GE GE □□□ Series Service Manual

IS200VAICH1DAA

1. Description

SPECIFICATIONS

2. Specifications

Specification	Value
Functional	**Part Number IS200VAICH1DAA**
Product	**Series Mark VI**
Instruction	**Manual GEH-6421 Vol. II Mark VI System Guide**
Original	**Manufacturer General Electric Company USA, GE Industrial Systems**
Product	**Type Analog Input/Output Board**
Functional	**Acronym/Abbreviation VAIC**
Number	**of Analog Inputs 20**
Number	**of Analog Outputs 4**
Location	**VME Rack**
Analog	**Output Circuits Range 4-20 mA and 0-200 mA**

3. Product Information

SPECIFICATIONS

Part No.: IS200VAICH1DAA

Manufacturer: General Electric

Country of Manufacture: United States of America (USA)

Number of channels: 24

Input span: 4-20 mA

Power consumption: Less than 31 MW

Technology:Surface mount

Product Type: Analog Input/Output Board

Availability: In Stock

Series: Mark VI

Functional Description

IS200VAICH1DAA is an Analog Input/Output Board developed by GE. It is a part of the Mark VI control system. The versatility of the VAIC extends to its support for both simplex and triple modular redundant (TMR) applications, providing adaptability to different system configurations. While the simplex configuration may lack the inherent redundancy of the TMR setup, it is a suitable and efficient solution for applications where a single VAIC can adequately meet the system's requirements. The simplicity of the setup facilitates ease of integration and maintenance in scenarios where the additional fault tolerance provided by TMR is not a critical requirement.

Features

Triple Modular Redundant (TMR) Configuration: In a TMR application, the VAIC plays a crucial role in enhancing system reliability and fault tolerance. The input signals from the terminal board are fanned out to three separate VME board racks labeled R, S, and T, each hosting its own instance of the VAIC. This triplex configuration ensures redundancy, with each VAIC independently processing the input signals.

The output signals are meticulously driven using a proprietary circuit that harmonizes the contributions of all three VAICs. This collaborative effort ensures that the desired output current is achieved. In the unfortunate event of a hardware failure in one of the VAICs, a failover mechanism is triggered. The faulty VAIC is promptly removed from the output circuit, while the remaining two VAICs seamlessly continue operations, maintaining the correct output current. This redundancy significantly enhances the reliability and fault tolerance of the system, ensuring continuous operation even in the face of hardware failures.

Simplex Configuration: In a simplex configuration, the VAIC operates in a more straightforward manner. The terminal board provides input signals to a single instance of the VAIC. In this scenario, there is a one-to-one relationship between the terminal board and the VAIC. The single VAIC, acting as the sole processing unit, is responsible for handling all input signals and generating the necessary output currents.

Installation Guidelines

When establishing cable connections to the TBAI (Terminal Board Analog Input) terminal boards, the process involves interfacing with the J3 and J4 connectors located on the lower portion of the VME (Versa Module Eurocard) rack. These connectors are specifically designed as latching type connectors, emphasizing a secure and stable connection for the cables that link the terminal boards to the broader system.

Identifying Connection Points:

The J3 and J4 connectors on the lower part of the VME rack are designated connection points for interfacing with the TBAI terminal boards. The latching type connectors are chosen to ensure that the cables remain securely connected, minimizing the risk of inadvertent disconnection or signal interruptions.

Cable Attachment:

To establish the cable connections, carefully attach the cables to the J3 and J4 connectors on the VME rack. The latching mechanism is designed to provide a reliable and robust connection. Ensure that the cables are securely latched into place to guarantee stable communication between the TBAI terminal boards and the VME rack.

Powering Up the VME Rack:

With the cable connections successfully established, proceed to power up the VME rack. This involves restoring electrical power to the rack, allowing the system to become operational. The power-up sequence is a critical step, and it ensures that the TBAI terminal boards and the entire system are ready for normal operation.

Checking Diagnostic Lights:

After powering up the VME rack, direct attention to the diagnostic lights located at the top of the front panel. These lights serve as indicators of the system's health and status. Different combinations of illuminated lights or specific patterns may convey information about the system's functionality, potential errors, or diagnostic information.

Normal Operation: A set of predefined diagnostic light patterns indicates that the system is functioning correctly, and the TBAI terminal boards are properly integrated.

Fault or Error Indication: Deviations from the normal light patterns may indicate faults or errors in the system. Consult the system documentation to interpret the specific diagnostic light patterns and take appropriate corrective measures if necessary.

Compatibility

The design of the TBAI demonstrates a forward-thinking approach, particularly in its ability to accommodate higher load resistance for 20 mA outputs. One notable feature is the provision of a drive voltage that can reach up to 18 V at the terminal board screw terminals. This capability is strategically integrated to address challenges associated with higher load resistances, ensuring the board's adaptability to a diverse range of operational scenarios.

When dealing with 20 mA outputs, the availability of a drive voltage of up to 18 V becomes instrumental. This feature enables the TBAI to effectively overcome the impedance presented by loads of up to 800 ohm. Moreover, the design takes into account the potential impact of extended wiring distances, allowing for the operation of the terminal board into loads of 800 ohm even with the inclusion of a 1000 ft length of #18 wire.

