# GE Service Manual

IS200VSVOH1B

## 1. Description

IS200VSVOH1B Technical Specifications

## 2. Specifications

| Specification | Value |
|---|---|
| Instruction | **Manual GEH-6421V** |
| Manufacturer | **General Electric** |
| Manufacturer | **GE Energy** |
| Series | **Mark VI Speedtronic** |
| Functional | **Description VSVO Servo Control Board** |
| Part | **Number IS200VSVOH1B** |
| Functionality | **Position Loop Control** |
| About | **the IS200VSVOH1B** |
| The | **IS200VSVOH1B is a board component made by General Electric for the Mark VI. The Mark VI was released by GE as part of their long-running and popular Speedtronic line for gas/steam turbine management, which began in the 1960s when the company released the Mark I system. This line of turbine control has continued development on through to the 2000s with the Mark VI and Mark VIe. The Mark VI includes Ethernet communications capabilities, a PC-based operator interface, and integrated hardware and software that are both designed specifically for turbine control. This IS200VSVOH1B printed circuit board product offering's greater Mark VI Turbine Control System Series represents a significant functional upgrade upon the Mark V Turbine Control System Se** |

## 3. Product Information

IS200VSVOH1B Technical Specifications

Instruction Manual GEH-6421V

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About the IS200VSVOH1B

The IS200VSVOH1B is a board component made by General Electric for the Mark VI. The Mark VI was released by GE as part of their long-running and popular Speedtronic line for gas/steam turbine management, which began in the 1960s when the company released the Mark I system. This line of turbine control has continued development on through to the 2000s with the Mark VI and Mark VIe. The Mark VI includes Ethernet communications capabilities, a PC-based operator interface, and integrated hardware and software that are both designed specifically for turbine control. This IS200VSVOH1B printed circuit board product offering's greater Mark VI Turbine Control System Series represents a significant functional upgrade upon the Mark V Turbine Control System Series of just about the same full extended product series title, as the Mark VI Series added the alternative energy-focused wind turbine possible application onto the rudimentary gas and steam turbine-based application range embraced by the earlier industry-standard Mark V.

Hardware Tips and Specifications

The IS200VSVOH1B functions as a Servo Control board. The board drives fuel/steam valves through its control of four electro-hydraulic servo valves. The board also provides pulse rate flow inputs, LVDT excitation, and LVDT position feedback. The IS200VSVOH1B can be used in Triple Redundant systems and also in Simplex systems. The IS200VSVOH1B is has a single slot front panel attached to the PCB. This panel includes a cable connector (J5) as well as LED indicators for status information. The three LEDs in the front panel include a RUN light (green,) a FAIL light (red,) and a STATUS light. The STATUS light typically is not powered. However, if an alarm condition is present this LED will be powered up and will display as a steady orange. The IS200VSVOH1B has six connectors, including two backplanes (P1/P2,) and four connectors made with conductive traces (P3 through P6.) The board includes four relays (K1 through K4.) Each of these components has a printed diagram on its top surface. The board is populated with resistors, capacitors, and TP test points. It also has inductor beads (L1-L10.) The board has over seventy integrated circuits.

The total of all of the IS200VSVOH1B printed circuit board-specific hardware component and component specification information thus far stored on this IS200VSVOH1B personalized product page has been reminiscent of a visual inspection of the IS200VSVOH1B device itself, as conducted by one of our diligent and experienced lead service technicians. This was necessary given the IS200VSVOH1B printed circuit board's lack of online-available instructional manual materials. Given this lack, the IS200VSVOH1B functional product number itself can also be introduced as a fine primary source of IS200VSVOH1B Board hardware component and component specification information, as it codes for these relevant details through a series of consecutive functional naming elements. For instance, this IS200VSVOH1B functional product number begins with an iteration of the dual-functional IS200 series tag that was specially designed by General Electric to assert this IS200VSVOH1B product's normal Mark VI Series assembly version on top of its more-standardized domestic original location of GE manufacture. Some of the other important IS200VSVOH1B Board hardware specifications embedded in functional chunks of this GE-devised medium include its:

VSVO functional product acronym

Conformal PCB coating

Group one Mark VI Series product grouping

B-rated primary functional revision

### Specifications and General Description

* **Specifications:**

* Part Number: IS200VSVOH1B

* Manufacturer: General Electric

* Product Type: Servo Control Board

* Series: Mark VI

* Availability: In Stock

* Country of Manufacture: United States(USA)

* **Description:** The IS200VSVOH1B is a VME Servo Control Board manufactured by General Electric as part of the Mark VI Series used in gas turbine control systems. It directs four electro-hydraulic servo valves, typically using two servo terminal boards to separate the four channels (TSVO or DSVO) and determining valve position using linear variable differential transformers (LVDT).

* **Installation:**

1. Turn off the processor rack for the VME.

2. Place the board in place and use your hands to press the top and bottom levers into the seat of the edge connectors.

3. Tighten the captive screws on the front panel's top and bottom.

* **Operation:**

* VSVO's four channels include LVDT position feedback, LVDT excitation, bidirectional servo current outputs, and pulse rate flows inputs.

* The TSVO provides excitation for up to six LVDT valve position inputs and accepts input from them; each servo control loop allows for a choice of one, two, three, or four LVDTs.

* For gas turbine flow measurement applications, three inputs pass through the TSVO to J5 on the VSVO board front. Each servo output has a suicide relay that, when controlled by firmware, shorts the output signal to signal common when de-energized, requiring a manual reset instruction to return to normal operation.

* Diagnostics monitor each servo's output voltage, current, and suicide relay.

### Diagnostics and Digital Servo Regulators

* **Diagnostics:** Three LEDs at the top of the VSVO front panel display status: regular RUN (flashing green), FAIL (solid red), and STATUS (generally off, flashes constant orange if the board has an alarm condition). Diagnostic tests include:

* Output servo current is excessive or not reacting.

* Regulator feedback (LVDT) signal exceeds limitations, causing the related regulator's poor sensor to be removed and the good sensor to be used.
* The servo suicided, resulting in a flaw.
* A/D converter calibration voltage is out of range.
* LVDT excitation voltage is out of range.
* The difference between the input signal and the chosen value exceeds the TMR differential limit.
* If signals become unhealthy, a composite diagnostic alert (L#DIAG VSVO) is triggered.
* Terminal board connectors (JR1, JS1, JT1) have their own ID devices (read-only chips containing serial number, board type, revision number, and plug location); a mismatch generates a hardware incompatibility fault.
* **Digital Servo Regulators:**
* Digital Servo Regulators n = 1-4 split the regulators into software and hardware portions.
* LVDT input is a 3.2KHz sinusoidal signal proportional to valve position.
* Pulse rate input is a TTL-type signal or periodic signal that activates a comparator input, which an FPGA converts to a flow rate.
* Signal space is labeled "si" (system input, controller reads from servo card) or "so" (system output, controller writes to servo card).

### Servo Suicide Control and Pulse Rate

* **Servo Suicide Control:** This control compares the absolute value of the filtered servo current error to the Sui Margin configuration parameter value to determine if the hardware servo current regulator has lost control. If feedback does not match the command, a diagnostic is generated and the servo current output is disabled.
* **1 PulseRate / 2 PulseRateMax:**
* The Digital Servo regulator is set up as a flow-rate controller, using a pulse signal with a frequency proportional to the liquid fuel flow-rate.
* In dual input instances, the higher pulse rate frequency is chosen as feedback for the flow rate regulator.
* System Limit functions monitor pulse rate inputs, are enabled via the SysLimxEnabl configuration parameter, and can latch signal space limit flags (SysLimxPR1 and/or SysLimxPR2) if desired.