

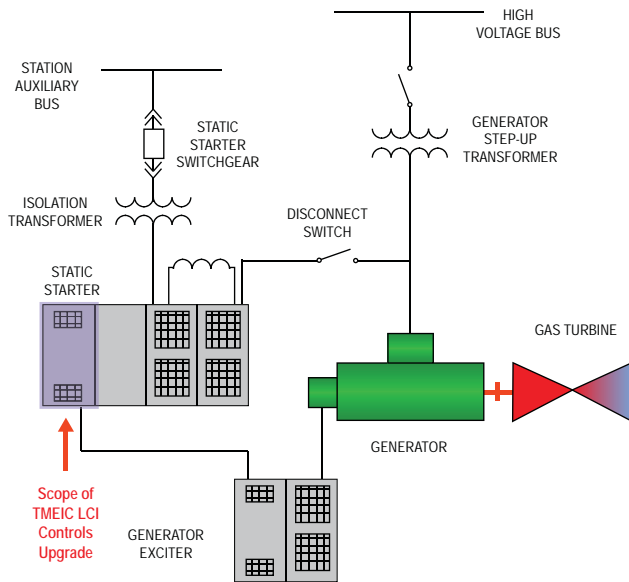
# Control Modernization for legacy Gas Turbine Starter Systems

## TMdrive-LCI-DFE (Digital Front End)

Legacy LCI drives and starters have provided reliable service for almost 25 years. To keep that record intact, TMEIC has developed a control upgrade for Legacy Gas Turbine Static Starter Systems, while preserving the existing power conversion hardware.

In addition to extending the product life, this modernization program provides significant functional enhancements plus a system condition and capability assessment of your static starter system.

Legacy LCI Gas Turbine Static Starter



TMEIC LCI Starter Control Upgrade



Innovation

Legacy Control

TMEIC Control



SCR Power Converter

1990 2000 2010 2015 2020

### Legacy LCI Control



#### Older printed circuit backplane:

- Obsolete circuit boards
- Limited I/O capability



#### Hardware dependent control:

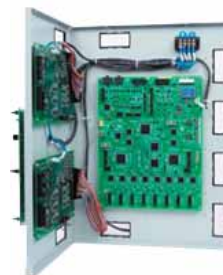
- Limited sequencer
- Fixed block diagram regulator
- Terminal emulator
- Repeated voltage feedback offset nulling



#### Limited control and data interface:

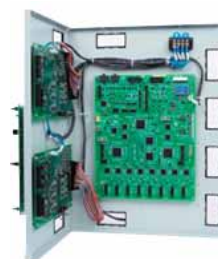
- Local keypad control
- Meters

### TMEIC LCI Control Upgrade



#### TMEIC Control Cards

- New-Hinge-Mounted Control Circuit Board Assembly to replace Innovation Series circuit board rack
- New I/O Modules, Gating/Feedback boards
- Interface boards to original SCR gating system
- New power supplies



#### Control Software Library

- Flexible sequencing logic
- Windows® based TMdrive®-Navigator
- Animated graphic displays
- Integrated trending window
- Common tool across all TMEIC drives
- Immune to voltage feedback offsets



#### Knowledge Management

- Local touch screen interface panel
- EGD Communications with turbine control
- Drivers for LAN-type communication
- Commissioning and maintenance for quick turnaround and trouble shooting

# Control Modernization for Legacy Gas Turbine Starter Systems

## Benefits of a TMEIC LCI Controller Upgrade

- Voltage Feedback offset nulling is eliminated
- Reduced number of circuit boards
- Color touch-screen Operator panel in control compartment door
- Extensive diagnostics and self-test capability
- External control interface through TMEIC TMdrive-Navigator Software

## New Control at a Fraction of the Cost of a New Static Starter

Prior to the introduction of the TMEIC LCI Static Starter control upgrade, the only way to realize the benefits of current generation technology was through the purchase of a new starter system.

For installations where the power conversion and bridge interface hardware is not causing unplanned outages, even more value can be realized through a retrofit program. A TMEIC LCI control upgrade project can cost as little as 20% of a similarly rated static starter.

## Total Project Cost Considerations Increase Savings

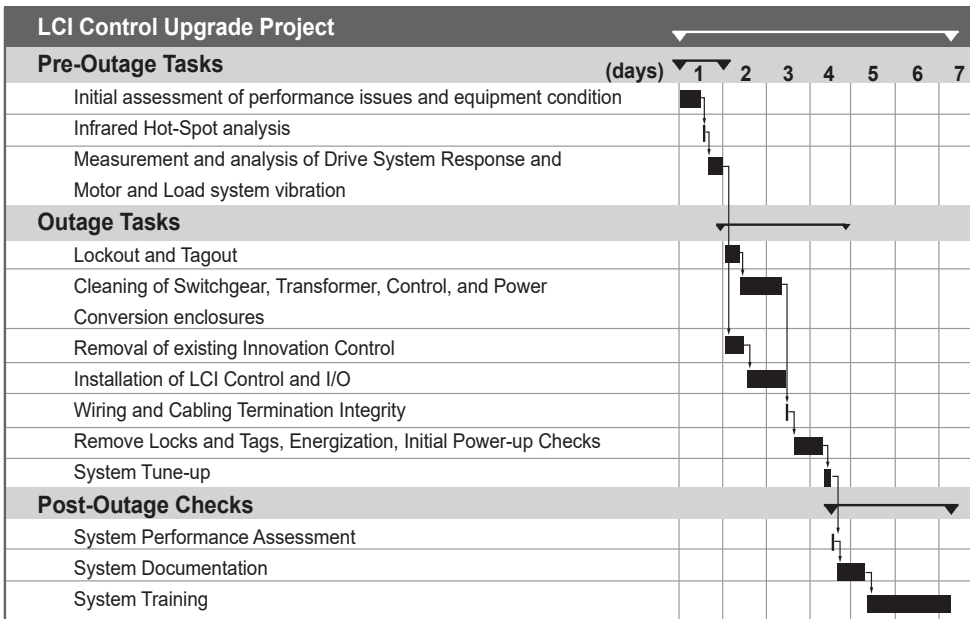
Unlike the Controller Upgrade, the purchase of a new starter also involves:

- Demolition and Rigging
- Installation and Cabling
- Reconstruction and Commissioning

With these factors, plus the cost of downtime considered, the realized savings of an upgrade over a new installation are even greater.

## Optional Engineering Assessment Provides Complete System Peace of Mind

The TMEIC LCI Assessment and Modernization Program provides drive system investment protection through well documented engineering procedures for assessment and preventive maintenance of switchgear, magnetics, controls, and power converters. Complete project management equals peace of mind.



**Results:**

- Extended Hardware Life
- Improved System Information
- Enhanced System Performance
- Increased Service Options
- System Condition Assessment

All within your regular outage schedule, with minimal risk, and low comparative cost.

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