GE GE □□□ Series Service Manual

IS420YAICS1B

1. Description

SPECIFICATIONS

2. Specifications

Specification	Value
Manual	**GEH-6855 Vol I and II**
Processor	**Board BPPC**
Power	**Consumption 5.3 Watts Typical**
Part	**Number IS420YAICS1B**
Manufacturer	**General Electric**
Ambient	**Temperature Range -40 to 158 °F**
Input	**Converter Resolution 16-bit ADC**
Functional	**Abbreviation YAIC**
Dimensions	**H 3.25 in x W 1.65 in x D 4.78 in**
ControlST	**Software Suite Version V06.01 and Later Versions**
Compatible	**Firmware V05.01 or Later**
About	**the IS420YAICS1B**
Greater	**Mark Product Series Information**
This	**IS420YAICS1B modular assembly product offering from General Electric was originally devised and produced with a specific functional role of an Analog I/O Pack in mind, for placement in the greater Mark VIe Turbine Control System Series. The Mark VIe Series that this IS420YAICS1B modular assembly belongs to has:**

3. Product Information

SPECIFICATIONS

Part Number: IS420YAICS1B

Manufacturer: General Electric

Series: Mark VIeS

Analog inputs: 10

Temperature Range: -40 to 158 degrees Fahrenheit

Compatible Firmware: V05.01 or Later

ControlST Software Suite Version: V06.01 and Later Versions

Input Converter Resolution: 16-bit ADC

Manua:l GEH-6855

Power Consumption: 5.3 W

Processor Board: BPPC

Function: Analog I/O Module

Availability: In Stock

Country of Manufacture: United States (USA)

Functional Description

IS420YAICS1B is an analog I/O module designed and developed by GE. It is a part of GE Mark VIeS control system. The Analog I/O pack (YAIC) is an electrical interface that connects one or two I/O Ethernet networks to an analog input/output terminal board. The YAIC includes a processor board shared by all Mark VIeS Safety control distributed I/O packs as well as an acquisition board dedicated to the analog input function. The I/O pack supports up to ten analog inputs, the first eight of which can be configured as 5 Vor 10 V or 4-20 mA current loop inputs. The final two inputs can be set to 1 mA or 0-20 mA current inputs.

Features

The component has current loop inputs, which are complemented by load terminal resistors conveniently located on the terminal board. These resistors enable precise current loop measurements, ensuring accurate and reliable data for control and monitoring purposes.

It boasts dual 0-20 mA current loop outputs. These outputs are essential for seamless interfacing with other systems and devices, facilitating the transmission of control signals and sensor data to external components. Whether it's for process control or data acquisition, these outputs enhance versatility and connectivity.

Three-pin power input ensures the device operates efficiently, guaranteeing consistent and dependable performance. Furthermore, the inclusion of two RJ-45 Ethernet connectors expands its connectivity options, enabling data exchange and communication with networked systems, enhancing its adaptability in modern industrial settings.

Streamlining the output process, the component features a DC-37 pin connector directly connected to the associated terminal board connector. This simplifies the connection procedure, reducing setup time and ensuring reliable data transmission. Additionally, the device incorporates LED indicator lights, offering valuable visual diagnostics. These indicators provide real-time information about the operational status, simplifying troubleshooting and maintenance tasks.

Integration ensures compatibility and simplifies the installation process, allowing users to leverage its capabilities effectively. Moreover, the component is received by a single DC-37 pin connector on simplex termin, further streamlining the connection process and ensuring a secure and reliable attachment to the system.

Combines precision, connectivity, and user-friendly features to meet the demands of industrial applications effectively. Its ability to provide accurate measurements, seamless interfacing, and streamlined connectivity make it an invaluable asset in enhancing control and monitoring functions in industrial settings.

Installation

Securely mount the terminal board of choice.

Insert one simplex YAIC I/O pack or three TMR YAIC I/O packs directly into the terminal board connectors.

