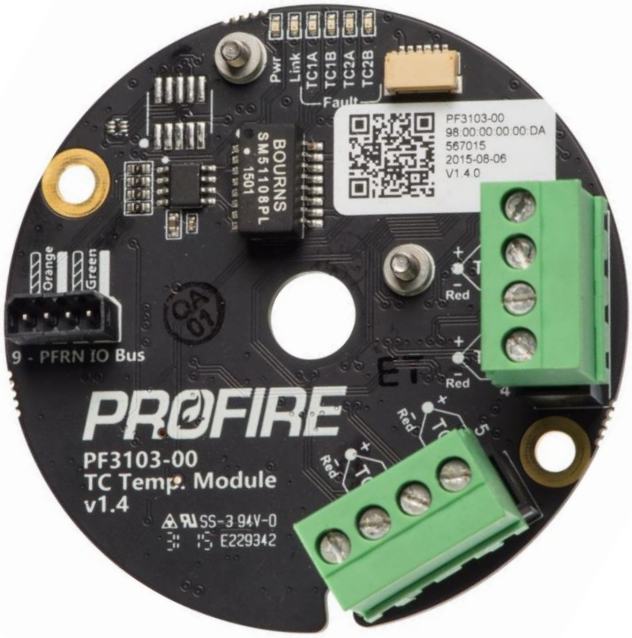
PROFIRE PF3100 Thermocouple Card

PF3103-00



The PROFIRE PF3100 Thermocouple Card relays the measured temperature from the appliance to a controller for use in process control and high temperature safety shutdown.

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1. Introduction

Functional Description

The PROFIRE PF3100 Thermocouple Card relays the measured temperature from the appliance to a controller for use in process control and high temperature safety shutdown.

Model Types

Model Number	Name	Description
PF3103-00B	Temperature Module - Head Connection	Head connection with 2 dual-element thermocouples with label
PF3103-00D	Temperature Module - No Probe	1 temperature module in an EPX enclosure with no temperature probe

2. Certifications

PROFIRE strives to ensure that certifications are updated as quickly as they become available for all of our products.

Thermocouple Card - Hazardous Location Rating

Certification: Class I, Div 2, Grp ABCD; T4; Type 4
IEC 61508 SIL 2, CSA 22.2 No. 60730-2-5, UL 60730-2-5.

The board includes the following symbols:


Caution: possibility of electric shock.

