AlarmLine™ Addressable Linear Heat Detector

Effective: February, 2000

SmartOne™

73.02

FEATURES

- **UL Listed**
- **FM Approved**
- **CSFM (pending)**
- **MEA (pending)**
- **Low-cost interface between AlarmLine™ sensor cable and control panel accepting SmartOne™ addressable devices**
- **Up to 255 Addressable AlarmLine Modules (AAM) per addressable loop**
- **Real-time monitoring**
- **Software adjustable alarm set point**
- **Optional pre-alarm and overheat output configuration selections**
- **Three cable styles (standard, nylon, bronze braided)**
- **Sensor cable restorable up to 257° F**
- **Full supervision for short and open circuits**
- **Two-color status-LED display for alarm and trouble conditions**
- **Intrinsically safe option**
- **Flexibility in zoning**
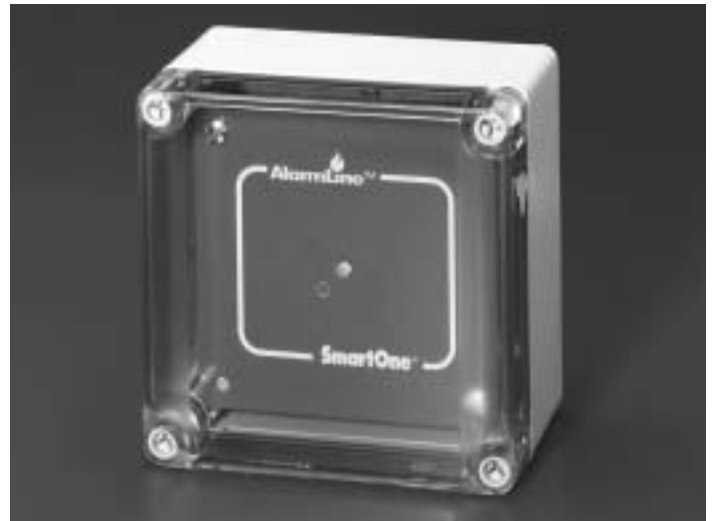
DESCRIPTION

The AlarmLine Addressable Linear Heat Detector provides early detection of fire or overheat condition in protected areas or equipment. It is especially suited for confined areas or environments where adverse ambient conditions cause other detection devices to be unreliable or difficult to use. The detector consists of two major components: A sensor cable and an Addressable AlarmLine Module (AAM).

The AAM is used with any intelligent control panel that accepts SmartOne devices.

APPLICATIONS

- Open-area protection
- Cable trays
- Rack storage
- Freezer warehouses
- Belt conveyers
- Floating roof fuel tanks
- Cooling towers
- Dust collectors
- Waste fuel drum storage
- Power distribution apparatus
- Escalators
- Tunnels
- Mines
- Hangers

BENEFITS

Application Flexibility: Allows installation at point of risk. Programmable pre-alarm, alarm, and overheat levels for differing ambient conditions.

Durability: Extrusion and braiding options to satisfy environmental conditions and project risks.

Reliability: Fault signaling of open and short circuit conditions, pre-alarm, alarm, and overheat reporting.

Recoverability: Self-restoring after fire events up to 257° F.

Sensitivity: Proven superiority over point-type measurement.

ANALOG HEAT SENSING

AlarmLine's analog heat sensing characteristics offer several distinct advantages:

Field Adjustability of pre-alarm, alarm, and overheat setpoints: Pre-alarm, alarm, and overheat thresholds may be programmed to meet specific system requirements.

Restorable: Cable does not need to be replaced after an alarm event as high as 257° F (125° C).

Integrating: It is not necessary to reduce sensor spacing with increased ceiling height per NFPA 72-1996, Section 5-2.4.1.2, Exception (a). System sensitivity remains constant as ceiling height increases without reducing spacing.

Short Circuit Discrimination: The system will produce a trouble condition instead of a false alarm in the event of a conductor to conductor short due to damage or electrical faults.

SENSOR CABLE

The AlarmLine sensor cable consists of four 26 AWG copper conductors, each color-coded in an insulated sheath containing a negative temperature coefficient polymer (where an increase in temperature decreases the resistance of the sensor).

