



MARINE ELECTROTECHNOLOGY

IFDS Integrated Fire Detection System

System Binder



MÉRIDIEN MARITIME
ISV008, ISV009 & ISV010
INSHORE SCIENCE VESSEL

Revision 0

REVISION

Rev	Name	Date of revision	Description
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SECTION 1

Instruction Manual



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Instruction Manual



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IMPORTANT INFORMATION

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1.0 TERMINOLOGY

The following terminology will be used throughout the document.

CPU: Name given to the processing core of the system.

CPU INTERFACE: Operator Interface.

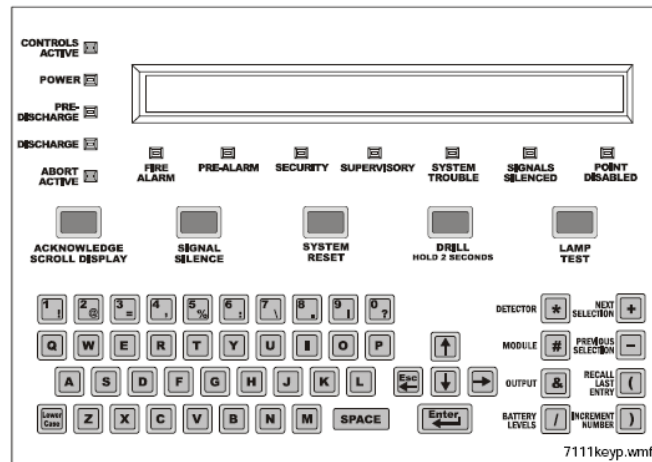


Figure 1: CPU Interface

FIRE DETECTION PANEL: Physical enclosure.



Figure 2: Fire Panel

SENSOR BASE: Detector mounting base.



Figure 3: Flangeless base

SENSOR SOUNDER BASE: Intelligent detector mounting base with integrated sounder device.

SMOKE DETECTOR: Detector with an optical sensing chamber that is engineered to sense smoke produced by a wide range of combustion sources.



Figure 4: Smoke Detector with flanged mounting base

HEAT DETECTOR:

Detector with a thermistor sensing circuit to produce a fixed-temperature and a rate-of-rise thermal detection.



Figure 5: Heat Detector with flangeless mounting base

MANUAL STATION:

Manual fire alarm station



Figure 6: Manual Pull Station

EXPLOSION PROOF DETECTOR: Detector in cast aluminum housing suitable for use in Hazardous Locations.



Figure 7: Heat Detector Explosion Proof

FLAME DETECTOR: Detector that respond to infrared radiation.



Figure 8: Flame Detector

ISOLATOR: Protect the system against wire-to-wire short circuits on the SLC loops.



Figure 9 : Isolator

MONITOR MODULE:

Monitor module use to interface dry contact.



Figure 10: Miniature and Standard Size Monitor Module

RELAY MODULE:

Relay module for activation of a variety of devices.



Figure 11: Relay Module

CONTROL MODULE:

Control module to generate/provide output.



Figure 12: Control Module

BELL: For audible signalization.



Figure 13: Bell

HORN AND STROBE: For visual and audible signalization.



Figure 14: Horn and Strobe

DISPLAY ANNUNCIATOR: Remote display annunciator with deported control function.



Figure 15: Display Annunciator

AMS: Alarm and Monitoring System

COMMUNICATION DEVICE:**Figure 16: RS-232 Server****MONITOR:**

AMS user interface to the system.

**Figure 17: AMS Display****POWER SOURCE:**

Electrical feeder necessary for the Fire Detection Panel.

SLC:

Signaling Line Circuit

NAC:

Notification Appliance Circuit

2.0 PROCEDURES

2.1 START-UP PROCEDURE

At the ship's Vac distribution power panels, close the circuit breaker that supplies the power source to the IFDS. Then please refer to the drawing(s) for power distribution of the system to locate fuses that need be pushed. When the panel is powered up, either by its batteries or from its Vac supply, the CPU2-640 will first check its memory and do internal tests. It will also show the software version present in it. During this first step, the local buzzer on the panel will sound, during approximately 15 seconds. In the second step, the Fire Detection Panel will scan all its loops connected on it and will confirm if all detectors that are programmed in its memory are correctly initialized and/or if there is an alarm.

2.2 SHUTDOWN PROCEDURE

Lift appropriate fuses according to Techsol's drawing.

3.0 CURRENT PROJECT SPECIFICITIES

Following information are applicable only on the current project.

Type Of CPU:	CPU2-640
Cabinet size:	B
Fire Panel Location:	Wheelhouse
Display Annunciator Location:	Engine Room
Delay before initiate fire alarm:	2 min on all smoke and heat detectors
Loop Arrangement :	Style 6
Section of manual that does not apply:	Explosion Proof Detector Flame Detector

4.0 IFDS SYSTEM DESCRIPTION

4.1 CPU AND CPU INTERFACE

The CPU is monitoring fire zones using sensors like smoke detectors, thermal detectors, and manual pull stations located all around the vessel. An intelligible message will be displaying on the CPU interface in case of fire and/or any failure on the system. There's also indicator lights on the CPU interface.

Indicator	Color	When Active	To Turn Off
POWER	Green	Lights when the proper primary AC power is applied. Remains lit while power is applied.	Always lit with AC power applied.
FIRE ALARM	Red	Flashes when a non-acknowledged fire alarm exists. Lights steadily after you acknowledge the fire alarm.	Clear the alarm condition and reset the system.
PRE-ALARM	Red	Flashes when a non-acknowledged fire Pre-Alarm exists. Lights steadily after you acknowledge the Pre-Alarm.	Clear the pre-alarm condition. (Action Pre-Alarm requires a system reset.)
SECURITY	Blue	Flashes when a non-acknowledged Security alarm exists. Lights steadily after you acknowledge the alarm.	Clear the Security alarm condition and reset the system.
SUPERVISORY	Yellow	Flashes when a non-acknowledged Supervisory condition exists. Lights steadily after you acknowledge the event.	Clear the condition
SYSTEM TROUBLE	Yellow	Flashes when a non-acknowledged system trouble exists. Lights steadily after you acknowledge the trouble.	Clear the trouble condition.
SIGNALS SILENCED	Yellow	Lights after a fire alarm condition occurs and after you press SIGNAL SILENCE.	Press SYSTEM RESET. DRILL will also turn off the led.
POINT DISABLED	Yellow	Lights when one or more system devices are disabled.	Enable the device or remove the disabled device from the system program.

4.2 FIRE DETECTION PANEL

The fire panel is located in the main fire control station. This panel, which can be from different size, contain several equipment like CPU, CPU interface, batteries, communication device, etc...

4.3 SENSOR BASE

Detector mounting base on which you can install smoke and heat detector head. Sensor sounder base give the possibility to have a local audible alarm when associated detector head is triggered.

4.4 SMOKE DETECTOR

This intelligent photoelectric smoke detector has an optical sensing chamber that is engineered to sense smoke produced by a wide range of combustion sources. It is addressable with a rotary selector and has a bicolor LED that blinks green every time the detector is addressed, and is illuminated steady red on alarm.

4.5 HEAT DETECTOR

The addressable thermal detector can be a rate-of-rise and/or fixed temperature type. It is addressable with a rotary selector and has a bicolor LED that blinks green every time the detector is addressed, and is illuminated steady red on alarm.

