

WES1A Fire Alarm

System Manual by Skanstec Engineering B.V
Submittal Number: SM-0010-E-S-MDCx

| Revision | Date of Issuance | Scope of Revision |
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This System Manual has been produced by Skanstec Engineering B.V as per current industry best practices and applicable occupational safety and health regulations.

This System Manual will allow the operator to operate and maintain the installed systems/equipment safely.

It is strongly recommended that the System Manual is first read and understood before commencing any operations on the installed systems/equipment.

The System Manual will provide information to the operator of the facility on:

- What systems/equipment/components were supplied and installed and by whom
- General description of the equipment/system and its relation to other related systems
- Detailed information on safe operation and maintenance
- References to relevant drawings, commissioning documentation, manufacturer literature (product data, calculation) and warranties

CONTACT INFORMATION

Design Team Details

The design for the installed systems/equipment was completed by:

Name of Fire Detection and Suppression Designer: Siemens

Address of Designer: Postbus 16068, Den Haag, 2500 BB

Telephone Number: [REDACTED]

Contact Name [REDACTED]

Main Contractor Details

The construction for the systems/equipment was undertaken by:

Name of Contractor: Dornan Engineering

Address of Contractor: 10 Eastgate Ave, Castlevew, Little Island, Co. Cork

Telephone Number: [REDACTED]

Contact Name: [REDACTED]

Subcontractor Team Details

The installation for the systems/equipment was undertaken by:

Name of Installer: Siemens

Address of Installer: Postbus 16068, Den Haag, 2500 BB

Telephone Number: [REDACTED]

Contact Name: [REDACTED]

Owner Project Team Details

Project Manager: Owen Johnson

Manufacturers and Component Suppliers

| Name | Equipment/System Supplied | Contact (Phone, Email, Address) |
|-------------|--|--|
| PLIMAT | ASD Piping and fitting accessories | Phone: [REDACTED] Email: sales@plimatuk.com Address: Unit 7 Newmans Copse Road Hounslow Business Park Totton Southampton SO40 9LX |
| SIEMENS | Fire Control Panel, Multi-Sensor Fire Detectors Flat, Manual Call Points, ASD Aspirating Smoke Detectors | Phone: [REDACTED] Email: Contact via Web Address https://new.siemens.com/global/en/general/contact.html Address: Smart Infrastructure Global Headquarters Theilerstrasse 1a CH-6300 Zug |
| VERGOKAN NV | Fire Alarm Installation Accessories | Phone: [REDACTED] Email: Vergokanexport@atkore.com Address: Meersbloem-Melden 16 9700 Oudenaarde |
| VIMPEX | Strobe Lights and CH Sounder | Phone: [REDACTED] Email: sales@vimpex.se Address: Star Lane Great Wakering Essex SS3 0PJ |

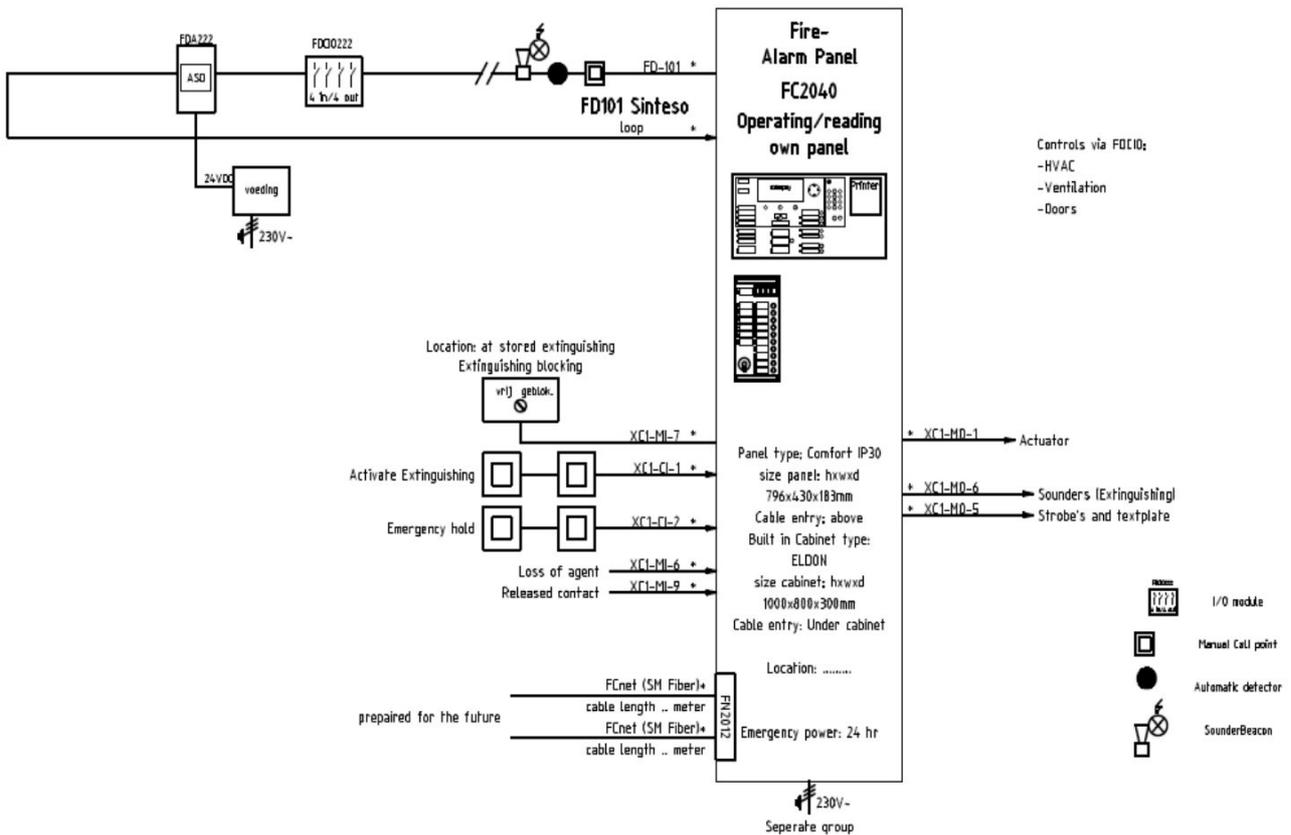
1. System Overview

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1.1 System Description

The System consists of the following:

- Fire Control Panel.
- Input/output Modules.
- Fire Detectors.
- Manual Call Points.
- Sounder Beacons.
- Air Sampling Detection.



Block diagram FS20

1.1.1 Fire Control Panel

The fire control panel is situated on the Ground Floor to oversee and manage the fire alarm system. It serves as the central hub connecting all detection, alarm, indication devices, and sounders.

Fire Control Panel consists of the following:

- LCD Display
- Extinguishing Control Panel (XCI2005-A1)
- Cable Set for communication from PMI (FCA2014)
- 4-Loops Peripheryboard P (FCI2024)
- Power Supply 150W (FP2004)
- Batteries
- Xv, X1
- Event Printer (FTO2001)
- RS232 module (isolated) (FCA2001-A1)
- Network Module (SAFEDLINK) (FN2001_1)
- License Key (FCA2035-A1)
- Connection Module (MoNet) (FCA2031-A1)
- Operating Terminal (FCM20xx)
- XTO2001
- Ethernet Switch Module (FN2012-A1)

A control panel, equipped with an extinguishing card and power supply kit, is supplied to oversee and regulate the Fire Suppression System. This panel is designed to interface with the fire control panel, allowing for centralized monitoring and control of the suppression system.

This standalone Power Supply Kit (FP120-Z1) is provided for a decentralized supply to the external devices. The Power Supply Kit has an integrated operating and fault indicator, which makes it possible to forward faults via potential-free contacts. It has the following features:

- Output power 70 W
- Two separately fused, reactionless DC 24 V outputs, limited to 2 A in total
- Short-circuit-proof
- Current limited
- Mains voltage monitored
- Batteries monitored
- Battery Charging with temperature compensation
- Uninterruptible Power Supply in Battery Operation
- AC 230 V or AC 115 V

1.1.2 Input/output Modules

Detectors and other devices transmit signals that are interfaced to the addressable input modules featuring switch contacts. These addressable input modules are responsible for monitoring the circuit wiring to the respective device.

When the power consumption of a module surpasses the recommended individual loading for the circuit, power supplies, batteries, and chargers are employed to provide power to input or output devices.

The signal from the I/O modules interfaces with the following:

- Air Conditioning Units
- CRAC Units
- Exhaust Fans

- ASDs

An input/output module (transponder) is supplied for the FDnet and C-NET detector lines. The monitored inputs/outputs are utilized as follows:

- Control output with potential-free relay contact for activation of alarming devices, fans, air conditioning systems, lift controls, etc.
- Monitorable contact input for reporting technical statuses or activating an alarm
- Use as monitored output with a separate power supply, e.g., for operating acoustic signal transmitters.

1.1.3 Fire Detectors

The building is equipped with the following types of fire detectors:

- Multi-Sensor Fire Detectors

Multi-Sensor Fire Detectors

Multi-sensors incorporate both heat and smoke detection capabilities to monitor temperature and smoke levels in their vicinity. The heat detectors continually assess the surrounding air temperature. Through software settings, they can function as multi-sensor smoke detectors, smoke detectors, or standalone heat detectors.

1.1.4 Manual Call Points

Manual call points are positioned at all final exits and along escape routes to enable manual operation in the event of a fire. They transmit data to the control panel upon activation, indicating the status of the manual switch. These call points are essential for manual fire suppression operations.

1.1.5 Sounder Beacons

Sounders and beacons are strategically installed throughout the building to offer both audible and visual alerts when the fire alarm system is activated. Beacons serve as a supplementary visual indicator alongside sounders. These installations are particularly beneficial for occupants who are deaf or hard of hearing.

1.1.6 Air Sampling Detection (ASD)

Aspirating smoke detectors (ASDs) are employed for early detection of smoke-generating fires in rooms and equipment located on the Basement and Ground Floor. Each aspirating smoke detector comprises an ASD assembly housing an integrated aspiration fan, flow sensors, filter, laser-based detection chamber, and control, output, and supervision circuitry.

The ASD continuously draws air from the monitored room through sampling points in the air sampling pipe distribution network. This air is then supplied to the detection chamber, where it is analyzed for smoke particles using the installed detector.

A communication interface is included to connect the aspirating smoke detector to the FDnet/C-NET. All aspirating smoke detectors are powered by an uninterruptible power

supply. Each ASD unit is equipped with a separate monitored power supply featuring integral backup rechargeable batteries. Additionally, each aspirating detection panel is supplied by a 24VDC battery-backed power supply.

The system comprises an air sampling pipe distribution network, encompassing piping, tubing, fittings, and fasteners. Piping extends from each ASSD apparatus to the protected areas, with sampling points positioned along the air sampling pipe distribution network.

The ASSD apparatus features independent configurable alarm and trouble relay outputs for interfacing with other systems. It supports and operates on an RS485 network, with each floor having its own independent network of devices. The RS485 network is wired with each device incorporating an integral repeater and loop isolator.

