GE IS220PAOCH1A

8-Channel Analog Output I/O Pack



GE IS220PAOCH1A is the Mark VIe analog output I/O pack for sending continuous control signals from the I/O Ethernet network to field equipment. Working with its associated output terminal board, it provides up to eight simplex 0–20 mA current-loop outputs. Each output includes current feedback through an analog-to-digital converter, allowing the pack to monitor the delivered signal as well as issue the command. The pack combines the distributed-I/O processor with output-specific electronics and local diagnostic indicators, distinguishing it from contact-output and analog-input packs in the same control platform.

Technical Specifications

Product Identity	
Control system	GE Mark VIe
Functional Configuration	
Product function	Analog output I/O pack
Output channels	8 simplex current outputs
Output range	0-20 mA
Feedback	Current feedback from each output
Network connectors	2 RJ45 I/O Ethernet ports
Terminal-board connector	DC-37
Supported boards	TBAOH1C; STAOH1A, as listed in GEH-6721G
Performance & Power	
D/A resolution	16 bit
Output compliance	18 V
Environment	
Internal temperature monitoring	A board sensor warns the controller when the pack temperature becomes excessive.

Selected original manufacturer material follows on pages 3–6.

Compatibility & Selection Guide

System and software compatibility. For IS220PAOCH1A selection, the GE compatibility table lists TBAOH1C and STAOH1A in simplex operation. DTAO is not supported. TBAOH1A and TBAOH1B can mechanically accept the pack but do not deliver the specified full accuracy and generate a compatibility fault.

Wiring & Installation Reference

Connections and terminal board

ENET1 / ENET2 · I/O Ethernet · Connect only the required IONet paths

Three-pin power input · 28 V DC supply · Verify polarity and the pack rating

DC-37 connector · TBAOH1C / STAOH1A · Align the mating connector without side force

Pack mounting and configuration

1. Confirm the assembly Check the terminal-board type and revision against the pack compatibility table.

2. Seat and secure the pack Align the connector and support studs; avoid forcing or bending the connector.

3. Verify configuration Apply the documented power and network sequence, then check identification, configuration and diagnostic indicators.

Installation precautions

Isolate the equipment before handling field wiring and follow the applicable GE site safety instructions.

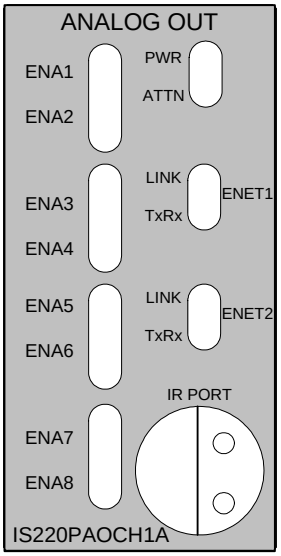
Terminal-board voltage, load and certification limits are board-specific; a similar connector does not establish compatibility.

