

# Global Instrumentation and Control

## Nuclear Instrumentation System

### Redesigned Bistable Card

#### Background

The Westinghouse original ex-core Nuclear Instrumentation System (NIS) has been protecting nuclear plants for over 50 years. Industry experience has proven the design to be robust, reliable and effective.

Westinghouse actively supports the original NIS with upgrades and replacements such as the redesigned bistable card. This card is a direct replacement for the original bistable cards. Westinghouse also continues to build and support the original bistable cards.

The redesigned bistable card provides substantial improvements to reduce the risk of false trips due to noise and power supply fluctuations. New status LEDs and diagnostic features facilitate calibration, testing and troubleshooting.

#### Description

The redesigned bistable card is a plug-in replacement for the original bistable cards, part numbers 3359C39G01, 3378C19G01 and 4256A55G02.

The redesigned bistable card duplicates all of the functionality of the original bistable cards but with modern components and manufacturing processes. The new design improves on the original with reliability enhancements, LED status indicators, and new test points. The new card is completely analog in design.

The redesigned bistable card is seismically and environmentally qualified as class 1E in accordance with the IEEE 323-1983 and 344-1987 requirements.

It is also qualified to the electromagnetic and radio frequency interference requirements of Regulatory Guide 1.180.

The redesigned bistable card is part number 10010B94G02.



*The 10010B94G02 card includes status LEDs that show the present state of the card.*

## Benefits

### Indicates Trip Status

The TRIP LED displays the state of the card. Green indicates that the card is currently not tripped. Red indicates that the card is currently tripped.

### Monitors Onboard Power

Both the main and the backup onboard power supply voltages are monitored to be within limits. Normally the PWR LED is green, indicating that the card is properly powered. Red indicates an abnormal voltage.

### Reduces Risk of False Trips due to Noise Spikes

The new bistable cards include additional filtering to better protect against false trips due to noise.

Transient voltage suppressors on all input, output and power supply lines protect the card from damage and degradation due to voltage spikes.

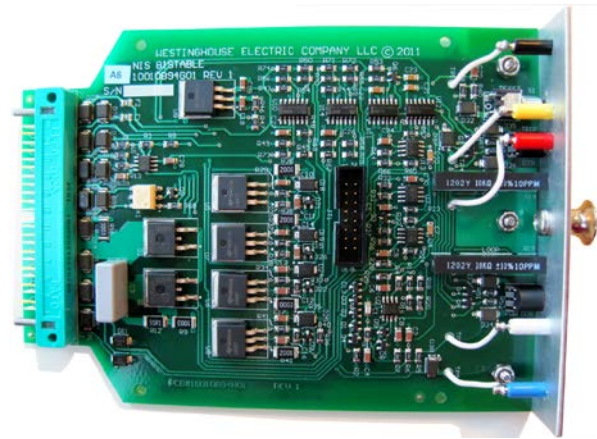
### Improved Immunity to Power Supply Voltage Changes

The original bistable card is susceptible to false trips if a drawer DC power supply drifts. The original bistable setpoint is directly dependent on the drawer power supply voltage.

The redesigned bistable card can withstand up to a  $\pm 40$  percent change in drawer power supply voltage without a false trip. A precision voltage reference is used to make the bistable setpoint extremely stable.

## Onboard Redundancy

Onboard card power is supplied by two pairs of redundant voltage regulators with automatic failover. The original bistable cards have no voltage regulation or redundancy.



*Redundant voltage regulators provide greater reliability and immunity to power supply fluctuations.*

### Set Point Resolution

The trip and loop adjustments are 20-turn foil potentiometers for finer resolution. The original bistable potentiometers are 10-turn wire wound.

### Test Points

Convenient card edge test points are included for signal input, comparator output and onboard power supply monitoring.