

# Level Sensors For Overfill AST Protection

## Background

In the wake of the Buncefield disaster in the UK (December 2005), the various regulatory entities and standards organizations have been scrambling to upgrade recommended practices and procedures to minimize the risk for storage tank overflow and hopefully prevent a recurrence of this tragedy.

The API 2350 subcommittee is working on the final draft for the 4th edition of Overfill Protection for Storage Tanks in Petroleum Facilities which will be released in the summer of 2008. This new edition will probably be used as the basis for an ANSI standard, which will make it the de facto standard for most of the world.

It is anticipated that the new standard will require that all petroleum storage facilities be categorized based upon the type of product stored, and the way the tanks are filled. A Category 4 (worse case) facility would store gasoline, and delivery would be at very high flow rates from a pipeline. No matter what Category a facility falls under, one of the main lessons learned from Buncefield is that an overfill protection system must be tested routinely. The entire system, from the level sensors to the alarms, must have a testing methodology which is representative of an actual alarm condition.

As the industry's premier tank monitoring experts, OMNTEC is committed to keeping our clients current with the latest requirements, and to providing "best-in-class" solutions for all their tank monitoring requirements.

## Solution

One of the most important requirements for successful tank overfill protection is the selection of the proper sensor for the application. This is usually a function of the tank type, and the stored product.

There are 3 basic types of aboveground storage tanks; namely, a) fixed roof, b) internal floating roof, and c) external floating roof. Of course, there are many other types of vessels, and application specific requirements such as heating and refrigeration which must be considered when selecting the proper sensors for overfill protection. OMNTEC has developed state-of-the-art level sensors for these 3 basic tank types. For all of these, we offer both single and dual point (HI + HI-HI) variants although we almost always recommend a dual point system.

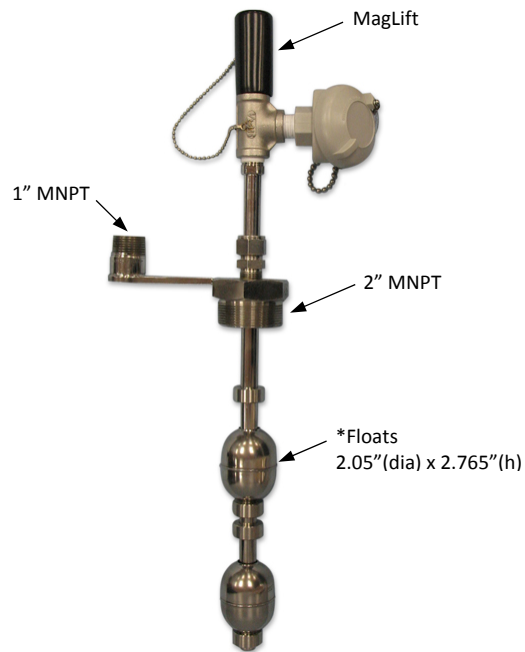
For *fixed roof tanks* (FRT's), the DuoCheck™ sensor is normally used. DuoCheck™ is a coaxial dual float switch which employs the MagLift™ pull-to-test mechanism. Many commercial level sensors feature a pull-to-test feature; however, many of these can provide misleading test results as the testing mechanism may transfer much more force to the sensor than its buoyancy can induce.

**Part Number:** **FI-NM-DC-M**  
(DuoCheck™)

**FI-NM-V2-M**  
(Versalevel™-02)

**8179802FP**  
(Versalevel™-X2)

**NOTE:** Single point sensors and numerous other types of level sensors are also available. Please consult factory for details.

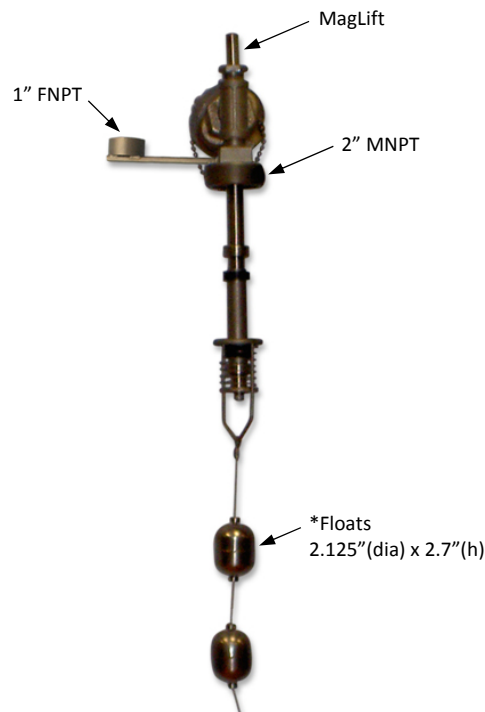


### DuoCheck™ Sensor

For fixed roof tanks (available in various lengths)

**Compatible Controller:** OEL8000II-W

**Required Accessories:** DC-TX-D1



### Versalevel™-02 Sensor

For internal floating roof tanks (available in various lengths)

