# GE GE □□□ Series Service Manual

IS200TREGH1BDB

## 1. Description

SPECIFICATIONS

## 2. Specifications

| Specification | Value |
|---|---|
| Manufacturer | **General Electric** |
| Series | **Mark VI Speedtronic** |
| Part | **Number IS200TREGH1BDB** |
| Product | **Type IS200TREGH1BDB Trip Emergency Termination Board** |
| Backwards-Compatibility | **1st two revisions** |
| Revision | **Total 3 Revisions** |
| Assembly | **Type Normal Assembly** |
| Shipping | **Weight 2 lb** |
| Frequently | **Asked Questions about IS200TREGH1BDB** |
| Was | **this IS200TREGH1BDB Trip Emergency Termination Board PCB manufactured domestically?** |

## 3. Product Information

SPECIFICATIONS

Part No.: IS200TREGH1BDB

Manufacturer: General Electric

Country of Manufacture: United States of America (USA)

Size: 7.0 in x 13.0 in

Temperature rating: 0 to 60 oC

Trip interlock filter: Hardware filter, 4 ms

Product Type: Turbine Emergency Trip Terminal Board

Availability: In Stock

Series: Mark VI

Functional Description

IS200TREGH1BDB is a Turbine Emergency Trip Terminal Board developed by GE. It is a part of Mark VI control system. The terminal board plays a crucial role in supplying power to three emergency trip solenoids within the system. Controlled entirely by the I/O controller, TREG handles the positive side of the DC power required to operate these solenoids. Conversely, the terminal board complements TREG by providing the necessary negative side of the DC power to ensure coordinated and balanced power distribution for the solenoids.

Trip Solenoid Connectivity and Functionality

Trip solenoids play a crucial role in the functionality and safety mechanisms of various systems, particularly in emergency shutdown scenarios. Their connectivity and operation are essential for ensuring seamless power transfer and effective response during critical situations.

Maximum of three trip solenoids can be interconnected between the TREG (Trip Relay Electromagnetic Generator) and TRPG (Trip Relay Power Generator) terminal boards. This arrangement forms vital connections within the system's emergency trip mechanism, enabling swift and reliable action when needed.

The connectivity between the trip solenoids and the terminal boards facilitates efficient power distribution and control. TREG delivers positive DC power, while TRPG provides the corresponding negative side, establishing the necessary electrical potential for the trip solenoids to operate effectively. This balanced power supply ensures proper functionality and responsiveness of the trip solenoids in triggering emergency shutdowns or protective actions as required.

By linking the trip solenoids in this manner, the system gains enhanced reliability and redundancy, minimizing the risk of failure or malfunction during critical operations. This configuration also allows for easier maintenance and troubleshooting, as each solenoid's connection and operation can be monitored and managed effectively within the overall system framework.

The connectivity and functionality of trip solenoids between the TREG and TRPG terminal boards play a pivotal role in ensuring the safety and reliability of the system, providing a robust mechanism for emergency shutdowns and protective actions when necessary.

I/O Controller Functions and Relay Control

The I/O (Input/Output) controller serves as the nerve center of the system, orchestrating a wide array of essential functions vital for its operation and safety. Its multifaceted capabilities extend far beyond mere oversight, encompassing critical tasks that safeguard equipment, personnel, and the integrity of operations.

At the core of its responsibilities lie emergency overspeed protection and emergency stop functions, pivotal features designed to preempt and mitigate potential hazards swiftly and decisively. The I/O controller's keen monitoring and rapid response capabilities ensure that any deviation from safe operating parameters triggers immediate protective actions, averting catastrophic consequences and safeguarding the system's integrity.

In addition to these fundamental safety measures, the I/O controller assumes control over the intricate network of relays stationed on the TREG (Trip Relay Electromagnetic Generator) board. Within this framework, twelve relays play a pivotal role in orchestrating critical operations and responses. Among them, nine are strategically grouped into three sets of three, forming a robust and redundant voting mechanism.

This voting mechanism operates as a fail-safe mechanism, ensuring that the activation of the three trip solenoids—integral components of the system's emergency trip mechanism—is executed with the utmost reliability and redundancy. By requiring a consensus among the relay sets before triggering the trip solenoids, the system mitigates the risk of false positives or single points of failure, enhancing overall reliability and operational integrity.

