

# CONTINUOUS THERMOCOUPLE TRANSDUCER CABLE

## FTLD® - The Heat-Seeking Thermocouple

### Introduction

The FTLD Continuous Thermocouple® is a temperature measuring sensor, which takes the form of a thin flexible cable. Like its predecessor CT°C®, it is a heat-seeking thermocouple, using similar thermo-electric techniques, but designed especially to reveal changes in the narrow band of temperatures only a few degrees above normal ambient.

FTLD is able to measure the maximum temperature detected between its two ends, then track any increase, even if the position of the "hot-spot" changes. Such ability offers an immense opportunity to prevent loss due to overheat, in commercial as well as industrial applications.

This advanced form of detector permits the design of overheat warning systems, which are highly sensitive to early departures from normal, yet exhibit an extraordinary freedom from false alarms.

### Operating Principle

A Circuit formed from two dissimilar wires joined at both ends, develops an emf (voltage) proportional to the difference in the two junction temperatures. This is the long established Thermo-electric effect, and today the junctions are known as the "Measuring Junction". See diagrams below.

Although an FTLD sensor performs like a normal thermocouple, the measuring junction is not formed by directly joining the two wires. More remarkably, the Measuring Junction is not fixed, but becomes concentrated at the hottest point within the insulation resistance when subjected to an increase in temperature.

The nature of the insulation causing this phenomenon is such that the voltage developed between the two wires always relates to the highest temperature along the cable sheath.

### Features

- Stable
- Moisture resistant
- Sensor needs no power
- Virtually free from false alarms
- Ambient temperature compensation
- Early warning of abnormal temperature
- Alarm point unaffected by cold weather
- Simple apparatus (Hazardous Area)
- User adjustable alarm settings
- No site calibration

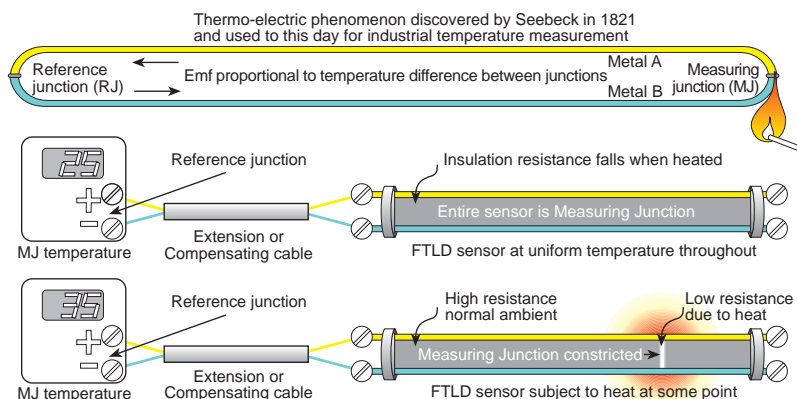
### Advantages

- Self-generating temperature sensor
- Measures maximum temperature
- Initial site temperature check not needed
- Visible operating status
- Optional rate of change alarm (same unit)
- Alarm settings directly in degrees
- Alarms can be set before installation
- Interchangeable sensors
- Sensor not microphonic
- System check facility in sub zero band
- Alarm units for mains power or low voltage
- Sensor need not be near alarm unit

### Specification

- Protective sheath - Dual layer PTFE
- Measuring element - Type "K" thermocouple - insulated
- Sensor output - Millivolts DC related to maximum cable temperature
- Normal operating range - -29 to 80°C (-20 to 176°F)
- Survival range - -40 to 200°C (-40 to 392°F)
- EMI protection - Twisted cores & metallised tape tube
- Insulation - Glass fibre impregnated with special insulating material
- Minimum bend radius - 40 mm
- Construction - Twisted pair, NTC insulation, EMI screen, outer sheath
- Sizes - 3.5mm OD approx. Cut to length as required
- Minimum length - 15 meters
- Hazardous area use - Measuring element is "Simple Apparatus"

### FTLD® - System Operating Principle



By measuring both the sensor output and the temperature at its own terminals the instrument is able to compute the hot spot temperature and make automatic compensation for ambient temperature changes

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## FTLD® - Prevention of Loss due to Overheat

Think of your sphere of work, look around you - is there more you can do?

### The Application

Temperature rise due to unrestrained release of physical or chemical energy, is a regular cause of serious loss in industry, commerce and everyday life. It is responsible for countless incidents, the financial consequences of which range from minor to catastrophic.

