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Tank Calibration Tips & Tricks

(Calibrating made easy)

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The accurate operation of Smartswitch Tank Control and Monitoring Systems requires the correct installation and calibration of the Smartswitch Sensors.

This document contains useful information and tips to ensure accuracy and safety in the operation of your vessels equipment.

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Tank Calibration Tip and Tricks

Calibrating made easy:



NOTE: Do not use this product with flexible or expanding tanks. Pressures or vacuums in these tanks will effect the accuracy of fluid level measuring within a tank.

The Smartswitch Solid State Pressure Sensor measures fluid levels from the pressure created by the weight of fluid within a tank at normal atmospheric air pressure. Pressure on the sensor is generated by the physical weight of the fluid in the tank however this pressure can be distorted by air pressure within the tank, either pressurised air or a vacuum. Please ensure your tank has a breather to enable the sensor to function correctly.



When fluid is pumped in or out the tank must be able to breathe freely via the vent line without restriction otherwise the accuracy of the sensor will be affected. The use of charcoal filters or undersize vent lines may cause this problem (see page 3 for recommended installation). Contact your dealer for advice on installation of the Sensor.

PLEASE NOTE: For sensor Model SEN-100 the maximum tank height is 1 Meter. For sensor Model SEN-250 the maximum tank height is 2.5 Meters. The maximum surge and safe pressure is 28psi.

Calibration of the sensor can be accomplished “off line” (as per fig.1 overleaf) if the tank depth is known. A fully calibrated sensor can be installed as the boat is available, this means the sensor can be set up at the workshop using a clear tube (fig.1.) then fitted to the boat tank later.

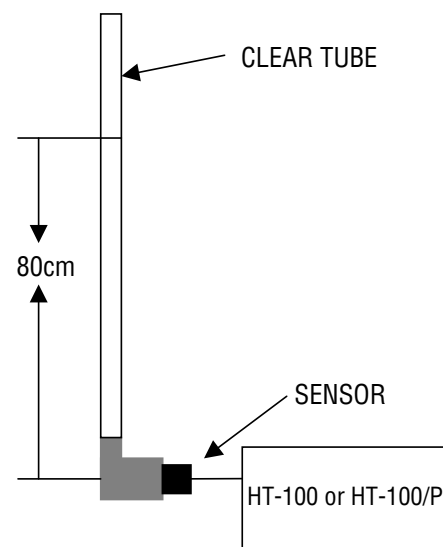


Fig 1.

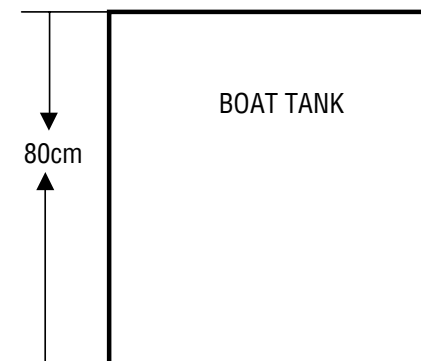


Fig 2.

METHOD: Connect a tube to a standard 3/4” BSP fitting as per fig.1 Pour a small amount of fluid into the tube (just enough to cover the sensor and start the calibration as per the manual setting the low point.

Now fill the tube to the height of the boat tank. For example, if the boat tank as shown below in fig. 2 is 80cm high then fill the tube to 80cm and finish the calibration as per the manual.



NOTE: Diesel and water are different weights therefore either calculate the difference using the method below, or use the actual fluid the tank is being calibrated for.

Diesel fuel weighs 83.3% per volume of water. Therefore, if calibrating for fuel but using water, a factor of 16.7% needs to be deducted from the water level height to provide proper calibration. Using the above example, an 80cm fuel tank would be calibrated as “full” using 66.6cm of water in the tube. ($80\text{cm} \times 0.833 = 66.6\text{cm}$)

Tank Calibration Tip and Tricks

Do's and Don'ts:

The Smartswitch Sensor may be fitted in a variety of ways including top mount, side wall, or pipe fitted. A range of fittings are available from your local dealer.

AD-100	Side Wall Adaptor for 3/4" sensor	AD-104	2" Pipe Adaptor for 3/4" sensor
AD-101	Top Mount Adaptor for 3/4" sensor	AD-105	1.5" Pipe Adaptor for 3/4" sensor
AD-102	Drain Valve Adaptor for 3/4" sensor	AD-106	Wet area kit
AD-103	3" Pipe Adaptor for 3/4" sensor		

We recommend fitting a valve between the tank and the sensor as below (fig 4). This is recommended for easy removal of the sensor during maintenance.