1.2 Asset Identifications

| Asset Tag/ID | Manufacturer | Model | Description |
|--------------|--------------|------------|---|
| FAS | Siemens | FC2040-AA | Fire Control Panel Power Supply: 150 W Max. Battery Capacity: 25 Ah |
| NA | Siemens | XCI2005-A1 | Standalone Extinguishing Control Panel |
| NA | Siemens | XCI2005-A1 | Extinguishing Card |
| PSU | Siemens | FP120-Z1 | Power Supply Kits Power Supply: 70 W (ASD) Batteries: max. 17 Ah |
| NA | Siemens | FTO2001-A1 | Event Printer For logging events. |
| NA | Siemens | FCA2001-A1 | RS232 Module (Isolated) For devices with an RS232 interface |
| NA | Siemens | FN2001-A1 | Network Module (SAFEDLINK) For networking several stations |
| NA | Siemens | BAT12-25 | Battery Rating: 12 V, 25 Ah |
| NA | Siemens | FCA2031-A1 | Connection Module (MoNet) |
| NA | Siemens | FHA2029-A1 | Mounting Kit (Switch) |

| Asset Tag/ID | Manufacturer | Model | Description |
|--------------|--------------|-------------------------------------|---|
| NA | Siemens | FN2012-A1 | Ethernet Switch (Modular) |
| NA | Siemens | VN2003-A1 | Ethernet Module (SM) |
| NA | Siemens | FCA2035-A1 | License Key (S3) |
| NA | Siemens | FDCIO222/ FDCIO221 | Input Module, Input/Output Modules Operating Voltage: DC 12...33 V Four Relay Outputs: AC 230 V / 4 A |
| NA | Siemens | FDCH221 | Housing with Cover, Seal, and Screws |
| MS | Siemens | Sinteso S-LINE FDOOT241-A | Multi-Sensor Fire Detectors Operating Voltage: DC 12...33 V |
| NA | Siemens | FDB222 | Flat, Addressable Detector Base 0.2...1.5 mm ² conductor cross- section |
| NA | Siemens | FDB291 | Base Attachment |
| NA | Siemens | FDB293 | Base Attachment Humid |
| MCP | Siemens | FDM226-RP | Manual Call Points FDnet/C-NET Operating Voltage: 12...33 V DC Operating Current (quiescent): 180 µA |
| NA | Siemens | Banshee Slow Whoop Multi Tone | Alarm Sounders Supply Voltage: 9 ... 30VDC |
| NA | Vimpex | VX1-24 | Strobe Lights Supply Voltage: 24 Vdc Output: 1W |
| NA | Vimpex | BANSHEE EXCEL | CH Sounder Operating Voltage: 9-30 V dc |
| ASD | Siemens | FDA241 | ASD Aspirating Smoke Detectors |

| Asset Tag/ID | Manufacturer | Model | Description |
|--------------|--------------|-----------------------|--|
| | | | Operating Voltage: 19.5...30 VDC Output: 4...20 mA |
| NA | Siemens | FDCC221S | Communication Interface Units Supplied with: – 2x spacers with thread – 4-pin plug-in terminal – ID adhesive label |
| NA | Siemens | FA2005-A1 | Batteries Rating: 12 V, 17 Ah |
| NA | Siemens | FDAZ292 | ASD Filter Box Contains filter set FDAZ292-AA with three filters, coarse/medium/fine |
| NA | Siemens | FDAZ292-AA | ASD Filter Set Filter set contains one coarse filter, one medium filter, and one fine filter. |
| NA | Plimat | NA | ABS Pressure Pipe Systems |
| NA | Plimat | REDPQRAV025 0 | PVC Quick Release Airline Adaptor and Valve Kit |
| NA | Plimat | RED30P020I | Red PVC-U Check Valves |
| NA | Plimat | REDSGVD040I | PVC-U Condensation Drain with Ball Valve |
| NA | Plimat | REDCKIT25F | Flush Air Sampling Kit |
| NA | Plimat | REDCKIT25C | Conical Air Sampling Kit |
| NA | Plimat | REDCKIT25D | Discrete Air Sampling Kit |
| NA | Plimat | NA | Flexible Pipe |
| NA | Plimat | NA | Clear Flexible Pipe |
| NA | Plimat | Refer to Technical | ASD Pipe Mounting Accessories (Clip, Threaded Rod Adaptors, |

| Asset Tag/ID | Manufacturer | Model | Description |
|---------------------|---------------------|--------------|-------------------------------------|
| | | Submittal | Fixing Nuts, Push in Plug) |
| NA | Vergokan NV | Various | Fire Alarm Installation Accessories |

2. Sequence of Operation

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2.1 Schedule of SOOs Sequence of Operations

| | SOO Title | Submittal/Document Reference Number |
|--|--------------------------------------|-------------------------------------|
| | Fire Suppression & Fire Alarm System | WES1A-MDCx-SOO-FP-003 |

3. Drawings

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3.1 Schedule of AE Drawings

| | Drawing Title | Drawing Number |
|----|---|--------------------|
| 1. | MDC-X Builaing - Electrical - Power and Data Plan_First Floor Level | WES1A.E-2005-MDC-0 |
| 2. | MDC-X Fire Alarm Plan – Ground Floor | XX |
| 3. | MDC-X HVAC and Pipework Plan – First Floor Level | XX |

3.2 Schedule of other Drawings

| | Drawing Title | Submittal/Document Reference Number |
|----|---------------|-------------------------------------|
| 1. | N/A | |

4. Maintenance

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4.1 Health & Safety Requirements

Prior to commencing any maintenance work, you must carry out a risk assessment and sign off the applicable form. You must take all necessary control measures dictated by the result of the risk assessment.

