ELSA
ADVANCED SYSTEMS

Early Warning Liquid Leak Locating System

EARLY WARNING LIQUID LEAK LOCATING SYSTEM

We won't have the society if we destroy the environment.

American Scientist, Margaret Mead. 1901-1978

Early Leak System Apparatus (ELSA) is an engineering company focused in designing products in relation to early warning liquid leakage detection. Formed by a dedicated technical team, with an accumulated engineering experience of more than 30 years. This dynamic, flexible, robust, and innovative team is ever ready to adopt new technology well and take ELSA to the next level and beyond.

OUR STRENGTHS

- The ability to develop our own ASIC (application specific integrated circuit) parts and implement it seamlessly into the product design for the leak detection industry application.

- The ability to offer semi-customized designs or solutions to meet the end-customer's specific requirements with fast turn-around time.

- The first and only company to offer "Failed-Safe Loop Back Feature" in the leak detection industry, which differentiates ourselves from traditional design (i.e. which only offers normal end termination approach).
  - ➔ This new Elsa feature will enable the system to continue detecting liquid leakage, even in the event of a cable break occurrence at the starting point of the sensing cable.

- Offer custom length providence for sensing cable to meet the exact requirements at the installation site.

- The ability to offer flexible design solutions such as:
  - ➔ Distributed or centralized panels system design;
  - ➔ Touch panel (optional) with various display sizes (such as LCD dimensions in 7 inch, 12 inch & etc).
  - ➔ Leak sensitivity is easily adjustable at site for each panel/zone.

We have grown exponentially since the time of its inception. We position ourselves in the frontier of the business with consistent effort in new product innovation and development.

CONTENTS

CLIENTELE

Bank Negara Malaysia
Bank of America
Bank of China International
Bank of Korea
Bank Switzerland International
BHP Billiton
Changi Water Reclamation Plant
Citibank
DBS
Deutsche Bank
Equinix
Global Switch
Group Schneider
Glaxo Smith Kline
Hewlett Packard
HSBC
Hyundai Steel Group
iCAP
JPMorgan
Kuwait Finance
Kuwait, Sabiya CCGT Power Plant
(Dewatering Works)
Maybank
Merill Lynch
Nomura
Pacnet
Prudential Asset Management
REC Solar
Rolls Royce Chemical Treatment Plant
Samsung
Samsung Securities
Seoul Financial Centre
Singapore Exchange
Singtel
Sun Microsystems
Tata Communication Exchange
Telecom Malaysia

