



TD-1000 Tank Monitor Installation Manual

TD-1000 Master Display Unit

Provides the following functions:

- **visual indication of tank level** (bar graph & percentage or volume in gallons or litres)
- **turn pump on or off**
- **two-point or five-point calibration for irregular tank geometries**
- **disable toilet when black tank full**
- **all tanks are name selectable e.g. (Aft-Grey) (Port Fuel) (Water)**
- **audible alarm**

Electrical Specifications: TD-1000

Operate voltage = 9 - 30vdc

Quiescent Current = 30mA @ 12vdc

Alarm/Buzzer output = 300Ma @ 12vdc

Pump output = 4 Amps @ 12vdc

Size = 65mm x 65mm x 80mm Deep

Data Retention = 50 years (without power)

Display Modes:

The TD-1000 has two display modes: Hold the Scroll button down for 3 seconds to change between display modes



Outputs:

Pump Output (4 Amps @ 12vdc)

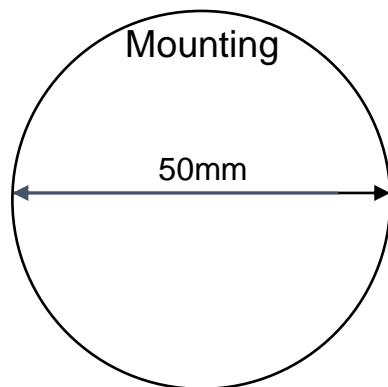
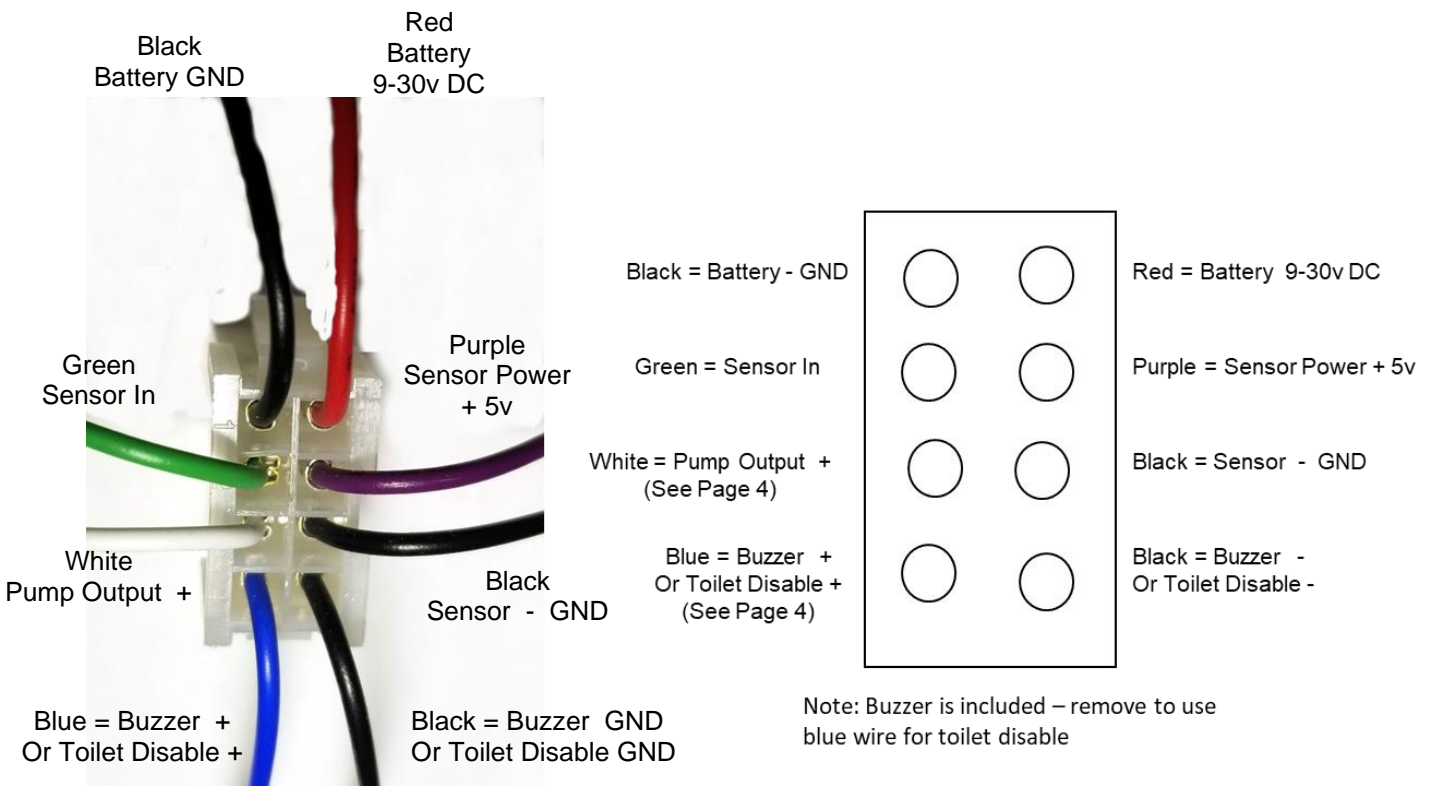
The TD-1000 has one output, which can be used to control an interposing relay for a pump such as a waste tank discharge pump. An auto-off feature is standard and is particularly helpful in preventing damage caused by a pump running dry. The auto-off point is programmable.

