GE
Energy

Mark* IV to Mark* VIe Migration
Gas Turbine Controls Upgrade

fact sheet

Now you can upgrade your Mark* IV gas turbine control to GE's latest technology, without changing your existing field terminations, field wiring, or turbine devices. GE Energy offers a prefabricated package to enable a seamless Mark IV to Mark VIe migration, replacing all of the vintage electronics in the existing Mark IV cabinet. Standard wire harnesses connect the new Mark VIe I/O to the Mark IV terminal boards with plug-in connectors to ensure point-to-point connectivity.

Reliability of a Modern Control System

In addition to retaining 100% of your field wiring and turbine devices, you also retain the same control and protection philosophy that has delivered operation and tripping reliability all these years. Your upgraded Mark VIe control will still be triple redundant, but with improved fault tolerance. For example, failure of an A/D converter in the Mark IV causes one of the three controllers to trip, but not in Mark VIe. Also, on-line repair of Mark IV systems require that one of the three controllers be taken off-line, but the Mark VIe can be repaired on-line.

Your board racks with hardwired backplanes are replaced with smart I/O modules with local distributed processors to interface with turbine devices. This eliminates berg jumpers for addressing, PROMs to change, and BRAM/EEPROM for non-volatile memory.

I/O Enhancements

Your smart I/O modules will provide features like 1ms time-tags for all contact inputs for Sequence of Events (SOE) monitoring. Additionally, the SOE can be synchronized between multiple units and to a plant time source. Flame scanners will be continuously monitored to see the actual light intensity instead of the simple on/off indication of the Mark IV.

Since the I/O modules are distributed via 100MB Ethernet, they can also be located in adjacent cabinets, such as generator protection panels to replace RTD monitors or analog meters on the door. The "25" backup synch check relay is now a function performed by redundant I/O modules and coordinated with another set of modules for auto synchronizing.

Even basic power distribution is improved. For example, your Mark IV has two feeders to isolate critical and non-critical solenoids. The new I/O has a pair of on-board fuses to isolate every solenoid and diagnostics to monitor their status.

Operator Interface

The operator interface on the cabinet door is replaced with a modern HMI in the same location. Now, you have a Proficy* HMI/SCADA CIMPLICITY* graphics package with accurate turbine screens, convenient navigation, superior alarm management, and tools for editing, trending, data analysis, and exporting data. The logging printer on the door is no longer needed since alarms are logged in the HMI. Similarly, the new Trip History handles significantly more points, with better time resolution, and stores data for 30 trips.

Remote operator panels and Smart Remotes can be replaced with HMIs and Historians that communicate in client/server configuration on modern Ethernet networks. HMIs communicate directly with the redundant controllers, thereby eliminating the existing Mark IV Communicator module and the need for a backup display. For units with DCS links, a replica of the Mark IV simple data dump protocol is available along with Modbus*, OPC, and GSM.

Configuration and Diagnostic Tools

The Mark VIe comes with the ToolboxST* software suite. Application software is upgraded from 16 bit integer data to 32 bit floating point and graphically represented as interconnected function blocks. Data can be dragged and dropped between blocks or onto trending screens. Features include block libraries, help files, math blocks, macros, logic and analog forcing. Changes to application software can be made on-line without rebooting the controllers as required in Mark IV.

ToolboxST is used to configure everything from I/O devices to networks and operator stations. It provides more extensive and precise diagnostics with clear messages to quickly identify fault locations and reduce mean-time-to-repair.

Related Products

Generator excitation upgrades are also available with cost-effective products, such as the Digital Front End (DFE), which replaces just the control portion of the exciter without affecting the power bridges. DFE shares the same ToolboxST software tools as the Mark VIe, HMIs, and has peer-to-peer Ethernet communications instead of hardwiring all signals.

Bently Nevada* Asset Condition Monitoring solutions are also available for the turbine and driven load equipment with communication on the same networks as the Mark VIe and DFE.

Benefits

- Minimum downtime for upgrade by retaining field terminations and turbine devices
- Improved fault tolerance and reliability
- Enhanced on-line repair at the I/O module level
- Modern HMI tools for ease of operation
- Modern maintenance tools and diagnostics to quickly identify faults
- Flexible Ethernet networks to distribute data
- Distributed I/O to integrate instrumentation in other cabinets
- Compatible with all new turbine technology, such as dry low NO_X

Mark IV

Mark VIe

Contact Information

GE Energy
Control Solutions
3800 North Wilson Avenue
Loveland, CO 80538
energy.controlsolutions@ge.com
http://www.ge-energy.com/oc
800-835-5182 / +1 970-461-5201

GEA-14803 (10/06)