4.5.1 FIXED TEMPERATURE HEAT DETECTOR

This heat detector will trigger in alarm when the ceiling temperature reaches 135°F or 190°F depending of the model.

4.5.2 RATE-OF-RISE HEAT DETECTOR

This heat detector will trigger in alarm when the ceiling temperature reaches 135°F or if the temperature increases at a minimum rate of 15°F per minute.

4.6 MANUAL STATION

This single action manual station with a pull down lever, when operated, locks in position after activation of the alarm circuit and can be reset with the key that is supplied with the unit. It is addressable with a rotary selector and has a bicolor LED that blinks green every time the detector is addressed, and is illuminated steady red on alarm. There's also models that are not addressable which have to be used with a monitor module.

4.7 EXPLOSION PROOF DETECTOR

Detector made of a cast of aluminum housing suitable for use in hazardous locations like batteries room and paint locker. Heat detectors are the most commonly used. A set of normally open contacts will close when the ceiling temperature increases at a minimum rate of 8.4 Celsius degrees per minute. Closing the contact initiates the fire alarm sequence. Independent of the rate-of-rise operation, the fixed temperature portion consists of a spring-loaded plunger retained by a fusible alloy that releases when the ceiling temperature reaches 93 degrees Celsius. Must be use with a monitor module. If the detector is tested in a way to be triggered by rising temperature, it will be resettable by cooling it down. Otherwise, it will not be possible to do so.

4.8 FLAME DETECTOR

This detector is engineered to respond to the nominal 4.45 micron band of infrared radiation, which is commonly known as the CO₂ spike. A characteristic of burning hydrocarbons is the emission of unusually high levels of IR radiation in this narrow portion of the radiation spectrum.

4.9 ISOLATOR

Module that will protect the system against wire-to-wire short circuits on the loops. It protect up to 25 units (detectors, pull stations etc...) that are connected on it and automatically reset on correction of short. It also has a LED that blinks in normal condition and will become steady when a short circuit is detected. For example, in case that a fire burns a wire and causes a short circuit on the loop, only the detectors that are between the same isolator will be lost.

4.10 MONITOR MODULE

Monitor modules are used to supervise a circuit of dry-contact input devices, such as conventional heat detectors and pull stations. It is addressable with a rotary selector.

4.11 BELL, HORN AND STROBE.

Audible and visual device attended to give an appropriate fire alarm signal to qualified crew. Horn and strobe are located in noisy environment like machinery space. Depending of the ship's class and the type of fire alarm, a delay before the activation of these outputs device can be added (see Section 3.0). These devices are not available in passenger space (if applicable).

4.12 DISPLAY ANNUNCIATOR.

The display annunciator allows you to provide alarm, reset, acknowledge and silence the control panel from a remote location.

4.13 AMS, MONITOR AND COMMUNICATION DEVICE.

The Alarm Monitoring System can communicate with the Fire Detection CPU via the communication device and display information on its monitor (See also Section 8).

4.14 POWER SOURCES

The power supply section is composed of two different sources of supply. The first source (Primary) comes from the ship's 120 or 240Vac power depending of the type of CPU. If for any reason this source fails, the second source will supply the system. This power comes from the 24Vdc batteries bank (most of the time located in the fire panel). In emergency situations, the system is supplied from this source. Batteries are sized to give autonomy of a minimum of 18 hours in monitoring services and 30 minutes in alarm mode. The system switches from one source to the other without interruption of service. Both supply sources are constantly monitored and, in the event of a failure, it will be reported on the system's display for immediate attention.



Required autonomy of the panel depends of the classification society.



Condition of the batteries may affect autonomy of the panel. See Maintenance.

4.15 SLC

Communication between the control panel and intelligent addressable monitor and control devices takes place through a Signaling Line Circuit (SLC), which can be wired in two different styles.

4.15.1 STYLE 4

Style 4 allows T-tapping. Each isolated branch are on a separate fire zone.

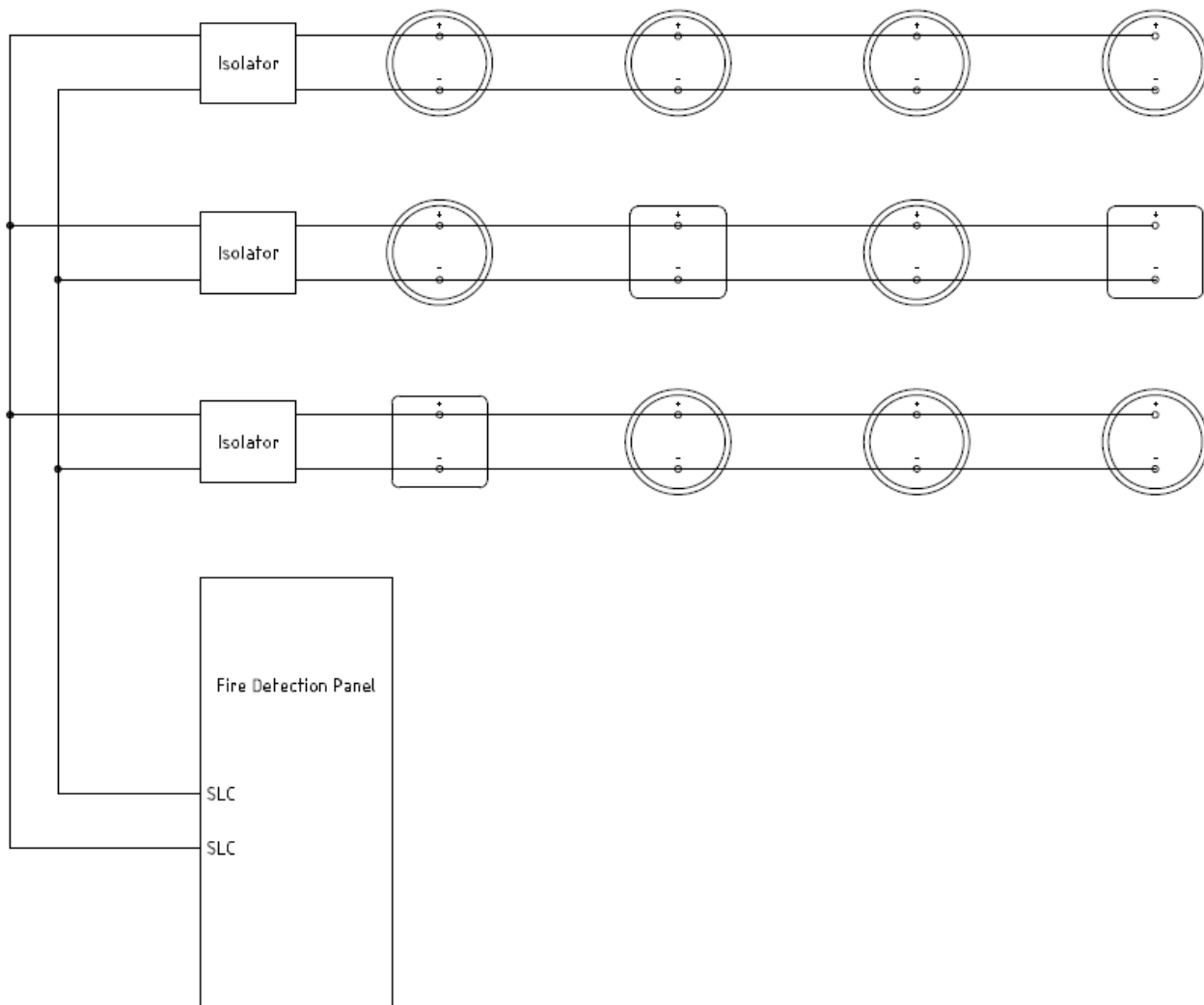


Figure 18: SLC Style 4 Wiring

A single wire break has for effect that communication will be lost with every detector after it. If there's a wire short, communication will be lost with detectors located in the same fire zone.

