

X10877

THYRISTOR CONTROLLER | 3-PHASE

Fuse Failure Monitor Board

Three-Phase

Fuse Monitoring up to 690VAC

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KEY FEATURES:

- ✓ Monitors up to three fused phases with selectable 2- or 3-phase (PH1, PH2, PH3) operation
- ✓ Supports 400–690VAC high-voltage systems
- ✓ Powered by a low-voltage 8–24VAC/DC control supply
- ✓ Opto-isolated phase sensing for safe, reliable voltage detection
- ✓ Latched fault indication ensures fuse failures are not overlooked
- ✓ Blinking LED diagnostics clearly identify failed phases
- ✓ Fail-safe relay output de-energises on fault for alarms or interlocks
- ✓ Flexible activation input accepts digital or analogue signals up to 24V

APPLICATIONS:

The Fuse Failure Monitor Board is ideal for monitoring fuse integrity in a wide range of industrial and commercial installations, including:

- HVAC power distribution panels
- Industrial motor control centres
- Power conversion and rectifier systems
- Electrical switchgear and control cabinets
- Process heating and automation systems
- Safety-critical three-phase power circuits

It is particularly suited to systems where **early fuse failure detection** and **clear fault identification** are essential for safety and uptime.

The **Fuse Failure Monitor Board** is a compact, industrial-grade monitoring solution designed to reliably detect **fuse failure or phase loss** in high-voltage three-phase electrical systems operating between **400 and 690VAC**. Developed for use in **industrial power control panels, HVAC systems and critical electrical installations**, the board provides immediate fault visibility and dependable signalling to help protect equipment, minimise downtime and improve maintenance response.

By continuously monitoring the presence of voltage on each fused phase, the unit delivers **clear visual status indication** via dedicated LEDs, while an integrated **fail-safe relay output** enables seamless connection to alarms, PLCs, interlocks or automatic shutdown circuits. This ensures that any loss of phase or blown fuse is rapidly detected and acted upon before it can lead to equipment damage or unsafe operating conditions.

Employing **opto-isolated phase sensing** and intelligent microcontroller-based firmware, the Fuse Failure Monitor Board offers high immunity to electrical noise and complete galvanic isolation between high-voltage inputs and low-voltage control circuitry. Fault conditions are **latched by design**, ensuring that failures remain clearly indicated until maintenance personnel intentionally reset the system, preventing intermittent or transient faults from being overlooked.

Designed for reliability, safety and ease of integration, the Fuse Failure Monitor Board is an ideal solution for engineers and panel builders seeking robust, accurate fuse monitoring in demanding industrial environments.

TECHNICAL SPECIFICATIONS

Parameter	Specification
Control Supply	8–24 VAC/DC (Powers logic and relay)
Phase Inputs	400–690 VAC (Voltage presence detection only)
Activation Signal	0–24 V (digital or analogue)
Fault Blink Rate	1 Hz (0.5s ON / 0.5s OFF)
Number of Phases:	2 or 3 (selectable)
Phase Sensing:	Opto-isolated
Relay Output:	Energised during healthy operation De-energised on any detected fault (latched)
Fault Reset:	Power cycle required

YOU MUST READ THIS BEFORE INSTALLATION

 ELECTRICAL SAFETY	 INSTALLATION REQUIREMENTS	 USER RESTRICTIONS	 USAGE ENVIRONMENT	 HOT SURFACE WARNING
WARNING: RISK OF ELECTRIC SHOCK Always consult the Installation & Maintenance Instructions before connecting this product to the power supply. WARNING: Disconnect Power Before Servicing Ensure the electrical supply is safely disconnected before connecting to any supply, load, or control terminals.	WARNING: Installation by Qualified Personnel Only This product must only be installed or fitted by a competent, qualified installer familiar with the relevant electrical standards and installation practices.	WARNING: Not for Use by Vulnerable Individuals This product is not intended for use by persons (including children) with reduced physical, sensory or mental capabilities, or lack of experience and knowledge, unless they are supervised or instructed by a person responsible for their safety.	WARNING: Industrial Use Only This is an industrial-grade product and is not intended for household use.	WARNING: Hot Surfaces On certain models, surfaces marked with this symbol become hot during use. Avoid direct contact and follow all thermal safety precautions.