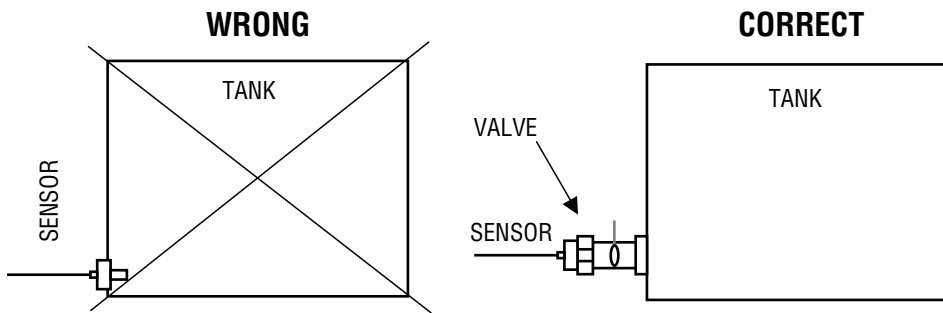


Fig 3.

Fig 4.

If calibrating with the sensor in the tank, please ensure you fill only to the top of the tank.

DO NOT allow fluid to fill the breather/overflow pipe (fig 5) as the system will see this as part of the tank and give incorrect readings.

Fig 5.

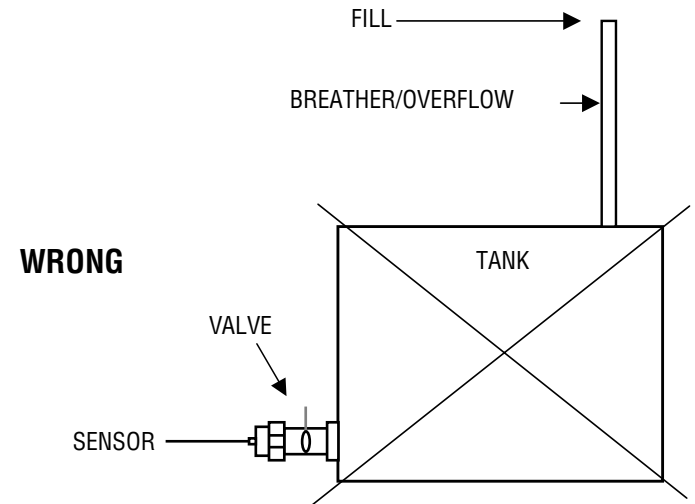
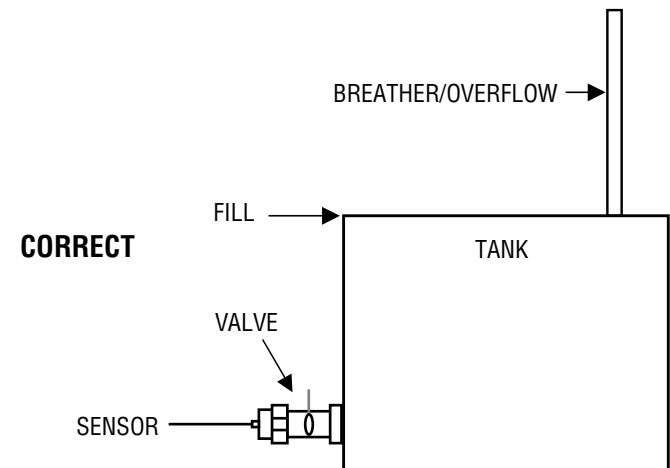


Fig 6.