To turn the Pump output On press and hold the Enter/Pump button for 5 seconds.

To turn the Pump output Off press the Enter/Pump button, or the output will automatically turn Off when the Pump Off point has been reached.

Alarm Output (300Ma @ 12vdc)

The alarm output can be programmed to activate a relay when the waste tank reaches the set alarm point, or can be used to **disable the toilet**, (see Fig1 or Fig 2 page 4) or used to **activate a buzzer** (buzzer supplied)

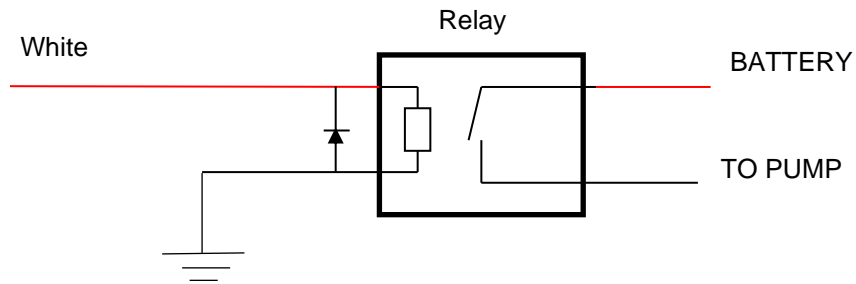


Drill a hole using a 50mm hole saw

Size= 75mm x 75mm

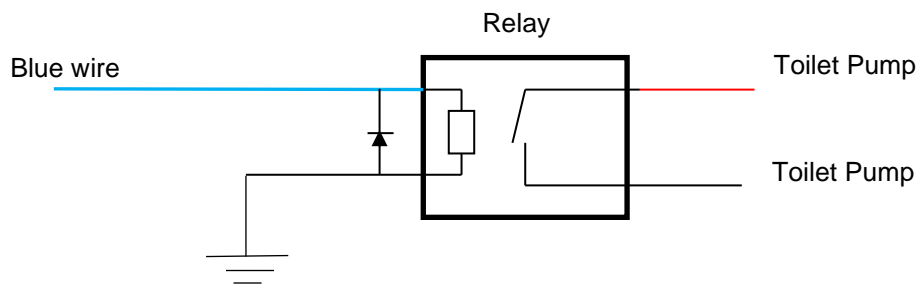


Pump Circuit Connection



Toilet Disable Connection

Fig 1

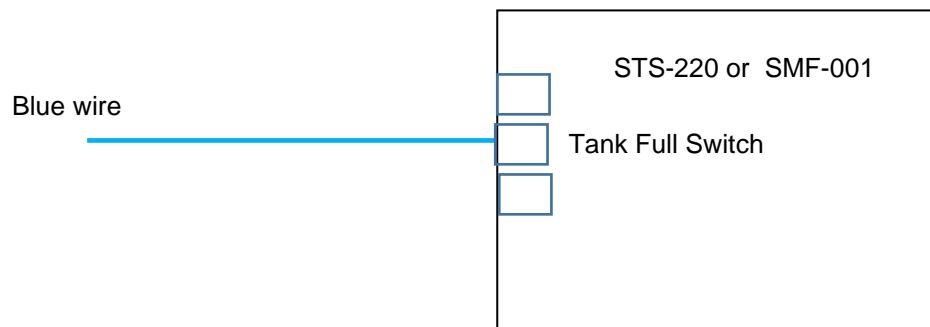


OR

Toilet Disable Connected to Smartswitch Toilet controllers

Remove the buzzer and connect blue output wire to Smartswitch STS-220 or SMF-001 toilet controller as shown, program the alarm output in the Set-up Menu (see Disable Toilet page 7)