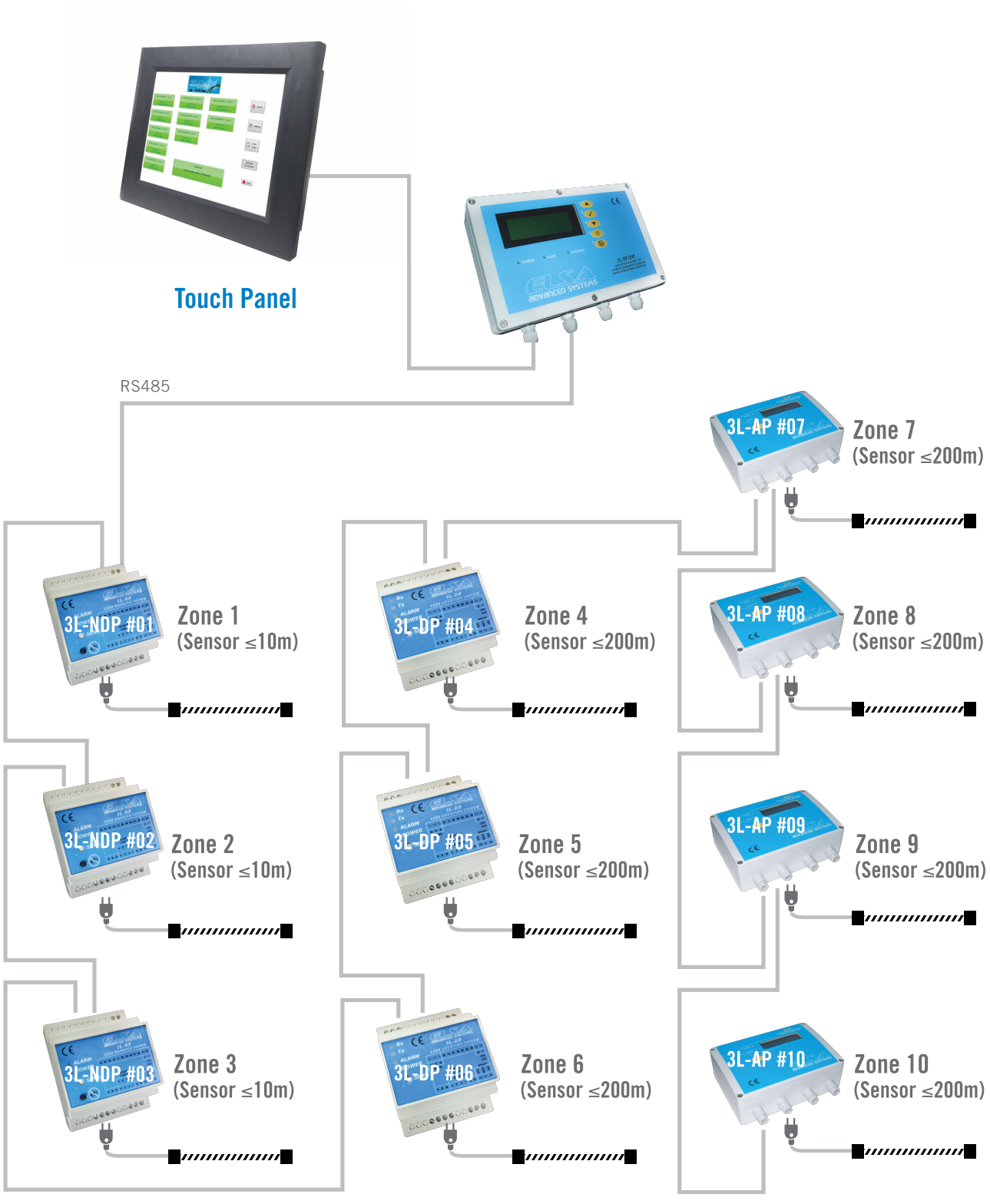
TOUCH PANEL 12.1 INCH
3L-TP/12

GENERAL FEATURES:

- Pin-Point Leak Location Precisely, tolerance +/-1m. (indication by RED DOT)
- History/Event Log : 5,000 events
- “Freezing” of selected zone(s) during maintenance/repair and no fault message generated
- Readily connect to GSM modem/dialer for SMS fault notification
- Modbus/TCP option available
- Ability to Zoom-In onto each floor plan
- Varies sizes of LCD monitor available upon request

APPLICATION NOTE

(3L-TP/12 + 3L-SP + 3L-AP + 3L-DP+3L-NDP) SYSTEM



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ELSA SUPERVISING PANEL
3L-SP/DP

3L-SP/DP is an advance supervising panel of Early Warning Leak Locating System

GENERAL FEATURES:

- Maximum number of 3L-AP/ 3L-DP/ 3L-NDP : 99 panels leak location panels added externally
- Maximum accumulated length of sensing cable : 20,000m [200m (internal) + 99 x 200m (external)]
- Precision to locate leak location : +/-1m or 0.5%
- Failsafe operation : Ability to operate in loop operation
  Ability to detect liquid leakage during cable break
- Display : Permanent backlight with LCD of 4 lines x 20 English characters
- Sound Alarm : 90dB max. buzzer with silencing button
- System Menu : Access to Event Log, System Reset, Configuration Mode
- Time to display Leak/Trouble from supervised panel : 18 seconds typical
- Liquid Leak detection data : Typically 20mm in length of liquid (e.g tap water) in full contact with sensing cable, leak sensitivity is adjustable
- Supervised Panels Identification : By different panel number and name with up to 35 characters
- Panel names setup : By PC-software
- Event Log : 896 Time-stamped Events stored in non-volatile memory, First-In-First- Out in case of overflow
- Mechanical dimensions : Rugged ABS UL-VO case of 222 x 146 x 55mm
- Ingress Protection : Dust-and splash-proof IP 65

