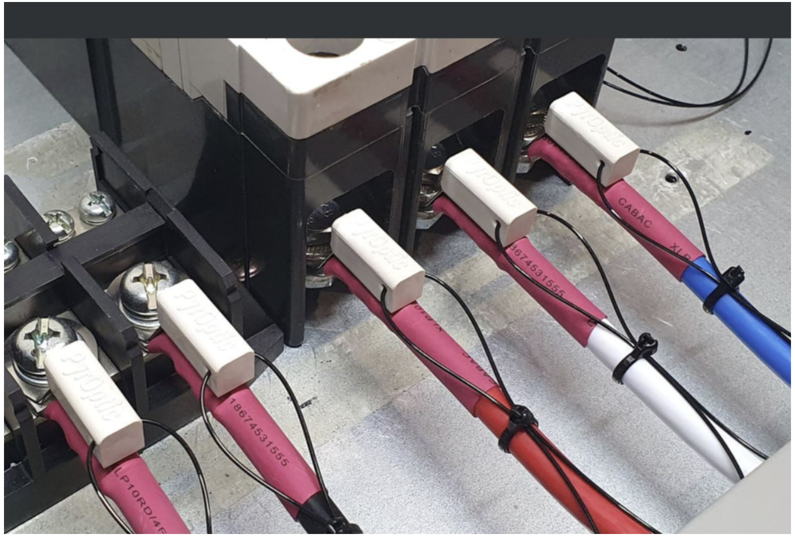
PyrOptic

Over Temperature Alarm for Electrical Assemblies



June 2025

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Over Temperature Alarm for Electrical Assemblies

- Uses the robust property of material phase change to cut a Plastic Fiber Optic (POF)
- A monitoring relay detects the broken POF and signals a hot joint alarm
- Ranges available to suit equipment, cable and insulation temperature classes from 70℃ to 110℃.

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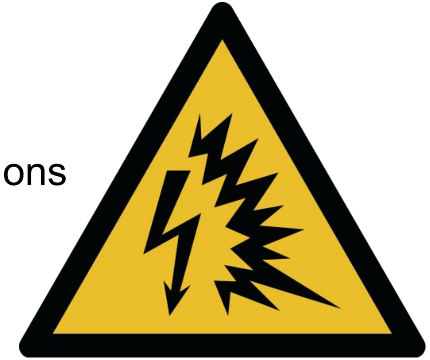
Over Temperature Alarm for Electrical Assemblies

Improve Safety

- Eliminate inspection tasks that expose personnel to electric shock and arc flash hazards
- Prevent catastrophic failure conditions

Reduce Risk

- Low cost and high reliability, widely distribute throughout electrical installations
- Provide continuous assurance over the assembly lifecycle
- Total coverage, no blind spots, not limited by field of view
- Simple and robust, operation based on the phase change of an inert material
- Does not compromise assembly arcing tests



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PyrO*node*

- Alarm Temperatures
  - 70℃ to 110℃

- Mounting Options
  - Ring lugs for bolted connections
    - M6 - M16 standard
    - Profiles to suit 6 - 630mm2 crimp lugs
  - Lugs for tunnel connections
  - Custom lugs

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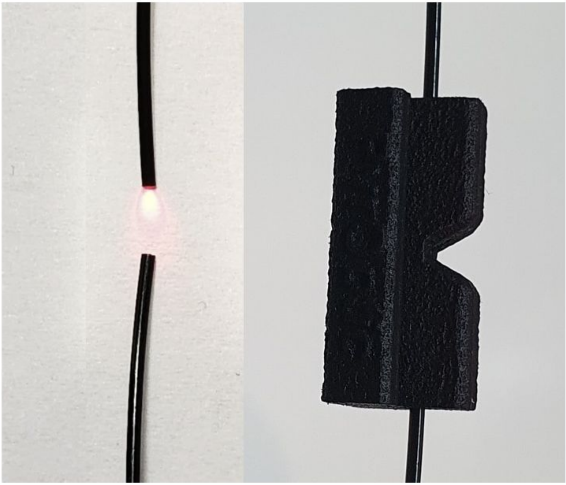
Plastic Fiber Optic (POF)

- Safe and simple installation without special tools
- Durable and flexible, similar to Nylon fishing line.
- Easily joined with Pyr*Optic* splicing system
    - Create disconnect-able sections in a POF loop
- Suitable for installation in ambient temperatures up to 105℃