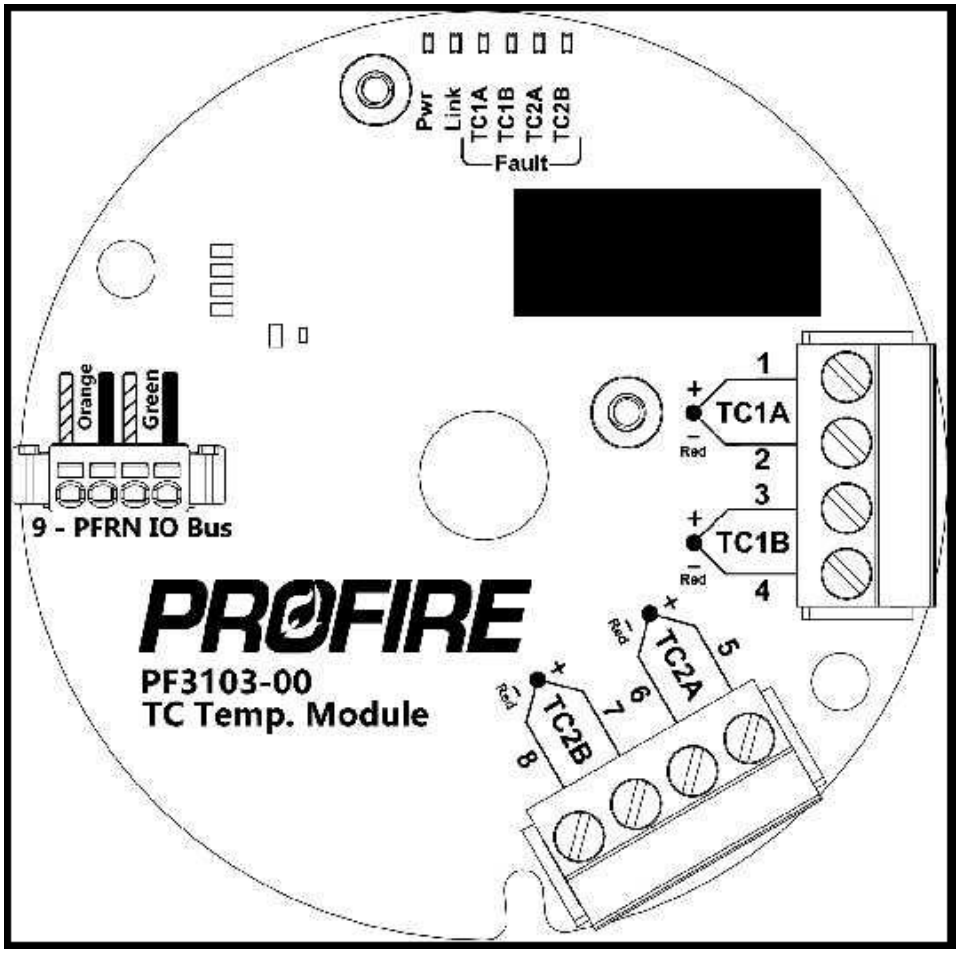

Caution: documentation must be consulted in all cases where this symbol is marked.

3. Card Information

Card Specifications

The ambient temperature rating for the Thermocouple card is -40°C (-40°F) to +60°C (+140°F).

Card Diagram



Terminal Specifications

Terminal		I/O	Safety Rated	Description	Electrical Ratings	
Name	No.				Voltage	Current
TC1A +	1	Input	Dual = Y Single = N	2 single or 1 dual element Type K "ungrounded" thermocouple input	3V	N/A
TC1A -	2	Input	Dual = Y Single = N	2 single or 1 dual element Type K "ungrounded" thermocouple input	3V	N/A
TC1B +	3	Input	Dual = Y Single = N	2 single or 1 dual element Type K "ungrounded" thermocouple input	3V	N/A
TC1B -	4	Input	Dual = Y Single = N	2 single or 1 dual element Type K "ungrounded" thermocouple input	3V	N/A
TC2A +	5	Input	Dual = Y Single = N	2 single or 1 dual element Type K "ungrounded" thermocouple input	3V	N/A
TC2A -	6	Input	Dual = Y Single = N	2 single or 1 dual element Type K "ungrounded" thermocouple input	3V	N/A
TC2B +	7	Input	Dual = Y Single = N	2 single or 1 dual element Type K "ungrounded" thermocouple input	3V	N/A
TC2B -	8	Input	Dual = Y Single = N	2 single or 1 dual element Type K "ungrounded" thermocouple input	3V	N/A
Port		**I/O**	**Safety Rated**	**Description**	**Electrical Ratings**	
Name	**Number**				**Voltage**	**Current**
PFRN IO Bus	9	I/O	N/A	The PFRN IO connect port is used to communicate with the BMS card.	36 VDC	1A Max

