Chapter 1.
General Information

Description

The ProTech-GII is an overspeed safety device designed to safely shut down steam, gas, and hydro turbines of all sizes upon sensing an overspeed or over-acceleration event. This device accurately monitors turbine rotor speed and acceleration via active or passive MPUs (magnetic pickups) and issues a shutdown command to the turbine's trip valve(s) or corresponding trip system.

The ProTech-GII consists of three independent modules whose trip outputs, dependent upon model used, are either independent or voted in a 2-out-of-3 configuration. An isolated bus architecture is used to share all inputs and latch status information between the three modules. Optionally each ProTech-GII module can be configured to use only its sensed "local" input signals or the voted result of all three modules' signals in its event latch decision logic. Optionally module trip and alarm latch statuses can also be configured to be shared with all other modules.

The ProTech-GII includes Overspeed and Over-acceleration functions as well as time stamped Alarm, and Trip logs. Indication that a test was active at the time of the event is provided on all logs and first-out indications are provided for Trip logs. The ProTech-GII also provides various pre-defined test routines including an automated periodic test routine to assist users with verifying system operation.

There are several ways to interface with the ProTech-GII. The front panel allows the user to view current values, and to perform configuration and test functions. All of the features and most of the information available from the front panel are also accessible via the Modbus interface. Finally, the Programming and Configuration Tool (PCT) is software that is run on a PC to download log files and manage settings files.

This product is designed for critical applications and when installed correctly complies with standards API-670, API-612, API-611, and IEC61508 (SIL-3).

The following table shows the various hardware configurations (mounting options, power supplies, and trip relay options) available:

Part Number	Description
8237-1594	ProTech-GII—Bulkhead Mount, HV/LV, Ind Relay, Voted Inputs
8237-1598	ProTech-GII—Panel Mount, HV/LV, Ind Relay, Voted Inputs
8237-1595	ProTech-GII—Bulkhead Mount, HV/HV, Ind Relay, Voted Inputs
8237-1599	ProTech-GII—Panel Mount, HV/HV, Ind Relay, Voted Inputs
8237-1596	ProTech-GII—Bulkhead Mount, HV/LV, Voted Relays, Voted Inputs
8237-1600	ProTech-GII—Panel Mount, HV/LV, Voted Relays, Voted Inputs
8237-1597	ProTech-GII—Bulkhead Mount, HV/HV, Voted Relays, Voted Inputs
8237-1601	ProTech-GII—Panel Mount, HV/HV, Voted Relays, Voted Inputs
8237-1656	ProTech-GII—Bulkhead Mount, HV/HV, Voted Relays, Voted Inputs – Limited Functions
8237-1660	ProTech-GII—Panel Mount, HV/HV, Voted Relays, Voted Inputs – Limited Functions
5437-1126	Spare Module for 8237-1594, 8237-1598
5437-1127	Spare Module for 8237-1595, 8237-1599
5437-1124	Spare Module for 8237-1596, 8237-1600
5437-1125	Spare Module for 8237-1597, 8237-1601

Table 1-1. Available ProTech-GII Models

Applications

The ProTech-GII is designed to be applied as an overspeed device for any size steam, gas, or hydro turbine, reciprocating engine, or plant process equipment. The device's fast response time (8–26 milliseconds depending on model and configuration), 0.5 to 32 000 rpm speed range, and integrated overspeed and acceleration detection/protection functionality, make it ideal for application on critical low-speed or high-speed rotating motors, compressors, turbines or engines. This device accepts one speed (MPU or PROX) input per module (3 total). In addition to the trip relay outputs, each ProTech-GII module provides one relay output that is dedicated to an alarm function (3 total) and one analog speed output (3 total).

The ProTech-GII utilizes a triple modular redundant architecture and 2-out-of-3 voting logic to accurately determine unsafe conditions and ensure that no single-point failure will affect system reliability or availability. With this design, failures in overspeed system components (switches, transducers, modules) are detected, annunciated, and allowed to be repaired or replaced while the monitored system continues to operate on-line. Optionally the ProTech-GII can be configured to share and vote on all speed inputs as required by the application, The ProTech-GII is designed for critical applications where both personnel safety and unit availability (operation run time) is a concern or necessity.