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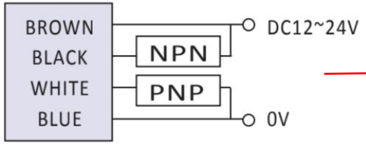
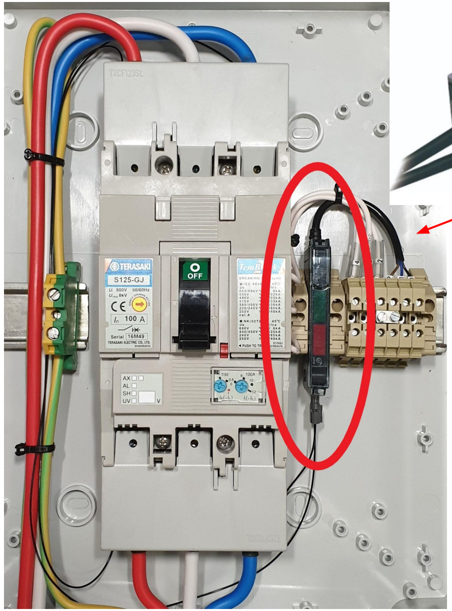
Monitoring Relay

- Automatically monitors Plastic Optical Fiber (POF) continuity
- Transistor outputs signal an over temperature condition
  - Control system digital inputs
  - LED panel indication
- One fibre relay is required per detection loop:
  - Detection loop has a maximum instation length of 100m
  - 6 to 30 pyronodes are typically found on a single detection loop
  - One detection loop and relay is recommended for each functional unit, incoming tier or bus tie of an electrical assembly