4.15.2 STYLE 6

Style 6 don't allows T-tapping. Each detectors located between two isolators are on a separate fire zone.

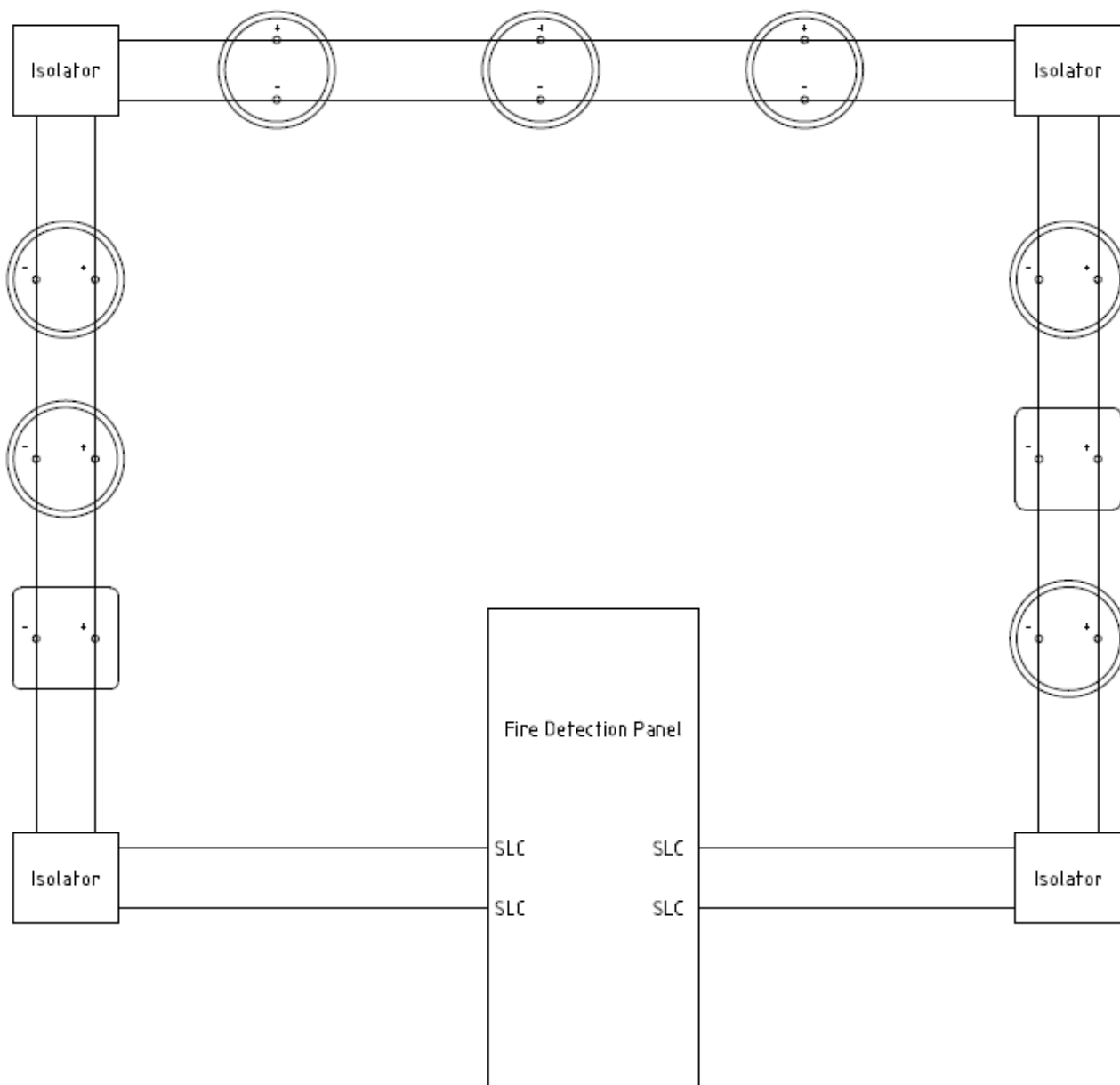


Figure 19: SLC Style 6 Wiring

A single wire break has no effect on the SLC. A trouble message will be raised on the cpu display, but the system will still be fully operational. If there's a wire short, you only lose the detector located in the same fire zone.

4.16 NAC

A Notification Appliance Circuit connect audible and visual notification appliances to the fire alarm system control unit.

5.0 ALARM GENERATION

The system responds to the alarm and trouble conditions by providing location/zone audible and visual annunciation.

5.1 SYSTEM NORMAL ANNUNCIATION

The system operates in Normal mode when no alarm or trouble exist. In Normal mode, the control panel displays a System Normal message.

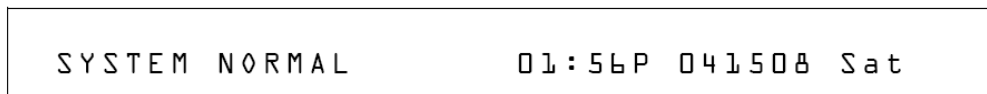


Figure 20: Sample System Normal Message

In Normal mode, the control panel does the following functions at regular intervals:

- Polls all SLC devices and the four NACs to check for valid replies, alarms, troubles, circuit integrity, supervisory signals, etc.
- Checks power supply troubles and batteries at 10-second intervals
- Refreshes the LCD display
- Scans for any keypad or Control Key entries
- Performs a detector automatic test operation
- Tests system memory
- Monitors for microcontroller failure

5.2 FIRE ALARM ANNUNCIATION

When an initiating device (detector or monitor module) activates, the control panel does the following:

- Produces a steady audible tone
- Activates the System Alarm relay.
- Flashes the Fire Alarm LED.
- Displays a Type Code that indicates the type of device that activated the fire alarm.
- Displays ALARM in the status banner on the LCD display, along with information specific to the device, as shown below:

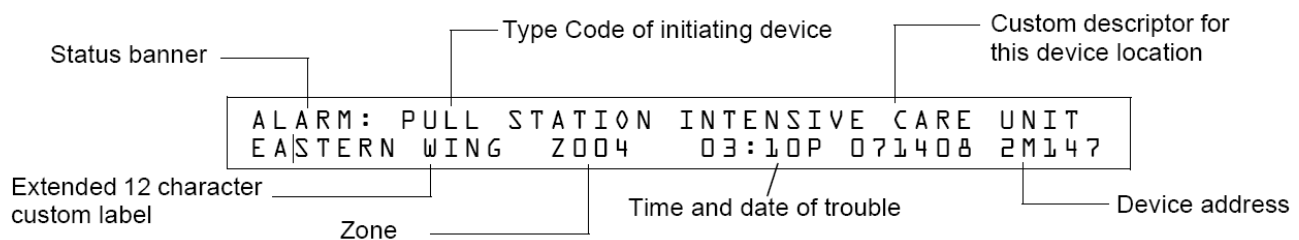


Figure 21: Sample Fire Alarm Display

- Sends an Alarm message to the LCD display.
- Latches the control panel in alarm.