Prior to commencing the maintenance, you must evaluate and, if necessary, ensure the equipment/systems are isolated and locked out and that all control and ancillary circuits have been de-energized. See section 4.2 for further instructions.

| System / Equipment | Potential Hazard | Advice on Minimizing Hazard |
|---------------------------|--|--|
| WES1A Fire Alarm inc (VA) | Trip or fall hazards | <ul style="list-style-type: none"> Walking/working surfaces training for working around uneven, wet and slippery surfaces (includes warning to others of slippery surfaces) use cord cover and out of traffic areas |
| WES1A Fire Alarm inc (VA) | Working at Heights | <p>Registers are to be completed as per client procedures laid down within this section to include:</p> <ul style="list-style-type: none"> working platform inspection provision and use of work equipment, report of inspection lifting operations and lifting equipment, report of inspection <p>Plant and machinery will only be operated by authorised persons, where applicable, and this will be restricted to holders of a CITB recognised Construction Plant Competency Scheme Card (CPCS) or equivalent approved scheme.</p> <p>Mandatory training requirements are to be imposed.</p> |
| WES1A Fire Alarm inc (VA) | Periodic climbing/ lifting/ bending/ stooping | <ul style="list-style-type: none"> Use proper lifting techniques. Ergonomic training |

| System / Equipment | Potential Hazard | Advice on Minimizing Hazard |
|---------------------------|---|--|
| WES1A Fire Alarm inc (VA) | Potential electrical shock | <ul style="list-style-type: none"> • Implement LOTO in accordance with employer policy and as noted in Safe Isolation advice. • Avoid working around electrical equipment or outlets. • Ensure insulation on electrical cord is unbroken. • Shut-off electricity if possible. • Call in electrician for electrical repair/connection. |
| WES1A Fire Alarm inc (VA) | Fire and Emergency response | <ul style="list-style-type: none"> • Proper training to be given of fire extinguisher, first aid and phone communication |
| WES1A Fire Alarm inc (VA) | Cuts, crush, pinch, etc. during operation and/or maintenance of powered equipment (electrical, pneumatic, hydraulic, etc) | <ul style="list-style-type: none"> • Keep protective guards in place disconnect from power source before servicing. Use lockout-tag out. use PPE • Keep away from power lines |

4.2 Lockout Procedure

IMPORTANT:

- Only trained and authorized operators are allowed to perform energy isolations and lockout as per applicable legislation.
- Operators must consider all other systems that might relate to each energy isolation.

| Equipment | Lockout Procedure(s) |
|----------------------------|---|
| Power Distribution Systems | <p>This instruction illustrates a safe isolation procedure for persons concerned with work on low and medium voltage electrical systems.</p> <p>Provide for a safe system of work upon electrical circuits and equipment and applies directly to building operations. Apply the local regulations as a standard to any place where a person is at work. The regulations also provide that wherever repair, alteration, extension or cleaning is carried out upon electrical systems or where technical knowledge is required in order to avoid the danger</p> |

| Equipment | Lockout Procedure(s) |
|--|---|
| | of an electrical shock a competent person only may do such work and he must be accompanied. |
| General Electrical Safe Isolation (LOTO) | <p>Implement Lock Out Tag Out Process as applicable to the equipment. This ensures the requirements According to the European standard EN 50110-1, the safety procedure before working on electric equipment comprises the following five steps:</p> <ol style="list-style-type: none"> 1. Disconnect completely; this means identify the source of supply, followed by the operation of switches, the removal of fuses or links, or physical disconnection of conductors in order to make any system, or part of a system DEAD and secured so that it cannot be inadvertently made live. This will involve cutting off an electrical installation, a circuit or an item of equipment from every source of electrical energy. 2. Secure against re-connection; A keyed lock and tag should be applied to the point of electrical isolation 3. Verify that the installation is dead; by testing the equipment/system is dead. 4. Carry out earthing and short-circuiting; and 5. Provide protection against adjacent live parts. <p>LOTO is the practice of Lock Out Tag Out. This involves removing a fuse or isolating a breaker & locking it off with a padlock to which only the person who isolated & is working on the isolated system has the key. This is the only acceptable method of 'Safe Isolation'.</p> |
| General | <ul style="list-style-type: none"> • Avoid risk wherever possible. • Carry out risk assessment to evaluate risks that cannot be avoided. |

4.3 Recommended Maintenance and Schedule

Note: This section is supplemented by manufacturer's literature documents.

| System/Equipment | Maintenance Tasks | Frequency |
|-------------------|---|-----------|
| Log Book | Examine the system log book. Ensure that any faults recorded have received appropriate attention. | 6 MONTHLY |
| Visual Inspection | Inspect visually to check whether | 6 MONTHLY |

| System/Equipment | Maintenance Tasks | Frequency |
|---|--|-----------|
| | <p>structural or occupancy changes affect the compliance of the system with the recommendations of this standard for the siting of manual call points, automatic fire detectors and fire alarm devices.</p> <p>Note: Particular care should be taken to verify whether:</p> <ul style="list-style-type: none"> • All manual call points remain unobstructed and conspicuous. • Any new exits have been created without the provision of an adjacent manual call point. • Any new or relocated partitions have been erected within 500 mm horizontally of any automatic fire detector. • Any storage encroaches within 300 mm of ceilings. • A clear space of 500 mm is maintained below each automatic fire detector. | |
| Visual Inspection | <ul style="list-style-type: none"> • Any building alterations or extensions require additional fire detection and alarm equipment to be installed. • The building occupier should inform the maintenance engineer of any structural or occupancy changes which might affect the siting or operation of the detector. | |
| Fire Alarm Control and Indicating Equipment | <ul style="list-style-type: none"> • The fire alarm functions of the control and indicating equipment should be checked by the operation of at least one detector or manual call point on each circuit. | 6 MONTHLY |
| Fire Alarm Control and Indicating Equipment | <p>A check should be made by the Responsible Person nominated by the User every day to ascertain the following:</p> <ul style="list-style-type: none"> • That either the panel indicates normal operation, or if not, that any fault indicated is recorded in the logbook. • That every fault warning recorded the previous day has received attention. | DAILY |

