Steam Turbine Control Application (STCA)

**Functionality and Capabilities**

**Steam Turbine Control Application**
- Selection of two or three speed probes
- Automatic fallback response to speed probe failure

**Predictive control response**
- Configurable setpoint and process variable
- Predictive response to avoid overspeed upon sudden driven load changes

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

**Actuator output**
- Linearization of actuator output
- Valve actual position deviation alarming (if position feedback is available)

**Sequencing**
- Full automatic cold, warm and hot start of turbine
- Automatic start up timing based on running and shutdown timing
- Automatic warmup timing based on casing or flange temperatures
- Critical speed zone ramping and avoidance
- Loading and unloading of a compressor in conjunction with its companion performance and anti-surge controllers

**Set point mode selection**
- Internal setpoint
- Local setpoint
- Remote setpoint
- Cascade setpoint
- Analog, pushbuttons, serial link

**Overspeed prevention**
- Keep steam turbine speed at or below maximum operating speed using predictive control response or open loop response

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

**Overspeed testing**
- Fully automated overspeed testing
- Manual overspeed testing allowed
- Password protected

**Power generation control module**
- Droop and isochronous mode
- Integration with auto-synchronization device

**Calculated variables**
- Actual speed based on number of installed probes and functional probes

**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, \([x] \text{ minutes}^* \) prior and \([y] \text{ minutes}^* \) after the event
- In parallel to HMI or stand-alone

**Sequence of event history on control system hardware, time stamped**
- Standard \([x] \text{ points}^* \) history in parallel to HMI or stand alone

**First out monitoring**
- Indication of first signal causing the [turbine] trip

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**Renowned control solutions to the Oil & Gas, Chemical and Petrochemical industries worldwide**

The turbine governor control or Steam Turbine Control Application (STCA) developed by Control-Care enables fully automated speed control during normal operation as well as startup/shutdown speed control including critical speed avoidance. It provides a versatile and economical way to regulate your steam turbine’s speed or power, protects the turbine against overspeed damage and automatically sequences startups and shutdowns. The STCA is fully configurable to any industrial steam turbine and is typically integrated into the train control system. This integration results in improved train control system availability and reliability as well as in reduced system cost, because dedicated speed control processor, rack and power supply are not required.

The entire Control-Care turbine and compressor control scheme can include compressor antisurge (ACA) and performance (PCA) control, load-balancing optimization (SCA), compressor auxiliaries sequencing, parametric diagnostics and ESD system interfacing.
Steam Turbine Control Application (STCA) functionality and capabilities

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

Control valve testing module
- Straight forward control valve stroking
- Straight forward control valve stroke verification tests
- Password protected user level access

Overspeed testing module
- Simple procedure for overspeed validation and testing
- Password protected user level access

Turbine performance deviation alarming
- Expected and actual performance are compared and alarmed in case diverging

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

Cascade control
- Control of an alternate process variable using an independent set of tuning parameters

Extraction control module
- Extraction pressure/flow control
- HP Steam pressure control
- LP speed control
- HP & LP valve start-up sequencing

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