ENVIRONMENTAL RATINGS

Operating temperature	:	0 °C to 40°C (indoor installation only)
Storage temperature	:	-20°C to 70°C
Humidity	:	5% to 95% non-condensing

POWER REQUIREMENTS

Power supply	:	230 +/- 15% VAC, 50/60 Hz
Optional input	:	115 VAC/50-60 Hz or 12 to 30 VAC/DC power input
Power consumption	:	8 VA/3 W maximum

POWER RELAYS SWITCHING CHARACTERISTICS

Cable break/power failure by contact (1 relay)	:	Operation – SPDT Switching current – 0.5 A at 250 VAC, 1A at 30 VDC
Liquid leakage dry contact	:	Operation – SPDT Switching current – 0.5 A at 250 VAC, 1A at 30 VDC

SUPERVISING CHANNEL

Physical support	:	RS485-two-wire, ESD and surge protected as per IEC 61000-4-2
Protocol	:	Modbus

SERIAL COMMUNICATION INTERFACE

Physical support	:	RS485-two-wire, ESD and surge protected as per IEC 61000-4-2
Protocol	:	Modbus

Optional GSM/GPRS transmitter interfacing
Optional Modbus over TCP/IP (allow world-wide remote supervision through Internet connection)
Optional BACnet/IP interface
Optional Profibus interface
Optional LONworks interface

COMPLIANCE TO INTERNATIONAL STANDARDS

EMC emission	:	IEC61000-6-3(2001) – Electromagnetic compatibility Generic emission standard for residential, commercial and light industrial environment
EMC immunity	:	IEC61000-6-1(2001) – Electromagnetic compatibility Generic immunity standard for residential, commercial and light industrial environment

3L-SP/DP DIMENSIONS

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ELSA CONTROL PANEL
3L-AP

3L-AP is a simple and easy to install complete monitoring system to detect early liquid leakage. Once leak is detected, it responses within a few seconds and provide liquid leakage location accurately.

GENERAL FEATURES:

- Maximum accumulated length of sensing cable : 200m (Note: 192m for 4 – 20mA interface)
- Maximum accumulated length of jumper cable : 300m
- Precision to locate leak location : +/- 1 m or +/- 0.5%
- Display : LCD with backlight - 2 x 14 characters (Blue background with white characters)
- Sound Alarm : 90 dB max. buzzer with silencing button
- System Reset : One single push button for testing/resetting the system (hold down buzzer button for 6 sec)
- Failsafe Operation : Ability to operate in loop installation: ability to detect/locate liquid leakage during cable break
- Time to detect Leak/Cablebreak : 4 seconds typical
- Liquid leak detection data : Typically 20 mm in length of liquid (such as tap water) in full contact with sensing cable, leak sensitivity is adjustable
- Multi-leak detection and location capability
- Modbus TCP (ability to provide world-wide remote supervision through Internet connection) as optional
- Remote supervision by RS-485 Modbus as optional
- Analog output 4 – 20mA interface as optional
- ASIC-based digital location principle (patent pending) with inherent temperature stability, zero-drift and very low power consumption

ENVIRONMENTAL RATINGS

Operating temperature	:	-10 to 50°C (indoor installation only)
Storage temperature	:	-20 to 70°C
Humidity	:	5% to 95% non-condensing

POWER REQUIREMENTS

Power supply	:	230 +/- 15% VAC, 50/60 Hz
Optional input	:	115 VAC/50-60 Hz or 12 to 30 VAC/DC power input
Power consumption	:	3.5 VA/3 W maximum

POWER RELAYS SWITCHING CHARACTERISTICS

Cable break/power failure by contact (1 relay)	:	Operation – SPDT Switching current – 3 A at 250 VAC, 5A at 30 VDC
Liquid leakage dry contact (2 relays)	:	Operation – SPDT Switching current – 5 A at 250 VAC, 7A at 30 VDC

SERIAL COMMUNICATION INTERFACE

Physical support	:	Two-wire RS485, ESD and surge protected as per IEC 61000-4-5
Protocol	:	Modbus