| System/Equipment | Maintenance Tasks | Frequency |
|--------------------------------|--|-----------|
| Fire Alarm devices | <ul style="list-style-type: none"> • Check the operation of the fire alarm devices. <p>The addressable above ceiling detectors as located on the Reflected ceiling plans are access for maintenance and testing via the ceiling hatches installed.</p> | 6 MONTHLY |
| Controls and Visual Indicators | <ul style="list-style-type: none"> • Check all controls and visual indicators at control and indicating equipment for correct operation. | 6 MONTHLY |
| Alarm Signals | <ul style="list-style-type: none"> • Check the operation of any facility for automatic transmission of alarm signals to an alarm receiving centre. • Note: Where more than one form of alarm signal can be transmitted (e.g. fire and fault signals), the correct transmission of each signal should be confirmed. | 6 MONTHLY |
| Ancillary Functions | <ul style="list-style-type: none"> • Test all ancillary functions of the control and indicating equipment. | 6 MONTHLY |
| Fault Indicators | <ul style="list-style-type: none"> • Check all fault indicators and their circuits, where practicable, by simulation of fault conditions. | 6 MONTHLY |
| False Alarms | <ul style="list-style-type: none"> • Check the records of false alarms. • Record the rate of false alarms during the previous 12 months. • Record action taken in respect of false alarms. | 6 MONTHLY |
| Analogue Values | <ul style="list-style-type: none"> • In fire detection systems that enable analogue values to be determined at the control and indicating equipment, it should be confirmed that each analogue value is within the range specified by the manufacturer. | ANNUALLY |
| Smoke Detectors | <ul style="list-style-type: none"> • Functionally test point smoke detectors by a method that confirms that smoke can enter the detector chamber and produce a fire alarm signal. • Ensure that the material used does not cause damage to or affect the | ANNUALLY |

| System/Equipment | Maintenance Tasks | Frequency |
|--------------------|--|------------|
| | subsequent performance of the detector. | |
| Heat Detectors | <ul style="list-style-type: none"> • Functionally test every heat detector by means of a suitable heat source, unless operation of the detector in this manner would then necessitate replacement of part or the entire sensing element (e.g. as in fusible link point detectors or non-integrating line detectors). A special test arrangement is required for fusible link heat detectors. • Note: The heat source should not have the potential to ignite a fire; live flame should not be used, and special equipment might be necessary in explosive atmospheres. | 12 MONTHLY |
| Heat Detectors | <ul style="list-style-type: none"> • At least one detector should be operated, with the system in 'Fire Alarm Test' mode, to test the ability of the control and indicating equipment to receive a signal, to activate the audible & visual alarms and provide indication at the main control panel. | WEEKLY |
| Manual Call Points | <ul style="list-style-type: none"> • Test the switch mechanism of every manual call point, either by removal of a frangible element, insertion of a test key or operation of the device as it would be operated in the event of fire. | ANNUALLY |
| Visual Devices | <ul style="list-style-type: none"> • Check all fire alarm devices for correct operation. Confirm that visual fire alarm devices are not obstructed from view and that their lenses are clean. | ANNUALLY |
| Visual Devices | <ul style="list-style-type: none"> • Batteries and their connections should be examined and tested to ensure that they are in good serviceable condition and not likely to fail before the next quarterly inspection. • Backup batteries should be tested to verify that they are satisfactory for a | 3-MONTHLY |

| System/Equipment | Maintenance Tasks | Frequency |
|------------------|---|-----------|
| | <p>further period of use by taking measurements that are indicative of the conditions of each cell, e.g. its voltage on a known and very high rate of discharge. Batteries in any case should be replaced after four years continuous use.</p> <ul style="list-style-type: none"> The alarm functions of the control and indicating equipment should be checked by the operation of a detector in each zone. All ancillary functions of the control panel should also be tested where practical. All fault indicators and their circuits should be checked, preferably by simulation of fault conditions. The control and indicating equipment should be visually inspected for signs of moisture ingress and other deterioration. | |
| Visual Devices | <ul style="list-style-type: none"> A visual inspection should be made to check whether structural or occupancy changes have affected the requirements for the siting of manual call points, detectors and sounders. The visual inspection should also confirm that a clear space of at least 750mm is preserved in all directions below every detector, that the detectors are sited in accordance with the relevant British Standards and that all manual call points and control panels remain unobscured and conspicuous. | |
| Filament Lamps | <ul style="list-style-type: none"> Replace all unmonitored, permanently illuminated filament lamp indicators at control and indicating equipment. | ANNUALLY |
| Cables | <ul style="list-style-type: none"> Visually inspect to confirm that all readily accessible cable fixings are secure and undamaged. | ANNUALLY |
| Cause & Effect | <ul style="list-style-type: none"> Confirm the cause-and-effect programme is correct. | ANNUALLY |

