



## RTP Safety Solutions for the Refining Industry

### Application

Safety System for Gas Fired Process Heaters

### Benefits

- ◆ SIL-3 Certified, ISA84 Compliant
- ◆ Low Cost Packaged Fired Heater Safety System
- ◆ Easy to Implement
- ◆ High Availability
- ◆ High Integrity
- ◆ Maintainable and Modifiable On-Line
- ◆ Can be Customized and Expanded for specific needs

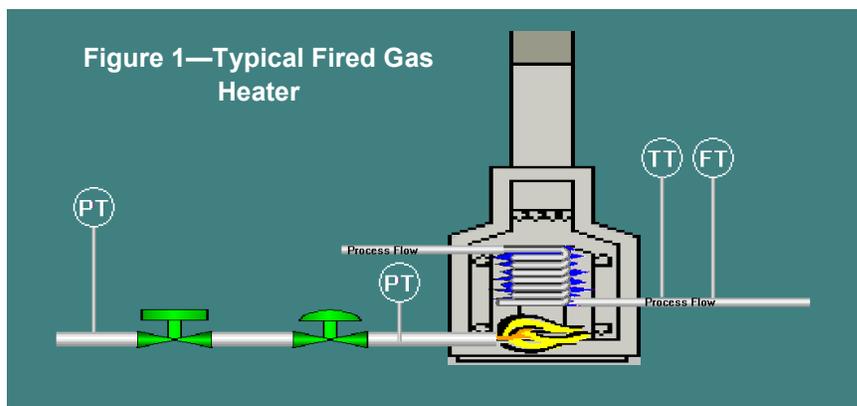
### Overview

Fired gas process heaters are utilized extensively in the refining and chemical industries. They are used to heat process fluids to enable flow and to reduce process fluctuations.

While these heaters are process critical, they can also be the source of serious safety issues if proper control is lost. It is important that the heater be taken to a safe state when necessary, but, for productivity reasons, it is also important that it not suffer false trips. A typical gas fired process heater would resemble that shown in Figure 1.

Many of these heaters are currently protected by systems that were installed prior to the adoption of ISA84. In these cases, HazOps should be conducted to ensure the protection systems are adequate.

RTP has developed a packaged solution for this application. The RTP Process Heater Safety System meets IEC61508 and ISA84 standards for such systems. It provides a cost effective, easy to implement solution for the protection of these process critical systems that reduces both cost and implementation time.



## 2500 Controller Family

RTP offers a complete family of high-integrity Safety Instrumented Systems, all following the standards of IEC61508. For the highest level of integrity and availability, the 2500-T Triple Modular Redundant System features 2oo3D voting with triple, dual, or simplex I/O to obtain the required SIL rating.

The 2500-D Safety Instrumented System is built on the same advanced technology as the 2500-T, for dual redundant 1oo2D solution. The 1oo2D voting uses advanced diagnostics to assist in results adjudication. According to IEC61508, 1oo2D systems can achieve the same the same SIL rating as 2oo3D systems. The 2500D features dual-redundant processors with triple, dual, or simplex I/O as required.

When processor redundancy is not a requirement, the 2500-S Single processor configuration provides integrity and availability that exceeds that of competing single systems. With its built-in data validation schemes and redundant host communications, secure measurement and control are achieved.

The 2500-T, 2500-D, and 2500-S support up to 32 chassis of I/O providing high availability systems with I/O counts as large as 10,000 I/O.

## RTP Corp.

1834 SW 2nd Street  
Pompano Beach, FL  
33069

## Phone

954/974-5500

## Fax

954/975-9815

## E-mail

rtpinfo@rtpcorp.com

## Web

www.rtpcorp.com

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## SIF's Implemented

The RTP Fired Gas Heater Safety System implements four or five Safety Instrumented Functions (SIFs) as standard.

- ◇ High pressure reported by the Pressure Transmitter in the main gas line before the block valve indicates an error in the gas line that could cause the process liquid to overheat or result in damage to the firebox.
- ◇ Low pressure reported by the Pressure Transmitter between the control valve and the burner would indicate a loss of sufficient pressure to insure safe operation of the burner.
- ◇ High temperature reported by the temperature transmitter indicates a fault in control of the burner by the control valve or a lack of process flow.
- ◇ Lack of flow reported by the flow transmitter would indicate an absence of fluid in the tubes. Continued operation in this event could result in damage to the heater or overheating of the process fluid.
- ◇ An optional analyzer might be installed in the exhaust stack. If so, indications of improper combustion could cause the

heater to shut down.

In the event that any of the above conditions occurs, the heater would be taken to a safe state by the RTP safety system.

The safe state would generally be to shut the burner down.

Other configurations and additional SIFs can also be accommodated within the RTP Process Heater Safety System.

## Hardware Configuration

The RTP Process Heater Safety System is a SIL-3 rated safety system consisting of redundant RTP 2500 controllers with 1 millisecond SOE (sequence of events) capability. The base system has eight redundant analog inputs, sixteen redundant digital inputs, and eight redundant digital outputs. It can also be furnished in a full TMR configuration.

## Connectivity

The RTP Process Heater Safety System can communicate with existing DCS systems either through the included OPC client and server applications or via an optional Modbus or Modbus/TCP connection.

## About RTP

Founded in 1968, RTP Corp. is a developer and manufacturer of high-performance critical control and safety systems. Markets for RTP Corporation's products include process control and safety systems, and nuclear power plant systems. RTP offers a wide range of rugged hardware and a complete suite of software for industrial control solutions that include seamlessly redundant and triplicated systems for mission-critical applications.