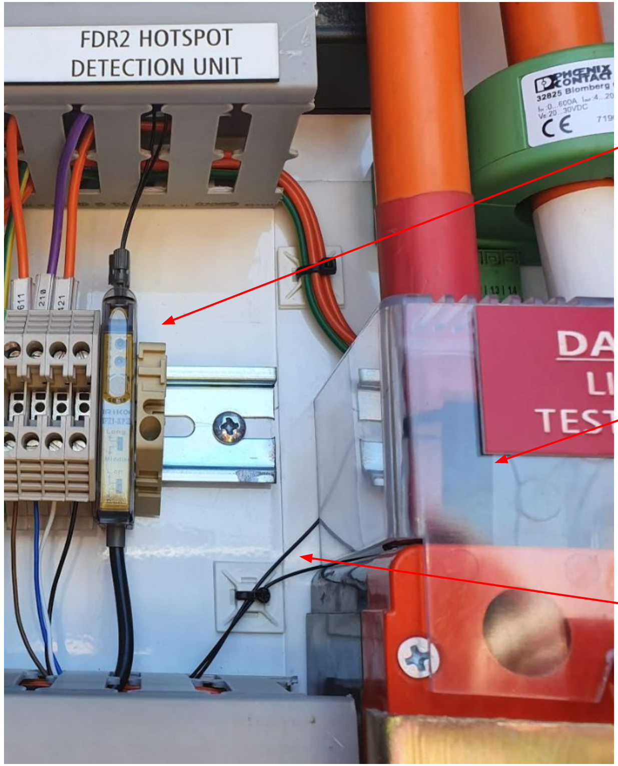


LOCAL ALARM/SCADA SYSTEM



10mm width

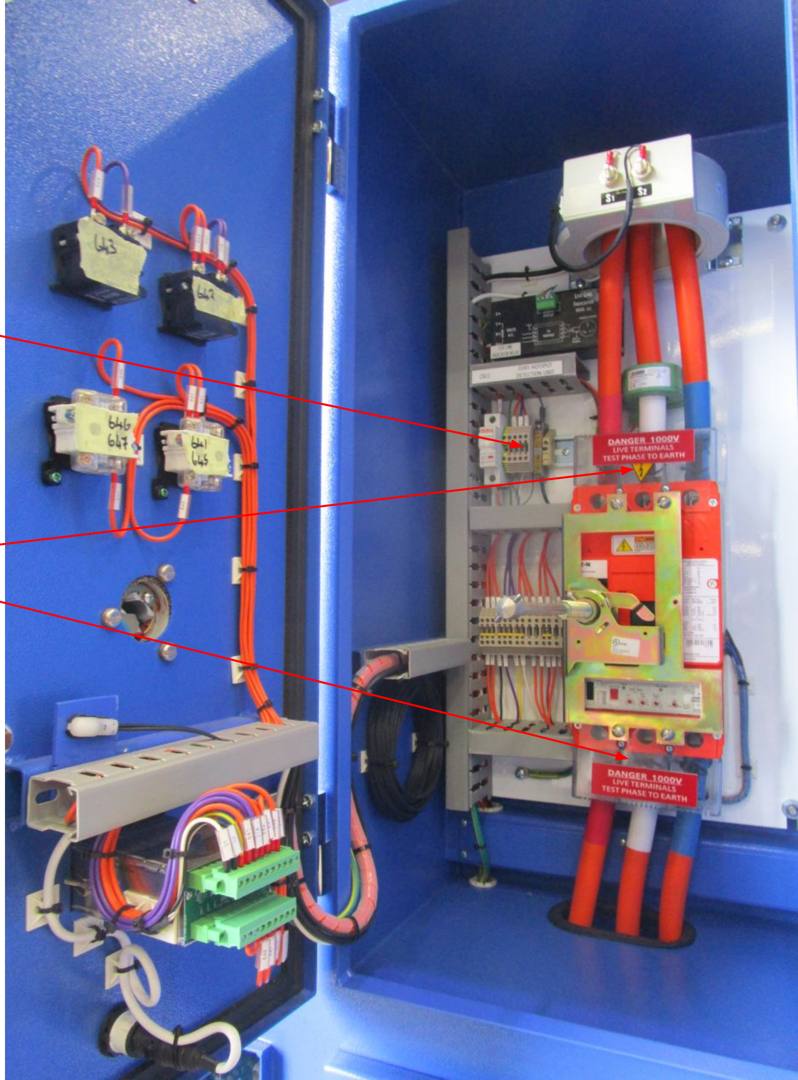
MCC Example



x1

x6

~2m



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MCC Example

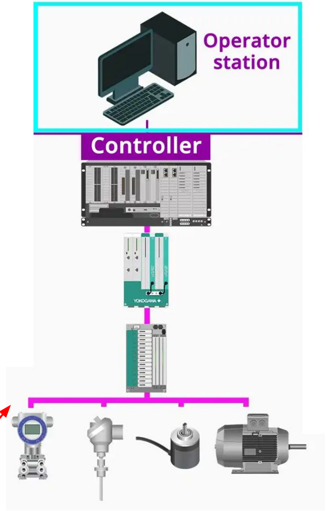
- Less than 30 minute installation time per functional unit

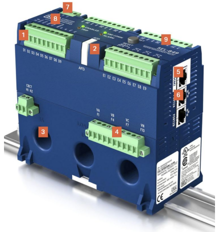
MCC/PCC

PyrO*node*
x6

Plastic Optical Fiber (POF) ~2m

Monitoring Relay x1





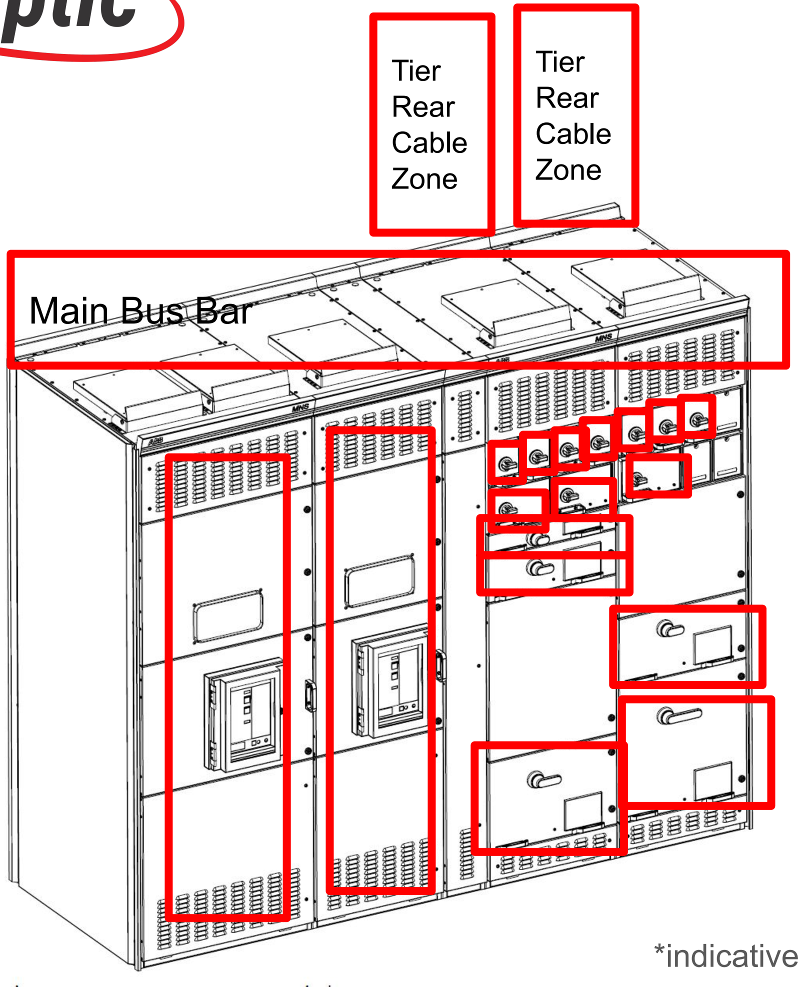
Switchboard Example

= 20 units (one per red zone)

