Hall Effect Liquid Level Sensing

Application Bulletin 212

Have you ever had a customer that wanted to sense a liquid level? One method would be to take advantage of Snell's Law and use an optical reflective device (See Application Bulletin 204). The IR light from the LED is reflected by a conical plastic or glass surface. However, when this reflecting surface is immersed in a liquid whose index of refraction matches the plastic or glass, it will not act as a good reflector. In some cases the liquid characteristics or the operating environment will not permit the use of optical sensing. An alternative is the Hall Effect sensor. Assuming the liquid is in a non-ferrous container, a small float and magnet would be placed in the liquid container as shown in Figure 1. The float must be constructed or constrained so the magnet patch will be known. An OH090U, OH180U or OH360U Hall Effect sensor would then be placed on the wall just outside the container. When the float with the magnet is close enough to the Hall Effect sensor, its output will change state.

The particular sensor used will be determined by several factors. The strength of the magnet and its distance from the Hall Effect sensor to the magnet are critical. The designer is faced with selecting a magnet, which is not affected by the liquid, and sizing the magnet to produce the needed flux density cost effectively. A common magnetic material to use is Alenco 8. A magnet of this material, which is .250 inch in diameter and 0.5 inches long, will produce a magnetic field of 500 gauss at a distance of about 0.1 inches. An oH360U will work in this field. The exact location at which the digital sensor will activate will vary with sensor sensitivity and will change along with the magnetic characteristics over temperature. The designer may want to include a means of adjusting the sensor position to move the trip point locations.

Hall Effect sensors are well suited for high temperature applications because they operate up to 150 degrees centigrade. They are also immune to dirt and other contamination if the electrical connections are protected. Also ambient light will not be a factor as it is with optical sensors.

Liquid level sensors are used in dishwashers, washing machines, the oil and gas industry, vending machines, medical equipment, and many other places.

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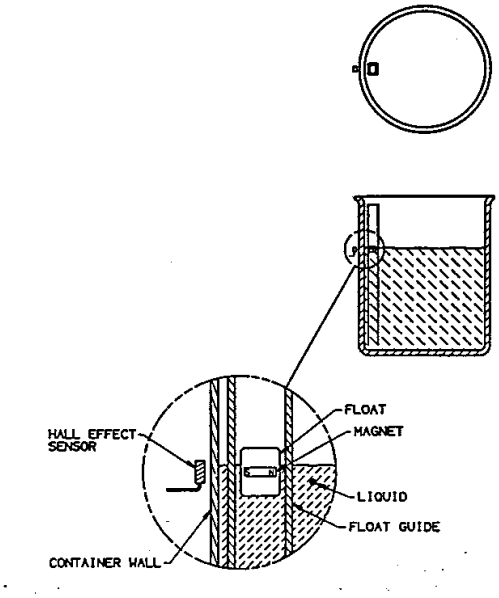

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