Optional Modbus/TCP output with 10/100Mbs Ethernet and RJ-45 connector

ANALOG OUTPUT

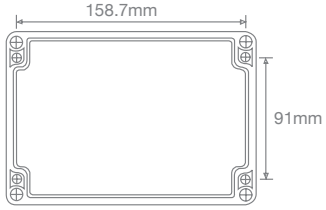
Physical support	:	4 to 20 mA opto-isolated interface
Voltage range	:	9 to 36 VDC overvoltage protected
Additional information	:	Two-wire opto-isolated analog current interface with galvanic separation of 2.5 kV
Nominal current	:	NORMAL – 4 mA CABLEBREAK – 20 mA LEAK – 6 mA plus 0.0625 mA per meter of leak location

COMPLIANCE TO INTERNATIONAL STANDARDS

EMC emission	:	IEC61000-6-3(2001) – Electromagnetic compatibility Generic emission standard for residential, commercial and light industrial environment
EMC immunity	:	IEC61000-6-1(2001) – Electromagnetic compatibility Generic immunity standard for residential, commercial and light industrial environment

3L-AP PANEL

(MOUNTING HOLE DIMENSIONS)



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ELSA CONTROL PANEL 3L-DP

3L-DP is a Liquid Leakage Locating Detection System with common interface through Dry Contact and/or remote supervision RS485 Modbus (Mounting: 4 Modules MS36 DIN-Rail)

GENERAL FEATURES:

- Maximum accumulated length of sensing cable : 200m
- Maximum accumulated length of jumper cable : 300m
- Precision to locate leak location : +/- 1m or +/- 0.5%
- Failsafe Operation : Ability to operate in loop installation
  Ability to detect/locate liquid leakage during cable break
- Time to detect Leak/Cablebreak : 3 seconds typical
- Liquid leak detection data : Typically 20mm in length of liquid (such as tap water) in full contact with sensing cable, leak sensitivity is adjustable
- Multi-leak detection and location capability
- Remote supervision by RS-485 Modbus
- ASIC-based digital location principle (patent pending) with inherent temperature stability, zero-drift and very low power consumption

ENVIRONMENTAL RATINGS

Operating temperature	:	0 to 40°C (indoor installation only)
Storage temperature	:	-20 to 70°C
Humidity	:	5% to 95% non-condensing

POWER REQUIREMENTS

Power supply	:	230 +/- 15% VAC, 50/60 Hz
Optional input	:	115 VAC/50-60 Hz or 12 to 30 VAC/DC power input
Power consumption	:	3.5 VA/3 W maximumPower relays switching characteristics

POWER RELAYS SWITCHING CHARACTERISTICS

Alarm dry contact	:	Operation – SPDT Switching current – 0.5 A at 250 VAC, 1A at 30 VDC

SERIAL COMMUNICATION INTERFACE

Physical support	:	RS485-two-wire, ESD and surge protected as per IEC 6100-4-5
Protocol	:	Modbus

COMPLIANCE TO INTERNATIONAL STANDARDS

EMC emission	:	IEC61000-6-3(2001) – Electromagnetic compatibility Generic emission standard for residential, commercial and light industrial environment
EMC immunity	:	IEC61000-6-1(2001) – Electromagnetic compatibility Generic immunity standard for residential, commercial and light industrial environment

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ELSA CONTROL PANEL
3L-NDP

3L-NDP is an Addressable Point Sensor for Liquid Leakage Detection System with common interface through Dry Contact and/or remote supervision RS485 Modbus (Mounting: 4 Modules MS36 DIN-Rail)

GENERAL FEATURES:

- Maximum accumulated length of sensing cable : 10m
- Maximum accumulated length of jumper cable : 300m
- Failsafe Operation : Ability to operate in loop installation
  Ability to detect/locate liquid leakage during cable break
- Time to detect Leak/Cablebreak : 3 seconds typical
- Liquid leak detection data : Typically 20mm in length of liquid (such as tap water) in full contact with sensing cable, leak sensitivity is adjustable
- Multi-leak detection and location capability
- Remote supervision by RS-485 Modbus
- ASIC-based digital location principle (patent pending) with inherent temperature stability, zero-drift and very low power consumption

ENVIRONMENTAL RATINGS

Operating temperature	:	0 to 40°C (indoor installation only)
Storage temperature	:	-20 to 70°C
Humidity	:	5% to 95% non-condensing

