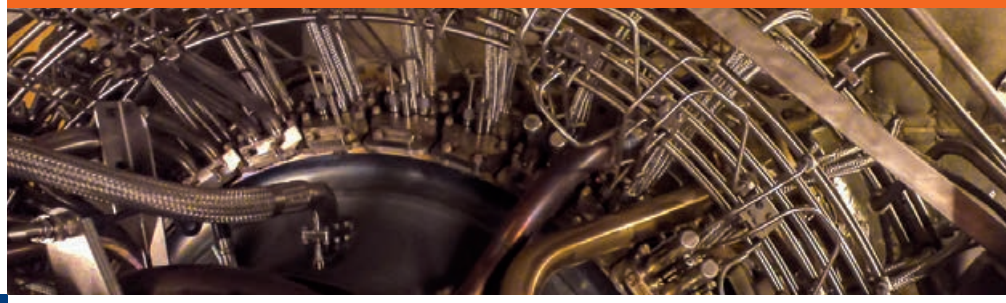
Control-Care

Gas Turbine Control Application (GTCA) functionality and capabilities



Renowned control solutions for the Energy, Chemical, and Petrochemical industries worldwide

The Gas Turbine Control Application (GTCA) designed and developed by Control-Care provides a versatile and cost-effective way to control an industrial or aero-derivative gas turbine. In addition to controlling speed or power, it also protects against excessive temperatures, speeds or pressures, and sequences the fuel flow during start-ups and shutdowns.
The GTCA is offered for single and/or multi-shaft turbines driving variable speed loads or synchronous generators.

The GTCA and GT Auxiliaries sequencing control are available for new and retrofit applications and can be configured for any industrial or aero derivative gas turbine. The full control package is usually integrated into the train control system as unit control package (UCP) or as part of the plant's distributed control system (DCS).

Upgrading many gas turbines' control systems often comprises upgrading fuel systems valves, pumps, and related equipment. Sometimes fuel systems are also added in fuel conversion projects to add dual fuel capability on a turbine previously operating on a single fuel. Control-Care Systems provides you with complete fuel system design compatible with the control system and lump-sum installation.

Gas Turbine Control Application provides closed loop control for

- Start up control
- Speed control gas engine, power turbine
- Frequency control
- Load control
- Temperature limitation
- Set point mode selection

Power generation control module

- Droop and isochronous mode
- Integration with auto-synchronisation device

Cascade control

- Control of an alternate process variable using an independent set of tuning parameters
- Generator load control
- Process pressure, flow control
- With Performance Control Application (PCA)

Speed selection

- Selection of two or three speed probes
- Automatic fallback response to any speed probe failure

Predictive control response

- Configurable set point and process variable
- Predictive response to avoid high speed upon sudden driven load changes
- Predictive response to avoid over temperature during starting and normal operation

Coordinated open loop response

- Increase availability and operability of the driven unit which may otherwise trip on high speed due to sudden load change
- Actuator control response dampening upon compressor surge detection

Actuator outputs

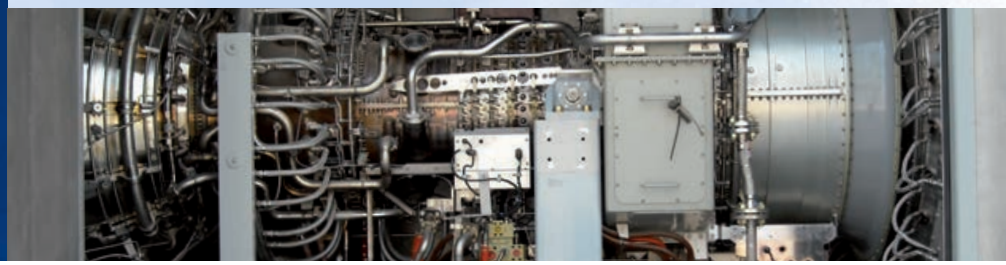
- Linearisation of various actuator outputs
- Valve actual position deviation alarming (if position feedback is available)
- Manual control during maintenance periods

Sequencing

- Full automatic cold and hot start of gas turbine.
- Automatic start up timing based on running and shutdown timing
- Automatic warmup timing based turbine OEM operational data
- Critical speed zone ramping and avoidance.
- Loading and unloading of a compressor in conjunction with its companion performance and antisurge controllers
- Fuel acceleration and deceleration schedules
- Temperature monitoring and limiting during start-up and normal operation

