

DYNAMIC PORT® Oil Sensing Upgrade

Background

The oil level indicating system on Westinghouse reactor coolant pump (RCP) motors monitors the oil inventory within the bearing oil reservoir. The concept behind the original system used on the lower oil reservoir on RCP motors was a simple transference of oil level from inside the bearing oil reservoir to an alarm reservoir and sight glass that is external to the lower oil reservoir.

The alarm/sight glass assembly reports the same oil level that is occurring within the lower bearing reservoir. However, once the motor is energized, the motion of the oil within the lower reservoir makes the indicated level repeatable, but unpredictable. This unpredictability and apparent change in actual oil level is due to pressure changes occurring within the oil reservoir. Additionally, thermal and hydraulic conditions change as the oil heats up during operation, which causes further deviation of the dynamic oil level, when the motor is running, from the static oil level, when the motor is not running. The oil level may fluctuate due to these changing conditions, but the actual oil inventory within the lower bearing oil reservoir remains unchanged.

Description

Westinghouse has developed the DYNAMIC PORT® oil level sensor to provide the most accurate monitoring of oil inventory in the lower oil reservoir. The DYNAMIC PORT eliminates erroneous level indications in the oil level monitoring system by allowing the running oil level to be dynamically tuned back to the static fill level. The DYNAMIC PORT differs from the original oil level monitoring design by allowing the customer to calibrate the running oil level in the alarm/sight glass assembly without any disassembly once the plant has reached normal operating temperature and pressure. This permits a direct correlation between oil level and oil inventory.

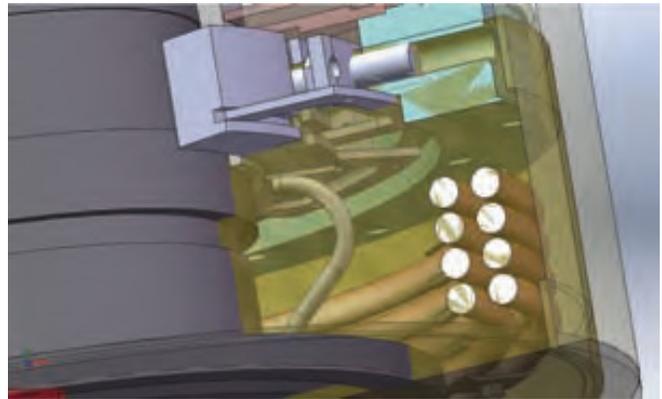
A modification to the oil pan and existing piping that interconnects the lower oil reservoir to the oil level alarm reservoir completes this upgrade. The DYNAMIC PORT allows the customer a quick and easy method to calibrate the dynamic pressures that cause oil level changes between static, motor-off conditions and dynamic, motor-on conditions.

Benefits

The addition of the DYNAMIC PORT does not significantly add to the overall mass of the oil pan, so the design loading and the seismic analysis of the motor are unaffected. The DYNAMIC PORT requires no disassembly of the oil reservoir for adjustments or cleaning.

Other advantages of the DYNAMIC PORT system include the following:

- Reduction in alarm response time relative to an increasing oil pot liquid level caused by a ruptured cooling coil.
- Reduction in alarm response time relative to oil loss.
- Elimination of oil level changes from the static fill position to the dynamic or running state of the motor.
- Elimination of superfluous oil level alarms.
- Facilitation in the proper filling of oil reservoirs.
- Elimination of oil vapor back-flow to alarm reservoir.
- Compensation for environmental variables, such as motor location.



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