# GE LM2500® GAS TURBINE GENERATOR DRIVE APPLICATION CONTROL PACKAGE

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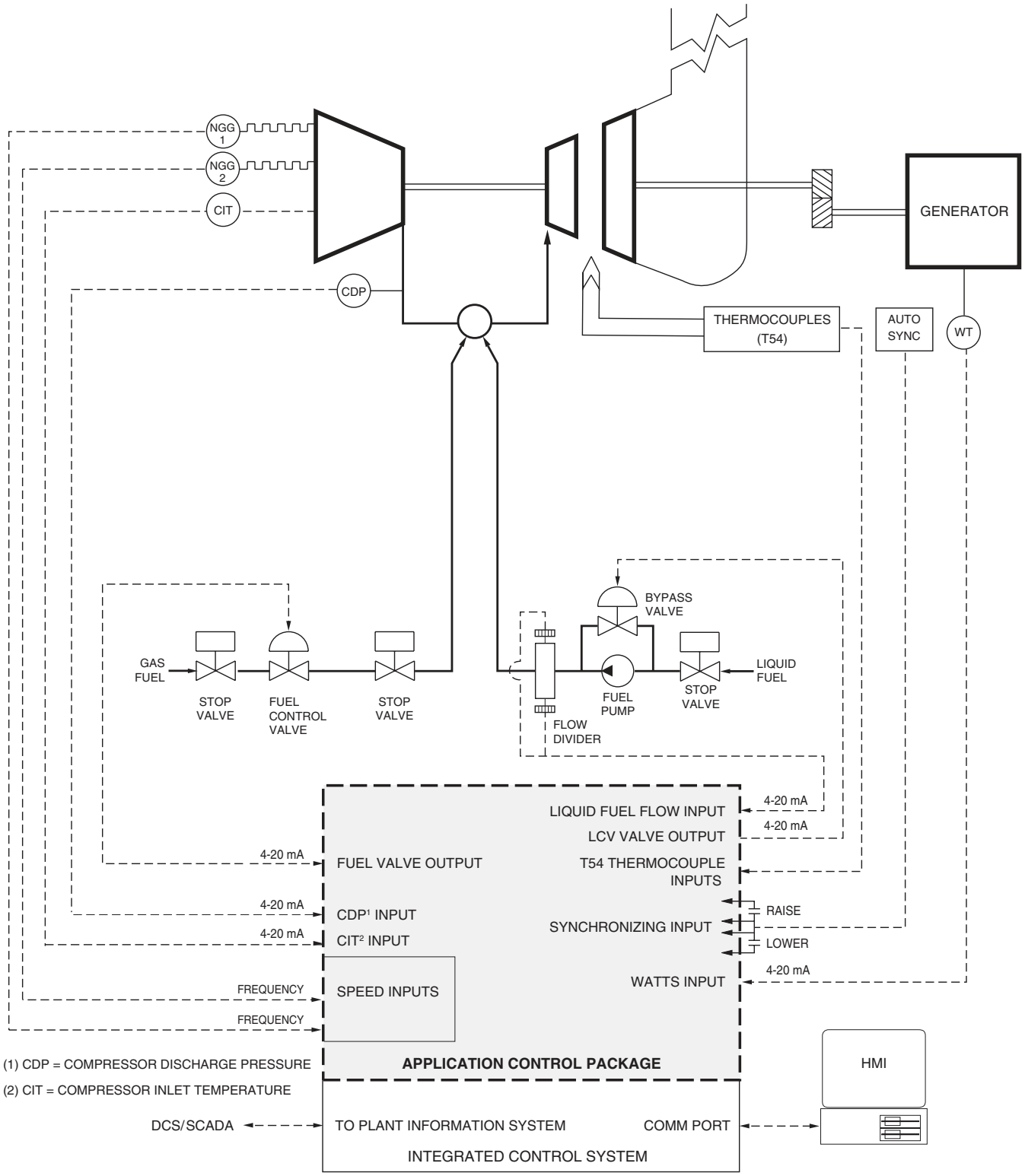


Simplified schematic showing a Petrotech GE LM2500® gas turbine generator drive application control package integrated into an advanced control system. Shown with dual fuel system.

