TSx

PROGRAMMABLE TURBOMACHINERY CONTROL SYSTEM

APPLICATION

The TSx is uniquely suited to meet the needs of critical turbomachinery control applications in oil and gas, power, refining, chemicals, or any other industry where unmatched performance and flexibility is demanded. The TSx architecture is completely scalable from the simplest single chassis systems to the most complex systems with up to sixteen chassis per node without any degradation in performance. It's a turbomachinery controller with 99.9999% reliability and an unheard of 5 millisecond scan rate (12 millisecond screw to screw) that's perfectly suited for any critical turbomachinery control application including:

- Gas Turbine or Steam Turbine
- Turbine Start-up & Sequencing
- Turbine Interlocks & Protection
- Turbine Speed Control
- Steam Extraction Control
- Gas Turbine Temperature Control
- Gas Turine Steam Injection Control (augmentation or abatement)
- MW Load Control (Generator Application)
- AVR Control (Generator Application)
- Auto-synchronisation (Generator Application)
- Anti-surge Control (Compressor Application)
- Performance Control (Compressor Application)
- Load Share Control (Compressor and Generator Application)
- Temperature Quench Control (Refrigeration Compressor Application)

Turbomachinery applications require a number of special types of I/O, such as pulse counters, LVDT interface, temperature inputs and various voltage interfaces. The TSx is able to interface with these I/O functions directly, eliminating interposing transducers that can create a single point of failure in some of the most important I/O loops of the control system.

TSx

PROGAMMABLE TURBOMACHINERY CONTROL SYSTEM

TSx OVERVIEW

The TSx employs a card-in-chassis arrangement with external termination assemblies. This arrangement provides the most concise and secure packaging possible. Removal and replacement of the I/O and processor modules can be accomplished without the risk of disturbing the field wiring. Chassis power is provided separately from the field power to assure that field faults will not affect operation of the logic system.

A hallmark of the TSx architecture is the ability to repair any redundant active component without interrupting the operation of the turbine or process.

In additon to being scalable, the TSx architecture is designed to support multiple architectures. That is, the TSx has the flexibility to be configured in a simplex configuration, a dual redundant configuration, TMR or a mix of any of these configurations. This feature allows the different controller configurations to be selected based on the integrity levels and availability needed for each application and thus enabling sharing a single set of spares for all configurations.

Key Features:

• Configurable Redundancy – Able to configure simplex or dual or TMR
• Simplex configuration meets SIL-2 ratings or Dual meets SIL-3 ratings
• High Speed Response Time (12msec)
• 1 msec SOE (Analog & Digital)
• Online Program and Configuration Changes
• Comprehensive diagnostics to ensure system integrity at all times
• Chassis Mounted Servo Controller Module
• Load sharing between redundant analog output legs
• True voted redundancy – not just a simple fail-over scheme
• High speed pulse input module – speed and acceleration updates every 1 ms
• Reverse rotation detection

SOFTWARE

The TSx comes with a fully integrated user-friendly suite of software applications specifically engineered to develop, deploy, commission and maintain your critical turbomachinery control application that includes:
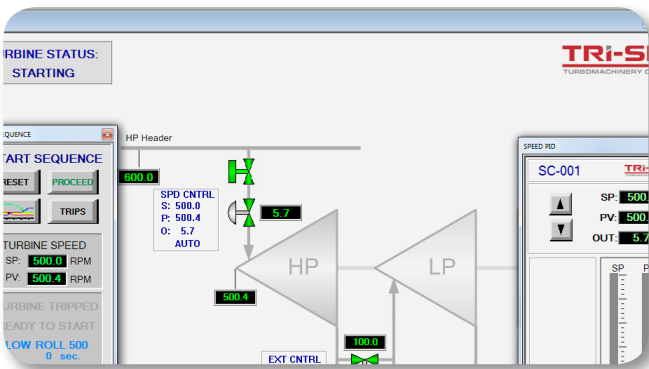
NetArrays