Speed limitation and high speed prevention

- Keep power turbine or gas engine speed at or below maximum operating speed using predictive control response or open loop response



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Gas Turbine Control Application (GTCA) functionality and capabilities

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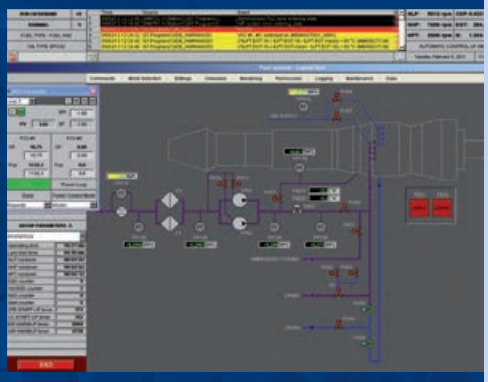
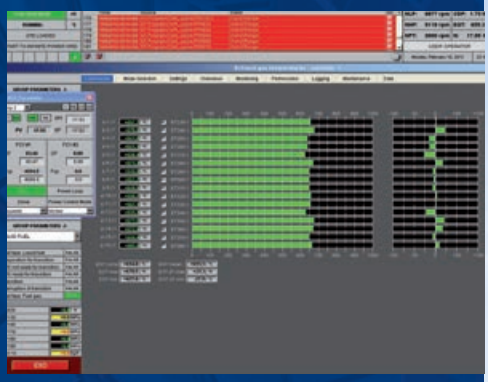
Our GTCA application will effectively protect and control your gas turbine during start-up conditions as well as during (ab)normal operation with minimal operator intervention. It is fully compatible with our Antisurge Control Application (ACA), Performance Control Application (PCA), Station Control Application (SCA), compressor auxiliaries sequencing, parametric diagnostics and ESD system interfacing.





High speed and acceleration protection
- Turbine trip when the rotor speed or acceleration exceeds allowable limit

Limiting control
- Maintain turbine speed within allowable operational range
- Maintain predefined process variables within limits

High temperature protection
- Turbine trip when engine or power turbine exceeds allowable temperature limit

Calculated variables
- Actual speed based on number of installed probes and functional probes
- Actual and average temperature with spread calculation and probe rejection

Alarms and events
- Time stamped alarm and event reporting for signaling and troubleshooting purposes

Critical event stored on control system platform
- Standard trending of critical parameters, [x] minutes* prior and [y] minutes* after the event
- In parallel to HMI or stand-alone

Sequence of event history on control system hardware, time stamped
- Standard [x] points* history in parallel to HMI or stand alone

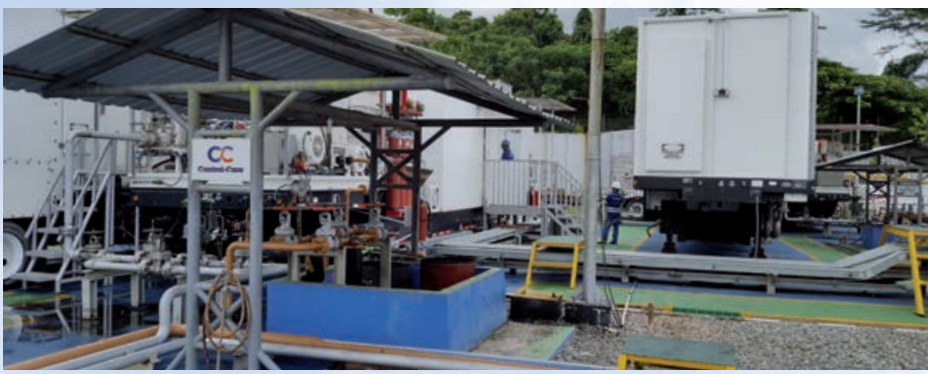
First out monitoring
- Indication of first signal causing the (gas turbine) trip

Graphical interfaces
- Hardware platform independent
- Sequencing and start permissive diagrams.
- Control application faceplate
- Control application configurator

User friendly application configurator
- Upper screen provides for loop configuration settings
- Lower screen shows dedicated loop's contribution to overall output

Valve testing module and manual control
- Straight forward fuel control valve stroking
- Straight forward fuel control valve stroke verification tests
- Auxiliary control testing
- Water wash testing
- Isochronous control
- Inlet guide vane control testing
- Starter testing
- Password protected user level access

Application control functions are selectable
- Customize each application individually by enabling or disabling site specific functionality (no programming)



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