I/O Boards

Most I/O boards, are single width VME boards, of similar design and front cabinet, using the same digital signal processor (TMS320C32).

The central processing unit (CPU) is a high-speed processor designed for digital filtering and for working with data in IEEE 32-bit floating point format. The task scheduler operates at a 1 ms and 5 ms rate to support high-speed analog and discrete inputs. The I/O boards synchronize their input scan to complete a cycle before being read by the VCMI board. Contact inputs in the VCCC and VCRC are time stamped to 1 ms to provide a sequence of events (SOE) monitor.

Each I/O board contains the required sensor characteristic library, for example thermocouple and RTD linearizations. Bad sensor data and alarm signal levels, both high and low, are detected and alarmed. The I/O configuration in the toolbox can be downloaded over the network to change the program online. This means that I/O boards can accept tune-up commands and data while running.

Certain I/O boards, such as the servo and turbine board, contain special control functions in firmware. This allows loops, such as the valve position control, to run locally instead of in the controller. Using the I/O boards in this way provides fast response for a number of time critical functions. Servo loops, can be performed in the servo board at 200 times per second.

Each I/O board sends an identification message (ID packet) to the VCMI when requested. The packet contains the hardware catalog number of the I/O board, the hardware revision, the board barcode serial number, the firmware catalog number, and the firmware version. Also each I/O board identifies the connected terminal boards via the ID wire in the 37-pin cable. This allows each connector on each terminal board to have a separate identity.

I/O Processor Board	Terminal Board	I/O Signal Types	No. per I/O Processor Board	Type of Terminal Board	Comments
VAIC	TBAI (2)	Analog inputs, 0–1mA, 4–20 mA, voltage	20	TMR, simplex	
			4		
		Analog outputs, 4–20 mA, 0–200 mA			
VAOC	TBAO	Analog outputs, 4–20 mA	16	TMR, simplex	
VCCC and VCRC	TBCI (2)	Contact inputs	48	TMR, simplex	(VCCC is two slots)
	TRLY (2)	Relay Outputs (note 1)*	24	TMR, simplex	
VCCC	TICI (2)	Point Isolated Contact inputs	48	TMR, simplex	VCCC-only in place of TBCI. (optional)
VGEN	TGEN	Analog inputs, 4–20 mA	4	TMR, simplex	
		Potential transformers	2		
		Current transformers	3		
	TRLY	Relay outputs (optional)	12		for FAS (PLU)
VPRO (3)	TPRO	Pulse rate	3	TMR	Emergency Protect
		Potential transformers	2		
		Thermocouples	3		
		Analog inputs, 4–20 mA	3		

Vibration

Seismic

Universal Building Code (UBC) - Seismic Code section 2312 Zone 4

Operating / Installed at Site

Vibration of 1.0 G Horizontal, 0.5 G Vertical at 15 to 120 Hz

See Seismic UBC for frequencies lower than 15 Hz.

Packaging

The standard Mark VI cabinets meet NEMA 1 requirements (similar to the IP-20 cabinet). Optional cabinets for special applications meet NEMA 12 (IP-54), NEMA 4 (IP-65), and NEMA 4X (IP-68) requirements. Redundant heat exchangers or air conditioners, when required, can be supplied for the above optional cabinets.

UL Class 1 Division 2 Listed Boards

Certain boards used in the Mark VI are UL listed (E207685) for Class 1 Division 2, Groups A, B, C, and D, Hazardous Locations, Temperature Class T4 using UL-1604.

Division 2 is described by NFPA 70 NEC 1999 Article 500 (NFPA - National Fire Protection Assocation, NEC - National Electrical Code).

The Mark VI boards/board combinations that are listed may be found under file number E207685 at the UL website and currently include:

- IS200VCMIH1B, H2B
- IS200DTCCH1A, IS200VTCCH1C
- IS200DRTDH1A, IS200VRTDH1C
- IS200DTAIH1A, IS200VAICH1C
- IS200DTAOH1A, IS200VAOCH1B
- IS200DTCIH1A, IS200VCRCH1B
- IS200DRLYH1B
- IS200DTURH1A, IS200VTURH1B
- IS200DTRTH1A
- IS200DSVOH2B, IS200VSVOH1B
- IS200DVIBH1B, IS200VVIBH1C
- IS200DSCBH1A, IS200VSCAH2A
- IS215UCVEH2A, M01A, M03A, M04A, M05A
- IS215UCVDH2A
- IS2020LVPSG1A

Chapter 5 Installation and Configuration

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Introduction

This chapter defines installation requirements for the Mark VI control system. Specific topics include GE installation support, wiring practices, grounding, typical equipment weights and dimensions, power dissipation and heat loss, and environmental requirements.

Installation Support

GE's system warranty provisions require both quality installation and that a qualified service engineer be present at the initial equipment startup. To assist the customer, GE offers both standard and optional installation support. Standard support consists of documents that define and detail installation requirements. Optional support is typically the advisory services that the customer may purchase.