Use the threaded studs next to the Ethernet ports to mechanically secure the packs. The studs fit into a terminal board-specific mounting bracket. The bracket should be positioned so that no right-angle force is applied to the -37 connector between the pack and the terminal board. The adjustment should only be needed once during the product's lifetime.

Depending on the system configuration, connect one or two Ethernet cables. The pack will work with either port. When using dual connections, it is common practice to connect ENET1 to the network associated with the R controller.

Connect the pack to power by plugging in the connector on the pack's side. This connector does not need to be inserted with the power disconnected from the cable because the I/O pack has an inherent soft-start capability that controls current inrush on power application.

Configure the I/O pack as needed.

Connectors

The following connectors are included in the I/O pack:

A DC-37 pin connector on the YAIC's underside connects to the discrete input terminal board. The 24 input signals, ID signal, relay coil power, and feedback multiplex command are all housed on the connector.

The primary system interface is an RJ-45 Ethernet connector labeled ENET1 on the pack's side.

The redundant or secondary system interface is a second RJ-45 Ethernet connector named ENET2 on the side of the I/O pack.

A 3-pin power connector on the pack's side provides 28 V dc power to the pack and terminal board.

Product Attributes

The product boasts exceptional accuracy, ensuring that the input measurements are highly precise. With an accuracy of 0.1% of full scale, it can provide reliable data even when operating under varying temperatures, maintaining consistent performance across its entire temperature range. This level of accuracy is crucial for applications where precise measurements are critical.

To maintain signal integrity and minimize interference, the product incorporates robust noise suppression mechanisms. It utilizes hardware filters with single-pole attenuation starting at 500 rad/s. This hardware filter efficiently removes unwanted high-frequency noise from the input signals, ensuring clean and reliable data.

In addition to hardware filtering, the product also offers a software filter. This filter employs a two-pole low-pass filter configuration that is adjustable to various cutoff frequencies: 0.75 Hz, 1.5 Hz, 3 Hz, 6 Hz, and 12 Hz. This flexibility allows users to tailor the filter to their specific noise suppression needs, further enhancing signal quality.

Common mode rejection (CMR) is essential for rejecting unwanted interference or noise that appears as a common signal across both input leads. The product excels in this regard, providing an impressive AC CMR of 60 dB at 60 Hz. This level of CMR ensures that interference originating from common sources, such as electrical noise, is effectively canceled out. AC CMR remains robust even when dealing with common mode voltages of up to ±5 V. This means that even in the presence of relatively high common mode voltages, the device maintains its ability to reject unwanted noise, ensuring the accuracy and reliability of the measured signals.

Compatibility

The I/O pack includes an internal processor board, while the YAICS1A includes a BPPB processor board. This processor has a limited component lifecycle, with firmware support only up to V04.06.

Upgrade to firmware V04.06 or higher from the ToolboxSTapplication. Firmware V05.00 and later are not supported.

The component includes a BPPC processor board that is compatible with ControlST Software Suite V06.01 or later and firmware V05.01 or later.

I/O pack versions YAICS1A and YAICS1B cannot be mixed on the same T-type terminal board. A TMR set's three I/O packs must all be the same hardware form. It is designed to work with the TBAISIC and STAIS#A terminal boards.

Simplex makes use of a single I/O pack with one or two IONet connections.

TMR uses three I/O packs with a separate IONet connection on each pack.

Analog Input Configuration

The I/O pack can accommodate up to ten analog inputs, with a unique configuration capability. Eight of these inputs can be configured as either 5 V or 10 V inputs or 4-20 mA loop inputs, providing flexibility in adapting to different sensor requirements.

The remaining two inputs are specifically designed for 1 mA or 4-20 mA current inputs.

Networking Capabilities

This I/O pack serves as a pivotal interface within the Mark VIe system. It can seamlessly connect with up to two Ethernet networks and a terminal analog I/O board.

Data communication is facilitated through dual RJ45 Ethernet connectors, ensuring robust connectivity.

Redundancy Considerations

While many units in the Mark VIe Series support dual, TMR (Triple Modular Redundancy), or simplex redundancy configurations, it's important to note that the I/O pack is compatible only with TMR or simplex applications.

