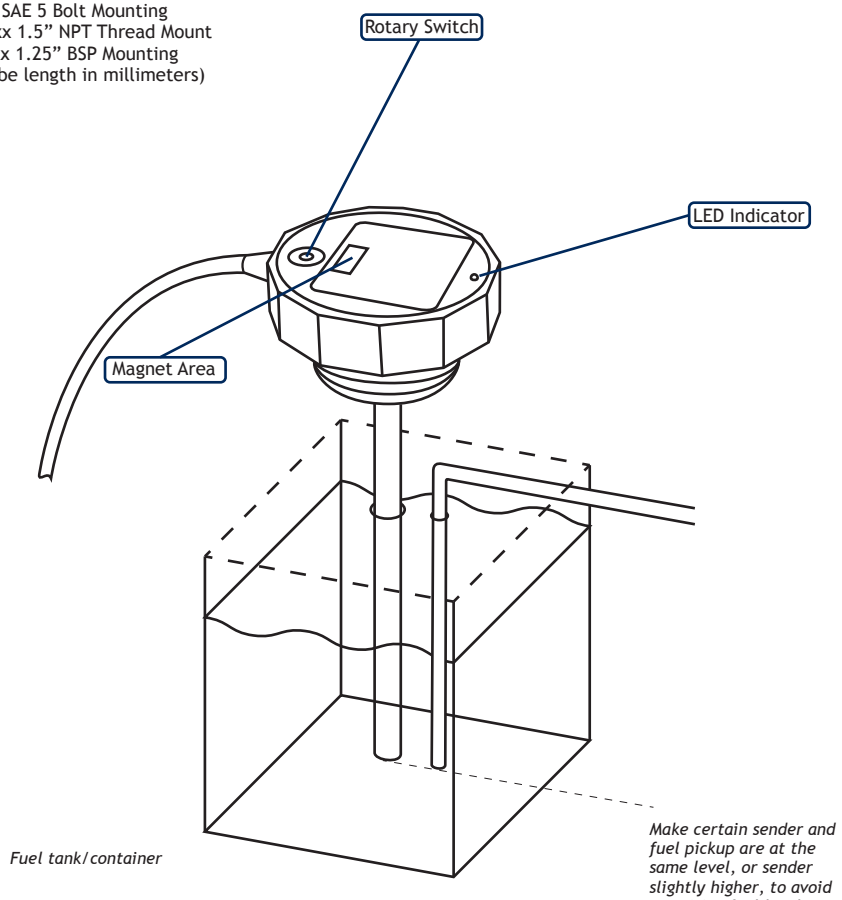
VOLUMETRIC FUEL SENDER
INSTALLATION AND OPERATING INSTRUCTIONS

Part Numbers:

3271-xxxx SAE 5 Bolt Mounting
3271N-xxxx 1.5" NPT Thread Mount
3271T-xxxx 1.25" BSP Mounting
(xxxx is probe length in millimeters)



SAFETY WARNING

Fuel sender should only be installed by a person competent and experienced in working with electrical systems and fuel tanks. All work involving fuel tanks should be performed with extreme care due to the possibility of igniting fuel fumes.

THE TANK MUST BE EMPTY, DRY, AND PURGED OF ALL FUMES BEFORE COMMENCING WORK.
IF YOU FAIL TO DO THIS YOU ARE EXPOSING YOURSELF TO A POTENTIALLY FATAL HAZARD.

Before beginning work the battery should be disconnected to avoid the risk of a short circuit, a fire or explosion.

1 INSTALLATION

Choosing the Sender location

Choose a location on the top surface of the fuel tank that
- Is over the deepest part of the tank
- is clear of any internal baffles
- is flat and level
- is within reach of an inspection hatch to facilitate mounting
- Allows installation of the Fuel Sender without bending it.

1.1 SENDER MOUNTING OPTIONS

The 3271 Sender is available with three different standard mounting options:

The original 3271 fuel sender is mounted using a standard 5 bolt SAE mount.

To mark the SAE 5 bolt holes place the cork mounting gasket at the desired location and mark the central hole and the 5 mounting bolt holes using a pencil through the holes in the gasket. Please note that the gasket holes are NOT arranged symmetrically.

The 3271N fuel sender is mounted using a standard American 1 ½"NPT (Tapered National Pipe Thread) threaded mount.