| System/Equipment | Maintenance Tasks | Frequency |
|------------------------------------|---|-----------|
| Standby Power | <ul style="list-style-type: none"> • Check standby power supply capacity to establish it remains suitable for continued service. | ANNUALLY |
| Interlocks | <ul style="list-style-type: none"> • Check condition for mechanical damage. • Check operation and control mechanisms. • Note: Interlocks will be with heating, ventilating and cooling equipment and with fire extinguishing. | ANNUALLY |
| Manufacturers Checks and Tests | <ul style="list-style-type: none"> • Carry out all further checks and tests recommended by the manufacturer of the control and indicating equipment and other components of the system. • On completion of the work, report any outstanding defects to the responsible person, complete the system logbook and issue a servicing certificate. | 6 MONTHLY |
| Fire Alarms - Associated Equipment | <ul style="list-style-type: none"> • Note: The client should carry out tests on equipment on a weekly basis in accordance with the local fire regulations. When carrying out maintenance any defects must be reported to the client. | |
| Batteries | <ul style="list-style-type: none"> • Examine batteries and their connections and momentarily test load with the mains disconnected (other than those within devices such as manual call points, detectors and fire alarm sounders of a radio linked system), to ensure that they are in good serviceable condition and not likely to fail before the next service visit. • Check batteries condition and life. <p>Note: Check according to the manufacturer`s recommendations.</p> | 6 MONTHLY |

4.4 Specific Tools

| Equipment / System & Maintenance Task | Specific Tool Required |
|---|--|
| Fire alarm control panel detection loop - Fault detection | Line tester - FDUL221 |
| Fire alarm point detection – Testing | Intelligent Detector Tester FDUD293 + Telescope rod (8m) FDUM292 |

4.5 Equipment Troubleshooting

| Equipment | Problem | Possible Solutions |
|------------|---------|---|
| Fire Alarm | NA | <p>Due to the life safety function of the fire alarm system, fault finding and rectification should only be attempted by competent Specialist Contractor employing trained personnel.</p> <p>Untrained personnel should not attempt anything other than what is detailed in the User Manual. Even persons attempting these functions should have had prior familiarisation and training.</p> <p>In the event that a fault message is displayed on the Main Fire Alarm Panel, then this should be reported to the Contractor with whom a maintenance Contract has been entered into.</p> |

4.6 System Troubleshooting

| Problem | Possible Solutions |
|---------|------------------------------|
| | Refer to 4.5 |

5. Spare Parts

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5.1 Spare Parts Schedule for Preventive Maintenance

| Equipment | Manufacturer of Equipment | Manufacturer Part No | Quantity/ Timeline | Spare Part Description | Data Sheet Submittal Document No. |
|-----------|---------------------------|----------------------|--------------------|------------------------|-----------------------------------|
| N/A | | | | | |

5.2 Spare Parts Schedule for Corrective Maintenance

| Equipment | Manufacturer of Equipment | Manufacturer Part No | Quantity/ Timeline | Spare Part Description | Data Sheet Submittal Document No. |
|-----------|---------------------------|----------------------|--------------------|------------------------|-----------------------------------|
| N/A | | | | | |

6. Manufacturer's Product Literature

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6.1 Schedule of Manufacturer's Product Literature

| | Manufacturer/Supplier | Submittal / Document title | Submittal/ Document Reference Number |
|----|------------------------------|-------------------------------------|---|
| 1. | Siemens, VimpeX | MDC-X Fire/Evacuation Alarm System | WES1A-019200-2000-0049-PD |
| 2. | Siemens, Plimat, VimpeX | MDCx Fire Alarm | WES1A-019200-2000-0049-PD |
| 3. | Vergokan NV | Fire Alarm Installation Accessories | WES1A-019200-2000-0049-PD |

7. Testing Documentation

SM-0010-E-S-MDCx - Fire Alarm

7.1 Schedule of Commissioning Documents

| | CX Report Type (level) | Item | Submittal/Document Reference Number |
|----|------------------------|---|---|
| 1. | Commissioning | L3_Blue_Life Safety_MDC Fire Cause & Effect_FAP_MDC-X | L3 Blue Life Safety MDC Fire Cause & Effect |
| 2. | Commissioning | ICL_Yellow_Life Safety_Aspirating Smoke Detection Panel_ASD02 MDC-X | ICL Yellow Life Safety Aspirating Smoke Detection Panel ASD-XXX |
| 3. | Commissioning | ICL_Yellow_Life Safety_Aspirating Smoke Detection Panel_ASD01 MDC-X | ICL Yellow Life Safety Aspirating Smoke Detection Panel ASD-XXX |
| 4. | Commissioning | ICL_Yellow_Life Safety_MDCx Fire Alarm Panel_FAP MDC-X | ICL Yellow Life Safety MDCx Fire Alarm Panel FAP-XXX |
| 5. | Commissioning | L3_Blue_Life Safety_Aspirating Smoke Detection Panel_ASD02 MDC-X | L3 Blue Life Safety Aspirating Smoke Detection Panel ASD-XXX |
| 6. | Commissioning | L3_Blue_Life Safety_Aspirating Smoke Detection Panel_ASD01 MDC-X | L3 Blue Life Safety Aspirating Smoke Detection Panel ASD-XXX |
| 7. | Commissioning | L2_Yellow_Life Safety_Aspirating Smoke Detection Panel_ASD02 MDC-X | L2 Yellow Life Safety Aspirating Smoke Detection Panel ASD-XXX |
| 8. | Commissioning | L2_Yellow_Life Safety_Aspirating Smoke Detection Panel_ASD01 MDC-X | L2 Yellow Life Safety Aspirating Smoke Detection Panel ASD-XXX |

| | | | |
|----|---------------|---|--|
| 9. | Commissioning | L2_Yellow_Life Safety_Fire Alarm Panel_FAP MDC-X | L2_Yellow Life Safety Fire Alarm Panel_FAP |
|----|---------------|---|--|

7.2 Schedule of Other Test Reports

| | Item | Submittal/Document Reference Number |
|----|------|-------------------------------------|
| 1. | N/A | |