**Compatible Controller:** OEL8000II-W

**Required Accessories:** DC-TX-D1

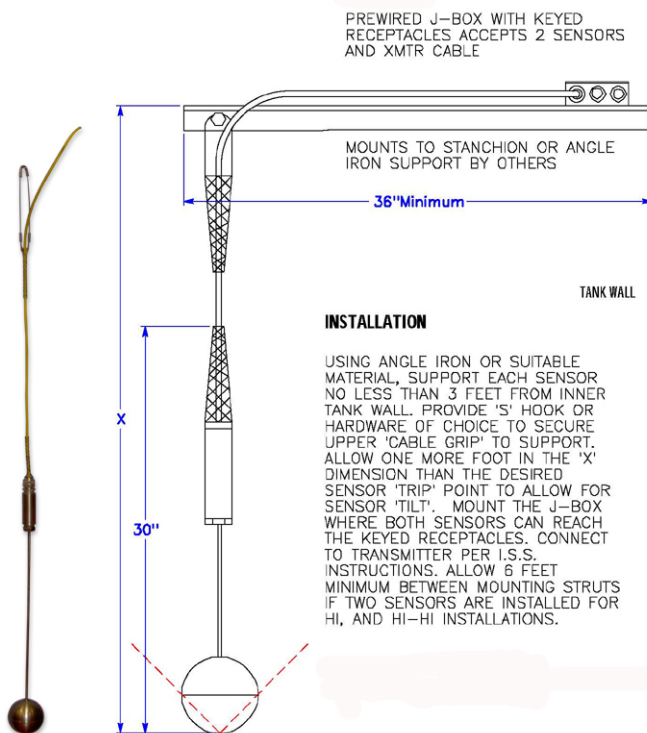
**\*IMPORTANT:** Be sure tank opening is greater than float diameter.

This may lead to temporarily freeing fouled sensors thus leading the operator to assume proper operation when in fact the sensor actually requires cleaning and maintenance.

The *MagLift™* mechanism is a magnetically coupled testing mechanism which can only transfer sufficient force to the sensor to successfully test it if it is not fouled. The diagram on the right shows the testing sequence for level sensors equipped with *MagLift™*.

For *internal floating roof (IFR)* tanks the Versalevel™-02 sensor is normally recommended. This is a dual displacer switch where the internal floating roof normally lifts the displacers sequentially (hi then hi-hi) to generate the alarms. As with the DuoCheck™ sensor, the Versalevel™ is tested using the *MagLift™* mechanism. Should the internal floating roof be sunk, or if product is on top of the roof, the displacers are sufficiently buoyant to activate the mechanism.

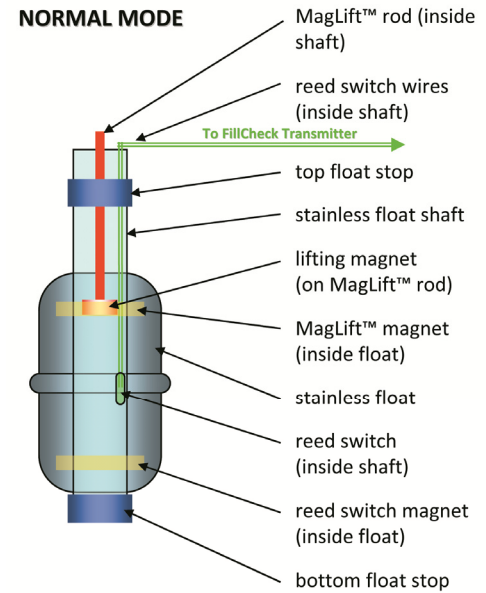
For *external floating roof (EFR)* tanks the Versalevel™-X sensor is normally recommended. In EFR tanks, wind, ice and snow prevent the use on displacer-type sensors; hence, the Versalevel™-X employs a heavy float on a rod containing an internal tilt switch. The float/rod assembly is suspended from the tank shell and must be tilted to a 45° angle to activate the alarm. As with the standard Versalevel™ sensor, the float on the Versalevel™-X is sufficiently buoyant so as to detect liquid if the roof has sunk or if water has accumulated on the roof. The Versalevel™-X is also useful for fixed roof tanks containing viscous, dirty, or sticky products. The Versalevel™-X is equipped with a pull-to-test lanyard which is attached to the bottom of the float/rod which tips the sensor up to an angle sufficient to activate the tilt switch.



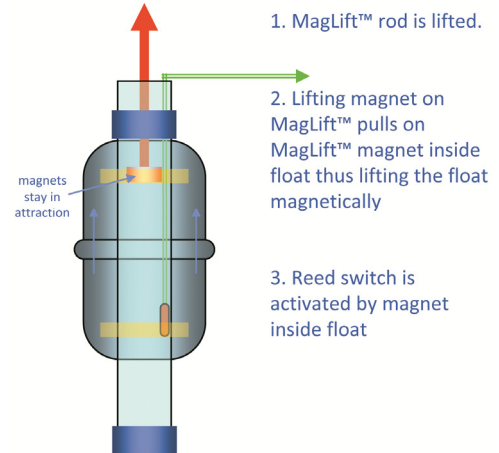
### Versalevel™-X

For external floating roof tanks  
Compatible Controller: OEL8000II-W  
Required Accessories: DC-TX-D1

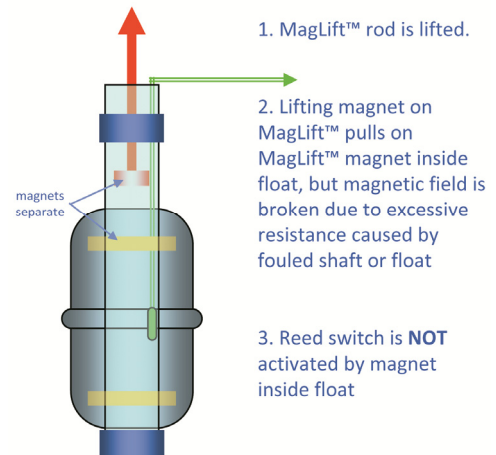
## MagLift™ Operating Principle



### SUCCESSFUL TEST



### FAILED TEST



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