In TMR redundancy, three I/O packs are employed, whereas in simplex redundancy, a single I/O pack suffices. Furthermore, all I/O packs within a TMR set must share the same hardware form.

Diagnostics and Environmental Performance

The I/O module incorporates robust self-diagnostic capabilities. During startup, it conducts a comprehensive power-up self-test, examining flash and RAM memory, processor board hardware, and Ethernet ports for optimal functionality. Additionally, continuous monitoring of internal power supplies ensures correct operation.

Operating efficiently within an ambient temperature range of -40 to 158 °F, this I/O pack features a 16-bit ADC for precise input conversion. Its dimensions are H 3.25 in x W 1.65 in x D 4.78 in, making it a compact yet powerful component within your system. Compatibility with ControlST Software Suite Version V06.01 and later versions is guaranteed, with the requisite firmware version set at V05.01 or later.

IS420YAICS1B Technical Specifications

Manual GEH-6855 Vol I and II

Processor Board BPPC

Power Consumption 5.3 Watts Typical

Part Number IS420YAICS1B

Manufacturer General Electric

Ambient Temperature Range -40 to 158 °F

Input Converter Resolution 16-bit ADC

Functional Abbreviation YAIC

Dimensions H 3.25 in x W 1.65 in x D 4.78 in

ControlST Software Suite Version V06.01 and Later Versions

Compatible Firmware V05.01 or Later

About the IS420YAICS1B

Greater Mark Product Series Information

This IS420YAICS1B modular assembly product offering from General Electric was originally devised and produced with a specific functional role of an Analog I/O Pack in mind, for placement in the greater Mark VIe Turbine Control System Series. The Mark VIe Series that this IS420YAICS1B modular assembly belongs to has:

specific applications in the management and control systems of popular, General Electric-compatible wind, gas, and steam turbines

the Mark V Series only possesses specific applications in gas and steam turbine assemblies specifically

a status as a desirable General Electric Mark product series

one of the final-developed General Electric Mark product series to exhibiting the patented Speedtronic control system technology first seen with the rollout of the Mark I Series

IS420YAICS1B I/O Pack Intended Functionality

The Analog I/O Pack IS420YAICS1B is part of the Mark VIe Series produced by General Electric. This I/O pack can:

interface between up to two Ethernet networks and a terminal analog I/O board

handle up to ten analog inputs

two of which can be configured as ±1 mA or 4-20 mA current input

the remaining eight are ±5 V or ±10 V inputs, or 4-20 mA current loop inputs

send and receive data through dual RJ45 Ethernet connectors

Additional IS420YAICS1B Device Hardware Information

This IS420YAICS1B I/O Pack is made up of two components:

one common processor board

one data acquisition board

diagnostic fault detection processes are completely handled solely through its data acquisition board

The associated terminal boards adopted in the robustly-supported modular assembly of the YAIC Analog I/O Pack here are the TBAISIC and STAIS2A terminal boards, which are both also considered component members of the greater Mark VIe Turbine Control System Series. While a variety of the units in the Mark VIe Series can be used in dual, TMR, or simplex redundancy applications, the IS420YAICS1B I/O pack can only be used in TMR or simplex applications, please note that when using this pack in a TMR redundant application three I/O packs will be used while only one I/O pack will be used in a simplex redundant application.

IS420YAICS1B Device Diagnostic Detail

Another vital note is that all of the I/O packs within the TMR set must be in the same hardware form. There is another version of the YAIC I/O pack that is labeled as the IS420YAICS1A pack, please note that the pack versions cannot be mixed on the same T-type terminal board. The IS420YAICS1B I/O pack can perform several self-diagnostic tests, some of which are: a power-up self-test that will check the:

flash memory

RAM memory

most of the processor board hardware

the Ethernet ports on the pack

This pack can also continuously monitor the internal power supplies to ensure correct operation. As detailed in the IS420YAICS1B functional product number, this IS420YAICS1B device exists within the very first grouping of Mark VIe Turbine Control System Series products.