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FUNCTIONS

Operating States

The firmware operates as a state machine with four states:

- IDLE:** No activation signal. Relay ON, all phase LEDs OFF.
- STARTING:** Activation detected. Short startup blink sequence.
- RUNNING:** Active monitoring. Phase LEDs ON if healthy.
- FAULT:** Fuse failure detected. Fault LED(s) blink, relay forced OFF.

Fault Detection Logic

Each phase is monitored through an opto-isolated sensing circuit. The microcontroller samples the phase presence periodically. If a phase is detected as missing for more than a defined number of samples, a fault is latched for that phase.

LED Indications

- POWER LED: Indicates board is powered.
- SIGNAL LED: Indicates activation signal present.
- PH1/PH2/PH3 LEDs:
 - Steady ON: Phase present and healthy (only when active)
 - Blinking: Corresponding fuse open or phase missing

Relay Output Behaviour

The relay output is energised (ON) during normal healthy operation, even when no activation signal is present. If any fuse failure is detected, the relay is de-energised (OFF) and remains latched until power reset.

Safety and Isolation

All high-voltage phase inputs are electrically isolated from the low-voltage control electronics using opto-isolated sensing devices. This ensures safe operation when monitoring systems up to 690 VAC.

How the Fuse Failure Monitor Works

When the board is powered using the 8–24 VAC/DC control supply, the internal electronics and microcontroller become active. At this moment, the board is energised but remains in standby mode. The POWER LED indicates that energy is present on the board.

The SIGNAL input is used to enable the monitoring function. This input can be driven by a digital signal or by an analogue voltage up to 24 V. Internally, the firmware evaluates this input continuously using stable detection with hysteresis to prevent false triggering caused by noise or transients.

When the SIGNAL input becomes active, the board enters a short startup phase. During this phase, the SIGNAL LED turns ON and the phase LEDs perform a brief blinking sequence. This provides visual confirmation that the board has detected the activation signal and is preparing to monitor the fuse status.

After the startup sequence completes, the board enters normal running mode. In this state, the board continuously monitors the presence of voltage on each phase input (PH1, PH2, PH3). Each phase is sensed through an opto-isolated circuit, allowing safe detection of high-voltage signals without any direct electrical connection to the control electronics.

If all monitored phases are present, the corresponding phase LEDs remain steadily ON while the SIGNAL input is active. This indicates normal operation and confirms that all fuses are intact. During this condition, the relay output remains energised, signalling a healthy system.



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If a fuse opens or a phase is lost, the affected phase is detected as missing. The firmware confirms the condition over multiple samples to avoid false alarms. Once confirmed, the board enters the fault state.

In the fault state, the LED corresponding to the failed phase begins to blink at a fixed rate. This blinking indication clearly identifies which fuse or phase has failed. At the same time, the relay output is de-energized, allowing the fault condition to be reported to external control or alarm systems.

Fault conditions are latched by design. Once a fuse failure is detected, the indication remains active even if the SIGNAL input is removed. This ensures that maintenance personnel can identify the failed fuse even after the system has been shut down.

If additional fuses fail after the first fault has occurred, the board continues monitoring all phases. New failures are added to the existing indication, allowing multiple phase LEDs to blink simultaneously.

To clear a fault condition, the board must be power-cycled. This intentional design prevents accidental reset of fault indications and ensures that fuse failures are properly serviced before operation resumes.

RECOMMENDATIONS

FUSING

It is recommended that semiconductor, fast-acting type fuses or circuit breakers (Semiconductor-MCB) be used for unit protection. On initial operation some loads may need an increased Factor of Safety (F of S) for unit and/or device protection. See the SRA datasheet for further information.

CE Marking

This product family carries a "CE" marking. These burst firing type controllers do not require a filter. For information see recommendation section and contact our sales desk. See the Declaration of Conformity.

DOCUMENTS

Other documents available on request, which may be appropriate for your application:

Code	Identity	Description
P01.1	COS	UAL Conditions of Sale

It is recommended that installation and maintenance of this equipment should be done with reference to the current edition of the I.E.T. regulations (BS7671) by suitably qualified/trained personnel. The regulations contain important requirements regarding the safety of electrical equipment. For International standards refer STANDARDS on D of C.

PRODUCT CODE AND RELATED PRODUCT CODE

Product Code	Product Description
A403228	Fuse Failure Monitor Board 690V

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