Condensation inside relays

Condensation inside relays is caused by temperature differences between the outside of the relay and the inside of the relay. The specific conditions at the location of the relay, like airflow or external heating sources, influence the occurrence of condensation. Therefore, there may be a difference in condensation between two relays mounted close to each other (one relay with and the other without condensation).

Condensation inside relays does not affect the performance. There will be no corrosion on the contacts and coil:

- Relay contacts are made of silver and are mechanically cleaned by contact wiping. This means the movement of opposing contacts when making contact: one of the contacts wipes over the other. This wiping action cleans the surface of both contacts which can be polluted with dust or other small particles. The result is good performance between two opposing contacts without interference due to polluted contacts.
- Contacts are also electrically cleaned during switching.
- Coil wire is protected with a varnish which protects the coil wires against external influences.

On all Mors Smitt relays humidity and salt mist tests have been performed by independent test agencies to verify correct working under these environmental conditions. Although during environmental tests condensation occurs inside the housing of the relay, all our relays have successfully passed the test, meaning that condensation does not affect the relay operation.

Besides the independent tests that prove the correct working of the Mors Smitt relays, heating of the relay due to activation of the coil will cause evaporation of condensation out of the relay. In other words, all condensation will disappear out of the relay.

Details of this process:
When air outside the relay has a lower humidity than inside, diffusion will cause moisture to move to the outside. Due to this process the inside of the relay dries up. This process is accelerated if the coil is powered and the relay warms up. This warming up of the relay creates an overpressure inside the relay that causes warm air (which has a higher absolute humidity) to be pushed outside. Since warm air is pushed outside the relay, an under pressure is created causing cool outside air (with lower humidity) to be sucked inside the relay, lowering the total level of humidity inside the relay. This mechanism, called breathing, will cause a situation in which no condensation exists.

Mors Smitt
A Wabtec Company