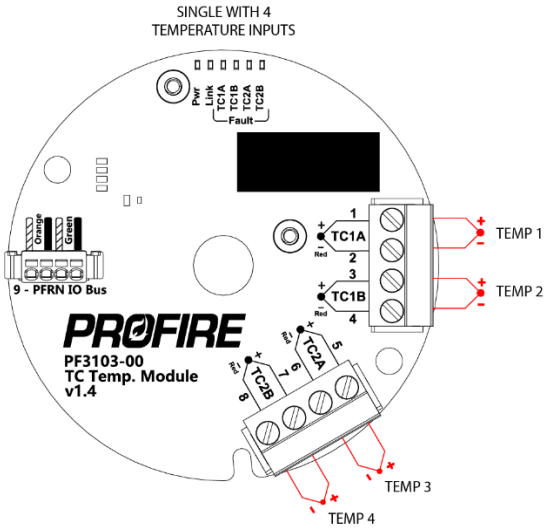
Terminal Descriptions

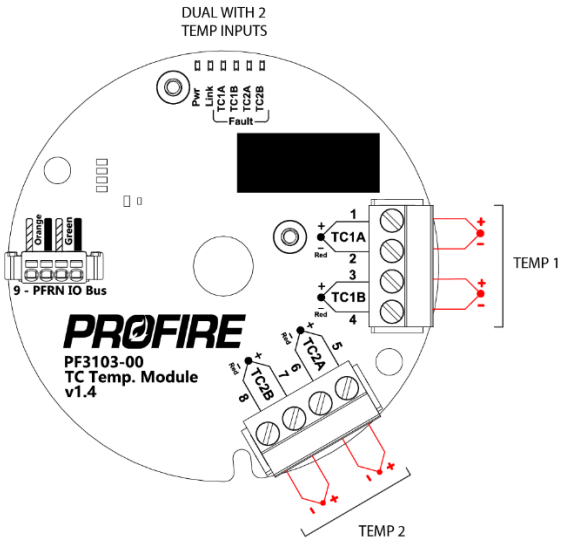
All Thermocouple Terminals

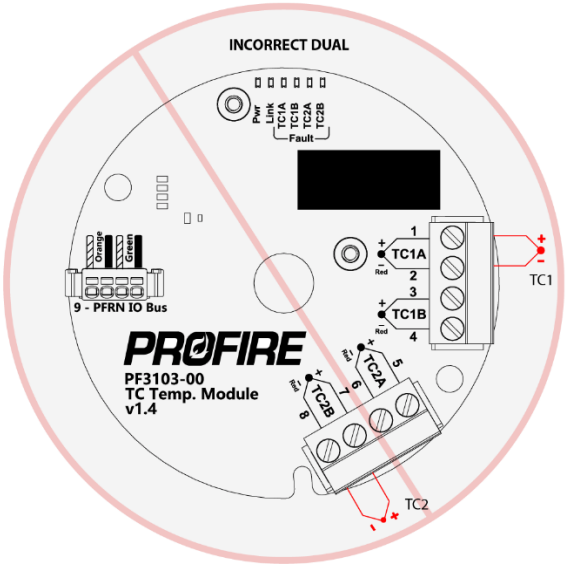
All thermocouples must be Type K “ungrounded.” All thermocouple negative terminals connect to red Type K wire, and all thermocouple positive terminals connect to yellow Type K wire.

Single element thermocouples are **NOT** considered safety rated and should only be used for monitoring non-safety critical processes.