Two of the conductors are enameled and provide loop continuity supervision, but not temperature sensing. The conductors are twisted at thirty turns per foot (90 turns per meter) and protected by a flame-retardant outer extrusion or metallic braid (See Figure 1). The color coding of the four inner conductors is repetitively marked on the outer coating every three feet as an aid installation. Cable is sold in standard coils of 656 feet (200 meters).

NOTE: The maximum length of sensor cable per zone depends on the maximum ambient temperature defined on the nomogram(s) (See Figures 2 and 3). Regardless of ambient temperature, however, the maximum length of cable is 3200 feet (1000 meters) per zone for Type "T" cable.
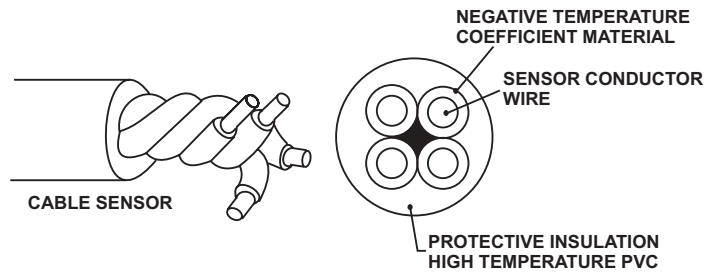

Figure 1. Standard Sensor Cable

PART NUMBERS

Sensor cable is available with the following part numbers:

Standard Sensor Cable

73-117068-013

Recommended for environments ranging from clean and dry to moderate dust and moisture.

Nylon Coated Sensor Cable

73-117068-016

Recommended for use in wet, oily, or corrosive environments or outdoors. Use in freezer warehouses.

Phosphor Bronze Braided Sensor

73-117068-019

Recommended for applications requiring superior abrasion protection and/or increased tensile strength.

ADDRESSABLE AlarmLine MODULE (AAM)

The AAM permits an AlarmLine sensor cable to be directly interfaced to any control panel that accepts SmartOne addressable loop devices. This interface will allow for pre-alarm, alarm, and trouble conditions to be transmitted to the control panel via the Rx/Tx (Receive/Transmit) loop. The AAM monitors the resistance of the sensor cable and generates a pre-alarm (if enabled), alarm, or overheat output (if enabled) when the resistance drops below the programmed threshold. The module also supervises the AlarmLine cable for opens and shorts, which will generate a fault condition.

All of the pre-alarm, alarm, overheat, and trouble conditions will be displayed on the Central Control Module (CCM) of the control panel. Up to 255 AAM modules can be connected to a single Rx/Tx module. Use of multiple AAMs allows flexibility in zoning larger installations for location of alarm and zone output control; the control panel acts as a central display and control interface.

The AAM receives power directly from the Rx/Tx loop which eliminates the need for additional wiring and external power supplies.

For further information on installation and configuration of the AAM, please refer to the AlarmLine Addressable Linear Heat Detector Installation, Operation, and Maintenance Manual, P/N 73.04.

The Addressable AlarmLine Module is available using the following part numbers:

73-100001-001

> Module with operating temperature range of -40° F to 140° F (-40° C to 60° C). Mounted on a 4-inch square faceplate. AAM mounts in a 4-inch square backbox, 2-1/8-inches deep.

73-100003-001

> NEMA-4 sealed, protective polycarbonate enclosure used to mount AAM in wet or dusty environments.