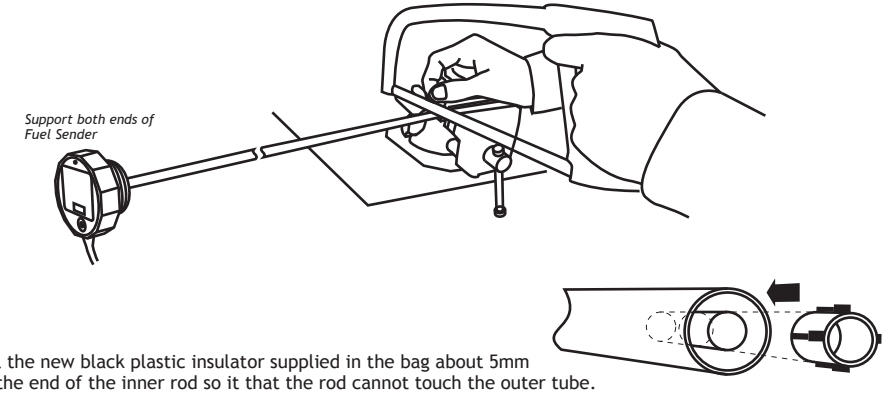
The 3271T fuel sender is mounted using a standard 1¼" BSP (British Standard Pipe) threaded mount with O ring seal.

1.2 MEASURING AND CUTTING SENDER TO LENGTH

Carefully measure the depth of the tank vertically from the top surface of the tank through the probe hole to the level of the fuel pickup tube near the bottom of the tank.

Measure from the underside of the sender body and mark the required probe length on the probe outer tube using an indelible marker.

Using a sharp hacksaw cut through the probes outer tube and inner rod to length TOGETHER. Do NOT use a pipe cutter or an angle grinder which could close the outer tube and restrict fuel flow into the tube. Ensure that the cut is clean and deburred inside the tube as any swarf trapped inside the tube could the affect the reading. This may require the dismantling, cleaning and reassembling of the tube if necessary.



Install the new black plastic insulator supplied in the bag about 5mm from the end of the inner rod so it that the rod cannot touch the outer tube.

It is ESSENTIAL to ensure that the fuel can flow into the tube easily and freely.
The probe CANNOT measure the fuel level unless the fuel has easy access INTO the probe tube.

1.3 MOUNTING THE SENDER TO THE TANK

Either mount the 3271 5 bolt SAE sender and the gasket to the tank using 5mm bolts, washers, spring washers and nuts. Apply some suitable sealant to the washers and bolt heads. Tighten the bolts progressively around the circumference of the sender to ensure a liquid tight seal.

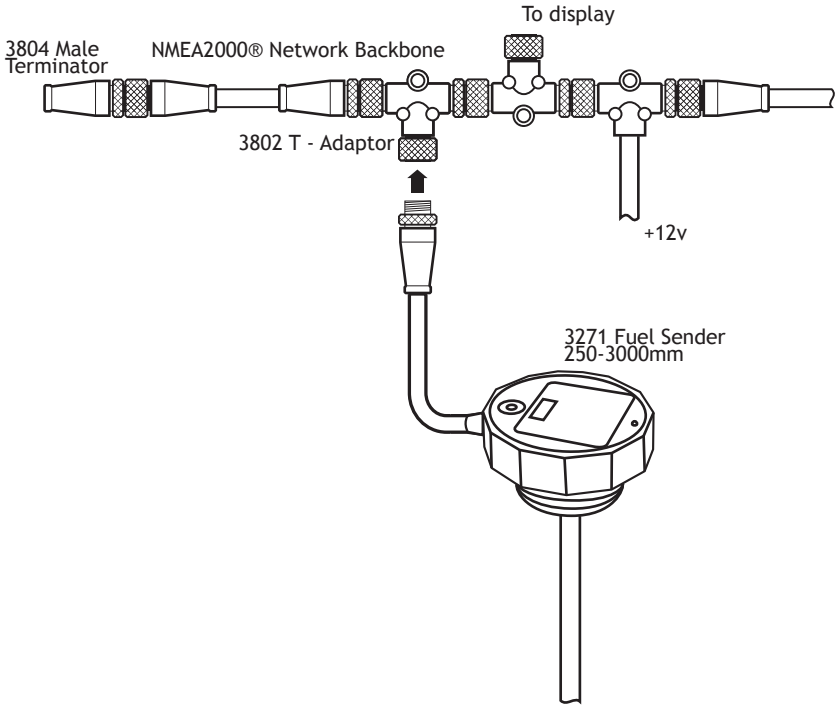
Or mount the 3271N or T threaded sender to it's threaded mounting point and screw down until the O ring makes a good seal or the taper thread is firmly seated.