POWER REQUIREMENTS

Power supply	:	230 +/- 15% VAC, 50/60 Hz
Optional input	:	115 VAC/50-60 Hz or 12 to 30 VAC/DC power input
Power consumption	:	3.5 VA/3 W maximumPower relays switching characteristics

POWER RELAYS SWITCHING CHARACTERISTICS

Alarm dry contact	:	Operation – SPDT Switching current – 0.5 A at 250 VAC, 1A at 30 VDC

SERIAL COMMUNICATION INTERFACE

Physical support	:	RS485-two-wire, ESD and surge protected as per IEC 6100-4-5
Protocol	:	Modbus

COMPLIANCE TO INTERNATIONAL STANDARDS

EMC emission	:	IEC61000-6-3(2001) – Electromagnetic compatibility Generic emission standard for residential, commercial and light industrial environment
EMC immunity	:	IEC61000-6-1(2001) – Electromagnetic compatibility Generic immunity standard for residential, commercial and light industrial environment

ELSA CONTROL PANEL 3L-NP

3L-NP is a Liquid Leakage Non-Locating Detection System. (Mounting: 4 Modules M36 Din-Rail)

GENERAL FEATURES:

- Maximum accumulated length of sensing cable : 60m
- Maximum recommended length of jumper cable : 100m
- Sound Alarm : 80dB max. buzzer with silencing button
- Time to detect Leak/Cablebreak : 3 seconds typical
- Liquid leak detection data : Typically 20mm in length of liquid (such as tap water) in full contact with sensing cable, leak sensitivity is adjustable

ENVIRONMENTAL RATINGS

Operating temperature	:	0 to 40°C (indoor installation only)
Storage temperature	:	-20 to 70°C
Humidity	:	5% to 95% non-condensing

POWER REQUIREMENTS

Power supply	:	230 +/- 15% VAC, 50/60 Hz
Optional input	:	115 VAC/50-60 Hz or 12 to 30 VAC/DC power input
Power consumption	:	1 VA/0.75 W maximum

POWER RELAYS SWITCHING CHARACTERISTICS

Alarm dry contact	:	Operation – SPDT Switching current – 0.5 A at 250 VAC, 1A at 30 VDC

COMPLIANCE TO INTERNATIONAL STANDARDS

EMC emission	:	IEC61000-6-3(2001) – Electromagnetic compatibility Generic emission standard for residential, commercial and light industrial environment
EMC immunity	:	IEC61000-6-1(2001) – Electromagnetic compatibility Generic immunity standard for residential, commercial and light industrial environment

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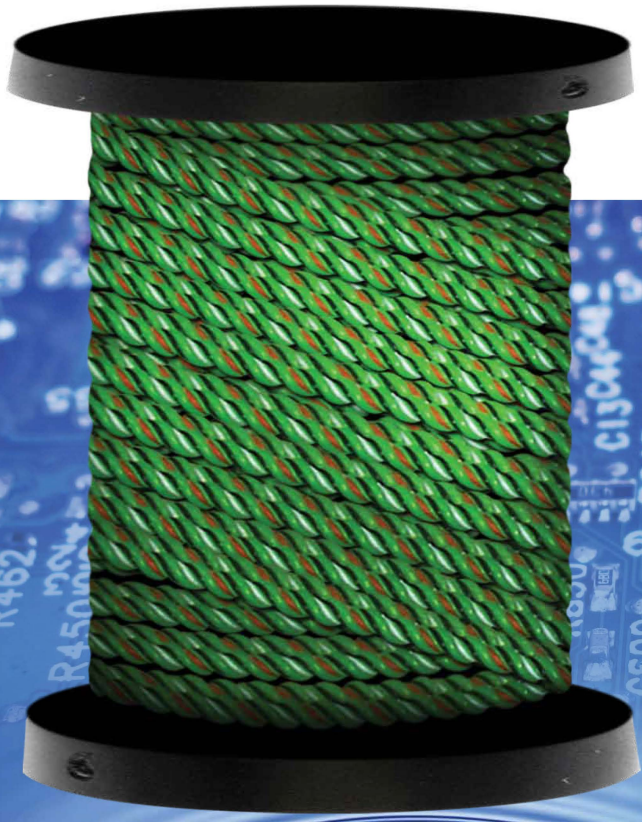