The ProTech-GII is certified as an IEC61508 SIL-3 (Safety Integrity Level 3) safety device and can be applied as a stand-alone IEC61508-based device or within an IEC61511-based plant safety system.
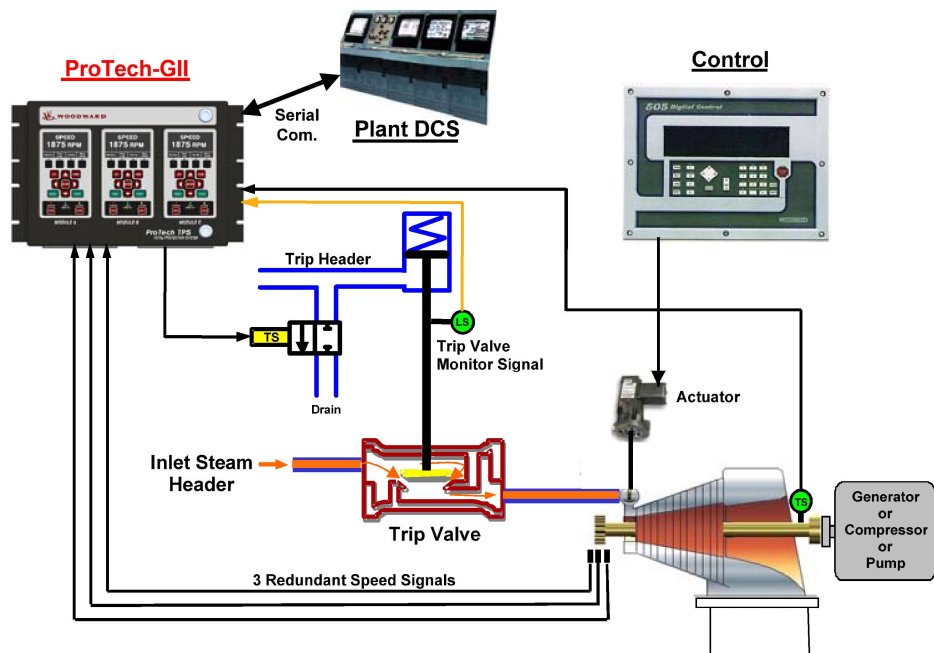
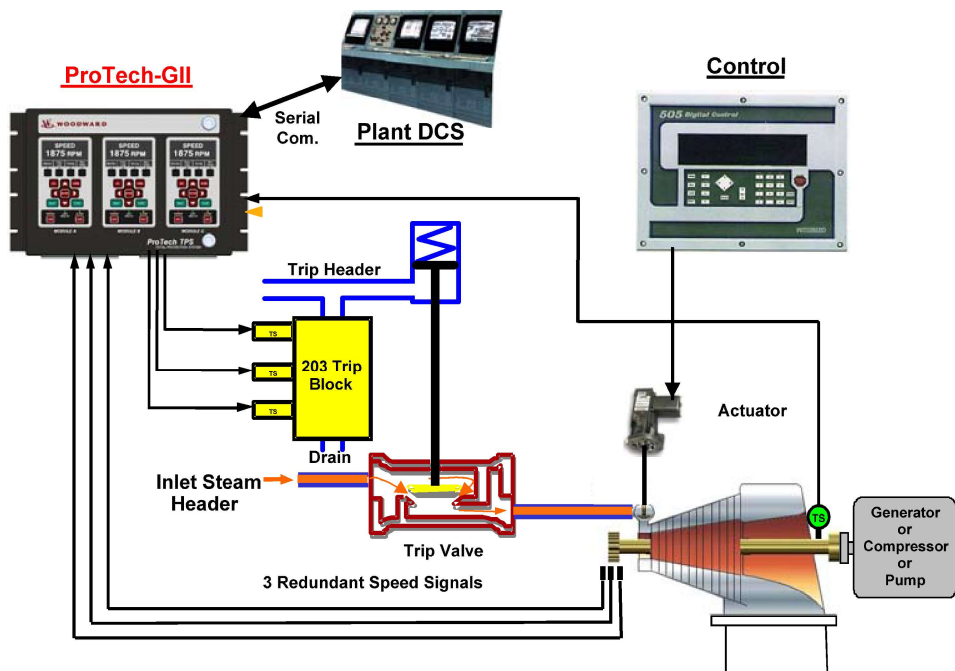Figure 1-1. Typical ProTech-GII Application (Voted Trip Relay Models)

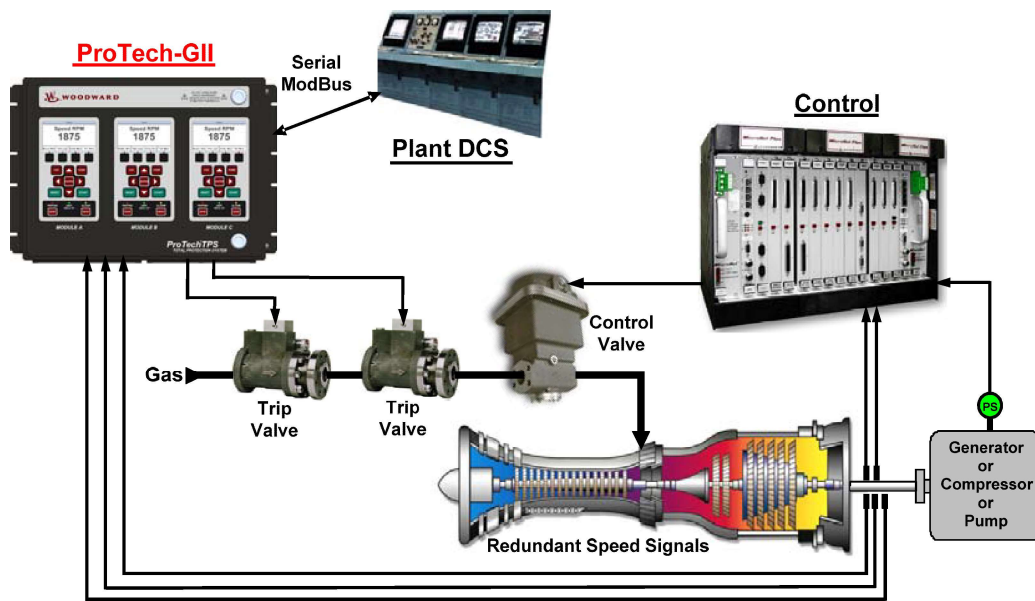Figure 1-2. Typical ProTech-GII Application (Independent Trip Relay Models)

Figure 1-3. Typical Gas Turbine Application (Voted Trip Relay Models)