CABLE SPECIFICATIONS

	Standard Sensor	Nylon Coated Sensor	Bronze Braided Sensor
Part Number	73-117068-013	73-117068-016	73-117068-019
Jacket Construction	Blue PVC	Black nylon extrusion over blue PVC	Phosphor bronze braid over blue PVC
Standard Available Length	656 feet (200m) reel	656 feet (200m) reel	656 feet (200m) reel
External Diameter	0.117 in. (3.25 mm)	0.153 in. (4.25 mm)	0.153 in. (4.25 mm)
Weight per 656 ft (200m)	7 lbs. (3.2 kg)	9.5 lbs (4.3 kg)	18.3 lbs. (8.3 kg)
Tensile Strength	100 N	100 N	1000 N
Conductor Insulation Colors	1 = Orange 2 = White 3 = Red 4 = Blue	1 = Orange 2 = White 3 = Red 4 = Blue	1 = Orange 2 = White 3 = Red 4 = Blue
Conductor Material	26 AWG Solid Copper	26 AWG Solid Copper	26 AWG Solid Copper
Conductor Diameter	0.018 in. (0.460 mm)	0.018 in. (0.460 mm)	0.018 in. (0.460 mm)
Twist of Inner Conductors	30 per ft. (90 per meter)	30 per ft. (90 per meter)	30 per ft. (90 per meter)
Dielectric Material	Specially Doped Polymer	Specially Doped Polymer	Specially Doped Polymer
Standard Outer Jacket Material	High Temperature PVC	High Temperature PVC	High Temperature PVC
Voltage Proof Between PVC Jacket and a Conductor	10 KV	10 KV	10 KV
Service Life	Up to 212°F (100°C) = 30 Years@ 257°F (125°C) = 24 Hours. Self Restores below 257°F (125°C) Above 374°F(190°C) is the destructive temperature.	Up to 212°F (100°C) = 30 Years@ 257°F (125°C) = 24 Hours. Self Restores below 257°F (125°C) Above 374°F(190°C) is the destructive temperature.	Up to 212°F (100°C) = 30 Years@ 257°F (125°C) = 24 Hours. Self Restores below 257°F (125°C) Above 374°F(190°C) is the destructive temperature.
Maximum spacing between parallel runs	30 feet (9 meters)	30 feet (9 meters)	30 feet (9 meters)

SENSOR MOUNTING HARDWARE

Three types of standard mounting hardware (master clamp, flange clamp, nylon cable tie) for AlarmLine permit safe, secure sensor cable installation in most applications. Other mounting means may be used as required by the specific application. The sensor should be supported at a minimum of ten foot intervals on straight runs when under tension, and more as conditions dictate at corners and transition points to provide suitable strain relief. Local codes or conditions may also require the sensor to be supported at closer intervals. Refer to Manual 73.04 for specific mounting information.

AAM SPECIFICATIONS

Specification	Value
Part Number (P/N)	73-100001-001
Supply Voltage	P.C. Line, 16.5 to 27.5 VDC
Current Consumption, Standby	425 microAmps
Current Consumption, Alarm	440 microAmps
Current Consumption, Fault	425 microAmps
Noise Performance	Withstands 5% RMS 60-Hz supply noise or 1 V RMS 60 Hz sensor noise with negligible performance change. RFI immunity at 10V/meter field strength over the band of 20 to 900 MHz
LED Pulse Modes	Normal: Slow flash GREEN every 9 seconds
	Pre-Alarm: Slow flash RED every 9 seconds
	Alarm: Fast flash RED every 2 seconds
	Trouble: Off
Operating Temperature Range	-40 deg F to +140 deg F (-40 deg C to +60 deg C)

INTRINSIC SAFETY BARRIERS

In classified hazardous areas where potentially explosive vapors, dust, or fibers exist, AlarmLine cable must installed using an intrinsic safety barrier. The barrier (P/N 73-117068-031) is a shunt diode safety barrier which limits the current and voltage in the sensor cable to safe levels. Each barrier handles two conductors, so two barriers are needed for each sensor cable. The barriers are designed to mount in separate weathertight enclosures. The intrinsic safety barrier's specifications are as follows:

UL Listed and FM Approvals	Class I, Division 1, Groups A, B, C, D Class II, Division I, Groups E, F, G: Class III, Division 1
Operating Temperature Range	-4°F (-20°C) to 140°F (60°C)
Humidity	5 - 95% R.H.
Terminals	Will accept up to #12 AWG
Working Voltage	6V
Maximum Voltage	7.5 V
Fuse Rating	100 mA
Leakage Current	1 mA maximum at 6V
End-To-End Resistance	145 ohm maximum 90 ohm minimum
Enclosures	73-117068-032 holds 2 barriers 73-117068-033 holds 5 barriers 73-117068-034 holds 12 barriers 73-117068-035 holds 24 barriers 73-117068-036 holds 32 barriers

SETTING THE ALARM TEMPERATURE

When determining the alarm temperature setting, the designer must take into account environmental factors that may affect the overall response of the system. By accounting for these factors, the designer minimizes unwanted alarms. Below is a step by step procedure which instructs the designer in selection of the proper alarm trip points.