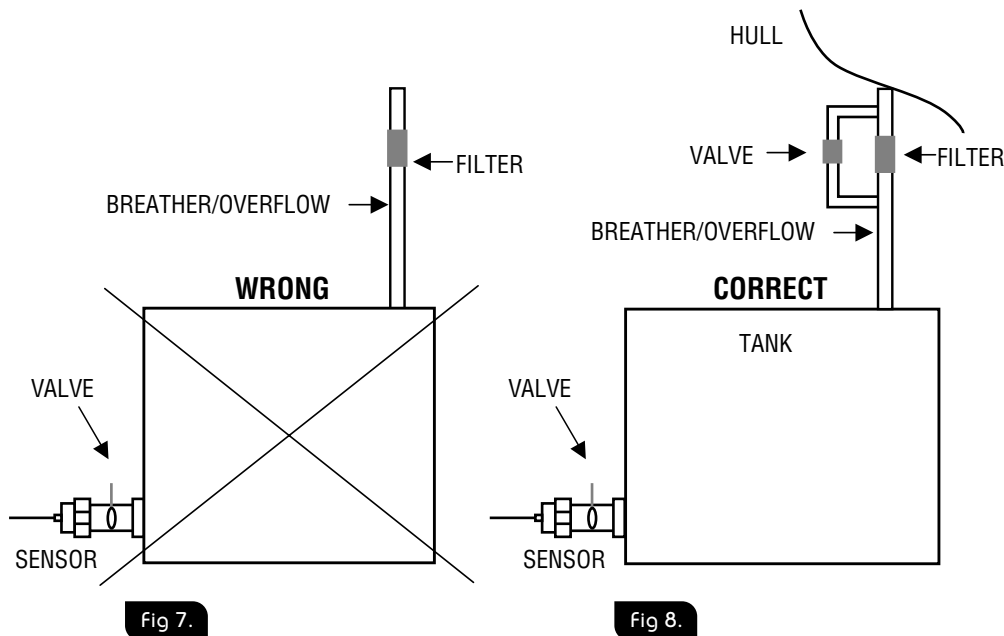
Tank Calibration Tip and Tricks

Do's and Don'ts:

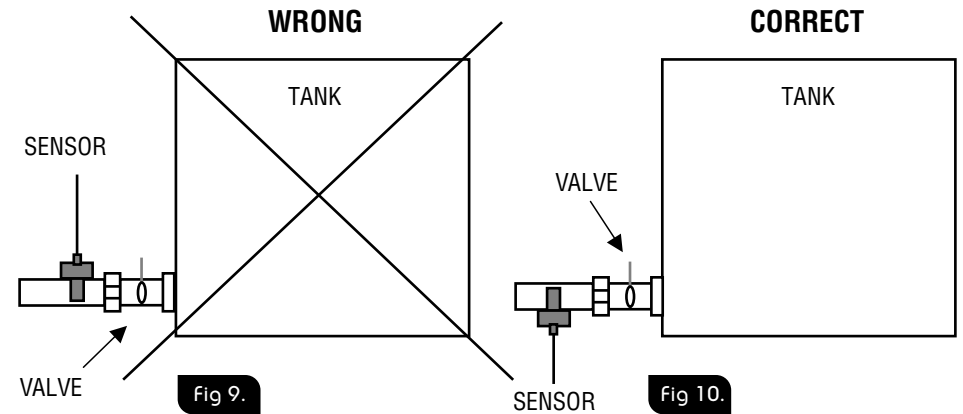
If an in-line filter is used on a tank breather pipe, this could cause negative pressure in the tank for a period of time due to the constrictive air flow during a pumping operation. This in turn will cause the pump to turn off prematurely as the system will think the tank is empty. The fitting of a solenoid valve or a one-way valve will as per fig. 8 will eliminate this potential situation.



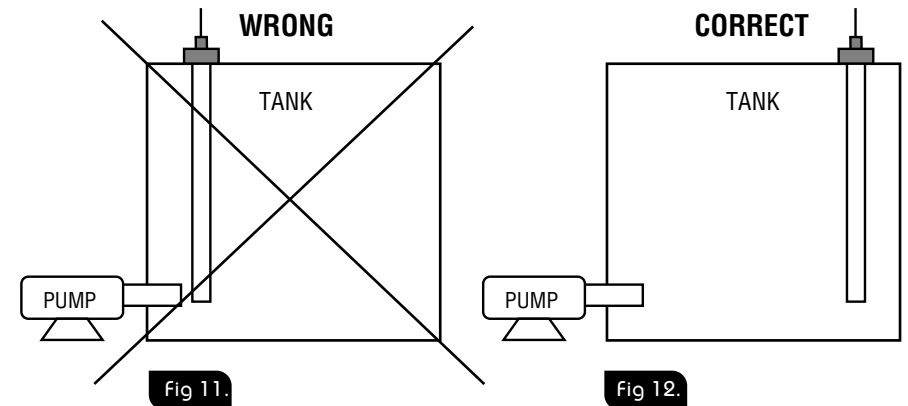
Note: The solenoid valve should be wired in parallel to the pump (i.e. to the same connectors as the pump). When the pump is on the valve will open allowing atmospheric pressure at the top of the tank. If fitting a one way valve it should be installed as follows: Blow into one end, if the flap opens this end should be on the hull side of the filter.



For pipe mounted sensors, we recommend the sensor be fitted in the bottom of the pipe (fig 10) to avoid air locks. Mounting in the side is acceptable if bottom is inaccessible.



For top mount installations, DO NOT mount the extraction pump below or next to the sensor or sensor tube (fig 11) as this will cause a vacuum.



For quick and easy calibration of a top mount sensor, simply set the low point with the complete sensor and air lock probe out of the tank. Ensure the tank is full and insert the sensor tube into the tank, now set the full point. Setting the "full" point may also be done "off-line", that is, outside the tank using a vessel made from a 4" tube for example.