



# Protectowire CTI™ Confirmed Temperature Initiation Linear Heat Detectors



## Features

- Digital operation with short circuit discrimination capable of distinguishing between short circuit and alarm conditions.
- Two distinct heat sensing technologies.
- Confirmed temperature initiation for highest immunity to nuisance alarms.
- Compatible with Protectowire Alarm Point Location Meter.
- Approved for hazardous locations.
- Available in five alarm temperatures to accommodate the widest range of applications.

## Description

The Protectowire family of Confirmed Temperature Initiation Linear Heat Detectors, are advanced multi-criteria detectors consisting of models with alarm temperatures ranging from 155°F (68°C) to 356°F (180°C). Each Detector is comprised of two special metallic alloy conductors individually insulated with a heat sensitive polymer. The insulated conductors are twisted together to impose a spring pressure between them, then wrapped with a protective tape and finished with a durable flame retardant outer jacket.

The Detectors are fixed temperature digital sensors that are capable of initiating an alarm signal once their rated activation temperature is reached. At the rated temperature, the heat sensitive polymer insulation yields to the pressure upon it allowing the conductors to move into contact with each other thereby creating a short circuit temperature measuring junction point. The associated zone control module is designed to detect a short circuit and enter a heat measuring thermocouple mode. By entering the thermocouple mode, the

control module is able to identify the temperature at the short and determine the type of off-normal condition being created based upon the alarm temperature threshold of the Detector.

If the interface control module determines that the temperature at the short is above the predetermined alarm threshold temperature, the module initiates an ALARM condition and displays the location of the alarm if equipped with the Protectowire Alarm Point Location Meter. If, however, the control module determines the temperature is below the alarm temperature threshold, it initiates a short circuit fault or TROUBLE condition and displays its location on the Protectowire Alarm Point Location Meter (if provided) so it can be corrected. The Protectowire advanced multi-criteria detectors are the first digital type linear heat detectors to provide true confirmed temperature initiation and mechanical short circuit discrimination. They provide stable linear temperature response with verified alarm temperature confirmation for exceptional false alarm immunity.



An ISO 9001:2008 Registered Company



## Protectowire CTI™ Features & Benefits

- Uses advanced multi-criteria detection for highest immunity to false alarms.
- Measures and confirms the temperature at the alarm point to provide true Confirmed Temperature Initiation (CTI).
- Reliable digital operation with separate short circuit fault identification. Protectowire's advanced multi-criteria detectors are the only digital type linear heat detectors capable of distinguishing between short circuits and true alarm conditions.
- Identifies and displays the location of an overheat or fire condition anywhere along its length when used with a Protectowire Alarm Point Location Meter.
- The Detector also meets intrinsically safe standards and is FM Approved for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G; Class I, Zone 0, AEx ia IIC T6 Ga -29°C ≤Ta ≤ +49°C hazardous locations when appropriate control option is ordered.
- Protectowire's advanced CTI Linear Heat Detector is manufactured under U.S. Patent 8,096,708 and has patents pending in many countries around the world.

## Installation

Protectowire CTI Linear Heat Detectors are approved as heat actuated automatic fire detectors and are intended to be used on a supervised initiating circuit with an approved fire protective signaling control unit. The Detectors must be installed in continuous runs without taps or branches in accordance with applicable sections of NFPA 70 National Electrical Code, NFPA 72 National Fire Alarm Code, or as determined by the local authority having jurisdiction.

Protectowire may be installed at the ceiling level or on the side walls within 20 inches (50cm) of the ceiling, to protect areas within buildings. The Detector has the additional benefit of being suitable for installation close to the hazard ( i.e. cable trays) in order to provide a rapid response. This is known as proximity or special application protection.

Recommended practice is to locate the associated Interface Module near the hazard area and connect the CTI Linear Heat Detector directly to the module. The Interface Module provides Form C (SPDT) contacts for Alarm, Trouble, and Short Circuit Fault connection to the host fire alarm control panel. When necessary, "T" type thermocouple extension grade wire, of an approved type, with a minimum conductor size of 20 AWG, may be installed as interposing cable from the Interface Module out to the beginning of the CTI Detector portion of the initiating circuit.

The CTI Detector portion of each initiating circuit shall begin and terminate at each end in an approved zone box or end-of-line zone box. In order to hold the cable securely, SR-502 Series Strain Relief Connectors shall be installed in all zone boxes where the CTI Linear Heat Detector enters or exits the enclosure.

## Installation Accessories

A comprehensive range of mounting and installation accessories are available for the installation of Protectowire CTI Linear Heat Detectors. Only installation hardware supplied or approved by the Protectowire Company should be used.

