# GE GE □□□ Series Service Manual

IS215VPROH2BD

## 1. Description

SPECIFICATIONS

## 2. Specifications

| Specification | Value |
|---|---|
| Functional | **Acronym/Abbreviation VPRO** |
| Group | **Variation H2B** |
| Manufacturer | **General Electric** |
| Number | **of LEDs 11** |
| Part | **Number IS215VPROH2BD** |
| Product | **Type Protection Assembly Board** |
| Redundancy | **Modes Simplex or TMR** |
| Series | **Mark VI** |
| About | **the IS215VPROH2BD** |
| Model | **IS215VPROH2BD was designed as part of the Mark VI Series from General Electric. This specific model is referred to as a Protection Assembly Board. The model is considered obsolete by General Electric as it is no longer actively produced. When being used in the Mark VI System the board has the ability to be fully programmed. The typical power source for this model is in the range of one hundred twenty to two hundred forty volts of alternating current.** |

## 3. Product Information

SPECIFICATIONS

Part No.: IS215VPROH2BD

Manufacturer: General Electric

Country of Manufacture: United States of America (USA)

Voltage Rating: 24 V dc or 48 V dc.

Technology: Surface-mount

MPU Pulse Rate Range: 2 Hz to 20 kHz

MPU Pulse Rate Accuracy: 0.05 percent of reading

Product Type: Turbine Protection Board

Availability: In Stock

Series: Mark VI

Functional Description

IS215VPROH2BD is a Turbine Protection Board developed by GE. It is part of Mark VI series. The Turbine Protection Board plays a pivotal role in ensuring an independent emergency overspeed protection system. This system operates in conjunction with associated terminal boards (TPRO and TREG), collectively forming a robust safety mechanism. The primary function of this protection system revolves around emergency overspeed protection, an imperative safety feature within turbine operations.

Independent Emergency Overspeed Protection

The protection system is structured around triple redundant VPRO boards, strategically placed in a dedicated module distinct from the turbine control system. These boards hold the responsibility of managing the trip solenoids, a critical component, through the intermediary TREG board.

It also features an Ethernet connection, facilitating IONet communications with the control modules.

VPRO Board Functions in the Protection Module

The VPRO board, situated within the Protection Module P, functions primarily to execute the emergency trip function. It accommodates the connection of up to three trip solenoids, linking to the TREG and TRPG terminal boards.

While the TREG board supplies the positive side of the 125 V DC to the solenoids, the TRPG board provides the negative side. Importantly, either board possesses the capability to initiate the turbine trip, thereby ensuring redundancy and fail-safe operation.

Control and Functionality

It is not limited to overspeed protection alone; it also oversees the emergency stop functions. Effectively controlling the twelve relays present on the TREG, nine of these relays are configured into three groups of three. These groupings act as voting inputs, collectively influencing the activation of the three trip solenoids. Furthermore, VPRO can drive a secondary TREG board through J4, enhancing the redundancy and backup functionalities of the system.

The collective functionality of the VPRO, TPRO, TREG, and TRPG boards culminates in a highly reliable and fail-safe emergency overspeed protection system, fundamental for ensuring the safety and integrity of turbine operations.

Installation

Begin the installation process by powering down the VME I/O processor rack to ensure safety during the installation procedure.

Carefully insert the VPRO board into the designated slot. Use both hands to gently push the top and bottom levers, securely seating the edge connectors of the board.

After properly positioning the VPRO board, tighten the captive screws located at the top and bottom of the front panel. This step ensures the board is firmly secured within the rack.

Once the VPRO board is securely in place, power up the VME rack. Perform a thorough check of the diagnostic lights located at the top of the front panel to verify proper initialization and functionality.

Cable connections to the TPRO and TREG terminal boards are established using the J3, J4, J5, and J6 connectors situated on the VPRO front panel. These connectors are of the latching type, providing a secure connection.

Connector J7 is designated for the 125 V DC power input. For comprehensive information regarding diagnostics, refer to the dedicated section in the provided documentation.

It is necessary to update the firmware to the latest version for optimal performance.

Other Features

Inputs: The Expander Load Source Board boasts a versatile array of input options to accommodate various monitoring and control requirements. This includes inputs for passive speed pickups, generator and bus voltage measurements, thermocouples, 4-20 mA current or voltage signals, as well as specific inputs for trip interlocks and emergency stop functionalities. These inputs enable the board to gather critical data regarding speed, voltage levels, temperature, and current flow, ensuring comprehensive monitoring and control capabilities within the system.

Outputs: On the output side, the board provides a range of functionalities to execute control actions based on the input data and system requirements. This includes outputs for trip solenoids and economizer relays, essential for implementing protective measures and optimizing system efficiency. Additionally, outputs for breaker relay commands and servo clamp relay contacts facilitate precise control over system components, ensuring safe and efficient operation under various conditions.

Power Supply Voltage: With an input supply voltage of 125 V dc, ranging from 70 V dc to 145 V dc, and output voltages of 5 V dc and 28 V dc, the board ensures stable power distribution to support its functionalities and connected devices. These voltage specifications are designed to meet the power requirements of the board and associated components, ensuring uninterrupted operation and system reliability.

Frame Rate: The high frame rate capability of up to 100 Hz enables the board to capture and process data at a rapid pace, facilitating real-time monitoring and control of system parameters. This high frame rate ensures that the board can keep up with dynamic changes in the system, enabling swift response times and precise control actions when necessary.

MPU Characteristics: With specific output resistance and inductance values, the board ensures efficient signal transmission and compatibility with connected devices. Moreover, the maximum short circuit current and voltage output specifications provide important safety considerations, while the normal mode load applied to input signals ensures accurate signal processing and reliable operation.

MPU Cable Requirements: The MPU cable requirements specify the maximum distance and cable characteristics for sensors connected to the board. With a maximum distance of 300 m (984 ft) and specific capacitance and resistance values for shielded pair cables, the board ensures optimal signal integrity and reliability over extended distances. These cable requirements enable flexible sensor placement while maintaining robust communication between the sensors and the board, ensuring accurate data acquisition and control within the

system.

IS215VPROH2BD Technical Specifications

Functional Acronym/Abbreviation VPRO

Group Variation H2B

Manufacturer General Electric

Number of LEDs 11

Part Number IS215VPROH2BD

Product Type Protection Assembly Board

Redundancy Modes Simplex or TMR

Series Mark VI

About the IS215VPROH2BD

Model IS215VPROH2BD was designed as part of the Mark VI Series from General Electric. This specific model is referred to as a Protection Assembly Board. The model is considered obsolete by General Electric as it is no longer actively produced. When being used in the Mark VI System the board has the ability to be fully programmed. The typical power source for this model is in the range of one hundred twenty to two hundred forty volts of alternating current.

The IS215VPROH2BD board has fully programmable software which will have rates of around ten, twenty, or forty milliseconds. These frames are typically the elapsed time in which inputs will be read, conditioned, and will execute the chosen application software. Once these functions have been performed the outputs will then be sent out across the rest of the Mark VI System.

There are some diagnostic LEDs on the front faceplate of the IS215VPROH2BD board, some of the LEDs are run, status, and fail LEDs. Typically the LED colors are green for the run, yellow for status, and red for fail. If this board requires a reset there is a reset button located on the front of the board.