1	2.5	2.5	11.9	250
FTPLUS2EH4.0	2	2	4	4	11.7	250
FTPLUS3EH4.0	3	2	4	4	12.8	300
FTPLUS4EH4.0	4	2	4	4	14.4	370

LPCB
TESTED &
CERTIFIED
BASEC



CONNECTING TODAY'S NEEDS

FIRETUFdata

2 Pair 0.65mm (0.33mm² – 22AWG)



FS Cables part number 387FTD203

Draka Comteg part number

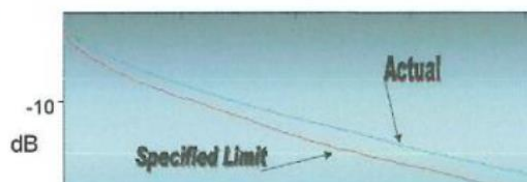
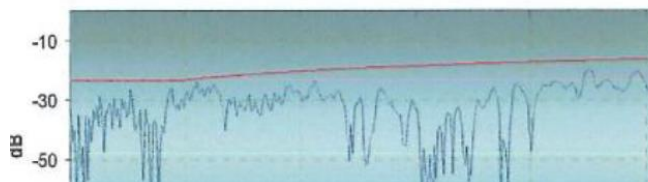
Application		Applicable Standards	
Fire resistant low smoke halogen free data cable providing circuit integrity and high speed data transmission. Ideal for use on B.M.S., alarm and evacuation systems in public buildings and tunnels.		Generally to ISO/IEC 11801:95, EN 50173 95 and EN 50288-2-1. Suitable for standard Insulation Displacement Connector L.A.N. sockets. RS-485 10Mb/s	
Cable Construction		Physical Characteristics	
Conductor	Bare Cu Wire	Outside Diameter of Conductor	0.65 mm
Insulator Material	PE/Sil Rbr	Outside Diameter of Insulation	1.70 mm
Number of Twisted Pairs	2 (two)	Outside Diameter of Sheath	8.10 mm
Glass Tape	Fibre	Weight	97 kg/km
Screen Material	Al/Myar	Sheath Colour	Red
Braid	TCWB		
Sheath Material	OHLS		
Cable Properties		Electrical Characteristics @ 20°C	
Min. Installation Bend Radius	6 x Dia	Structural Return Loss SRI	IEC dB
Min. Installed Bending Radius	8 x Dia	Characteristic impedance @ 10MHz	100±5Ω
Max. Installation Tension	30N	DC Conductor Loop Resistance	<19 Ω/km
Max. Installed Tension	Zero	Nominal Velocity of Propagation	57%
Installation Temp. Range	0°C to +50°C	Insulation Resistance (500V)	≥5000 MΩ.km
Installed Operating Temp. Range	-20°C to +60°C	Voltage	300/500V
Fire Tests & Standards		London Underground Tests & Approvals	
Fire Resistant BS5839 Enhanced	>2hrs @ 950°C	Fire Resistant BS5839-1 Clause 26.2E	>2hrs
Fire Resistant BS6387	>3hrs @ 950°C	Fire Resistant BS8434-2 2003	PH120
Fire Resistant IEC60331-23	>3hrs @ 750°C	Fire Resistant BS EN 50200 2000	>3hrs
Fire Resistant BS EN 50200	>3hrs @ 950°C	Flame Retardant	BS406
Flame Retardant	IEC60332-3-24	Smoke Emission	BS EN
Corrosivity : acid & halogen free	IEC60754-1+2	LUL - Flammability, smoke & fume	2-0100
Smoke Test: low smoke emission	IEC61034-1+2	DP99 Compound approval	E4156
		LUL standard E4156 part 1	Approv

FIRETUF[®]
data

LUL Approved Cable

SRI

Attenuation





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