= 240 units (estimate 12 per zone)

= 60m (estimate 3m per zone)

	PyrOptic ($AUD)	Alternative ($AUD)
Connections	240	240
Cost per/connection*	$30.00	$270.00
System cost	$7,200.00	$64,800.00
Switchboard cost	$220,000.00	$220,000.00
Relative system cost	3%	30%



*indicative only

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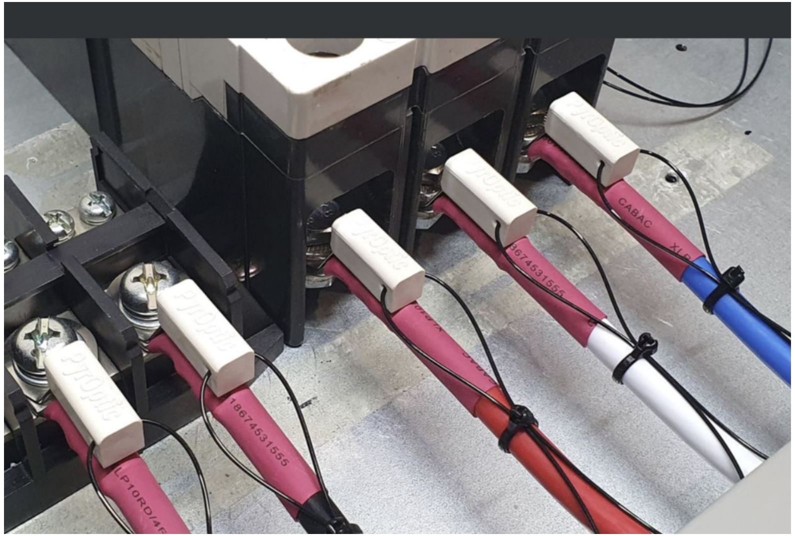
Frequently Asked Questions



Question:

➔ What are some advantages of PyrO*ptic* versus thermal imaging?

Answer:

➔ Eliminates the hazards of routine inspections

➔ Does not compromise assembly arcing tests

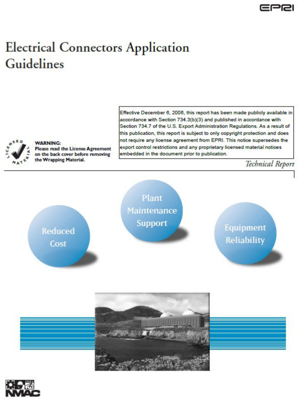
➔ Enables skilled resources to be more efficiently deployed

➔ Total coverage, no blind spots, not limited by field of view

➔ Studies have found routine inspection tasks are ineffective at detecting connection failures, PyrO*ptic* overcomes this problem through continuous monitoring

References:
EPRI Electrical Connectors Application
Guidelines 100347, Final Report, December 2002

“Roughly two-thirds of all low-voltage termination failures noted were detected during operation and affected functionality of the circuit/connected load. Surveillance testing and maintenance were the next most common methods of detection, respectively, accounting for roughly 30% of all low-voltage termination failure reports collectively. Hence, surveillance testing and maintenance activities may identify only a fraction of incipient low-voltage system component failures or instances of degradation.”



EPRI

Electrical Connectors Application Guidelines

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Technical Report

Reduced Cost

Plant Maintenance Support

Equipment Reliability

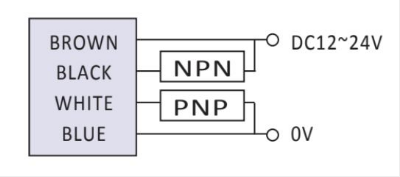
Question:

➔ How do you know PyR*Optic* has alarmed?