The required alarm temperature and the correct alarm configuration setting for the AAM are determined using the AlarmLine nomogram(s).

Measurements are in Feet/Fahrenheit or Meters/Centigrade.

The use of the nomogram requires two known factors:

• Maximum ambient temperature of the alarm zone. (Scale A).

• The total length of the sensor cable to be used. (Scale L).

The resistance change required to create an alarm can be a result of either a predetermined minimal increase in temperature over the entire length of the sensor, or a significant increase on a shorter section of cable. The alarm temperature in either case is determined only after the alarm trip switch position for the entire sensor length is known.

A shorter section of sensor cable exposed to an overheat condition will require a higher temperature to achieve an alarm than a longer length of sensor cable exposed to the same overheat condition.

The maximum length of sensor cable per zone depends on the maximum ambient temperature defined on the nomogram. Regardless of ambient, however, the maximum length of cable connected to a single AAM is 3200 feet (1000 m). If

cable length exceeds 3200 Ft., the alarm condition could be reached at room temperature (70° F (20° C)) for most switch settings. Refer to Manual 73.04 for more information.
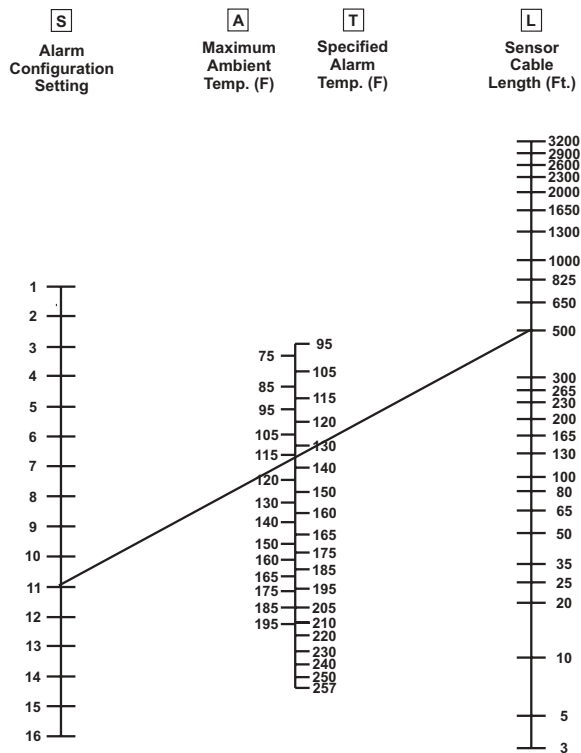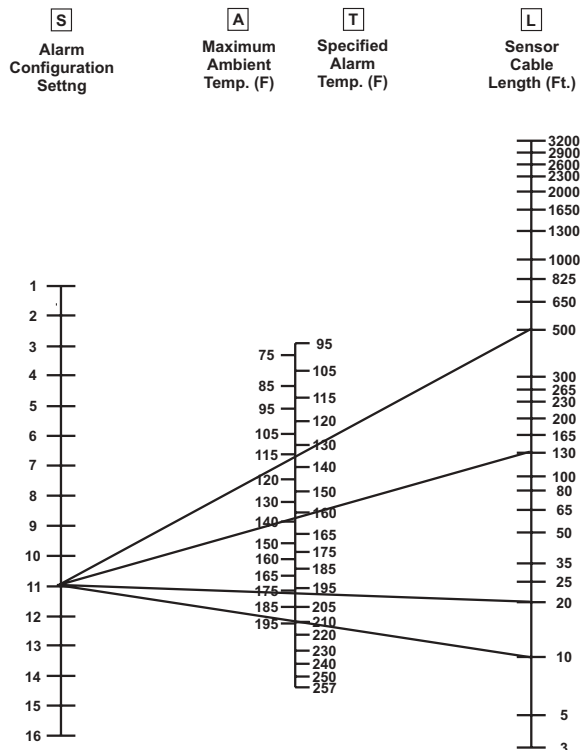