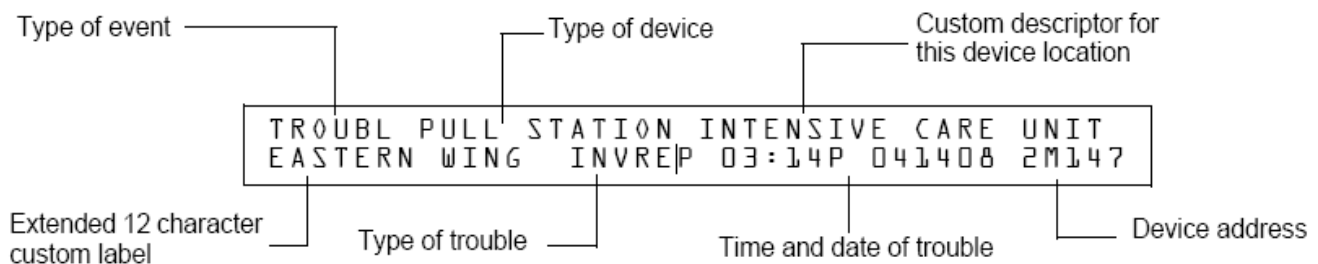


You cannot return the control panel to normal operation until you correct the alarm condition and reset the control panel.

5.3 TROUBLE ALARM ANNUNCIATION

The system goes into system trouble when the control panel detects an electrical fault. If no fire alarm exists, the control panel does the following:

- Produces a pulsed audible tone
- Activates the Trouble relay.
- Flashes the SYSTEM TROUBLE LED.
- Displays a Type Code that indicates the type of device with a trouble.
- Displays TROUBL in the status banner on the LCD display as well as the type of trouble any information specific to the device.
- Sends a Trouble message to the LCD display as follow:

**Figure 22: Sample Trouble Message**

If a fire alarm exists when a trouble exists, the SYSTEM TROUBLE LED lights, but the alarm message appears in the LCD display.

6.0 ALARM PANEL FUNCTIONS

6.1 ALARM SILENCING

Use the SIGNAL SILENCE key to silence the panel sounder and turn off all audio and visual devices connected to Notification Appliance Circuits. When pressed, the control panel does the following:

- Turns off the panel sounder;
- Turns off all silenceable output circuits;
- Lights the SIGNALS SILENCED LED.



All silenceable output will resound if there's a new fire detection

6.2 ALARM ACKNOWLEDGMENT

Use the ACKNOWLEDGE/SCROLL DISPLAY key to respond to new alarm or trouble signal. When pressed, the control panel does the following:

- Silences the panel sounder;
- Changes all active LED indicators from flashing to steady;
- Sends a signal to silence the sounders on the LCD-80 and ACS annunciators.

You can also press this key to display multiple alarms or troubles. If more than one alarm or trouble exist, the control panel displays the next alarm or trouble for 3 seconds (or until you press the ACKNOWLEDGE/SCROLL DISPLAY key), then displays the next alarm or trouble.

6.3 DRILL

Use the DRILL key to manually activate all silenceable outputs and Notification Appliance Circuits. To prevent accidental activation, you must press the DRILL key for 2 seconds. When pressed, the control panel does the following:

- Turns on all silenceable NACs;
- Turns off the SIGNALS SILENCED LED.

6.4 SYSTEM RESET

Use the SYSTEM RESET key to reset the control panel. When pressed, the control panel does the following:

- Clears ALL active inputs;
- Interrupts resettable power.

If any alarm or trouble exists after you press the SYSTEM RESET key, all NACs, control outputs, and panel audio and visual indicators will reactivate.



Active trouble conditions will not be cleared and still be reported upon RESET.

6.5 LAMP TEST

Use the LAMP TEST key to test the control panel LEDs, all installed panel circuits, and the panel sounder. When pressed and held, the control panel does the following:

- Lights all control panel LEDs;
- Turns on the panel sounder;
- Lights all segments of the LCD display. When the LAMP TEST key is held for longer than five seconds, the LCD will display the Software Revisions;
- Lights all panel circuit LEDs.

7.0 PROCEDURES

7.1 DETECTOR TESTING

All sensors must be tested after installation and periodically thereafter. Testing methods must satisfy the authority having jurisdiction.

7.1.1 SMOKE AND HEAT DETECTOR MAGNET TEST

Apply the test magnet against the cover in the magnet test area, as shown in the next figure, to activate the test feature. The LEDs should latch on within 10 seconds, indicating alarm and annunciating the panel. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for a fire alarm to be generated on the main fire panel screen. Confirm that the right zone is identified on the message. Reset the detector at the cpu display.

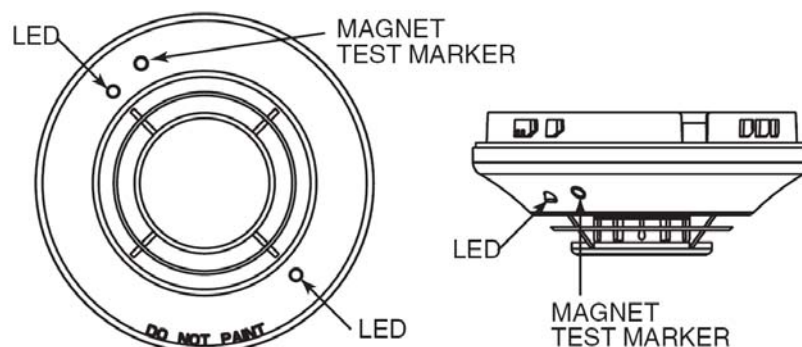


Figure 23: Views showing position of test magnet.

7.1.2 SMOKE DETECTOR TRUE FUNCTIONAL TEST

From a distance of 2 to 4 ft. (.6-1.2 m), using a canned aerosol smoke, aim spray for 1-2 seconds at the vents or side of the detector. The LEDs should latch on within 10 seconds, indicating alarm and annunciating the panel. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for a fire alarm to be generated on the main fire panel screen. Confirm that the right zone is identified on the message. Reset the detector at the cpu display.



Canned aerosol simulated smoke (canned smoke agent) formulas will vary by manufacturer. Misuse or overuse of these products may have long term adverse effects on the smoke detector. Consult the canned smoke agent manufacturer's published instructions for any further warnings or caution statements.

7.1.3 HEAT DETECTOR TRUE FUNCTIONAL TEST

From the side of the detector, using hair dryer of 1000-1500 watts, direct the heat towards the sensor. Hold the heat source about 6 inches (15 cm) away to prevent damage to cover during testing. The LEDs should light when the temperature at the detector reaches the alarm setpoint, indicating alarm and annunciating the panel. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for the right message to be generated on the main fire panel's screen, auxiliary display screen and that all auxiliary system showing the right indication. The message should be in a blinking text until acknowledged. Reset the detector at the cpu interface.