7.3 Schedule of Certificates

| | Item | Submittal/Document Reference Number |
|----|------|-------------------------------------|
| 1. | N/A | |

8. Training Materials

SM-0010-E-S-MDCx - Fire Alarm

8.1 Schedule of Training Materials

| | Training Description | Media | Submittal/Document Reference Number |
|----|---------------------------------|-------|-------------------------------------|
| 1. | To be completed at final issue. | | |

9. Warranties

SM-0010-E-S-MDCx - Fire Alarm

9.1 Schedule of Warranties

| | Manufacturer | System/Equipment | Submittal/Document Reference Number |
|----|--------------|------------------|-------------------------------------|
| 1. | | Warranty | |

10. Environmental, Health and Safety References

SM-0010-E-S-MDCx - Fire Alarm

10.1 Schedule of EHS Regulations and Requirements

| | Regulation Description | Reference |
|----|------------------------|---------------------|
| 1. | EN 1990 | Design Working Life |

10.2 Schedule of EHS Documentation

IMPORTANT!

- DCOps technicians, ensure to consult the latest electrical single-line diagrams in the Operations document management system.
- Refer to the approved SCCAF for calculated values, engineers findings and labels.
- Refer to section 4.1 Health and Safety Requirements for additional safety / hazard concerns.

| | Submittal Title | Submittal/Document Reference Number |
|----|-------------------------------|-------------------------------------|
| 1. | Not applicable to these works | |

11. Design Specifications

SM-0010-E-S-MDCx - Fire Alarm

11.1 Schedule of Design Specifications

| | Specification Section Number | Specification Name |
|----|------------------------------|---|
| 1. | WES1A_26 08 00 | CSPECs - Commissioning of Electrical Systems |
| 2. | WES1A_26 08 01 | Testing Electrical Systems (EMEA) |
| 3. | WES1A_28 08 01 | Commissioning of Electronic Fire Detection and Signalling System (EMEA) |
| 4. | WES1A_28 31 05 | Fire Alarm Cables and Containment Systems (EMEA) |
| 5. | WES1A_28 31 11 | CSPECs - Digital, Addressable Fire-Alarm System (EMEA) |
| 6. | WES1A_28 31 13 | Air Sampling Smoke Detection Systems (EMEA) |

Glossary of Terms

| | Term | Description |
|-----|--------|---|
| 1. | A | Amperage (Amps) |
| 2. | A&E | Architectural & Engineering Firm |
| 3. | A/C | Air Conditioning |
| 4. | AC | Alternating Current |
| 5. | ACC | Auto Changeover Controller – Control unit to monitor and control operation of incoming breakers (mains & generator) in PMDCs, PMDC-IR and Control Unit provided to changeover power to critical distribution elements |
| 6. | ACH | Air Changes per Hour |
| 7. | AHU | Air Handling Unit |
| 8. | AI | Analogue Input |
| 9. | AO | Analogue Output |
| 10. | ATP | Automatic transfer Pair deriving primary supply from PMDC and alternate supply from IR SWDB and feeding downstream busbar system for data hall IT critical and mechanical load. |
| 11. | BAS | Building Automation System |
| 12. | BDC | Panel board for miscellaneous supplies – Typically supporting mechanical services in plant rooms and general lighting & small power distribution boards |
| 13. | BMS | Building Management System |
| 14. | BST | British Summer Time |
| 15. | CCNR | Core Campus Network Room |
| 16. | CD-ROM | Compact Disc Read Only Memory |
| 17. | CFR | Code of Federal Regulations |
| 18. | cGMP | Current Good Manufacturing Practices in accordance with Title 21 |

| | Term | Description |
|-----|-------------|---|
| | | Code of Federal Regulations. |
| 19. | CHW | Chilled Water |
| 20. | CIP | Clean in Place |
| 21. | CMT | Construction Management Team |
| 22. | CP/ MCU | Cooling Panel board for Modular Cooling Unit – Supplies to mechanical plant associated with Cooling Towers. Provided under separate package |
| 23. | CRAC | Computer Room Air Conditioning Unit |
| 24. | CRAH | Computer Room Air Handling Unit |
| 25. | CVB | Constant Volume Box |
| 26. | DC | Direct Current |
| 27. | DC | Data Centre |
| 28. | DDC | Direct Digital Control |
| 29. | DDE | Dynamic Data Exchange |
| 30. | DDS | Detailed Design Specification |
| 31. | DI | Digital Input |
| 32. | DO | Digital Output |
| 33. | DPU | Distributed Processing Unit (Standalone BMS Control Panel) |
| 34. | EMS | Environmental Monitoring System (Qualified) |
| 35. | EU | European Union |
| 36. | FAS | Fire Alarm System |
| 37. | FAT | Factory Acceptance Test |
| 38. | FMC | Facility Management Control |

| | Term | Description |
|-----|-------------|--|
| 39. | FS | Functional Specification |
| 40. | FTS | Functional Test Specification |
| 41. | GAMP | Good Automated Manufacturing Practice |
| 42. | GDP | Good Documentation Practice |
| 43. | GEP | Good Engineering Practice |
| 44. | GLS | Graphic Locator System |
| 45. | GMP | Good Manufacturing Practices |
| 46. | GMT | Greenwich Mean Time |
| 47. | GUI | Graphical User Interface |
| 48. | HDD | Hardware Disk Drive |
| 49. | HDS | Hardware Design Specification |
| 50. | HFAT | Hardware Factory Acceptance Test |
| 51. | HMI | Human Machine Interface |
| 52. | HOA | Hand-Off-Auto Switch |
| 53. | HV | High Voltage |
| 54. | HVAC | Heating, Ventilation and Air Conditioning |
| 55. | Hz | Hertz |
| 56. | I/O | Input / Output Signals |
| 57. | ICEA | Insulated Cable Engineers Association |
| 58. | ICU | Integral Control Unit |
| 59. | IED | Intelligent Electronic Devices – Protection relays/devices |
| 60. | IP | Ingress Protection |

