Virtual Controller for Mark VI and Mark VIe

Overview
GE brings more than 50 years in turbine control and design expertise together with an unmatched knowledge of the turbines at your site. With a virtual controller from GE, you can have an accurate and easy-to-maintain simulator that only an original equipment manufacturer (OEM) can provide. GE’s virtual controller software creates a safe environment for training and testing control system changes to help improve the effectiveness of your operations and maintenance processes.

The Virtual Controller for Mark VI and Mark VIe simulates control system responses in a safe, software environment with no risk to an operating power plant. It is provided with an Application Programming Interface (API) for integration with the overall plant simulator. The virtual controller exhibits exceptional high-fidelity in its simulation of the turbine control and its associated GE HMI, facilitating system validation testing, installation support, operator training, maintenance training, and ongoing change management.

Simulation benefits
- Provides operators a safe environment for training, and allows for exploration of optimized operations
- Provides a testing environment in which to review changes before applying in the operating plant
- Saves and restores initial conditions to quickly take the virtual controller to a desired scenario without having to maneuver or restart the simulation
- Supports scenario-based training for technicians to learn troubleshooting and repair techniques on GE controls
- Reduces control system commissioning time for new plants

How it works
Our experts set up virtual controllers that replicate real controllers in the plant. They also configure one or more GE HMIs to match screens at plant. The virtual controller runs the same site-specific application software as the actual control system; however, instead of communicating with real I/O a GE-developed API is used to link with simulator models.

The simulator can be scaled to suit various needs—from a single HMI and one gas turbine to a full control room replica with multiple HMIs and dozens of virtual controllers. Unlike the actual plant process, which should not be interrupted or manipulated for training purposes, the virtual controller supports a variety of features to enhance system analysis and training—including Run, Stop, Pause, Step, Save/Restore initial conditions, Overrides, and Backtrack commands.
System integration

Each virtual controller consists of four major processes that perform the following:

- Run the identical application code that runs in the operating Mark VI or VIe controllers, and provide high fidelity responses with machinery simulations
- Provide communication interface with the ToolboxST* to allow highly realistic configuration and diagnostics simulation
- Provide Ethernet Global Data (EGD) services in support of our HMI simulations
- Provide alarm services to accurately model the alarms delivered to the simulator from the Mark VI or VIe panels

The API provided with the virtual controller software makes these processes accessible for integration with a third-party simulator. The virtual controller is easy-to-program and maintain as the software used is ToolboxST, which most plant operators are familiar with. Because of this, moving files from the plant to simulator for training and testing is easy and maintains settings.

No special training needed

Specific training to operate the simulator is not necessary as it runs an exact copy of the plant’s Mark control system including panel software and HMIs. Training for control system operators on our larger GE control system equipment and software is available from one of our experienced instructors.

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