7.1.4 MANUAL STATION

Initiate the manual station by following the instruction on it. Most of the time it should be push in and pull down. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for a fire alarm to be generated on the main fire panel screen. Check for the right message to be generated on the main fire panel's screen, auxiliary display screen and that all auxiliary system showing the right indication. The message should be in a blinking text until acknowledged. Reset the detector at the cpu interface.

7.1.5 EXPLOSION PROOF DETECTOR

Use an electric heat gun or blow dryer to test the thermal explosion proof detector. Direct the heated air stream towards the thermal detector from a distance of approximately 12 inches. Use a smoke can to test smoke explosion proof detector. Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for the right message to be generated on the main fire panel's screen, auxiliary display screen and that all auxiliary system showing the right indication. The message should be in a blinking text until acknowledged. Reset the detector at the cpu interface.



A sensor that fails any of these tests should be replaced.

A safer way to test the detectors without damaging them can be done. The material needed for the test is a kettle, rubber gloves and a rag or a cloth. First get the water inside the kettle at a boiling temperature. Then, using your rubber gloves, get wet rag in contact with side of heat detector inside explosion proof shell until an alarm is heard (expect roughly 3-4 seconds). Verify that the fire alarm is activated for that zone; both audible and visual alarms should be turned on (there may be a delay before the visual and audible alarm initiate). Check for the right message to be generated on the main fire panel's screen, auxiliary display screen and that all auxiliary system showing the right indication. The message should be in a blinking text until acknowledged. Reset the detector at the cpu interface.

7.2 REPLACING DETECTOR

To replace a smoke or a heat detector, remove the old detector head by turning it counter clockwise. Set the new detector head address with the same address as the old head by turning rotary address switches to appropriate number (See Next Figure).

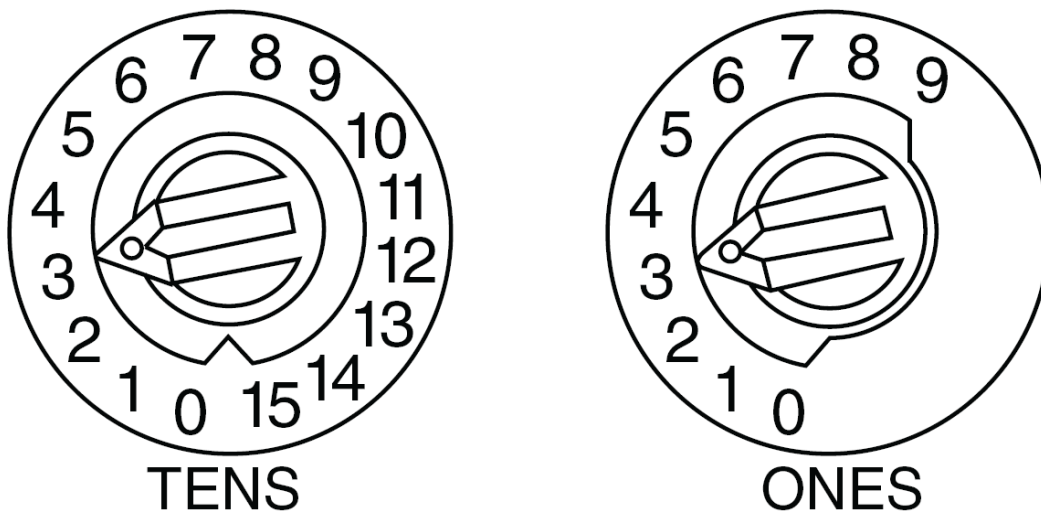


Figure 24: Address switches

Install the sensor into the sensor base. Push the sensor into the base while turning it clockwise to secure it in place.



Before removing the detector, notify the proper authorities that the detector is undergoing maintenance and will be temporarily out of service.

7.3 SETTING TIME AND DATE

Press ENTER on CPU Display then press **1**. You should be on password screen. Enter the password 11111 then press ENTER. Press the **5** key to display the Change Time/Date screens. Follow the instructions below to set time and date:

To	Do this
Change time and date values	Enter values from the numeric keys on the keypad.
Change A (AM) or P (PM)	Press + (Next selection) or – (Previous Selection)
Change the day	Press + (Next selection) or – (Previous Selection)
Move to another digit	Use the left and right arrows on the keypad
Save the time and date and return	Press Enter key
Return to Normal Display	Press ESC key

8.0 INTERFACE

8.1 GENERAL ALARM AND PUBLIC ADDRESS

The system is designed in a way that if the general alarm is required and the fire detection system was already on alarm, it will mute its bells and horns outputs to leave the first priority to the general alarm. The same is also applicable for the public address. Even more, the public address has the strongest priority over the IFDS and the general alarm. If the public address is required, it will mute the IFDS output so everyone can listen to the message. Fire detection system can use general alarm bells as long as it doesn't sound through passenger space (applicable on passenger boat).

8.2 DOOR HOLDBACK

Contacts are available inside the fire detection panel to interface with fire door holdback control. Those contacts will trigger in case of fire detection.

8.3 ALARM AND MONITORING SYSTEM

The Techsol alarm and monitoring system can communicate with the fire detection system to show information about fire location by alarm message description and graphical animation. The fire system communicates with the alarm system by a communication Ethernet link connected on a dedicated network. However, the IFDS doesn't need the alarm & monitoring system to operate. This is only an option and it is not necessary for the ship normal operation.

8.3.1 AMS SCREEN DESCRIPTION - FIRE DETECTION OVERVIEW

If an alarm occurs, the same alarm message that appears on the Fire Detection Panel will be shown on the alarm viewer. In the section “System Status and Deck Selection”, the number of fire or fault alarm will be increased on the appropriate deck. In this section, you can access to deck top view by pressing on the appropriate deck (see section 8.3.2).

The section “System Control” is only available on screens that are located in wheelhouse and other fire control areas. You have a limited choice of remote actions that can be done on the fire detection panel through the alarm and monitoring display. Which are Acknowledge, Reset and Silence.



8.3.2 AMS SCREEN DESCRIPTION - FIRE DETECTION DECK VIEW

When an alarm occurs, you can locate the detector that had triggered in alarm state by looking on the different deck top view available. If the device is in alarm, there will be an animation representing the type of alarm. You can cycle through the different deck view available by pressing on the arrow button available on the different deck view.



9.0 TROUBLESHOOTING

This section contains the information required to enable the maintainers to localize and fault isolated malfunctions in the Fire Alarm System.

9.1 FAULT ISOLATION

The Fire Detection System is a supervised system, which essentially will self-isolate most problems in the system. The Fire Alarm Panel contains indicators which light up to identify a system trouble and/or failed detectors. The display will be self explanatory in regards to the fault description. Refer to the system wiring diagram.

9.2 POINT AND SYSTEM TROUBLES LISTS

There are a variety of point or system trouble types that may appear in a trouble message. The tables below give lists of the most common troubles and indications of their cause.

9.2.1 DEVICE TROUBLES

A message from the “Trouble Type” column in the following table will appear in the upper right corner of the panel display when a point (device) trouble occurs. Use this table to help determine what the trouble is.

Trouble Type	Trouble Description	Action
ADRFLT:	There is more than one device of a single type (detector or module) with the same SLC address. A detector and a module can share the same address on an SLC, but two detectors, or two modules, cannot. Note that some addressable devices (e.g. certain power supplies and XPIQs) may not appear to be detectors or modules, but are addressed on the SLC as such.	Readdress the incorrect device using Techsol drawings.
DIRTY 1:	The detector is dirty.	Replace detector head.
DIRTY 2:	The detector is dirty and it has a false alarm risk.	Replace detector head.
INVREP:	The device has returned a response to the panel that the panel did not expect.	Check the device for functionality, addressing and wiring.

