

# BYPASS RELAY

## FUNCTION

The bypass relay has the sole function of amplifying the force of the signal to the bypass valve (s). It takes the signal of the V-3 point on the control valve relay and increases the force sufficiently to operate the camshaft at the bypass valve(s).

positions the bypass valve(s). The lift of this relay is representative of the desired bypass flow.

The bypass valve(s) are to be opened when, due to limited turbine output, the steam flow into the turbine is held at a smaller magnitude than the steam generated by the reactor.

## CONSTRUCTION AND OPERATION (REFER TO FIG. 1)

The bypass relay is located in the turbine front standard. The relay is oil-opened and spring-closed, with the oil supply coming from vacuum trip No. 2. Thus, tripping of vacuum trip No. 2 will close the bypass relay. The bypass relay is a pilot valve (1) controlled and spring-closed hydraulic relay (2) which

As indicated in the description for the control valve relay, the position of the V-3 pilot valve of the control valve relay unit serves as an input signal to the bypass relay and, for this reason, the floating lever (3) of the bypass relay pilot valve is connected with the V-3 control valve relay pilot valve by a suitable linkage system. As long as the V-3 primary relay pilot valve is on port, the bypass relay is held at some minimum lift close to the point where the No. 1 bypass valve begins to open. As soon as the

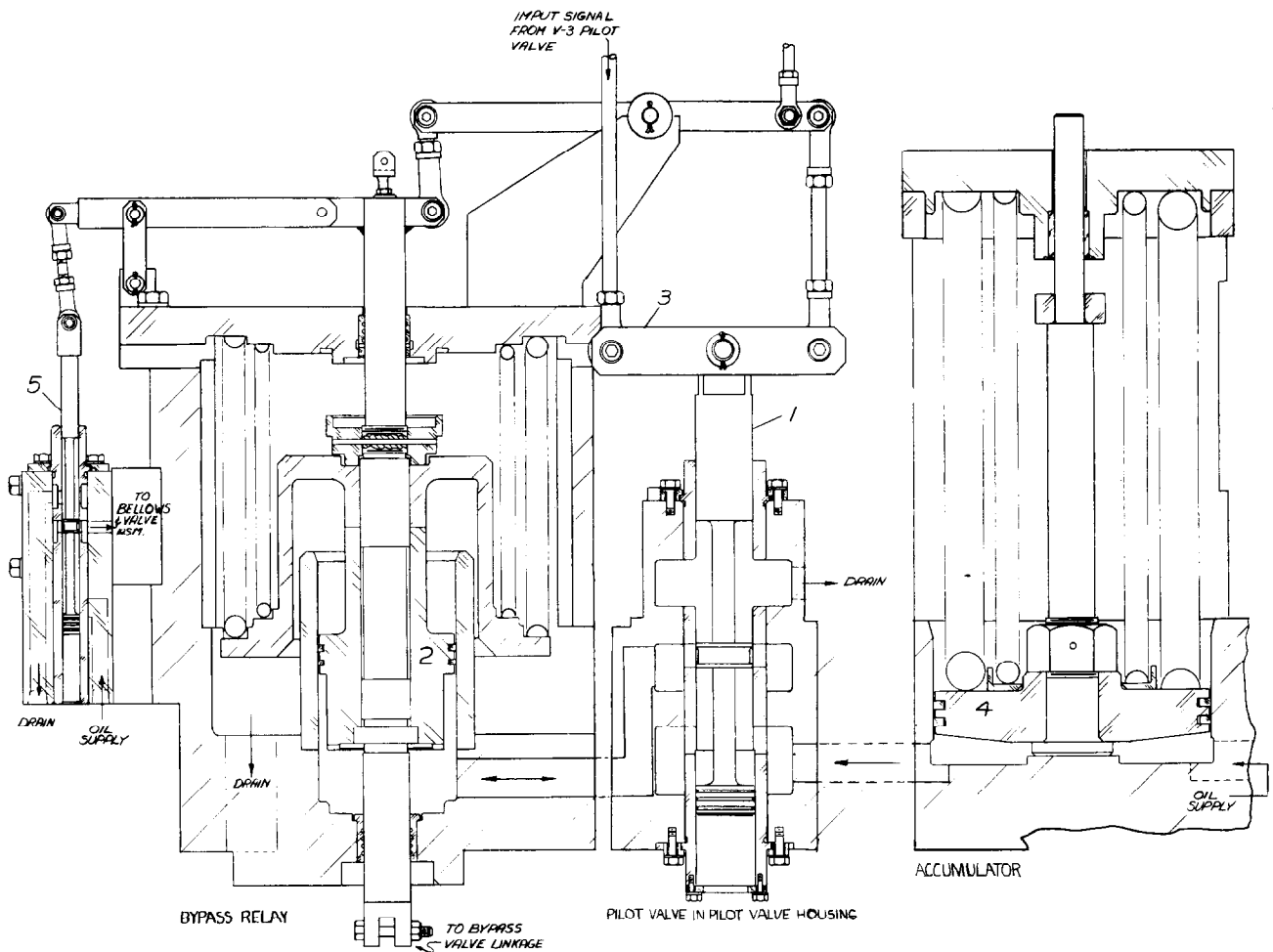


Fig. 1. Bypass relay assembly  
(Dwg 125C6369, rev. 0)

V-3 pilot valve moves into the open-end overtravel range, the bypass relay piston is lifted which, in turn, will open the bypass valve(s) in sequence.

Under steady-state conditions, the output of the bypass relay (2) always conforms to the V-3 signal generated by the V-3 pilot valve of the control valve relay unit.

In the event of a turbine-generator load rejection, the bypass relay (2) has to open fast, requiring a substantial flow of hydraulic fluid which is in excess of what the turbine shaft pump can supply. An accumulator (4) of the spring-loaded piston type is provided to supplement the oil supply during rapid opening of the bypass relay.

On the input side of the relay, between the V-3 point and the pilot valve, there is an adjustable lever which may be shortened or lengthened. This lever makes it possible to adjust the input to the bypass valves so that their characteristic almost exactly matches the characteristic of the control valves.

Attached to the side of the bypass relay casing is a pilot valve (5) which can hydraulically take the "Bellows and Valve Assembly" out of service. (This bellows and valve assembly is mounted on the primary control valve servomotor and is part of a feedback loop from the control valves to the force restored regulators.) Refer to "Forced Restored Regulators," Tab 10. This pilot valve is adjusted so that when the bypass valves just start to crack, oil is not supplied to the "Bellows and Valve Assembly" thus taking it out of service.

## ADJUSTMENTS AND MAINTENANCE

Adjustments will be made during test and initial operation and will not normally require further attention. The adjustable lever will be set at this time.

The other bearing and sliding surfaces inside the front standard housing are lubricated by hydraulic oil leakage in the immediate vicinity and require no further lubrication.