CAUTION
ALWAYS OBSERVE THE FUEL TANK DURING INITIAL FILLING AND OPERATION TO ENSURE THERE ARE NO LEAKS AT THE SENDER MOUNT.

1.4 WIRING AND NETWORK

The plug on the fuel sender cable should be mounted into a T adaptor on the NMEA2000® network as shown in the following diagram.

Ensure that it is mated securely and the retaining ring has been tightened correctly to ensure the junction is waterproof. Note that this cable length may be extended to a maximum of 6 metres by using micro drop cables.



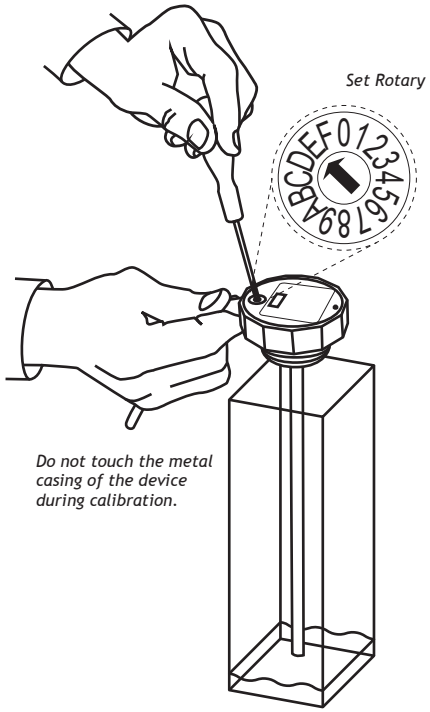
2 TANK LEVEL CALIBRATION

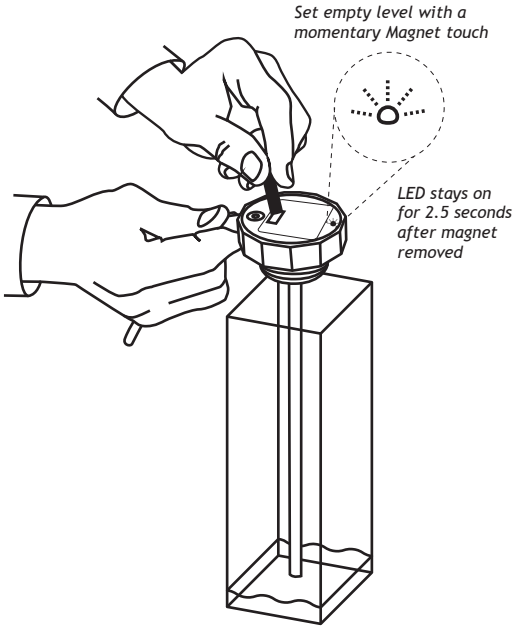
The sender is factory calibrated to the full and empty tank. This is not guaranteed to be precise for every tank. It can be easily recalibrated to the empty tank and to the full tank to give an accurate reading. This simple two step process is described below.

2.1 CALIBRATING TO THE EMPTY TANK

The sender must be calibrated to the empty tank value either with the sender in the empty tank, or if it is not possible to empty the tank, with the sender hanging vertically next to the tank.

Apply power to the network, turn the small rotary switch to "E" and then applying a small magnet momentarily to the top of the sender at the marked point. When the sender detects the magnet it will light the blue LED for 2.5 seconds and will then measure and remember the empty calibration value. DO NOT HOLD THE MAGNET AGAINST THE SENDER as this can delete settings