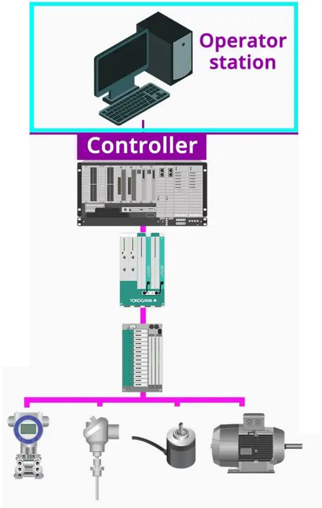
Answer:

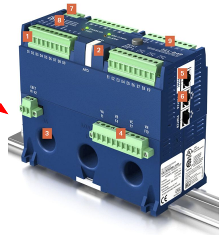
➔ The monitoring relay provides two digital outputs for signaling an alarm, transistor NPN and PNP type.

- Connect to a control system digital input for a SCADA/HMI alarm
- Wire to an LED indicator on the MCC door for a local alarm



MONITORING RELAY OUTPUTS



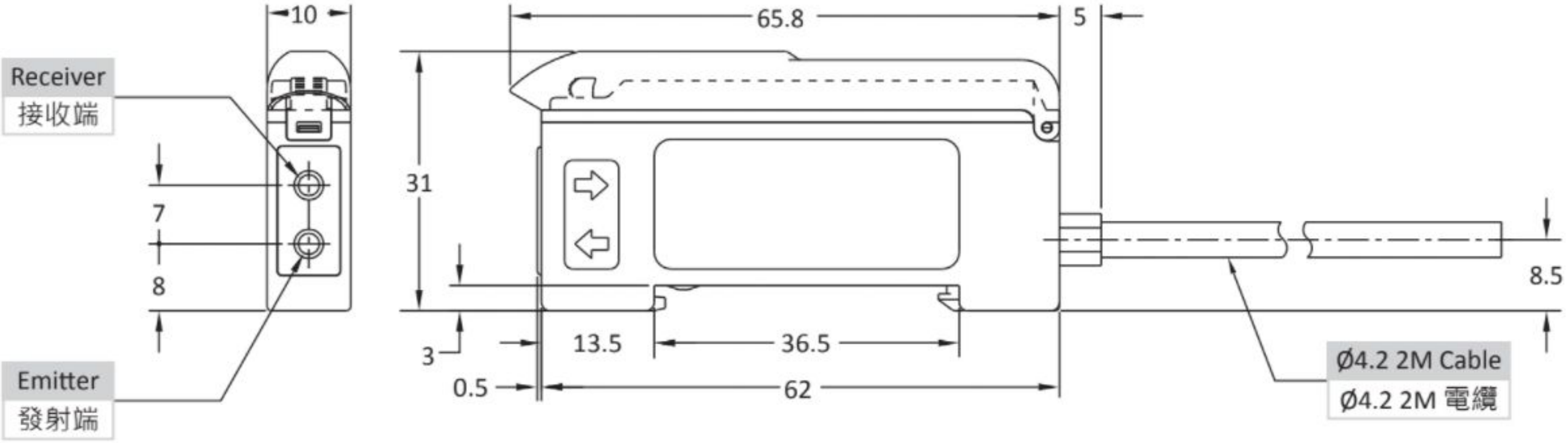


Question:

➔ What are the dimensions of the Monitoring relay?

Answer:

➔ Dimensions in mm



Question:

➔ Can PyrO*ptic* affect the connection integrity?

Answer:

➔ No

- ◆ Installing a PyrO*node* is the same as a installing a thin washer under the bolt head

- ◆ PyrO*nodes* do not form part of the current carrying path

Question:

- ➔ Can PyrO*ptic* be used on HV applications?

Answer:

- ➔ No

    - ◆ HV equipment standards such as IEC 62271-200 require the complete assembly to be tested, this must be considered prior to installing *any* solutions not approved by the OEM.

Question:

➔ Does PyrO*ptic* affect verification testing of low voltage electrical assemblies made to standards such as AS/NZS and IEC 61439 ?

Answer:

➔ PyrO*ptic* does not affect the verification testing of an electrical assembly if properly installed. The installer must understand the standard and tests to which the electrical assembly is made in order to ensure a compliant installation.

- PyrO*ptic* does not form part of the current carrying path or contribute to temperature rise of an electrical assembly.
- Plastic optical fibre jacket material is PA12 with comparative tracking index (CTI) 600
- PyrO*nodes* must be installed in accordance with the creepage and clearance requirements of the assembly.


IEC 61439-1

Edition 3.0 2020-05

INTERNATIONAL STANDARD

NORME INTERNATIONALE

Low-voltage switchgear and controlgear assemblies –
Part 1: General rules

Ensembles d'appareillage à basse tension –
Partie 1: Règles générales