Figure 2. Example for Type "T" cable (Feet/Fahrenheit)

Figure 3. Example for Type "T" Cable (Feet Fahrenheit)

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KIDDE-FENWAL, INC.
400 MAIN ST. ASHLAND, MA 01721

ADDRESSABLE ALARMLINE™ MODULE
CAT NO. 73-100001-001

PRODUCT MUST BE INSTALLED AND OPERATED
IN ACCORDANCE WITH KIDDE-FENWAL INSTALLATION
MANUAL 73.04 AND JURISDICTION OF LOCAL AUTHORITY.

DATE OF MANUFACTURE: DEVICE
ALL TERMINALS ARE POWER LIMITED   ADDRESS # _ _ _ _
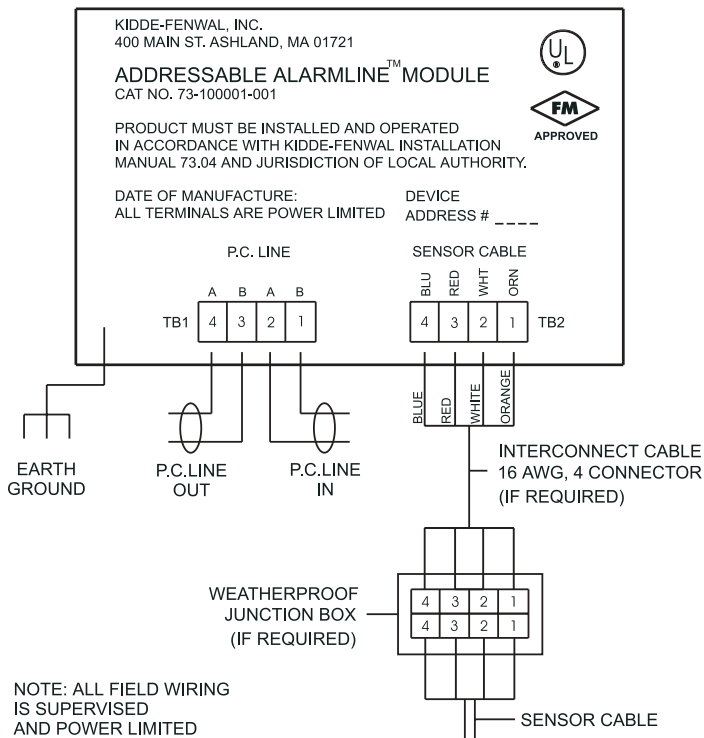
Figure 4. Wiring the AAM to a Panel

Figure 5. NEMA-4 Enclosure with AAM

ADDRESSABLE AlarmLine MODULE WIRING

The Addressable AlarmLine Module (P/N 73-100001-001) may connected to any fire control panel that accepts SmartOne addressable devices. The module is wired directly to the Rx/Tx of the panel as shown in Figure 4.

Refer to Manual 73.04 for complete wiring information.

NEMA-4 ENCLOSURE

The NEMA-4 polycarbonate enclosure (P/N 73-100003-001) is designed to mount the Addressable AlarmLine™ Module in areas requiring additional protection from wet and/or dusty environments. This enclosure is rated as follows:

• UL 508 Type 4, Type 4X, Type 6, Type 12, and Type 13
• NEMA Type 4, Type 4X, Type 6, Type 12, and Type 13
• CSA Type 4, Type 4X, Type 6, Type 12, and Type 13
• Flammability rating UL94-5V
• IEC 529, IP66

The enclosure is equipped with a clear cover so that the AAM alarm/trouble status indicator LED can be viewed. The cover also provides a molded-in wire-lead hole for tamper resistant installation. Mounting holes for the enclosure are molded directly under the cover screws. A cover gasket assures watertight and dust-tight seals. The impact-resistant, glass-filled, polycarbonate enclosure material is easily punched, drilled, or sawed to provide access for field wiring.