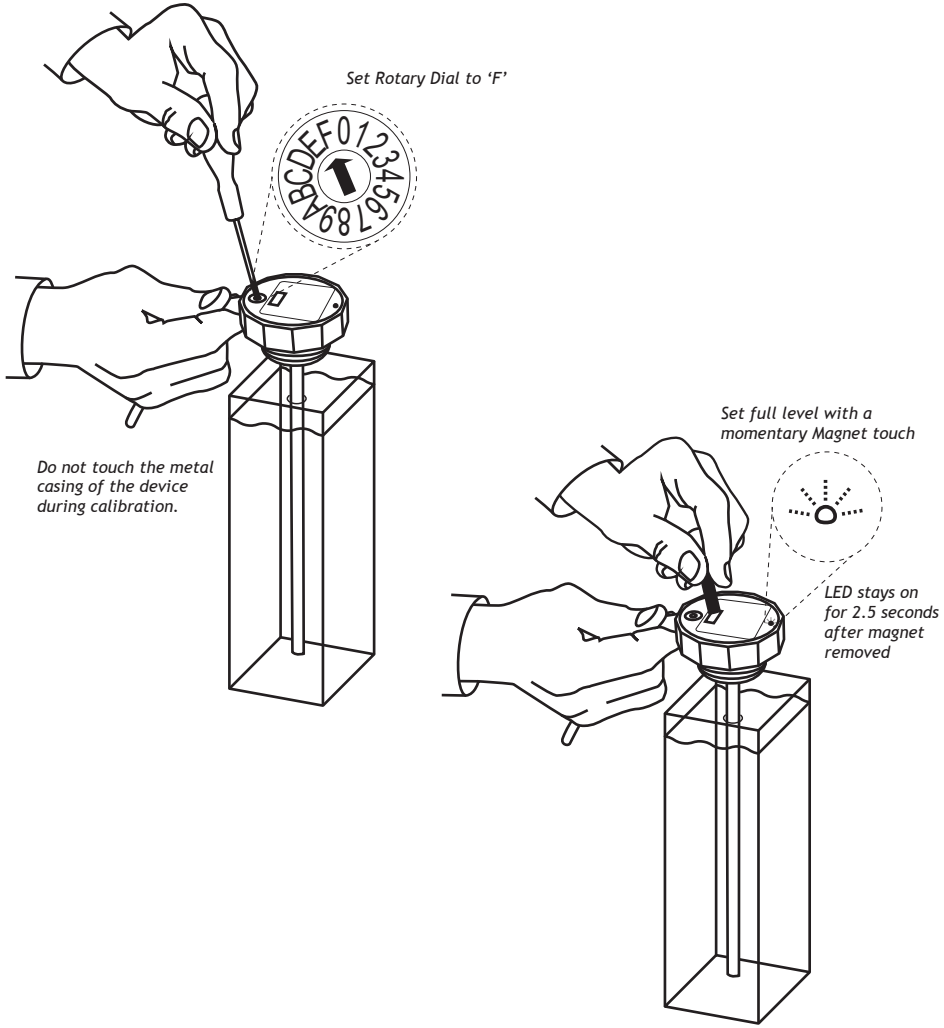




2.2 CALIBRATING TO THE FULL TANK

The sender must then be calibrated to the full tank value either with the sender in the full tank, or if it is not possible to fill the tank, with the sender hanging vertically in a tube of fuel to the desired full level next to the tank.

Apply power to the network, turn the small rotary switch to “F” and then applying a small magnet momentarily to the top of the sender at the marked point. When the sender detects the magnet it will light the blue LED for 2.5 seconds and will then measure and remember the full calibration value. DO NOT HOLD THE MAGNET AGAINST THE SENDER as this can delete settings



3 TANK VOLUME CALIBRATION

The 3271 Volumetric Fuel sender can be set to either transmit the remaining tank LEVEL as a percentage or the remaining tank VOLUME as a percentage. The 3271 can be user or factory programmed with up to 100 points of volumetric information and to transmit the remaining fuel VOLUME percentage if the user chooses. This can then be shown on any NMEA2000® Fuel Level Display.

The Volume Mode Tank data can be entered from any Oceanic Systems Display that is equipped to set up this data. Please contact us for more information on these displays. It can also be set up at manufacture if the information is made available at the time of ordering.

3.1 SELECTING VOLUME OR LEVEL MODE

When the unit is transmitting the tank LEVEL the blue LED will give a SINGLE flash every 2.5 seconds.

When the unit is transmitting the tank VOLUME the blue LED will give a DOUBLE FLASH every 2.5 seconds.

The unit can be switched from LEVEL to VOLUME mode very easily. By setting the rotary switch to “C” and applying the magnet as before, the unit will transmit the tank LEVEL. This will show a single flash.

By setting the rotary switch to “D” and applying the magnet as before the unit will transmit the tank VOLUME. This will show a double flash.

Do not forget to set the rotary switch to the tank instance or number after doing this (see section 4). If the unit has NOT been programmed with tank volume information then setting it to transmit volume will send the normal tank level information for safety.

