

Control Systems

Gas Turbine Generator DI-TRONICS[®] Model # GTG 8080

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To safely and efficiently operate a gas turbine generator (GTG) set, the control system must be technologically advanced and capable of meeting operational challenges found in today's demanding power generation environments.
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Dresser-Rand Controls Systems have been designing control systems for various applications for more than 50 years. With this heritage comes a wealth of experience designed into every system. The DI-TRONICS[®] gas turbine generator (GTG) control system is an integrated solution incorporating all subsystems required to monitor vibration, temperature, fuel control and other process variables to provide efficient operation of the gas turbine. These systems use the most up-to-date, state-of-the-art technology as described below.

At the heart of the system is a programmable logic controller (PLC). Today's PLCs are technically advanced, have a flexible configuration and can be programmed in many common program languages including ladder logic and IEC1131. DI-TRONICS process control programs are ready to use with comprehensive documentation. Governor control and other high-level programs are developed in segregated blocks to ensure the highest level of system reliability and security.

The DI-TRONICS PLC-based controllers interface with the instrumentation of the gas turbine-driven generator train through an input/output (I/O) system and communicate both internally and externally in a variety of standard industry protocols. The GTG system interfaces with the existing generator control panel to provide a comprehensive train control system.

These benefits translate into lower life cycle costs associated with spare parts, ease of operation, reduced maintenance and comprehensive training, as well as improvement in performance and throughput. In addition, the use of advanced packaging techniques provides easy access to panel internal components with the smaller panels offering a distinct advantage where space is limited.

System Configuration and Benefits

The standard DI-TRONICS GTG system configuration includes the following subsystems, based on either an Allen Bradley, GE or Triconex PLC controller, incorporating the following standard functions:

- Freestanding NEMA 12 or equivalent enclosure
- Lube oil system monitoring
- Generator synchronizing devices
- Synchronization check relay
- PLC with I/O and communication
- Functions include: gas turbine governor; integrated temperature monitoring; radial vibration and axial position monitoring; start, stop, alarm, and shutdown sequencing; and water wash sequencing
- Two-out-of-three voting back-up over-speed module
- Back-up over-speed switch modules (two for the gas turbine and two for the power turbine)



For more information on the **DI-TRONICS control system**, contact:

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System Communication

Communication to external system devices is provided using the MODBUS TCP/IP protocol.

Hard-wired Relay Backup Shutdown System

A hard-wired relay back-up system is used to shut down the gas turbine generator train in critical situations. Inputs to the system include:

- Two PLC outputs from independent paths to indicate a PLC failure
- Gas turbine over-speed switch contacts
- Power turbine over-speed switch contacts
- One fuel control summary shutdown contact
- One train vibration summary shutdown contact
- Other ESD shutdown contacts as required

Standard System Components

The following components and displays are provided as part of the core system:

- 17" touch screen monitor (D-R HMI – panel mounted)
- Indicator Lights:
 - Permissive to start – Green
 - Unit running – Green
 - Common alarm – Amber
 - Common shut down – Red
 - PLC failure – Red
 - Normal stop – Blue
- Pushbuttons:
 - Unit start
 - Unit normal stop
 - Alarm silence
 - Acknowledge
 - Reset
 - Speed raise
 - Speed lower
 - ESD – Pull to stop (no guard)
- Selector Switches:
 - Mode select (local/remote)
 - Speed controls (auto/manual)
 - External light switch

System Options and Enhancements

The following options are available and will be quoted upon request:

- Dresser-Rand ENVISION™ condition monitoring system (see separate literature)
- Additional operator pushbuttons and/or pilot lights
- Non-standard communications protocols
- RS232/485 serial communications
- DCS communications
- Hazardous area panel classification and certification
- Laptop computer (programming and maintenance device)
- Additional local operator panel
- Non-standard HMI systems (replaces DI-TRONICS HMI)
- Intrinsically safe barriers or isolators
- Upgrade to redundant configuration
- Ethernet communication
- Fire and gas monitor
- Fuel valve replacement
- Client-witnessed factory acceptance test (FAT)

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