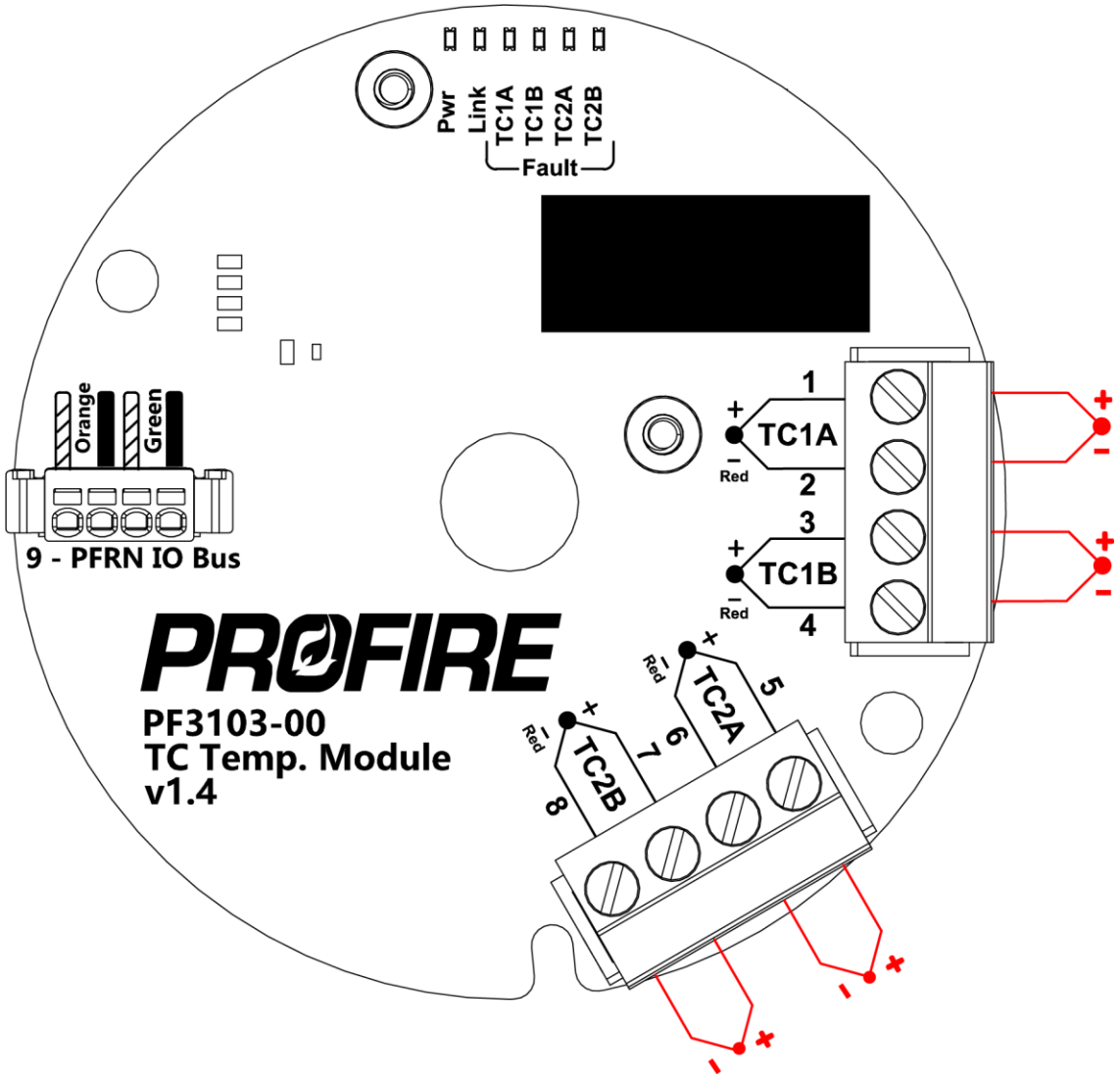
Dual element thermocouples **ARE** considered safety rated when configured in software as such, and when wired correctly. These inputs may be used for monitoring safety critical processes.







4. Wiring Diagram



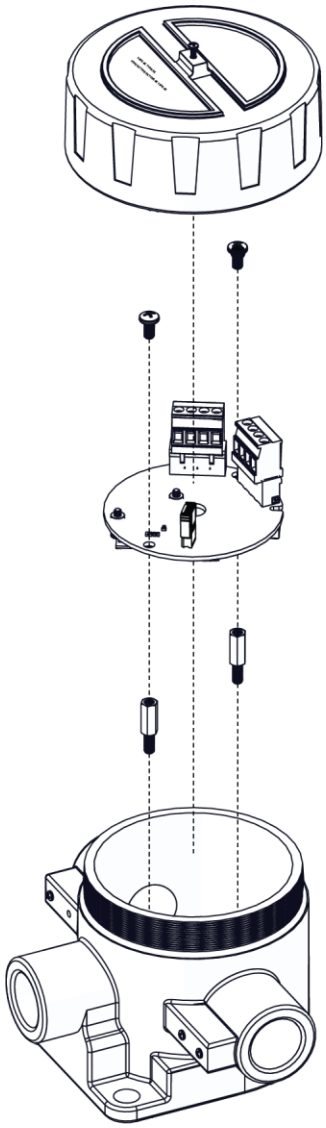
Wiring Specifications

12-30 AWG can be used for all connections. External fuses must be installed according to the local electrical code. Wire gauge size must also be selected in accordance with local electrical codes.

5. Mounting Instructions

Mounting the Card in the Enclosure

1. Install four (4) #10-32 screws through the Thermocouple card (as indicated in the image below).
2. Torque to 26 in*lb.



6. Enclosure Specifications

The Thermocouple Card is mounted in the TLX enclosure.

Specifications	TLX Enclosure
Body Type	*Standard 1/2" NPT Head Connection*
Hazloc Rating	*Class I, Div 1, Grp BCD, T4*
Mounting	*1/2" NPT Thermowell*
Operating Temperature	*-40°C (-40°F) to 60°C (140°F)*
Storage Temperature	*-40°C (-40°F) to 60°C (140°F)*
Probe	*11.5" Probe Dual Element Type K Thermocouple, pre-wired to TC1A and TC1B inputs*
Measurement Temperature Range	*-200°C (392°F) to +1350°C (2462°F)*
Optional: Temperature Probe Operating Range	*0°C (32°F) to +925°C (1697°F)*
Optional: Temperature Probe Union Operating Range	*-40°C (-40°F) to +250°C (482°F)*

7. Instructions for Use

The Thermocouple card is designed to be used with a certified BMS controller as part of the PF3100 platform.