ELSA SENSING CABLE 3L-LS

3L-LS is the sensing cable used to detect water and slightly corrosive and conductive liquids

CHARACTERISTICS & PERFORMANCE:

- Application : Water and slightly corrosive conductive liquids
- Diameter size : 6.3mm average
- Continuity wires : White & Red insulated with flame-retardant polymer
- Sensing wires : 2 x Black wires, semi-conductive polymer
- Carrier : Flame-retardant polymer material with greenish colour in high visibility
- Fire resistance : Non-flame propagating and self-extinguishing

3L-LS SENSING CABLE LENGTH:

- Available in random length or cut-to length as per requirement

3L-LS SENSING CABLE CONNECTIONS/JOINTS:

- Male/female connector (i.e. all connections/joints is modular)
- Hot-Shrink-Tube approach (i.e. all connections/joints is fix)

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ELSA SENSING CABLE
3L-AS

3L-AS is the sensing cable used to detect highly corrosive and conductive liquids such as 100% sulphuric acid

CHARACTERISTICS & PERFORMANCE:

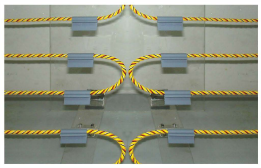
- Application : Highly corrosive conductive liquids such as 100% Sulfuric Acid
- Diameter size : 6.3mm average
- Continuity wires : White & Red insulated with fire-resistant fluoropolymer
- Sensing wires : 2 x Black wires, semi-conductive fire-resistant fluoropolymer
- Carrier : Fire-resistant fluoropolymer material with yellowish color in high visibility
- Fire resistance : UL910 (NFPA 262), highest Fire/Smoke standard

3L-AS SENSING CABLE LENGTH:

- Available in random length or cut-to length as per requirement

3L-AS SENSING CABLE CONNECTIONS/JOINTS:

- Male/female connector (i.e. all connections/joints is modular)
- Hot-Shrink-Tube approach (i.e. all connections/joints is fix)



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APPLICATIONS

- Datacenter (IDC) for Banks, Finance, Logistics & etc.
- Telecommunication Switching Room
- Clean Room for Semiconductor Plants
- Clean Room for LCD Manufacturing Plants
- Clean Room for Wafer Fabrication Plants
- Clean Room for Bio-Medical Plants
- District Cooling/Heating Systems
- Water Treatment Plants
- Underground hot water piping
- Tunnel

ORDERING INFORMATION

- 3L-TP/12 : Touch Panel in 12.1 Inch
- 3L-SP/DP : Supervising Panel to monitor 3L-AP/3L-DP/3L-NDP up to 100 units
- 3L-AP : Control Panel (Locating) with only relay/dry contacts for alarm
- 3L-AP/RS485 : Control Panel (Locating) with RS485 interface as an option
- 3L-AP/420 : Control Panel (Locating) with 4 to 20 mA interface as an option
- 3L-AP/Modbus_TCP : Control Panel (Locating) with Modbus TCP as an option
- 3L-DP : Control Panel (Locating) with RS485 interface as standard
- 3L-NDP : Control Panel (Addressable by zone name) with RS485 interface as standard
- 3L-NP : Control Panel (Non-Locating) with relay/dry contact for alarm
- 3L-LSxxx : Liquid sensing cable, where xxx is the length in meter
- 3L-ASxxx : Liquid sensing cable with UL910, where xxx is the length in meter
- 3L-T_Joint : Sensing Cable T-Joint or diversion
- 3L-BJxxx : Belden 8723 jumper, where xxx is the length in meter
- 3L-HDC/2ST100 : Hold down clip of 100 pieces with double sided tape per pack
- 3L-HMG/100 : Hot melt glue of 100 pieces per pack
- 3L-T/L50 : Tag or Label of 50 pieces per stack
- 3L-Connetor/Kits : Male/Female connector pair with kits
- 3L-DS (04) : Distance spacer 04m
- IP65 wall mount enclosure (3L-DP/3L-NDP/3L-NP)

WARRANTY

I year (Limited Warranty)

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American Scientist, Margaret Mead. 1901-1978

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