Trouble Type	Trouble Description	Action
NO SIG:	The device (module or detector) is not responding to the poll. Either the device is not working or it is not connected properly.	Determine whether the device is functional, and connected and addressed properly on the SLC.
OPEN:	The module device has an open circuit on its supervised wiring.	Check the connections from the module to the input or output device to which it is wired.

9.2.2 SYSTEM TROUBLES

A message from the “Trouble Type” column in the following table will appear in the panel display when a system trouble occurs. Use this table to help determine the cause of the trouble.

Trouble Type	Trouble Description	Action
AC FAIL:	The main power supply has lost AC power.	Investigate whether there is an AC power loss, or whether the power supply is correctly installed and wired.
BATTERY:	The main power supply’s battery charge is too high or too low.	Check batteries, replace if necessary.
CHARGER FAIL:	The main power supply’s battery charger is not working properly.	Correct the fault.
GROUND FAULT:	A ground fault has occurred within the panel.	Locate the ground fault and repair.
LCD80 SUPERVISORY:	Communication has been lost with the LCD-80.	Check connections to the LCD-80 Annunciator.
STYLE 6 POS. LOOP <u>X</u> :	There is an open circuit on the positive side of loop x. Style 6 is supervised methods of communicating with addressable devices. If the control panel detects a trouble (open), it will drive both ends of the loop, maintaining communication in an unsupervised method. The latching trouble will display on the panel as a Style 6 trouble until you correct the condition and press RESET.	
STYLE 6 NEG. LOOP <u>X</u> :	There is an open circuit on the negative side of loop x. Style 6 is supervised methods of communicating with addressable devices. If the control panel detects a trouble (open), it will drive both ends of the loop, maintaining communication in an unsupervised method. The latching trouble will display on the panel as a Style 6 trouble until you correct the condition and press RESET.	
STYLE 6 SHORT LOOP <u>X</u> :	Style 6 is supervised methods of communicating with addressable devices. If the control panel detects a trouble (open or short), it will drive both ends of the loop, maintaining communication in an unsupervised method. The latching trouble will display on the panel as a Style 6 trouble until you correct the condition and press RESET.	

10.0 MAINTENANCE

The Techsol maintenance philosophy for the Fire Alarm Detection System is to replace a failed circuit board (module) with a new module. The failed modules are not cost effective to repair in the field. Failed or defective parts on the panels and detectors can be replaced without adjustment to restore operation of the system. It is important however, if a detector is replaced, to set back the same address on the new unit as the one replaced (See section 7.2).

10.1 MAINTENANCE SCHEDULE

The system should be inspected and tested on a scheduled basis to insure reliable trouble free operation. Routine checks are required to visually inspect the main fire panel, as well as detectors in the system for signs of tampering, over heated or stressed components.

10.1.1 MONTHLY

- Monthly checks of the supervisory circuits at the Fire Alarm Panel by operating the lamp Test push button are recommended. Observe that all visual indicators on the control panel are lighted. All modules' healthy indicators (input and output) should be on and the audible should sound.

10.1.2 QUARTERLY

- Do the monthly tests;
- Inspect all detectors (smoke and heat) for accumulation of dust or dirt. The internal components of the detectors are treated with anti-static compound to reduce attraction of dust and dirt;
- Inspect manual fire pull stations and heat (E/P) detectors for damages.

10.1.3 ANNUALLY

The annual system test is used to verify the total system's operations. Perform the following test procedure to verify system's operations:

- Verify that the Fire Detection Systems is ON;
- Press the lamp test push button and hold. Verify that the panel's buzzer, the engine room's horn and strobe are on, and that the main fire panel and trouble indicators are lit. Release the push button;
- Remove one smoke detector on zone 1 and check for the trouble alarm to be generated on the screen and that the trouble indicator is lit. Check the text message on the main fire panel's screen, auxiliary display's screen and that all auxiliary system showing the right indication and confirm that the right zone is identified. The message should be in a blinking text until acknowledged;
- Repeat step for all fire zones;
- Test each detector according with section 7
- Press Drill key until bell ring and check if all output device work properly.

SECTION 2
System Drawings
(Refer to Drawing Binder)

SECTION 3

Point List

POINT LIST

IFDS (Integrated Fire Detection System)

ISV008, ISV009, ISV010 Inshore Science Vessel

Sensor	Channel Type	Slave Server	Slave Address	Drawing	Detector Address	Sensor Type	LOW Alarm	LOW Warning	HI Warning	HI Alarm	Delay (Sec.)	Fire Zone	Units	Supplied by	Comment
Wheelhouse Port - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1M001	Pull Station (FMM)	1 = Alarm			0	1		Techsol		Focsle Deck
Wheelhouse Port Fixed Fire Extinguishing Door Open - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1M017	Door Switch (FMM)	1 = Alarm			0	1		Techsol		Focsle Deck
Wheelhouse Center Aft - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1M002	Pull Station (FMM)	1 = Alarm			0	1		Techsol		Focsle Deck
Wheelhouse Stbd Aft - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1D003	Smoke	1 = Alarm			0	1		Techsol		Focsle Deck
Wheelhouse Stbd - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1M004	Pull Station (FMM)	1 = Alarm			0	1		Techsol		Focsle Deck
Wheelhouse Center - Fo'c'sle Deck	DI	Nport	190.1.1.233	FD01BA	1D005	Smoke	1 = Alarm			0	1		Techsol		Focsle Deck
Stairways Main Deck Fwd - Main Deck	DI	Nport	190.1.1.233	FD01BA	1D006	Smoke	1 = Alarm			0	1		Techsol		Main Deck
Stairways Main Deck Fwd - Main Deck	DI	Nport	190.1.1.233	FD01BA	1M007	Pull Station (FMM)	1 = Alarm			0	1		Techsol		Main Deck
Stairways Hold Fwd - Hold Deck	DI	Nport	190.1.1.233	FD01BA	1D008	Smoke	1 = Alarm			0	1		Techsol		Hold Plan
Stairways Hold Fwd - Hold Deck	DI	Nport	190.1.1.233	FD01BA	1M009	Pull Station (FMM)	1 = Alarm			0	1		Techsol		Hold Plan
Lower Accommodation Room 3 - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D010	Smoke	1 = Alarm			0	2		Techsol		Hold Plan
Lower Accommodation Room 4 - Hold Deck *	DI	Nport	190.1.1.233	FD01CA	1D011	Smoke	1 = Alarm			0	2		Techsol		Hold Plan (*Present only on ISV008)
Lower Accommodation Bathroom Stbd - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D012	Heat	1 = Alarm			0	2		Techsol		Hold Plan
Bow Thruster Compartement - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D016	Smoke	1 = Alarm			0	2		Techsol		Hold Plan
Lower Accommodation Bathroom Port - Hold Deck *	DI	Nport	190.1.1.233	FD01CA	1D013	Heat	1 = Alarm			0	2		Techsol		Hold Plan (*Present only on ISV008)
Lower Accommodation Room 2 - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D014	Smoke	1 = Alarm			0	2		Techsol		Hold Plan
Lower Accommodation Room 1 - Hold Deck	DI	Nport	190.1.1.233	FD01CA	1D015	Smoke	1 = Alarm			0	2		Techsol		Hold Plan
Mess Aft - Main Deck	DI	Nport	190.1.1.233	FD01DA	1M020	Pull Station (FMM)	1 = Alarm			0	3		Techsol		Main Deck
Mess Aft - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D021	Smoke	1 = Alarm			0	3		Techsol		Main Deck
Galley - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D022	Heat	1 = Alarm			0	3		Techsol		Main Deck
Mess Fwd - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D023	Smoke	1 = Alarm			0	3		Techsol		Main Deck
Mess Fwd - Main Deck	DI	Nport	190.1.1.233	FD01DA	1M024	Pull Station (FMM)	1 = Alarm			0	3		Techsol		Main Deck
Freezer Store - Main Deck	DI	Nport	190.1.1.233	FD01DA	1M025	Heat (FMM)	1 = Alarm			0	3		Techsol		Main Deck
Dry Store - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D026	Smoke	1 = Alarm			0	3		Techsol		Main Deck
Bosun's Stores - Main Deck	DI	Nport	190.1.1.233	FD01DA	1M027	Heat (FMM)	1 = Alarm			0	3		Techsol		Main Deck

