

Poison Tank Ball Position Detector

The Sartrex Poison Tank Ball Position Detector uses a photoconductive cell detection system to monitor the level of fluid in liquid poison tanks of the Liquid Injection Shutdown System. The tanks contain high purity, oxygen free heavy water that is light straw in colour. Two light emitting diodes are screwed into the sides of the tanks, directly opposite each other. Normally a polyethylene ball, floating on the fluid, blocks the optical link between the two units. If the ball drops low enough, the photo-transistor in unit two sees the radiant output from unit one and triggers the alarm. A power failure can also trigger the alarm condition.

The photo-cell lamp unit consists of the emitter/detector on the right and the hermetically sealed window fitting.



A complete assembly consists of:

Window Fittings

Two window fittings, in hermetically sealed steel casings, are screwed into the sides of the poison tanks. No part of the fitting protrudes into the tank. The purchaser specifies the torque to ensure the pressure integrity of the fitting-boss. The purpose of the fittings is to provide a sealed, pressure resistant window for optical coupling with a complementary photocell-lamp unit.

Photocell-Lamp Units

Each unit consists of a photo-transistor, a lens and two light emitting diodes that are connected to transient suppression components. These components are soldered to a circular printed circuit board and are connected to a current limiting resistor. A hermetically sealed connector protects the resistor from possible fluid leakage and connects to a junction box. This box also houses the power supply, interconnections and six dual level detectors. The photocell-lamp unit operates in one of four modes: normal, alarm, test and repair.

Dual Level Detectors

The detectors keep track of the two photocell lamp units using the current relays. If the second lamp does not see the light of the first lamp the normally open relay remains open. However, if the second lamp does detect a light then the relay closes and triggers the alarm.