



**GE Power Systems**  
Steam Turbine

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## Nonreturn Valve Trip Relay

### I. PURPOSE

For normal operation of a turbine equipped for extraction, the emergency trip system includes devices to ensure that the nonreturn valve(s) in the customer's lines which prevent reentry of steam from the extraction header are closed.

If these nonreturn valves are oil operated, the piping to them including pressure feed and return, involves a potential hazard since a leak adjacent to turbine parts normally at high temperatures may cause a fire. As a safety feature, the nonreturn valve(s) are operated by a fluid-trip valve which controls the air-operated mechanisms. Therefore, any leaks in the air pressure piping to the nonreturn valve(s) present no fire hazard. Also of course, there is no return oil problem since the air pressure can be dumped to atmosphere.

### II. DESIGN FEATURES

The trip relay located on either the hydraulic power unit or main oil tank contains a shaft which moves in response to fluid pressure on the piston. The shaft, sealed against leakages by a bellows, is keyed to prevent rotation.

A double-seated valve connected to the other end of the shaft opens the air supply to the nonreturn valve piping through chambers in both the support and valve body.

With no fluid pressure applied against the piston, a spring in the cylinder block closes the valve.

### III. OPERATION

To operate, it is necessary for the overspeed trip trigger to be in the reset position and for the customer's shutoff valve to this relay from his air supply to be open. When the turbine is operating, fluid pressure from the emergency trip header is automatically applied to the port leading to the piston and drives both the piston and valve forward to open the air supply to the nonreturn valves.

When fluid pressure is removed from the piston, the spring in the cylinder block returns the valve to the closed position and shuts off the air supply and dumps air pressure from the nonreturn valve(s) to atmosphere.

#### IV. MAINTENANCE

This relay does not require any lubrication.



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