| | Term | Description |
|-----|-------------|---|
| 61. | IQ | Installation Qualification |
| 62. | IR SWDB | Isolated Redundant Distribution Switchboard deriving supply from PMDCIR and providing alternate supply to critical IT and ancillary building loads via Automatic Transfer Pair switchgear |
| 63. | ISA | Instrumentation Systems and Automation Society |
| 64. | kW | Kilowatt |
| 65. | l/s | Litres per Second |
| 66. | LB | Load Bank |
| 67. | LBS | Load Bank Switchgear |
| 68. | LPHW | Low Pressure Hot Water |
| 69. | LV | Low Voltage |
| 70. | MB | Main Building |
| 71. | MCB | Miniature Circuit Breaker |
| 72. | MCC | Motor Control Centre |
| 73. | MCU | Modular Cooling Unit |
| 74. | MDC | MDC Main Distribution Centre – switchboards deriving supply from dedicated power transformers and feeding downstream new SDCs. |
| 75. | MDC | Main Distribution Centre |
| 76. | MES | Manufacturing Execution System |
| 77. | MMI | Man Machine Interface |
| 78. | MRP | Media Redundancy Protocol |
| 79. | MV | Medium Voltage |
| 80. | MVD's | Medium Voltage Distribution Centres - 12kV boards deriving its supply from the upstream SSS's and the GPS – MVD's have a split bus-bar with a dual incomer. |

| | Term | Description |
|------|-------------|---|
| 81. | NC | Non-Critical Alarms |
| 82. | °C | Degree Centigrade |
| 83. | OFE | Owner Furnished Equipment |
| 84. | OIP | Operator Interface Panel |
| 85. | OPC | OLE for Process Control, (Object Linking and Embedding for Process Control) |
| 86. | OQ | Operation Qualification |
| 87. | OWS | Operator Work Station |
| 88. | P&ID | Piping and Instrument Diagram |
| 89. | PC | Personal Computer |
| 90. | PD | Partial Discharge |
| 91. | PID | Proportional-Integral-Derivative |
| 92. | PLC | Programmable Logic Controllers |
| 93. | PQ | Performance Qualification |
| 94. | PSU | Power Supply Unit |
| 95. | PT | Pressure Transmitter |
| 96. | QA | Quality Assurance |
| 97. | QBMS | Qualified Building Management System |
| 98. | R&D | Research & Development |
| 99. | RAID | Redundant Array of Independent Disk |
| 100. | RH | Relative Humidity |
| 101. | RIO | Remote I/O |
| 102. | RTN | Real Time Network |

| | Term | Description |
|------|-------------|---|
| 103. | SAN | Storage Area Network |
| 104. | SAT | Site Acceptance Test |
| 105. | SCADA | Supervisory Control and Data Acquisition System – The SCADA system carries out and monitors all automatic electrical switching procedures. |
| 106. | SDC | Site Distribution Centre –switchboard deriving supply from upstream MDC and feeding downstream PMDCs |
| 107. | SDP | Smoke Damper Panel |
| 108. | SDS | Software Design Specification (Detailed SOO) |
| 109. | SFAT | Software Factory Acceptance Test |
| 110. | SGS | Swing Generator Switchgear – The SGS is an 12kV switchboard which distributes the power from the ‘swing’ generator to the GPS’s and the load bank. |
| 111. | SHE | Safety, Health and Environment |
| 112. | SOO | Sequence of Operation |
| 113. | SOP | Standard Operating Procedure |
| 114. | SPD | Surge Protection Device |
| 115. | SSFR | Shared Services Facility Racks |
| 116. | SSNR | Support Services Network Room |
| 117. | SSS | Secondary Service Selection Switchgear – The SSS has 3 (three) incoming circuit breakers. It derives its primary supply from a 150/30kV power transformer. The second incomer to the SSS is from the alternative SSS and its third incoming circuit breaker is supplied from the Generator Paralleling Switchboard. The SSS provides power to downstream loads such as MVD’s, CCNR and CUB. |
| 118. | SST | 220/22 kV Substation |
| 119. | TBC | To Be Confirmed |
| 120. | TCP/IP | Transmission Control Protocol over Internet Protocol |

| | Term | Description |
|------|-------------|--|
| 121. | TDR | Time Domain Reflectometry |
| 122. | U0 | Nominal system phase-to-earth voltage |
| 123. | UAT | User Acceptance Test |
| 124. | UPS | Uninterrupted Power Supply |
| 125. | URS | User Requirements Specification |
| 126. | USS | Unit Substation Switchgear – 12kV Switchgear comprising of two circuit breakers on a common Busbar, supplying 1no. MV/LV transformer. This MV Switchgear arrangement shall be free-issued to the LV Switchgear specialist for incorporation into the 'USS Skid'. |
| 127. | UTC | Coordinated Universal Time |
| 128. | V | Volts |
| 129. | VAV | Variable Air Volume |
| 130. | VDC | Voltage in a direct current (DC) circuit |
| 131. | VDU | Visual Display Unit |
| 132. | VFC | Volt Free Contact |
| 133. | VFD | Variable Frequency Drive |
| 134. | VLF | Very Low Frequency |
| 135. | VSD | Variable Speed Drive |
| 136. | VSD (VFD) | Variable Speed Drive (Variable Frequency Drive) |
| 137. | WB | Wet Bulb |