The provision of a drive voltage up to 18 V plays a crucial role in maintaining signal integrity over extended distances and when confronted with higher load resistances. This is particularly relevant in industrial and control system applications where precise and reliable analog signal transmission is imperative for accurate monitoring and control processes. The TBAI's capability to operate into loads of 800 ohm with the inclusion of 1000 ft of 18 wire showcases a margin of robustness. This margin not only accommodates the inherent resistance introduced by the wiring but also ensures that the terminal board can reliably deliver the required current in challenging environments.

Input Processing and Transmission

For monitoring 20 inputs, the VAIC necessitates the utilization of two terminal boards, effectively managing the input data conversion and transmission. Upon digital value conversion,

the VAIC drives these outputs back through the terminal board, enabling integration into the customer circuit. This process involves converting digital values to analog currents, which are then routed through the terminal board for transmission to external circuits.

Support for Simplex and TMR Applications

The VAIC board accommodates both simplex and triple modular redundant (TMR) applications, providing adaptability and reliability in various system configurations. In a TMR configuration, input signals are distributed to three VME board racks designated R, S, and T, each equipped with a VAIC. Notably, output signals employ a proprietary circuit mechanism that utilizes inputs from all three VAICs to generate the desired current. In case of a hardware failure, the malfunctioning VAIC is isolated from the output, allowing the remaining two boards to sustain correct current outputs.

Operation in Simplex Configuration

In a simplex configuration, the terminal board supplies input signals to a single VAIC, which exclusively manages all output currents. This setup simplifies the architecture, with a single VAIC responsible for both input signal conversion and output current generation.

Importance of Configurational Flexibility

The VAIC's ability to function in both simplex and TMR configurations showcases its adaptability to different operational needs. Its role in processing analog inputs and generating accurate output currents ensures reliable system performance, offering redundancy in TMR setups and streamlined operation in simplex configurations based on system requirements.

IS200VAICH1DAA Technical Specifications

Functional Part Number IS200VAICH1DAA

Product Series Mark VI

Instruction Manual GEH-6421 Vol. II Mark VI System Guide

Original Manufacturer General Electric Company USA, GE Industrial Systems

Product Type Analog Input/Output Board

Functional Acronym/Abbreviation VAIC

Number of Analog Inputs 20

Number of Analog Outputs 4

Location VME Rack

Analog Output Circuits Range 4-20 mA and 0-200 mA

About the IS200VAICH1DAA

Manufactured as an Analog Input/Output Board, the IS200VAICH1DAA model is part of the Mark VI series of models produced by General Electric. The Mark VI Series that this IS200VAICH1DAA printed circuit board product was originally manufactured for has to be explained as possessing a specific series of possible functional applications in the control systems and management systems of General Electric-centric gas, steam, and wind turbine automated drive assemblies. This has to be identified as quite the expansive upgrade upon the previously-existing Mark V Turbine Control System Series of a similar full extended product series title, as that former industry standard had gas and steam-based possible applications alone. The Mark VI Turbine Control System Series containing this IS200VAICH1DAA device here is separately desired on its greater automated industrial promotional marketplace for its status as one of the final-developed GE Mark product series incorporating the patented Speedtronic control system technology into a number of different devices.

Hardware Tips and Specifications

When the model is used in the Mark VI series, it can accept and control four analog outputs and twenty analog inputs. Each of the terminal boards will accept two outputs and ten inputs. Several terminal boards can connect to the VAIC model and will be done through the cables on the VME racks; some boards that will connect to the board are an STAI board or a TBAIH1C board. The main function of the VAIC model is to convert inputs to digital values to then be transferred through the VME backplane to the VCMI board, which will then transfer those values to the controller. The outputs on the VAIC board will convert the digital values to analog currents, which are then driven through the terminal board into the customer circuit. This IS200VAICH1DAA product's IS200VAICH1DAA instructional manual attached above in our manuals tab serves to identify a number of relevant other IS200VAICH1DAA Board hardware qualities, including but not limited to its:

Gas turbine compressor stall detection firmware

The JT1 JS1, and JR1-labeled output ports

Two total multiple-pin terminal strips

While some Mark VI models can only be used in simplex or triple modular redundant (TMR) system applications, the IS200VAICH1DAA model can be used in both. While the board can be used in both system applications, the board functions differently in each. When the VAIC module is used in a TMR system, it will send the analog inputs to three control racks from the JR1, JS1, and JT1 connectors. The power supply of 24 VDC is sent to transducers from all of the VME racks and can be selected on the terminal board or is a diode. Each available analog current output will be fed by the available currents from all of the VAIC units. For more information regarding the IS200VAICH1DAA board's hardware, specification, different applications, and more, refer to the attached GEH-6421 Instruction Manual and datasheet. This IS200VAICH1DAA PCB is actually not the originally-produced device of its specific Mark VI Series functional role, as that would have to be considered the IS200VAICH1 parent circuit board not utilizing this IS200VAICH1DAA device's unique three-fold product revision table containing two functional Mark VI Series revisions and a sole artwork configuration revision.