



RTP3000 TAS

Control for Rotating Machinery

Summary

The RTP 3000 offers integrated solutions for the control of rotating machinery.

By integrating the functions of overspeed control and servo control with the industry leading speed of the RTP controllers, the user is able to provide tighter control of rotating machinery and the integration of all operational information in one control system.

With one device to mount and wire, the RTP solution provides a cost-effective solution that conserves valuable panel space and provides world class control of rotating machinery.

Overview

The RTP 3000 is a fault-tolerant scalable control system that, due to its unique architecture, can be used in various applications in a process facility.

Configurable Redundancy

The RTP 3000 is available in simplex, dual triple, or quad modular redundant configurations allowing the system to be configured for maximum availability, for minimum cost, or for any combination of the two desired.

Any node can be scaled from a small simplex system with a few I/O points to a multi-chassis triplicated system with 10,000 I/O or more. This assures that the RTP 3000 can be used for all rotating machinery applications.

In any event, the advanced diagnostics of the RTP 3000 assure the user of a fault-tolerant design that allows for hot swap of all system components.

I/O points can be configured to be redundant or triplicated using RTP's unique Signal Validation routines. RTP is the only supplier of TMR control systems that allows users to configure I/O point redundancy on a point-by-point basis without having to specify special redundant or triplicated

Benefits

- Integrated rotating machinery control includes:
 - Independent Overspeed Trip
 - Integrated Servo control with LVDT feedback
- Up to 99.9999% Availability
- Fully redundant or TMR configurations available for increased availability.
- Fastest Scan Speed enables:
 - Ability to Integrate Surge Control Algorithms
 - Tightest control of speed under changing load conditions
- Lowest Installed Cost
- SIL rated solutions available
- NetSuite software provides advanced monitoring and alarming capabilities

modules. Thus, a critical thermocouple input can be triplicated while other, less critical temperature inputs can remain simplex.

High Speed

The RTP 3000's multiprocessor architecture assures maximum speed by utilizing a parallel processing architecture that, in its ultimate configuration, provides 105 microprocessors working simultaneously to provide the fastest possible throughput.

Ease of Configuration

The 3000 is configured using RTP's NetArrays configurator. NetArrays is an IEC61131-3 qualified configuration program using all 61131-3 languages. NetArrays also provides Fuzzy Logic and C++ support.

In addition to NetArrays, NetSuite, RTP's comprehensive software package, provides the fastest alarming and data archiving package in the industry, a change tracking system, an HMI package, a trending and report generation package,

and OPC client and server applications for communications with foreign devices.

All these applications are provided to the user in one comprehensive site license which supports unlimited installs, unlimited tags, and requires no dongles or other copy protection.

Redundancy is implemented transparently. The user completes logic configuration without regard to the level of redundancy. When the program is downloaded, the redundant controllers manage all necessary configuration.

Intelligent High Speed Counter – Overspeed Trip

The RTP High Speed Counter Module (HSCM) provides significant advantages when used on rotating machinery applications.

The module provides eight (8) independent input channels, each of which can be configured as pulse counters, frequency counters, or quadrature input channels. The inputs can be configured for pulses up to 501 Kilohertz.

The module also provides eight (8) digital output channels.

The HSCM can be configured to run its own NetArrays program. Since it runs independently of the 3000-node processor, in this configuration the HSCM can be used as an independent overspeed trip device in compliance with API requirements. Running its local program, the HSCM exhibits a scan time of less than 1millisecond. This speed ensures that the HSCM will stop the overspeed machine quickly preventing damage to the machine or to the equipment associated with it.

Even in this local control mode, all the I/O information obtained by the HSCM is accessible to the 3000-node controller. Therefore, speed control can be accomplished in the node controller while the HSCM serves as an overspeed protection device. Even if the 3000 should cease operation, the HSCM would continue to provide overspeed protection.

Intelligent Servo Control

The second special purpose module that becomes part of RTP's rotating machinery solution is an intelligent servo module (SCM).

A LVDT/Servo module was also created to meet the needs of rotating machinery applications. The module contains two (2) LVDT inputs, two (2) Servo outputs, and four (4) digital inputs. Each servo output has a current range of $\pm 100\text{ma}$.

Like the HSCM Speed Input Module, the Servo Control Module can be used in local control mode by downloading a program from the 3000 to the Servo Control Module.

In this case, local control mode would allow the servo loop to be closed in about 1 millisecond. The four digital inputs could be used as digital inputs to increase/decrease the speed of the servo. As with the speed control module, module, even in local control mode, input and output values are available to the 3000 node controller.

Surge Control

The speed of the RTP3000 solution allows for surge control algorithms to be implemented in the control system to provide maximum safety and efficiency of compressors being controlled.

One System – Every Application

The RTP 3000 can be used as a DCS, as a Safety and Critical Control System, as a PLC, and as a controller for rotating machinery.

That means that one control system working on one redundant network programmed using one skill set can meet all the control needs of a process facility, minimizing spare parts and training while optimizing uptime and productivity. And remember, there are no software or hardware keys and free upgrades or enhancements are included with the modest registration fee.

RTP – The answer for all your control needs.

Specifications

Processor	Intel Atom Z520PT @1.33GHz 2 Isolated 1000BaseT PCIe based Ethernet Channels System Controller Hub WITH 512Mbyte SDRAM 64bits wide, 32MByte Flash Memory
Sequence of Events	1-millisecond SOE processing (analog and digital) Stores up to 300,000 events
Operating Temperatures	-20C to 60C (-4F to +140F)
AC Input Options	4A @120/240VAC, 47-63Hz (External 24 VDC input available for I/O cards)
DC Input Options	10A @24 VDC, 5A @48VDC
Chassis Dimensions:	
6 slot chassis	Height: 11.3 inches (28.7cm), Width: 7.625 inches (19.37 cm), Depth: 11.3 inches (28.7 cm)
11 slot chassis	Height: 11.3 inches (28.7cm), Width: 11.382 inches (28.91 cm), Depth: 11.3 inches (28.7 cm)
15 & 19 slot chassis	Height: 11.3 inches (28.7cm), Width: 19 inches (48.3 cm), Depth: 11.3 inches (28.7 cm)

An independent OEM using a standard program performed throughput tests on several standard turbine control engines. The results are shown in Table 1 as Screw-to-Screw Timing.

Manufacturer	Withheld	Withheld	RTP
Market Distribution	Largest independent supplier of TMC in the world	Best selling PLC in the US	Fastest, highest availability, highest integrity system made in the world.
Original Design	Purpose built for control of rotating machinery	General purpose PLC adapted to turbine control	High speed, critical control DCS System
Proprietary Platform	Yes	Yes	No
Processors	Simplex, Redundant or TMR	Simplex or Redundant	Simplex, Redundant, TMR, Quad
User Defined Logic Blocks	No	Yes	Yes
Fastest Scan Rate	5msec	5msec Simplex/ 50msec Redundant	1ms
Screw to Screw Timing	40msec	60msec	5msec

Table 1 – Rotating Machinery Control Systems