NetArrays is an easy-to-use IEC61131-3 compliant project program development tool that incorporates a comprehensive set of graphical objects that can perform any control task.
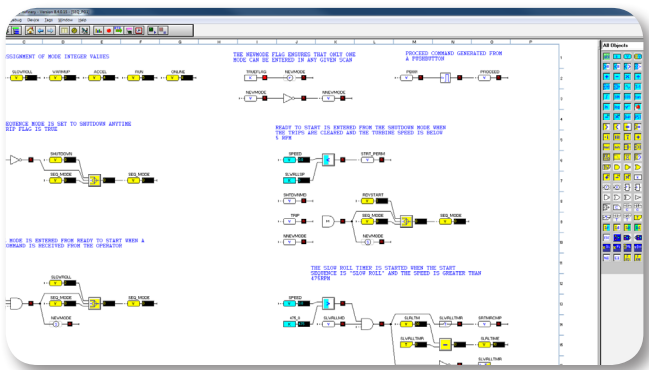

View

The TSx View application allows you to create and run your own custom Human-Machine Interface (HMI) to monitor and control your turbomachinery and auxilliaries. It's OPC-enabled allowing for easy connectivity to other devices or systems via OPC-DA

Trend

The Trend application graphically plots up to 10 traces of NetArrays data values. It has two distinct modes of operation: displaying real-time data (Live Data Mode) or displaing archival data from the alarm and data archive (Archive Data Mode).
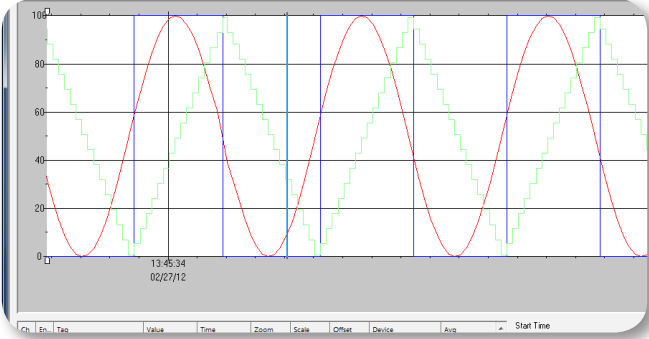
Project Tag Database Manager

The Project Tag Database Manager provides a central database for device configuration data and tags for applications involving single or multiple nodes. Its secure, redundant architecture ensures seamless integration throughout the suite of applications and eliminates the tag management hassle associated with system integration.

Alarm and Data Archive

The Alarm and Data Archive provides redundant alarm management, data archival, 1 ms resolution sequence of events and OPC-DA functions.

Communications

- **OPC-DA and A&E**
- **Modbus TCP/IP Master and Slave**
- **Modbus Serial Master and**

Certifications

- **IEC61508**
- **ISASecure**

Environmental

- **Operating Temperature: -20°C to +60°C (-4°to +140°F)**
- **Storage Temperature: -25°C to +85°C (-13°to +185°F)**
- **Humidity: 10% to 95% non-condensing**

I/O Modules

DI Module, 12-CH SIL-3, Supervised

DI Module, 32-CH SIL-2, Non-Isolated Single Ended

DO Module, 8-CH SIL-3, 20-140 VDC

DO Module, 8-CH SIL-3, 20-60 VDC Supervised

DO Module, 24-CH DC Voltage Sinking

DO Module, 24-CH DC Voltage Sourcing

DO Module, 16-CH SIL-3 Supervised

DO Module, 24-CH SIL-2 Supervised

RO Module, 12-CH SIL-3 24-Volt AC/DC

RO Module, 12-CH SIL-3 120 Volt AC

RO Module, 24-CH Maximum Load: 1 A per channel

AI Module, 8-Ch SIL-2, Isolated Low-Level (0 to ±160 mV)

AI Module, 8-CH SIL-2, Isolated Current Input

AI Module, 32-CH SIL-2, Non-Isolated Single Ended

THCO Module, 8-CH SIL-2, 0 to ± 78.125 mV

RTD Module, 8-CH 3/4-wire connected, 1KHz scan rate

AO Module, 4-CH SIL-3, Isolated Voltage Output

AO Module, 4-CH SIL-3, Isolated Current Output

AO Module, 16-CH SIL-2, Voltage Output

AO Module, 16-CH SIL-2, Current Output

Servo Module, 2-CH, ±160 mA AO, w/ 8-CH Isolated DI

PI Module, 8-CH SIL-2, 30KHz, w/ 8-CH DI, 8-CH Supervised DO

DIMENSIONS

19z.5"W x 11.3"H x 11.3"D (500 x 287 x 287 mm)

19.50"

11.3"

TRi-SEN **TS**x

18.50"

11.30"