

No Power, No Problem. VLI's Keep Things On The Level

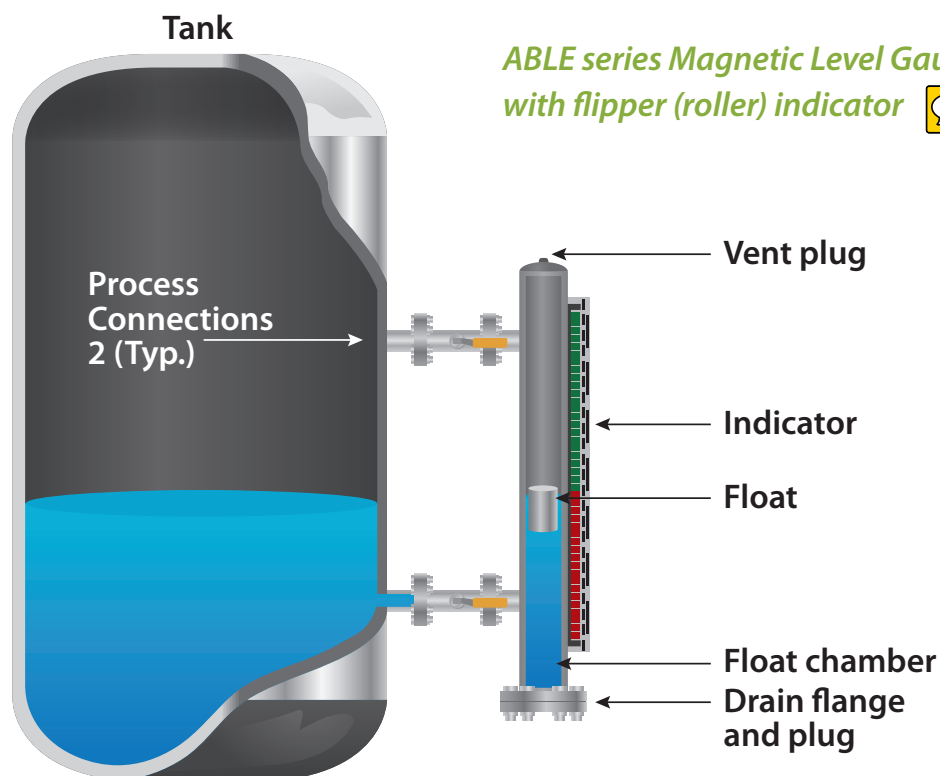
Using visual level indicators will allow processing plant operators to keep track of tank fill levels even in the case of an emergency power outage.

System failure strikes at a fuel processing plant! The process control system is temporarily out of order. Emergency power generators now have to ensure that there are no system outages and that no situations beyond the operator's control arise. Fill levels of diesel tanks have to be checked periodically and product transferred to another tank, if necessary. Suddenly, monitoring the fill level becomes one of the most important issues in the plant, requiring the full attention of the staff.

Energy free operation is one of the main features of visual level indicators (VLI), such as magnetic level gauges based on the float principle. Even in the case of a full scale power failure, the display works reliably, which is imperative for fluid handling operations. Similarly,

temporary power failures or power fluctuations do not affect the display. The most important controls, such as shut-off valves, can also be controlled manually despite comprehensive automation. However, under such circumstances the necessary information has to be available in order to be able to make use of such facilities.

Easy and intuitive readability is also an important factor. Fill level is directly and clearly visible on the VLI installed on the side of a storage tank. How big would a digital display have to be so it can be read from a distance of 50m, especially under reduced visibility conditions? Multicolour indicator rails that display different values for different media and locations make it possible for plant staff to read them even when working with multiple tanks.



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The speed and simplicity of the measurement in principle is another advantage. There are no runtime calculations, no conversions and no sensitive electronics. VLI systems facilitate simple installation, maintenance free operation under normal conditions and they can be checked by anyone. Their ruggedness is a major benefit in rough environments, which makes them suitable for use on submarines, ships, offshore platforms and refineries.

Due to a wide range of available materials for construction, from plastics to pure titanium, vacuums from >600 bar and fluid densities from 0.27g/cm³ can be displayed. A temperature range of -196°C to +400°C covers media such from LNG to steam.

Operating Principle

The VLI operating principle is based on the use of a permanent bar magnet system, which ensures the safe and reliable activation of visual indication elements (flags), switches, and transmitters, even when used on thick walled, high pressure indicator pipe. The magnetic guide tape is integrated within the indication rail to ensure the float bar magnet is always aligned like a compass needle to the polarised flags and switches. This ensures continuous reliability of the indicating switching and transmitter control functions.

Every flag of the indication rail is equipped with its own permanent magnet. Thus the indication flags magnetically interlock with each other and so are kept in a stable position. The guide tape further enhances performance through the magnetic damping effect that produces safe and reliable indication of liquid level, even under difficult applications with rapidly changing liquid levels and/or vibrations.



The low weight of the bar magnet permits the use of lightweight hermetically sealed floats. These compact floats ensure the highest possible diameter difference between float OD and tube ID – an important advantage when dirty or highly viscous liquids need to be measured. A short float design also often enables a larger indication range compared to competitive products.

Why no SIL?

All these features should allow VLI meters to reach a high safety integrity level (SIL) rating. However, these ratings only apply to electrical, electronic, and programmable electronic systems. Although VLI's include selective (magnet switch) or continuous electronic data logging (transducer), this is not sufficient for VLI's to receive a SIL rating. The electronic components in the indicators would be viable for certification and meet the associated requirements, but their function is, however, only established in combination with the float, which is a mechanical component.

Whilst SIL certification for a VLI would be inappropriate, as the electronic and mechanical components are not integrated, magnetic level gauging technology is one of the safest and reliable measurement systems available.

Experience is key

ABLE instruments has been providing magnetic level gauges to the process and research industries for over 30 years. All of the VLI products meet the market specified requirements regarding pressure vessels, hazardous environments and other specific standards, such as those dictated by shipbuilding and military applications.

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