View terminal diagram (PDF) — page 3 · View mounting instructions (PDF) — page 4

PAOC Analog Output

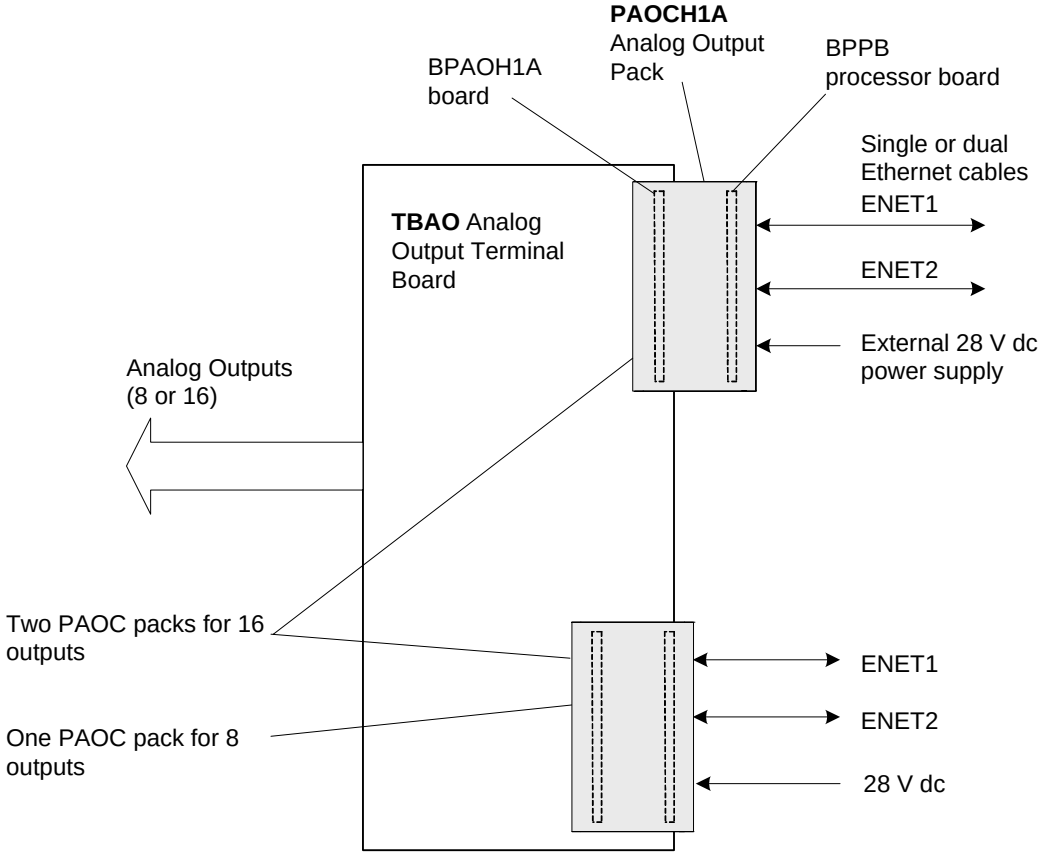
PAOC Analog Output

Functional Description



The Analog Output (PAOC) pack provides the electrical interface between one or two I/O Ethernet networks and an analog output terminal board. The pack contains a processor board common to all Mark* VIe distributed I/O packs and an acquisition board pair specific to the analog output function. The pack is capable of providing up to eight simplex 0-20 mA current loop outputs and includes an analog to digital converter for current feedback from each output.

Input to the pack is through dual RJ45 Ethernet connectors and a three-pin power input. Output is through a DC-37 pin connector that connects directly with the associated terminal board connector. Visual diagnostics are provided through indicator LEDs, and local diagnostic serial communications are possible through an infrared port.



Compatibility

PAOCH1A is compatible with the analog output terminal board TBAOH1C, and the STAO board, but not the DIN-rail mounted DTAO board. The following table gives details of the compatibility:

Terminal Board	TBAOH1C			DTAO	STAOH1A
Control mode	Simplex-yes	Dual - no	TMR-no	No	Simplex-yes

Control mode refers to the number of I/O packs used in a signal path:

- Simplex uses one I/O pack with one or two network connections.
- Dual uses two I/O packs with one or two network connections.
- TMR uses three I/O packs with one network connection on each.

While the PAOC will mount on a TBAOH1A or TBAOH1B terminal board, the pack will not realize full accuracy of the analog signals due to circuit differences between the terminal board revisions. For this reason, the PAOC is only compatible with the H1C version of TBAO and will report a board compatibility problem with any of the earlier revisions. No physical damage will result if a PAOC is powered up on an older board in error.

Installation

➢ To install the PAOC pack

1. Securely mount the desired terminal board.
2. Directly plug one PAOC I/O pack for simplex or three PAOC I/O packs for TMR into the terminal board connectors.
3. Mechanically secure the packs using the threaded studs adjacent to the Ethernet ports. The studs slide into a mounting bracket specific to the terminal board type. The bracket location should be adjusted such that there is no right-angle force applied to the DC-37 pin connector between the pack and the terminal board. The adjustment should only be required once in the life of the product.
4. Plug in one or two Ethernet cables depending on the system configuration. The pack will operate over either port. If dual connections are used, the standard practice is to connect ENET1 to the network associated with the R controller.
5. Apply power to the pack by plugging in the connector on the side of the pack. It is not necessary to insert this connector with the power removed from the cable as the I/O pack has inherent soft-start capability that controls current inrush on power application.
6. Configure the I/O pack as necessary.

Note The PAOC mounts directly to a Mark VIe terminal board. Simplex terminal boards have a single DC-37 pin connector that receives the PAOC. TMR capable terminal boards have six DC-37 pin connectors, of which only two may be used by PAOC packs, one for the first eight outputs and the other for the second eight outputs. The PAOC is a simplex-only pack.

Operation

Processor

The processor board in the pack is common to all Mark VIe Ethernet I/O packs. It contains the following:

- High-speed processor with RAM and flash memory
- Two fully independent 10/100 Ethernet ports with connectors
- Hardware watchdog timer and reset circuit
- Internal I/O pack temperature sensor
- Infrared serial communications port
- Status-indication LEDs
- Electronic ID and the ability to read IDs on other boards
- Substantial programmable logic supporting the acquisition board
- Input power connector with soft start/current limiter
- Local power supplies, including sequencing and monitoring

The processor board connects to an acquisition board specific to the I/O pack function. Upon application of input power, the soft-start circuit ramps up the voltage available on the processor board. The local power supplies are sequenced on, and the processor reset is removed. The processor completes self-test routines and then loads application code specific to the I/O pack type from flash memory. The application code reads board ID information to ensure the correct matching of application code, acquisition board, and terminal board. With a good match, the processor attempts to establish Ethernet communications, starting with request of a network address. The address request uses the industry standard dynamic host configuration protocol (DHCP) and the unique identification read from the terminal board. After Ethernet initialization, the processor programs the on-board logic, runs the application, and enables the acquisition board to begin operation.

The processor application code contains all the logic necessary to allow the pack to operate from one or two Ethernet inputs. When operated from two Ethernet inputs, both network paths are active all the time. A failure of either network will not result in any disturbance to the I/O pack operation, and the failure will be indicated through the working network connection. This arrangement is more tolerant of faults than a classic hot-backup system where the second port is only used after a primary port failure is detected. The Ethernet ports on the processor auto-negotiate between 10 MB/s and 100 MB/s speed, and between half-duplex and full-duplex operation.

An industry-standard infrared serial communications port is provided on the processor board. Accessible through the pack front, this port provides diagnostic information on the pack status and an ability to program the pack when both Ethernet connections fail. It is possible to communicate with this port using most notebook computers and most hand-held Personal Digital Assistants (PDA).

Analog Output Hardware

The PAOC includes eight simplex 0-20 mA analog outputs capable of 18 V compliance. A 16-bit digital-to-analog converter (DAC) commands and drives the output current with an external transistor amplifier. A board temperature sensor is included to warn the control if the pack's internal temperature becomes excessive.

