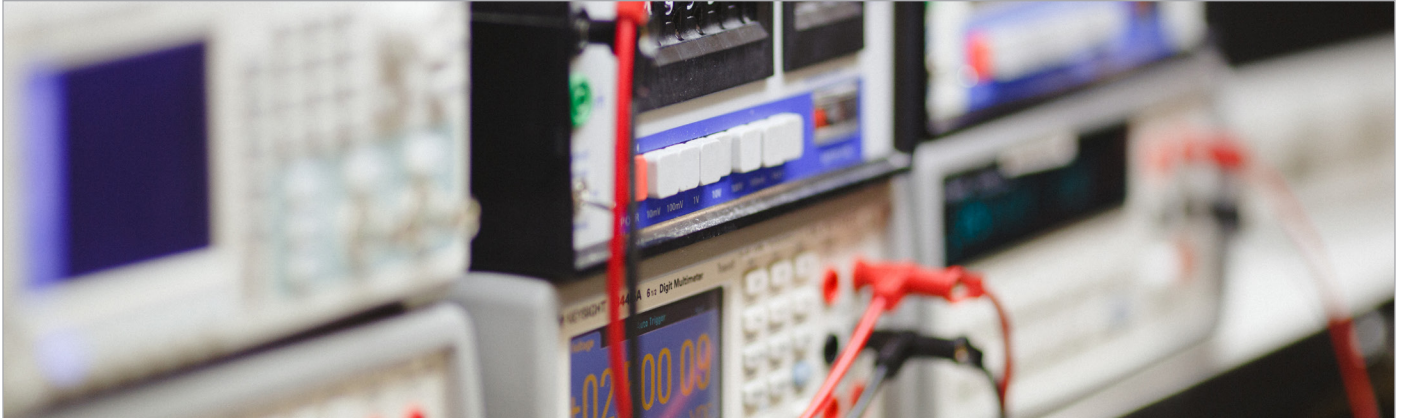


Reactor Protection System (RPS) Testing

Bypass Testing Instrumentation

**CURTISS -
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Nuclear Products and Services



RPS System Testing

Some plants perform Reactor Protection System (RPS) testing with the channel under test in a tripped condition, putting the RPS in a one-out-of-three logic state. Although this increases vulnerability to a single failure is of limited duration, many plants are now testing with the channel under test in a bypass condition, putting the RPS in a two-out-of-three logic state. The NRC has allowed testing in bypass for a limited time, since the increased risk to the plant is very small.

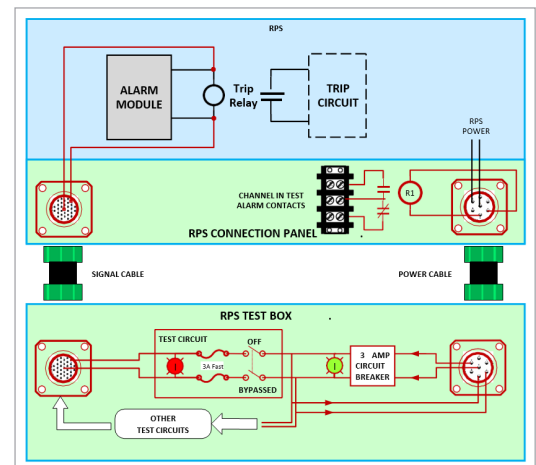
For plants that want to test in bypass, but do not have the installed equipment to do so, Curtiss-Wright has developed easily-installed hardware to facilitate bypass testing. The hardware consists of: 19" connector panels that mount in each protection channel cabinet; a test box that allows individual bypassing of up to ten trips in a single channel; and interconnecting cables. The connector panel is completely passive, and does not affect the operation of the RPS when the cables are disconnected.

As the sketch shows, when connected, RPS power is passed to the test box and, when a test switch is in BYPASS, the power is used to hold the associated trip relay in an energized position. Powering the box also energizes an alarm relay to alert the operator that a bypass condition may be initiated.

Once the cables are removed, there are no remaining components connected to the RPS trip circuit, so there is no safety concern.

Ginna's RPS has two trip circuits powered from a diverse AC source, so the test box shown to the right has two breakers – one for the first eight trip circuits, and one for the last two – and an extra power connector. Minor changes of this type can be easily accommodated.

The test box itself is a NEMA 3R 16 x 12 x 6" box, and the connection panel is a 1U (1.75") high 19" wide panel. The panel is seismically qualified by analysis for 2-over-1 concerns.



Example Implementation of RPS Test Box System



RPS Test Box

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