POINT LIST

IFDS (Integrated Fire Detection System)

ISV008, ISV009, ISV010 Inshore Science Vessel

Sensor	Channel Type	Slave Server	Slave Address	Drawing	Detector Address	Sensor Type	LOW Alarm	LOW Warning	HI Warning	HI Alarm	Delay (Sec.)	Fire Zone	Units	Supplied by	Comment
Cooler Stores - Main Deck *	DI	Nport	190.1.1.233	FD01DA	1D028	Heat	1 = Alarm			0	3		Techsol		Main Deck (*Present only on ISV008)
Captain Cabin - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D029	Smoke	1 = Alarm			0	3		Techsol		Main Deck
Bathroom Captain Cabin - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D030	Heat	1 = Alarm			0	3		Techsol		Main Deck
1 Berth - Main Deck	DI	Nport	190.1.1.233	FD01DA	1D031	Smoke	1 = Alarm			0	3		Techsol		Main Deck
Dry Lab Fixed Fire Extinguishing Door Open - Main Deck	DI	Nport	190.1.1.233	FD01EA	1M047	Door Switch (FMM)	1 = Alarm			0	4		Techsol		Main Deck
Dry Lab - Main Deck	DI	Nport	190.1.1.233	FD01EA	1D040	Smoke	1 = Alarm			0	4		Techsol		Main Deck
Dry Lab - Main Deck	DI	Nport	190.1.1.233	FD01EA	1M041	Pull Station (FMM)	1 = Alarm			0	4		Techsol		Main Deck
Wet Lab - Main Deck *	DI	Nport	190.1.1.233	FD01EA	1M042	Pull Station (FMM)	1 = Alarm			0	4		Techsol		Main Deck (*Present only on ISV008)
Wet Lab - Main Deck *	DI	Nport	190.1.1.233	FD01EA	1D043	Heat	1 = Alarm			0	4		Techsol		Main Deck (*Present only on ISV008)
Wet Gear - Main Deck	DI	Nport	190.1.1.233	FD01EA	1M044	Pull Station (FMM)	1 = Alarm			0	4		Techsol		Main Deck
Wet Gear - Main Deck	DI	Nport	190.1.1.233	FD01EA	1D045	Smoke	1 = Alarm			0	4		Techsol		Main Deck
Bathroom Wet Gear - Main Deck *	DI	Nport	190.1.1.233	FD01EA	1D046	Heat	1 = Alarm			0	4		Techsol		Main Deck (*Present only on ISV008)
ER Stairways Main Deck - Main Deck	DI	Nport	190.1.1.233	FD01FA	2M001	Pull Station (FMM)	1 = Alarm			0	5		Techsol		Main Deck
ER Stairways Main Deck - Main Deck	DI	Nport	190.1.1.233	FD01FA	2D002	Smoke	1 = Alarm			0	5		Techsol		Main Deck
ER Center - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2M003	Pull Station (FMM)	1 = Alarm			0	5		Techsol		Hold Plan
Port Main Engine - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D004	Heat	1 = Alarm			0	5		Techsol		Hold Plan
Port Generator - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D005	Heat	1 = Alarm			0	5		Techsol		Hold Plan
Engine Room Port Aft - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2M006	Pull Station (FMM)	1 = Alarm			0	5		Techsol		Hold Plan
Harbour Generator - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D007	Heat	1 = Alarm			0	5		Techsol		Hold Plan
Stbd Main Engine - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D008	Heat	1 = Alarm			0	5		Techsol		Hold Plan
Stbd Generator - Hold Deck	DI	Nport	190.1.1.233	FD01FA	2D009	Heat	1 = Alarm			0	5		Techsol		Hold Plan
Workshop Space - Hold Deck	DI	Nport	190.1.1.233	FD01GA	2M020	Pull Station (FMM)	1 = Alarm			0	6		Techsol		Hold Plan
Workshop Space - Hold Deck	DI	Nport	190.1.1.233	FD01GA	2D022	Smoke	1 = Alarm			0	6		Techsol		Hold Plan
Aux. Machinery Space - Hold Deck	DI	Nport	190.1.1.233	FD01GA	2M023	Pull Station (FMM)	1 = Alarm			0	6		Techsol		Hold Plan
Aux. Machinery Space - Hold Deck	DI	Nport	190.1.1.233	FD01GA	2D024	Smoke	1 = Alarm			0	6		Techsol		Hold Plan

Page 3 of 3

915.5 - FIRE DETECTION SYSTEM - IFDS INTEGRATED FIRE DETECTION SYSTEM

SECTION 4

Bill of Materials

**TECHSOL INC.**

770A, St-Joseph Est
 Québec (Québec) G1K 3C3
 Tél.: (418) 688-2230 Fax: (418) 688-2233