3.2 WATER IN FUEL DETECTION

The fuel sender will detect the presence of water in the fuel and alert the user to the problem. If the probe tube is in contact with water the sender will cease to transmit the actual fuel level and send tank empty and tank full alternatively to attract the users attention to the fuel gauge associated with the contaminated tank.

The user should drain the water out of the contaminated tank and refill with clean fuel. This should remove the water from the probe tube which will then revert to transmitting the actual tank level.

In the event that the sender is still transmitting the tank empty / tank full signal this means the water contamina-tion was severe enough to be forced into the fuel probe tube. In this case the sender will need to be demounted from the tank and have the probe outer tube removed and cleaned internally and the probe inner cleaned.
Re-assemble and remount in the normal way.

How to remove the outer tube and inner probe:

- The outer tube is held into the top body with four grub screws. The outer grub screws act as locking screws for two inner grub screws.
- The inner screws only need to be slackened rather than removed and then the tube will come loose and can be removed for flushing out and drying.
- When you reassemble be sure the small black plastic centralisers on the inner rod are evenly spaced and be sure not to over tighten the inner grub screws. It is possible to crush the tube onto the inner rod if they are over tightened which will result in the sender always reporting water in fuel.

Inner Grub screws - Black
Outer Grub screws - Silver
These are to be tightened to 1.5 Nm torque

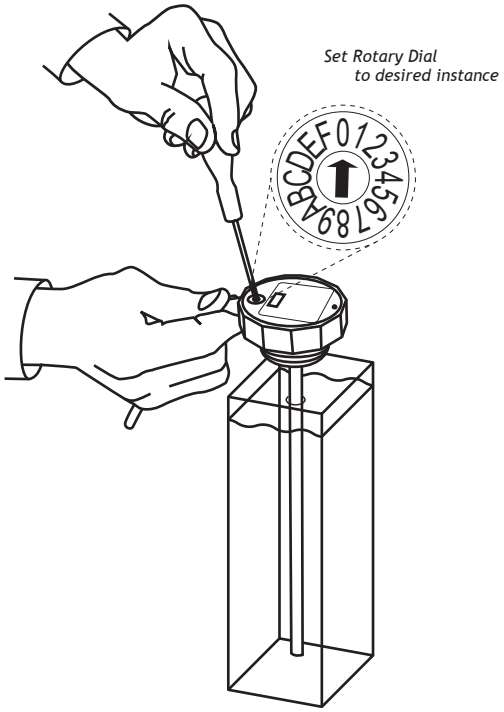
4 SETTING THE INSTANCE

When the unit is installed the small rotary switch should be set to reflect the fuel tank number. The NMEA2000® standard allows for up to 12 different fuel tanks to be installed on a single network and these should be selected by using switch positions 0 for the first tank, 1 for the second tank up to 9 for the tenth tank and then A for tank eleven and B for tank twelve.

Once the module has been installed there is no normal operator intervention required.

The unit has a blue LED which flashes every time the sender transmits a signal. If this is not flashing it means that the unit is not receiving power from the network or that no other device is connected to the network.

Switch Position	Device Instance SW2
0	0
1	1
2	2
3	3
4	4
5	5
6	6
7	7
8	8
9	9
A	10
B	11
C	Invalid
D	
E	
F	



5 TROUBLE SHOOTING

If the sender is sending inaccurate readings then this can ONLY be due to either:

1. The fuel is not free to travel up inside the tube due to a blockage at the bottom of the probe or a blockage of the air release hole(s) at the top of the tube.

2. The tank LEVEL calibration has been done incorrectly.

There can be no other cause than these. The principle of operation of the sender is based on simple physics and providing the fuel has free access and the calibration has been done correctly the unit will ALWAYS read correctly.

LED does not flash	Check power is provided to network. Check cable runs have not been damaged.
LED flashes rapidly	No display equipment connected to receive data.
Fuel level alternates from 0% to 100%	Probe is shorted out, remove tube and check for swarf and probe insulator is fitted. Water contamination, see “Water in Fuel Detection”.
I have multiple tanks but only one is displayed	Check each rotary switch is addressed to an individual tank instance and the display is set to receive the corresponding tank instance. Check the display is capable of displaying multiple tanks.
Fuel level is not reading correctly.	Carry out “Tank Level Calibration” process.
Calibration settings lost	If the magnet is held against the magnet for too long it's possible that the settings get lost. They can be re-loaded by following the instructions in section 2, being careful to touch the magnet momentarily.

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