Operation

Operating controls and their uses are described under the Terminal Descriptions section.

8. Preventative Maintenance & Inspection

In order to ensure that the Thermocouple card works correctly and efficiently, the following maintenance and inspection procedures should be followed:

- Ensure that all wires are connected correctly.
- Check for corrosion and ensure that no wires are frayed or worn, and all insulation is intact.
- Confirm no moisture or condensation is apparent on the board or in the enclosure.
- Ensure that the board does not show any sign of mechanical damage (e.g. – damage from an impact such as dropping an item).
- Ensure that the board does not show any sign of electrical damage (components should not be burnt or damaged in any way).
- Confirm that the temperature of the board is within ambient temperature operating limits.
- Check that the enclosure is secured and that the device is not subject to excessive vibration.
- Routine inspections of all equipment should be performed. If any abnormality is found, corrective actions should be taken. If the abnormality cannot be corrected, contact PROFIRE.
- A qualified technician should perform any tests necessary to confirm that the equipment is still in a safe condition.
    - Ensure power LED is lit (blue)
    - Ensure link LED is lit (green)

- Using a calibrated dry block, insert the attached thermocouple into the dry block, and using the PF3100 system, monitor the measured temperature to ensure the temperature read is accurate (within 2°C).
- Ensure the thermocouple is a non-grounded type K thermocouple.
- Short all inputs and monitor the temperatures using the PF3100. Measured temperature with short should be near ambient temperature.
- Ensure all shorts are removed and re-wire the proper temperature element.

Cleaning

If the card becomes dirty it can be cleaned with compressed air. Do NOT use solvents, cleaners, or liquids to clean the board. Caution must be exercised when cleaning the board in order to prevent damage from ESD (electrostatic discharge).

Replacement Parts

Please contact PROFIRE should any replacement parts be required.

9. Important Safety Information

Before installing the PF3100 Thermocouple card, please review the list of warnings below. Product use in a manner not specified by PROFIRE is not recommended. Failure to observe the following warnings may result in death, electrocution, property damage, product damage, product damage, government fines, or malfunction of the product itself.

WARNING: Explosion Hazard

- Do not disconnect while circuit is live unless area is known to be non-hazardous or equivalent.
- Substitution of components may impair suitability for specified zones.
- Do not service unless the area is known to be non-hazardous.
- Do not open when energized.
- Installation and use must conform to the directions in this guide.
- System must be properly connected to earth-ground for effective operation of flame detection circuitry.

Installation Warnings

- Ensure that the PF3100 enclosures are securely closed each time after opening the enclosure. This protects the internal circuitry from moisture damage and other environmental concerns. Moisture damage is not covered by the product warranty.
- Do not drill holes in or otherwise modify the TLX enclosure. Any such modifications will compromise suitability for Class I, Div 1/Zone 1.
- The probe assembly is suitable for use in Div 1/Zone 1 but must be installed using appropriate fittings and an appropriately rated Thermowell in order to maintain the Div 1/Zone 1 rating of the enclosure. Please refer to the Canadian Electrical Code or National Electrical Code as applicable for details.
- Never install the probe directly into a bath or pressure vessel. Always use an appropriately rated Thermowell.
- This card will **NOT** function with grounded thermocouples.

- Unused ½ "and ¾" NPT conduit ports must be plugged using appropriately rated pipe plugs in order to maintain the Div 1/Zone 1 rating of the enclosure. Please refer to the Canadian Electrical Code or National Electrical Code as applicable for details.
- Dual element thermocouples must be used and properly set-up in order to maintain the safety function. For details on how to set-up a dual input thermocouple please see the "Quick User Guide" document at the following link:

  http://3100.profireenergy.com/pf3100-documentation/

10. PROFIRE Contact Information

If you have any concerns or questions about this product, please contact PROFIRE as follows:

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