## APPLICATION

The Petrotech GE LM2500® gas turbine generator drive application control package replaces older mechanical/hydraulic/electronic/pneumatic gas turbine fuel regulators with a modern, reliable application control package which runs on an open architecture advanced PLC-based system. The control package for the gas turbine provides on-line dual fuel control, speed ratio control and inlet guide vane control based on temperature.

## ADVANTAGES

- **Hardware independent system:**
  Application control package's portability allows customer choice of PLC platform, reducing need for additional spare parts and training expenses. Available PLCs include General Electric 90-70 and 90-30, Siemens/TI, Modicon Quantum, and Allen-Bradley.
- **Fault tolerant:**
  Control package is available on fault tolerant controllers for critical control applications.
- **Simplified interface to DCS or SCADA:**
  Communication tasks are handled with a separate, dedicated module in the PLC, increasing data rate and simplifying network installation.
- **Improved fuel regulation:**
  Fast loop sampling rate, combined with modern digital control techniques, improves steady-state setpoint control, and reduces overshoot during transients, allowing full load rejection without driving the unit into overspeed.
- **Improved start-up reliability:**
  Special "lean lightoff" procedure ignites all burners with essentially 100% reliability, and with greatly reduced thermal stress.
- **Improved exhaust temperature monitoring and control:**
  Advanced statistical algorithms detect turbine hot/cold spots and automatically reject failed thermocouples.
- **Fail-safe features:**
  Redundant overspeeds; open/short monitoring of mA and thermocouples; readback monitoring of outputs, and special self-check features improve safety and reliability.
- **Non-proprietary interfaces:**
  Simple 4-20 mA, RTD, thermocouple, and dry contact I/O allow simple interface to existing sequence/protection logic unit, making low-cost partial upgrades practical, and system troubleshooting simple.
- **Improved operator information with optional HMI:**
  Optional Human-Machine Interface MS Windows-based graphic operator interface displays system status, trending and data logging, which can be used as part of a preventive maintenance program.

## SCOPE OF SUPPLY

TThe application control package for the GE LM2500® gas turbine generator drive system, includes:

**Analog inputs, 4-20 mA:**

- Watts (load control)
- Compressor discharge pressure (PCD)
- Fuel interstage pressure

**Analog inputs, frequency:**

- Two (2) redundant NGG

**Analog inputs, mV:**

- T54 (EGT) (up to 16 thermocouples)

**Analog outputs, 4-20 mA:**

- Speed ratio valve position setpoint
- Fuel control valve position setpoint
- Inlet guide vane position setpoint (if applicable)

**Operating states:**

- Firing
- Warm-up
- Accelerate
- Load
- Synchronize

**Status, alarms and shutdowns:**

- Fault
- NGG overspeed alarm
- NGG underspeed shutdown
- NGG overspeed shutdown
- Redundant NGG overspeed shutdown
- △NGG alarm
- High T54 alarm
- High T54 shutdown
- Low T54 shutdown
- Low T54 delayed alarm
- Rejected thermocouple (TC)
- Too few thermocouples shutdown
- Thermocouple spread alarm
- Thermocouple spread shutdown
- Manual
- High firing fuel pressure shutdown
- Transmitter failure alarms
- Transmitter failure shutdowns
- Output failure shutdowns
- Control mode

## SCOPE OF SUPPLY - Continued

**Controllers/Special Features**

- Start-up controller for fuel valve
- T54 controller for fuel valve
- T54 acceleration controller for fuel valve
- EGT controller for fuel valve
- EGT rate of rise controller for fuel valve
- T54 controller
- T54 controller for inlet guide vanes (if applicable)
- Combustion monitoring system
- Dual fuel capability with on-line transfer

**Ramps:**

- Firing (lean lightoff) ramp
- Start-up ramp
- Loading ramp
- Cooldown ramp

## OPTIONS FOR COMPLETE CONTROL SYSTEM UPGRADE

- Gas turbine sequencing and protection discrete logic
- Generator sequencing and protection discrete logic
- Communication interface to DCS or SCADA
- Human machine interface unit with licensed software package
- Complete custom engineered control panel, factory tested and ready to install
- Fuel valve system upgrade
- Inlet guide vanes actuator system upgrade or retrofit
- Thermocouple upgrade
- Flame sensor upgrade
- Vibration system upgrade
- Installation and commissioning
- Training

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