No COMMANDE DU CLIENT / CUSTOMER ORDER

CCGS Inshore Science Vessel , ISV008

DATE _____
 August 31th, 2010

LISTE DE MATÉRIEL / BILL OF MATERIAL

ELEMENT	MANUFACTURIER	NUMERO PIECE	NUMERO DE SERIE	DESCRIPTION	QTÉ	REFERENCE
ITEM	MANUFACTURER	PART NUMBER	SERIAL NUMBER	DESCRIPTION	QTY	REFERENCE
1	Notifier	CPU2-640	N/A	Control Module for NFS-640E	1	See Dwg FDZZAA
2	Notifier	LEM-320	N/A	Loop Expansion Module	1	See Dwg FDZZAA
3	Notifier	CHS-M2	N/A	Rack for CPU-640	1	See Dwg FDZZAA
4	Notifier	DP-DISP2	N/A	Top Slot Plate	1	See Dwg FDZZAA
5	Notifier	SBB-A4	N/A	Size 'A' Enclosure	1	See Dwg FDZZAA
6	Notifier	BP-4	N/A	Battery Cover	1	See Dwg FDZZAA
7	Notifier	DR-A4	N/A	Door, lock and Key	1	See Dwg FDZZAA
8	Notifier	BMP-1	N/A	Side Plate CPU-640 KDM-R2 Display	2	See Dwg FDZZAA
9	Notifier	KDM-R2	N/A	Display 80 char	1	See Dwg FDZZAA
10	Notifier	PE12V18B1	N/A	Battery 12Vdc 18 Amp Hours	2	See Dwg FDZZAA
11	Notifier	KMS-6-24A	N/A	Bell	9	See Dwg Series FD
12	Notifier	WBB-C	N/A	Surface Box for Bell	8	See Dwg Series FD
13	Notifier	MPS-950B	N/A	Manuel Pull Station	16	See Dwg Series FD
14	Notifier	NBS-950	N/A	Manuel Pull Station Base	16	See Dwg Series FD
15	Notifier	P4RHKA B	N/A	Horn & strobe (Outdoor, 4 Wires)	1	See Dwg Series FD
16	Notifier	FSP-851A	N/A	Flashscan Photoelectric Sensor	19	See Dwg Series FD
17	Notifier	FST851RA	N/A	Heat Detector, rate-of-rise, Adres.	12	See Dwg Series FD
18	Notifier	CR-135	N/A	Heat Detector, rate-of-rise,	2	See Dwg Series FD
19	Notifier	B710LPA	N/A	Low Profile Sensor Detector Base	33	See Dwg Series FD
20	Notifier	FMM-101A	N/A	Addressable Module Standard mini	18	See Dwg Series FD

**TECHSOL INC.**

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ITEM	MANUFACTURER	PART NUMBER	SERIAL NUMBER	DESCRIPTION	QTY	REFERENCE
21	Notifier	ISO-XA	N/A	Isolation Module	11	See Dwg Series FD
22	Notifier	FMM-1A	N/A	Addressable module	4	See Dwg Series FD
23	Notifier	FRM-1A	N/A	Addressable Relay module	1	See Dwg Series FD
24	Notifier	FCM-1A	N/A	Addressable Control Module	1	See Dwg Series FD
25	Notifier	LCD-80	N/A	Auxiliary Annunciator Display	1	See Dwg FD01AB
26	Notifier	ABF-1DB	N/A	Auxiliary Annunciator Flush Box	1	See Dwg Series FD
27	Moxa	NPORT 5110A	N/A	RS-232 serial device To TCP/IP	1	See Dwg FDZZAA
28	Releco	C9-A40X-24V	N/A	Relay 24 Vdc 4 Poles	2	See Dwg FDZZAA
29	Releco	S9-M	N/A	Relay Socket	2	See Dwg FDZZAA
30	Panasonic	PM5S-A-24-240V	N/A	Timer	1	See Dwg FDZZAA
31	Federal	450-024-31	N/A	Outdoor Horn 24Vdc	1	See Dwg Series FD
32	Federal	WB	N/A	Siren Weatherproof Backbox	1	See Dwg Series FD
33						
34						
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36						
37						
38						

Check : Samuel LeclercDate: 21/07/2011

**TECHSOL INC.**

770A, St-Joseph Est
 Québec (Québec) G1K 3C3
 Tél.: (418) 688-2230 Fax: (418) 688-2233

No COMMANDE DU CLIENT / CUSTOMER ORDER

CCGS Inshore Science Vessel , ISV009 & ISV010

DATE

July 21, 2011

LISTE DE MATÉRIEL / BILL OF MATERIAL

ELEMENT	MANUFACTURIER	NUMERO PIECE	NUMERO DE SERIE	DESCRIPTION	QTÉ	REFERENCE
ITEM	MANUFACTURER	PART NUMBER	SERIAL NUMBER	DESCRIPTION	QTY	REFERENCE
1	Notifier	CPU2-640	N/A	Control Module for NFS-640E	1	See Dwg FDZZAA
2	Notifier	LEM-320	N/A	Loop Expansion Module	1	See Dwg FDZZAA
3	Notifier	CHS-M2	N/A	Rack for CPU-640	1	See Dwg FDZZAA
4	Notifier	DP-DISP2	N/A	Top Slot Plate	1	See Dwg FDZZAA
5	Notifier	SBB-A4	N/A	Size 'A' Enclosure	1	See Dwg FDZZAA
6	Notifier	BP-4	N/A	Battery Cover	1	See Dwg FDZZAA
7	Notifier	DR-A4	N/A	Door, lock and Key	1	See Dwg FDZZAA
8	Notifier	BMP-1	N/A	Side Plate CPU-640 KDM-R2 Display	2	See Dwg FDZZAA
9	Notifier	KDM-R2	N/A	Display 80 char	1	See Dwg FDZZAA
10	Notifier	PE12V18B1	N/A	Battery 12Vdc 18 Amp Hours	2	See Dwg FDZZAA
11	Notifier	KMS-6-24A	N/A	Bell	9	See Dwg Series FD
12	Notifier	WBB-C	N/A	Surface Box for Bell	8	See Dwg Series FD
13	Notifier	MPS-950B	N/A	Manuel Pull Station	15	See Dwg Series FD
14	Notifier	NBS-950	N/A	Manuel Pull Station Base	15	See Dwg Series FD
15	Notifier	P4RHKA B	N/A	Horn & strobe (Outdoor, 4 Wires)	1	See Dwg Series FD
16	Notifier	FSP-851A	N/A	Flashscan Photoelectric Sensor	19	See Dwg Series FD
17	Notifier	FST851RA	N/A	Heat Detector, rate-of-rise, Adres.	8	See Dwg Series FD
18	Notifier	CR-135	N/A	Heat Detector, rate-of-rise,	2	See Dwg Series FD
19	Notifier	B710LPA	N/A	Low Profile Sensor Detector Base	29	See Dwg Series FD
20	Notifier	FMM-101A	N/A	Addressable Module Standard mini	16	See Dwg Series FD

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DATE

July 21, 2011

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21	Notifier	ISO-XA	N/A	Isolation Module	11	See Dwg Series FD
22	Notifier	FMM-1A	N/A	Addressable module	4	See Dwg Series FD
23	Notifier	FRM-1A	N/A	Addressable Relay module	1	See Dwg Series FD
24	Notifier	FCM-1A	N/A	Addressable Control Module	1	See Dwg Series FD
25	Notifier	LCD-80	N/A	Auxiliary Annunciator Display	1	See Dwg FD01AB
26	Notifier	ABF-1DB	N/A	Auxiliary Annunciator Flush Box	1	See Dwg Series FD
27	Moxa	NPORT 5110A	N/A	RS-232 serial device To TCP/IP	1	See Dwg FDZZAA
28	Releco	C9-A40X-24V	N/A	Relay 24 Vdc 4 Poles	2	See Dwg FDZZAA
29	Releco	S9-M	N/A	Relay Socket	2	See Dwg FDZZAA
30	Panasonic	PM5S-A-24-240V	N/A	Timer	1	See Dwg FDZZAA
31	Federal	450-024-31	N/A	Outdoor Horn 24Vdc	1	See Dwg Series FD
32	Federal	WB	N/A	Siren Weatherproof Backbox	1	See Dwg Series FD
33						
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35						
36						
37						
38						

Check : Samuel LeclercDate: 21/07/2011

SECTION 5

N/A

SECTION 6

N/A

SECTION 7
Specifications
(Located on Techsol CD)

SECTION 8

Certifications

(Located on Techsol CD)