Through meticulous coordination and decisive relay control, the I/O controller optimizes the system's responsiveness and resilience, empowering it to adapt dynamically to evolving operational conditions and unforeseen contingencies. This comprehensive approach to relay management not only enhances safety and reliability but also streamlines maintenance and troubleshooting efforts, facilitating efficient operation and sustained performance over time.

Simplex System Configuration

In simplex systems, an additional cable, routed from J1 to the TSVO terminal board, plays a critical role.

This cable facilitates the transmission of a trip signal, enabling a servo valve clamp function post-turbine trip.

This feature contributes significantly to system safety and stability by implementing essential measures upon turbine trip occurrences.

Solenoid Trip Tests

The system's application software, integrated into the controller, plays a pivotal role in conducting rigorous tests on the trip solenoids, ensuring their reliability and functionality. These tests encompass various modes, starting with online tests that facilitate the manual tripping of each trip solenoid individually. This can be achieved either through the PTR relays directly controlled by the controller or via the ETR relays managed by the protection module. To confirm the successful tripping of each solenoid, a contact within each solenoid circuit serves as an input, providing a positive indication once the solenoid has executed a trip operation.

Two distinct categories of tests are conducted: online solenoid tests and offline overspeed tests. The online solenoid tests enable the sequential and individual tripping of solenoids, ensuring their operational functionality. Conversely, the offline overspeed tests simulate primary and emergency overspeed conditions through software, independent of real-time operations. These simulations are crucial for verifying and confirming actual trip responses against software-generated overspeed scenarios. This process allows for validation of the system's ability to respond accurately to emergency conditions, thereby ensuring system integrity and safety.

During testing, the controller utilizes PTR relays to manually initiate solenoid tripping, offering direct control, while the protection module governs the ETR relays, providing an alternate method for initiating solenoid trips. The inclusion of contact inputs within solenoid circuits serves as an essential feedback mechanism, supplying confirmation that each solenoid has successfully executed a trip operation. The offline overspeed tests play a critical role in ensuring the system's reliability by validating its responses to simulated emergency conditions, thereby verifying the efficacy of the system's safety protocols.

IS200TREGH1BDB Technical Specifications

Manufacturer General Electric

Series Mark VI Speedtronic

Part Number IS200TREGH1BDB

Product Type IS200TREGH1BDB Trip Emergency Termination Board

Backwards-Compatibility 1st two revisions

Revision Total 3 Revisions

Assembly Type Normal Assembly

Shipping Weight 2 lb

Frequently Asked Questions about IS200TREGH1BDB

Was this IS200TREGH1BDB Trip Emergency Termination Board PCB manufactured domestically?

Yes. This IS200TREGH1BDB Trip Emergency Termination Board product was domestically-made in GE's Salem,Virginia factory plant location.

Would this IS200TREGH1BDB Trip Emergency Termination Board PCB be protected by any warranties upon my purchase here?

Yes. This IS200TREGH1BDB Trip Emergency Termination Board device would be claassified as protected by a guaranteed three-year PCB warranty upon any purchase here.

About the IS200TREGH1BDB

The IS200TREGH1BDB is a Trip Emergency Termination Board (PCB) created by General Electric (GE).

It is a component of the Mark VI series, part of GE's Mark family of gas/turbine equipment.

Used for automating and managing gas and/or steam turbines.

Considered a significant functionality-based upgrade from the Mark V Turbine Control System Series.

Hardware Tips and Specifications

Form Factor: Rectangular printed circuit board.

Terminal Blocks:

Two (2) long solid black terminal blocks on the left border.

Each contains twenty-four (24) silver metallic terminals (total 48).

MOVs (Metal Oxide Varistors):

Around ten (10) round, red components.

Lined up to the right of the terminal blocks.

Relays/Contactors:

Occupy most of the middle space.

Arranged in two (2) long lines of six (6) components each (total 12).

Positioned in parallel pairs from top to bottom.

Jack Connector Ports:

Group of three (3) ports along the right border.

Each port contains a collection of small pin ports.

Capacitors:

Four (4) large, rectangular, solid yellow capacitors.

Two (2) paired near the upper right corner, and two (2) paired in the bottom right corner.

Product Identification Details (from Part Number)

"IS200" series tag: Indicates normal Mark VI Series assembly and domestic manufacture location (likely GE's Salem, Virginia factory).

"TREG" functional product abbreviation.

"H1" series grouping tag: Denotes Conformal PCB coating style and Group one Mark VI Series grouping.

Three-fold revision table (indicated by the "BDB" at the end of the part number).