



*GEK 19318
Reissue, January 1993
Reformatted, February 1999*

GE Power Systems
Steam Turbine

Low Bearing Pressure Trip Relay

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This publication was originally issued by the Medium Steam Turbine Department of the General Electric Company in Lynn, Massachusetts.

This, and all subsequent issues of this document, will be made under the responsibility of GE Power Generation in Schenectady, New York.

LOW BEARING PRESSURE TRIP RELAY

PURPOSE

The low bearing pressure trip relay controls the emergency trip header at its source-- the high-pressure hydraulic supply. If the bearing oil pressure drops below a preset value, the emergency trip header will be dumped to drain regardless of the state of the other components in the emergency trip system. This relay prevents a bearing failure in the event bearing oil pressure is lost by immediately shutting down the turbine.

DESIGN FEATURES

The relay consists of an operating piston (2, Figure 1) which senses bearing oil pressure. The piston transmits force through shaft (3), to which it is connected, to pilot valve piston (4). The pistons are spring loaded against the force of the bearing oil pressure by spring (5). Tension on the spring is adjusted by adjusting screw (6).

The pistons are housed in cylinder block (1) which has ports for hydraulic fluid and is bolted to a manifold in the dry compartment of the front standard.

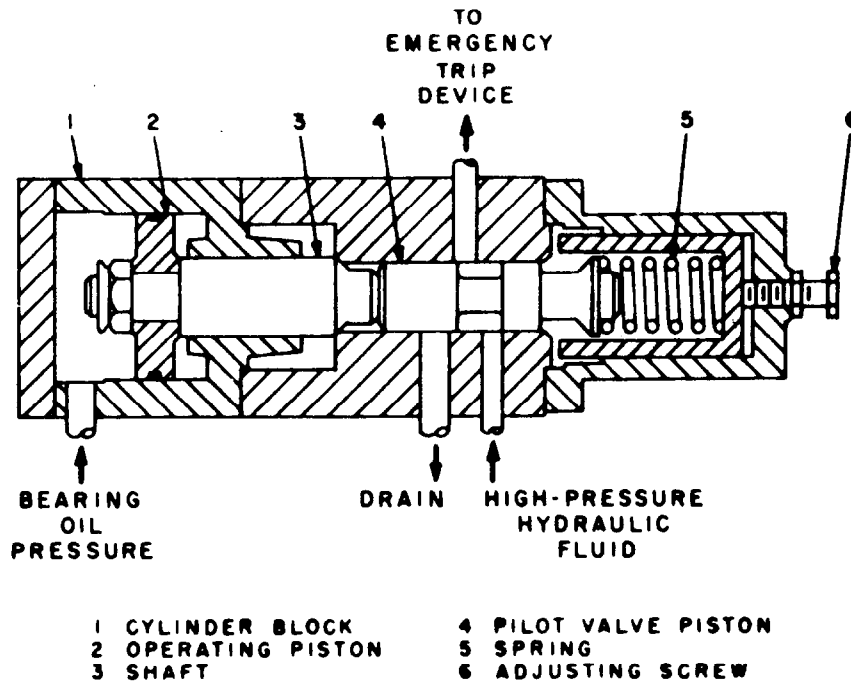


Fig. 1 - Low bearing pressure trip relay

OPERATION

Bearing oil is supplied to the end of operating piston (2). At normal bearing oil pressures, the force applied to the operating piston is sufficient to move it and pilot valve piston (4) to full stroke against the spring.

At this point, pilot valve piston (4) exposes a port in the pilot valve bushing and cylinder block to supply the high-pressure hydraulic fluid. Also opened is a second port which supplies fluid to the emergency trip device. The drain port is closed. With the relay in this position, the emergency trip header is maintained in the reset position.

When the bearing oil pressure drops below a value determined by the adjustment of screw (6), the spring moves the piston and pilot valve assembly in the opposite direction. This closes the high-pressure hydraulic fluid port, opens the drain port and thereby trips the high-pressure header supply to the emergency trip device and the turbine.

The relay will reset when the bearing oil pressure returns to the normal operating value.

ADJUSTMENT

The adjusting screw makes it possible to set the relay to trip and reset at a wide range of bearing oil pressures. The relay is set at the factory to trip at 8 psig and reset at 10.5 psig. This setting should be maintained in the field.



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