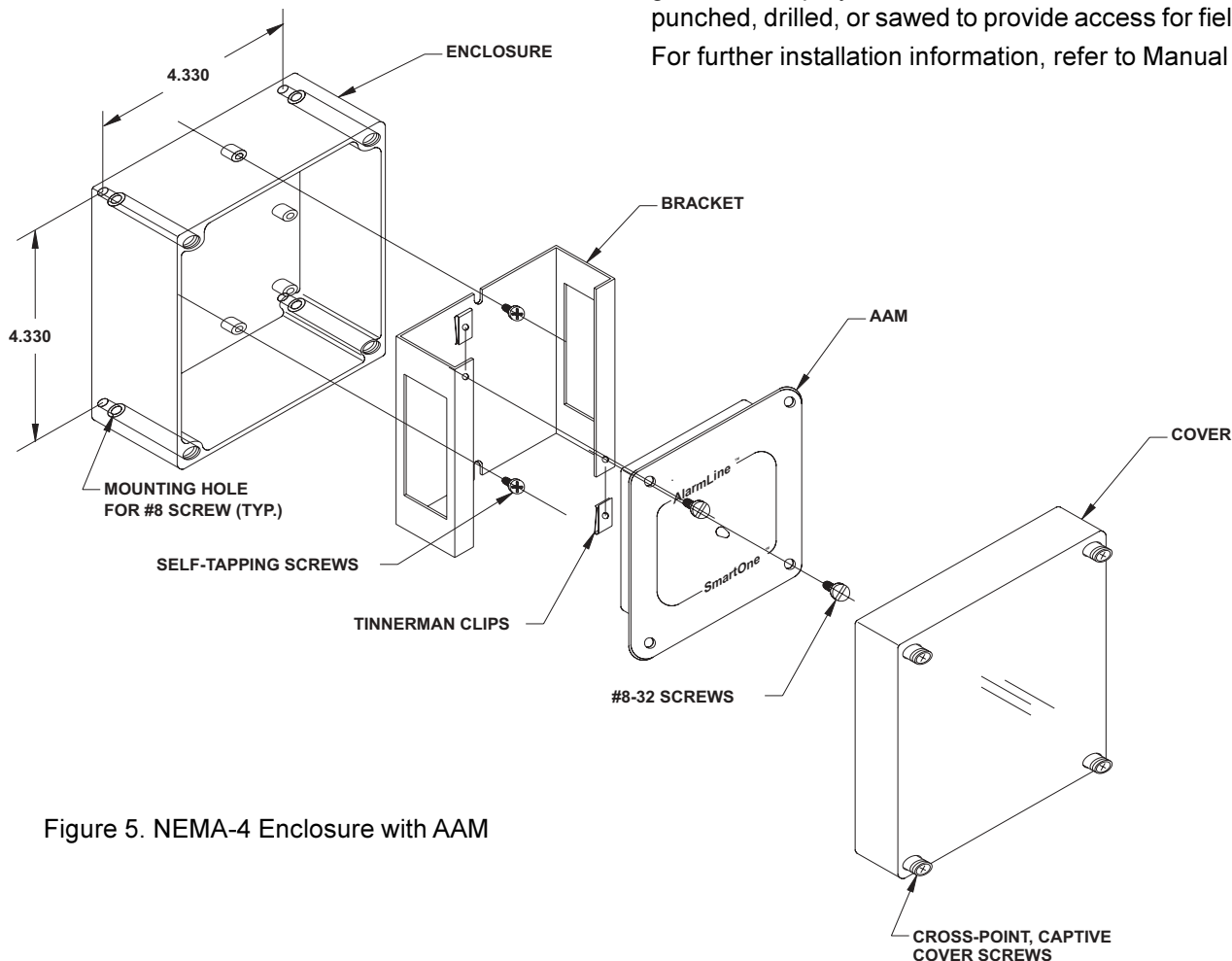For further installation information, refer to Manual 73.04.

SmartOne™