Messenger wire is also available for the Detector on special order. It consists of high tensile strength stainless steel wire, which is wound around the Detector at the rate of approximately one turn per foot. It is a carrier or support wire that is designed to simplify the installation of the Detector in areas where mounting is difficult. Consult the Protectowire Company for details regarding your specific application.

## Specifications

Maximum Voltage Rating:	30 VAC, 42 VDC
Resistance:	.282 ohms/ft. (.925 ohms/m)
Conductor Polarity:	Un-insulated Copper Colored Conductor – Positive (+) Un-insulated Silver Colored Conductor – Negative (-)
Min. Bend Radius:	2.5 inches (6.4 cm)
Weight:	Nominal 7.5 lbs. / 500 ft. (3.4 kg / 152 m)

## Temperature Ratings & Model Numbers

Product/Jacket Type	Model Number	Alarm Temperature	Max. Recommended Ambient Temperature	Max. Listed Spacing FM	Max. Listed Spacing UL/cUL
<b>CTI</b> Multi-Purpose/ Commercial & Industrial Applications	CTI-155	155°F (68°C)	115°F (46°C)*	30ft (9.1m)	50ft (15.2m)
	CTI-190	190°F (88°C)	150°F (66°C)	30ft (9.1m)	50ft (15.2m)
	CTI-220	220°F (105°C)	175°F (79°C)*	25ft (7.6m)	50ft (15.2m)
	CTI-280	280°F (138°C)	200°F (93°C)	25ft (7.6m)	50ft (15.2m)
	CTI-356	356°F (180°C)	221°F (105°C)	See Note 1	50ft (15.2m)
<b>CTI-X</b> High Performance/ Excellent Abrasion, Weathering & Chemical Resistance Properties	CTI-155X	155°F (68°C)	115°F (46°C)*	30ft (9.1m)	50ft (15.2m)
	CTI-190X	190°F (88°C)	150°F (66°C)	30ft (9.1m)	50ft (15.2m)
	CTI-220X	220°F (105°C)	175°F (79°C)*	25ft (7.6m)	50ft (15.2m)
	CTI-280X	280°F (138°C)	200°F (93°C)	25ft (7.6m)	50ft (15.2m)
	CTI-356X	356°F (180°C)	250°F (121°C)	See Note 1	50ft (15.2m)

\*For open area applications the recommended UL 521 maximum ambient temperature for CTI-155 models is 100°F (38°C), and CTI-220 models is 150°F (66°C). Temperatures shown in table are acceptable for UL Special Application use.

Note 1: FM Approved for special application use only. All models can be supplied on Messenger Wire. Add Suffix "-M" to the above model numbers.



## CTM-530 Series Protectowire Interface Module with Confirmed Temperature Initiation (CTI™)



### Features

- Provides a single zone interface for Protectowire Type CTI™ Linear Heat Detectors
- Patented technology can distinguish between mechanical shorts and thermal alarm conditions (Short Circuit Discrimination)
- Integrated Protectowire Alarm Point Location Meter with field calibration
- 4x20 LED backlit LCD display
- Plug-in terminals for easier field wiring connections
- 4-20mA outputs for Status and Alarm Point Location
- 64 Event History Log (FIFO)
- Optional intrinsically safe detection circuit available for use in hazardous locations.

### General

The CTM-530 is a detection control module that acts as an interface between a main fire alarm control panel detection circuit or addressable node and Protectowire Type CTI Linear Heat Detector. The module provides one (1) supervised detection circuit that may be field wired for either Class A (Style D) or Class B (Style B) service. The alarm initiating circuit is capable of operating up to 4000 feet (1219 meters) of Protectowire Type CTI Linear Heat Detector. The CTM-530 initiating circuit currently does not support other types of normally open contact alarm initiating devices.

### Description

The CTM-530 operates using Protectowire's patented CTI Confirmed Temperature Initiation technology. When paired with Protectowire Type CTI Linear Heat Detectors, the module can distinguish between a mechanical short in the linear heat detector and a thermal alarm activation thereby greatly reducing the risk of false alarms. This multi-criteria detection method provides for

short circuit discrimination, a feature previously unavailable for digital type linear heat detectors.

The CTM-530 is designed for easy installation and is optionally available in a NEMA-4X\* rated enclosure for mounting outside of the host fire alarm control panel or remotely near the hazard to be protected. In order to ensure proper operation, each CTM-530 module requires regulated resettable external power which is normally provided by the host fire alarm panel. Each module contains a green "Power-On" LED indicator, one (1) red "Alarm" LED indicator, one (1) yellow "Trouble" LED indicator and one (1) yellow "short fault" LED indicator. One (1) set of Form C alarm contacts, one (1) set of Form C trouble contacts and one (1) set of Form C short circuit fault contacts are also provided to connect the unit to the host fire alarm panel. The module also provides two 4-20mA outputs, one which allows monitoring of the module status and the other for monitoring alarm point location information.