One common example of temperature rise ending in loss, is combustion. Some others are wear, distortion, fracture, melting, drying, and seizure.

Breakdown at temperatures well below the boiling point of water, is an area of particular concern - one where losses from shut-down can be enormous. For example, temperatures at which ordinary heat detectors remain dormant, can destroy the electronics crucial to computers, communications and data handling equipment.

For many years point type temperature detectors of various types, including conventional thermocouples, have been used to monitor processes and plant risk from heat induced damage. In almost every case the inevitable compromise between numbers (cost), and detector coverage (efficiency), has defeated the exercise.

FTLD offers a very powerful and cost effective alternative to any currently available system, by eliminating the question of where to place the sensor; by constantly monitoring maximum temperature in the area covered; and by possessing such stability, that false alarms are virtually non-existent.

Very often, a loss-inducing condition begins with temperature rising very slowly above normal for the installation at risk. This is the time when corrective action has the greatest chance of success. An FTLD system capitalizes on this opportunity by alerting operating personnel to the onset of a dangerous condition, some time before the main danger temperature alarm is initiated.

### Areas of Risk

#### Storage & Maintenance

- Foodstuffs, Beverages & Medicines
- Wines & Spirits
- Coal, Gas & Oil
- Fabric, Timber & Building Materials
- Clothing
- Paper & Board
- Aircraft, Ship & Vehicle Maintenance

#### Communications

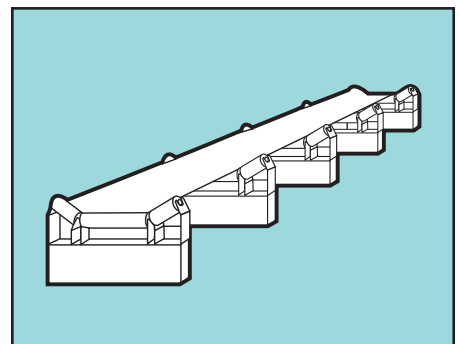
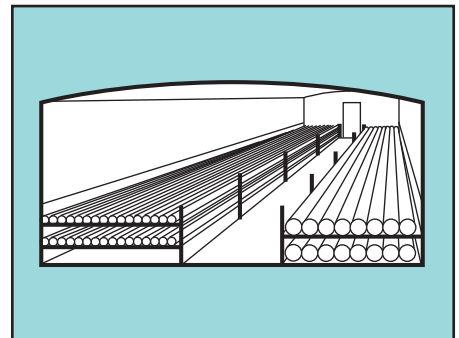
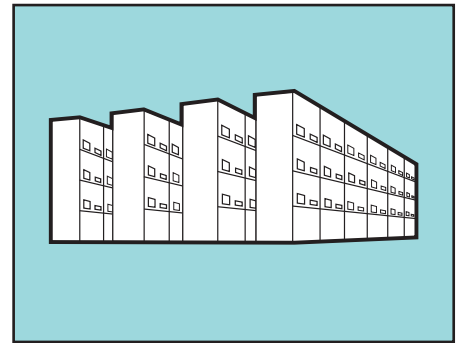
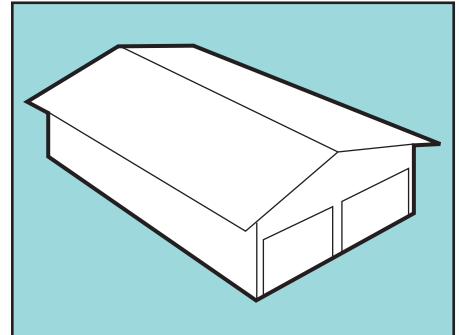
- Telephone Exchanges
- Computer Installations
- Radio, Radar & Television Stations
- Television & Film Studios
- Data & Signal Cable Ducts
- Instrumentation & Control Rooms
- Civil & Defense Facilities

#### Services

- Food Production & Supply
- Manufacturing Facilities
- Rail, Road & Cable Tunnels
- Fuel, Water & Sewage Treatment
- Airports, Seaports, Rail & Bus Stations
- Hospitals, Schools & Universities
- Shopping, Sports & Leisure Centers

#### Materials Handling

- Oil & Gas Pumps & Valves
- Coal Conveyors & Silos
- Electricity Sub-stations
- Air, Sea & Land Vehicles
- Agriculture
- Ship, Aircraft & vehicle Loading
- Goods & Mail Distribution



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HIGH TEMPERATURE  
VERSION < 1800°F.**