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## 900/910 Rapid Pressure Rise Relay Installation and Testing Instructions

### BACKGROUND

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The Qualitrol 900/910 Series Rapid Pressure Rise Relay (RPRR) is designed to respond only to rates of pressure change outside the safe limits determined by the transformer manufacturer. It will not respond to the normal pressure variations caused by temperature variation, vibration, mechanical shock, or pump surges.

The 900 Series is calibrated for mounting under oil and the 910 Series is designed for the gas space. Each Series offers separate models for vertical and horizontal mounting; the orientation of the included vent is critical and the mounting styles cannot be interchanged.

### INSTALLING THE RELAY

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Care should be taken to assure that the relay mounting is rigid; ideally, the tank should be reinforced near the RPRR. If the relay is mounted on an isolation valve, care should be taken to minimize the moment arm (distance from the tank wall to the base of the RPRR): this will minimize the risk of false operation due to vibration and shocks. Installed Rapid Pressure Rise Relays must not have natural frequencies of 50/60 Hz or multiples thereof when measured at the relay.

**The relay should never be left on the transformer with the shut-off valve closed.** If it is the practice of the transformer manufacturer to close this valve for shipment then the relay should be removed and re-mounted after the transformer is in place and filled with oil. Note also that closing the shut-off valve while the relay switch is connected to an energized breaker tripping circuit may cause unintentional tripping.

All relays mounted in the horizontal position must be installed with the electrical connector pointed straight down. On some terminal box models the bleed screw will then be located on the side rather than on the top as is customary. Note that the taper of the oil chamber in the housing facilitates the removal of air but that special models are available for those cases where a top bleed valve is required.

After installing the relay, open the shut-off valve and release any air trapped in the sensing chamber of the relay by cracking open the bleeder valve. Close the bleeder valve after the liquid has begun to flow.

A valve or tank opening of Ø2.00 to Ø2.40 inches is recommended. A mounting gasket is not supplied but for most models and applications a 3.50 inch OD by 2.50 inch ID by .187 thick, 70 durometer nitrile or Viton flat gasket is appropriate. The mounting gasket should be centered in the gasket recess. Gasket cement or similar adhesive is recommended. Tighten the bolts in an alternating pattern and repeat the pattern several times until the flange is seated to the mounting surface.

### FIELD TEST OPERATING SPECIFICATIONS

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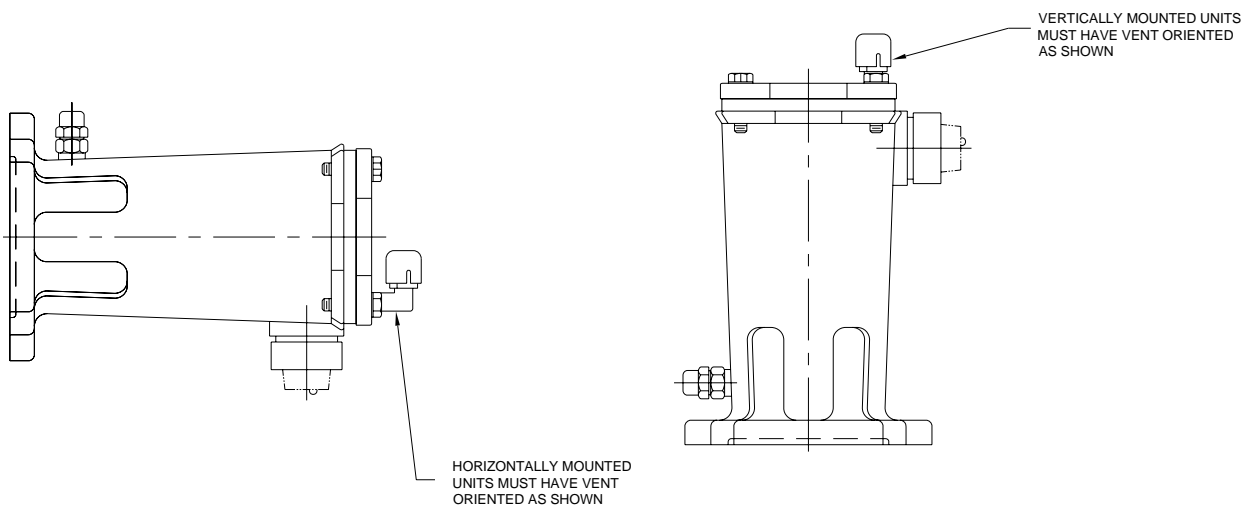
The 900/910 Series is calibrated at the factory to provide the response times given in PPS-9. The Relay is not designed for field calibration but an approximate test for proper calibration can be made either on the bench or after the Relay has been installed using KIT-013-1. The test requires removing the vent to pressurize the switch chamber of the Relay and **care must be taken to properly orient the vent when re-assembling** to horizontally mounted units (see illustration below).

The KIT test results are not a precise measurement of calibration but an approximate indication of Relay functionality. Frequency of testing varies greatly with criticality of application but once per year is typical. The test procedure is described in PPS-9. If the Relay does not operate within the range specified below, repeat the test with the pressure at the upper limit – this will help reduce false negatives due to gauge calibration and process errors. Make sure to wait at least 45 seconds after pressurizing the Relay for stabilization before releasing the pressure.

	Relay Operates	Relay Does Not Operate
<b>900 Series</b>	3.25 – 3.50 PSIG	1.25 – 1.50 PSIG
<b>910 Series</b>	2.50 – 2.75 PSIG	.75 – 1.00 PSIG

Note that these values have changed slightly several times since the introduction of the Relays owing to changes in the manufacturing process but that the calibration values themselves have not been altered.

IMPORTANT: WHEN TESTING IS COMPLETE REASSEMBLE THE VENT WITH PROPER ORIENTATION TO ASSURE WEATHERTIGHTNESS.



## APPLICATION RECOMMENDATIONS

Under certain conditions the Relay may respond to rapid rates of pressure rise which are not initiated by the transformer on which it's mounted. Through faults may generate pressure pulses by moving older, looser cores. A sufficiently large external shock to the Relay body may likewise trigger a response. While the sensitivity of the 900/910 Series Relays is not adjustable, the sensitivity of the 930 Series Electronic Pressure Monitor is and it should be considered for these applications.

Critical installations may require redundant relaying schemes to minimize the risk of false tripping due to the above conditions. Two-out-of-three logic can be employed with either the mechanical or electronic Relays.

High vibration installations (Reactors, older transformers) may also require the 930 Series Relays which have no moving parts at the sensor and are inherently more resistant to wear from vibration over time.