The standard CTM-530 module contains a built in Protectowire Alarm Point Location Meter. This meter will automatically display

the distance from the beginning of the detector run to the heat actuated (shorted) portion of the detector. The Alarm Point Location Meter can be programmed to display in either standard units (Feet) or metric units (Meters). The meter display provides a simple “on screen” calibration procedure allowing the measurement to be field calibrated to the installed detector length and ambient temperature for optimal accuracy.

## Specifications

### Electrical

- Power input - Regulated 12 to 24 VDC (+10% / -15%) @ 1 Watt
- Power Limited, onboard surge and EMI protection devices

### Inputs

- One initiating device circuit capable of monitoring up to 4000 Feet (1219 Meters) of Protectowire Type CTI Linear Heat Detector. For all CTI type detectors, twisted “T” type thermocouple grade extension wire is required for use as interconnecting cable on the detection circuit. Minimum conductor size is 20 AWG (0.812 mm), or as required by local code.

### Environmental

- Ambient temperature Range:  
Standard version -20° to 120°F (-29° to 49°C)  
LT version -40° to 120°F (-40° to 49°C)
- Humidity: Max. 95% non-condensing

### Indicators

- 4x20 Character LED backlit LCD display
- One green “Power” indicator
- One red “Alarm” indicator
- One yellow “Fault” indicator
- One yellow “Short Fault” indicator

## Ordering Information

Model No.	Description
CTM-530	Interface Module for Protectowire Type CTI with LCD display and navigation buttons.
CTM-530E	Interface Module for Protectowire Type CTI with LCD display and navigation buttons mounted in a NEMA-4X (IP66) Enclosure.
CTM-530E-I	Interface Module with ISB for Protectowire Type CTI with LCD display and navigation buttons mounted in a NEMA-4X (IP66) Enclosure.
CTM-530LT	Interface Module for Protectowire Type CTI without LCD display and navigation buttons for use in low temperature environments. This model requires the use of a separately ordered hand-held programmer. Consult Factory for details.
CTM-530LTE	Interface Module for Protectowire Type CTI without LCD display and navigation buttons, mounted in a NEMA-4X (IP66) Enclosure. For use in low temperature environments. This model requires the use of a separately ordered hand-held programmer. Consult Factory for details.
CTM-530LTE-I	Interface Module with ISB for Protectowire Type CTI without LCD display and navigation buttons, mounted in a NEMA-4X (IP66) Enclosure. For use in low temperature environments. This model requires the use of a separately ordered hand-held programmer. Consult Factory for details.
CTMP-1	Hand-held programmer for CTM-530LT Models. Required for commissioning system, setting alarm temperature and accessing history log.

### Relay Outputs (Rated 1 amp @ 24VDC Resistive)

- One (1) set of Form C (SPDT) Fault Contacts
- One (1) set of Form C (SPDT) Short Fault Contacts
- One (1) set of Form C (SPDT) Alarm Contacts

### Option I - Intrinsically Safe Detection Circuit

- Option I provides an intrinsically safe Class B detection circuit for use in those areas classified as hazardous. This feature utilizes one shunt diode barrier per zone and is FM Approved for Class I, II and III, Division 1, Groups A, B, C, D, E, F and G; Class I, Zone 0, AEx ia IIC T6 Ga -29°C ≤ Ta ≤ +49°C.

### Optional Enclosure Specifications

- 10.5" H x 8.5" W x 4.5" D (27cm x 21.5cm x 11.4cm)
- Add 1.6" (4cm) to overall height for external mounting feet
- Clear full view door
- NEMA 4X Rated (Rating UL listed only)\*  
(Closest IEC equivalent - IP66)  
Option I increases enclosure size. Consult factory.

## 4-20mA Output Information

**Description** - The CTM 530 provides two 4-20mA outputs that allow for monitoring of the module status and active alarm point location reading. These outputs are intended for annunciation purposes only. Module monitoring is intended to be accomplished using the on-board dry contacts connected to a listed or approved fire detection control panel initiating device circuit.

For Class “A” wiring configurations, the status output will also indicate which detector input is currently being measured by the alarm point location meter. The measurement is alternated between inputs approximately every 3 seconds with the status output indicating which input is currently being read.

Consult Manual for detailed output levels for each status loop.

*Note: All specifications subject to change without notice.*