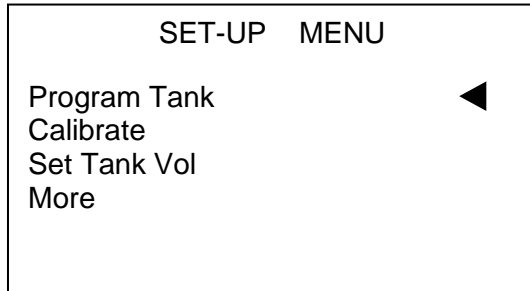
Fig 2



Programming Instructions

Step 1: Placing the unit in Program Mode

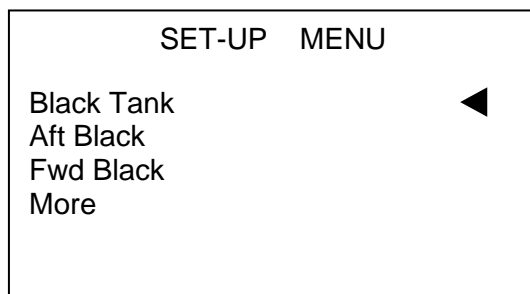
Press and hold down the Scroll key now press and hold the Mute key. Hold together for 3 seconds.



Push the Enter/Pump button to select the tank Name or scroll to another function

Step 2: Selecting Tank Name (24 names are available on 8 menu screens)

The display will now show:

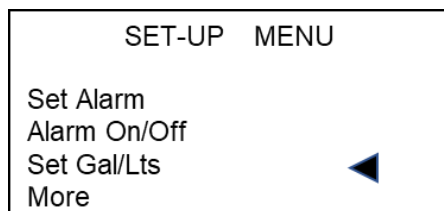


Push the Enter button to select the tank Name or scroll to next screen for another name

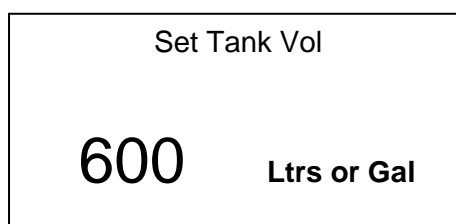
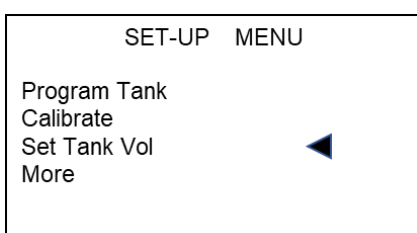
Calibrating the tank

PLEASE SEE PAGE 8 FOR SENSOR CALIBRATION

Step 3: Selecting Litres or Gallons



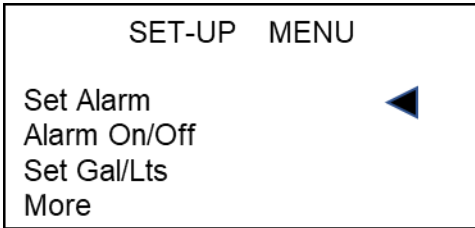
Step 4: Setting Tank Vol



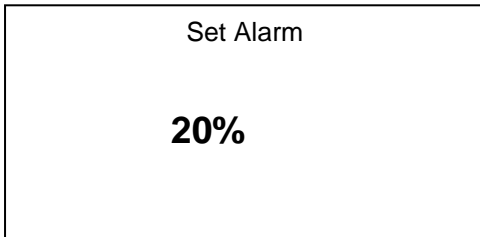
The Tank Vol is the amount the tank holds.

Use the Scroll or Mute key to increase or decrease the tank volume. Press the Enter key to set this value.

Step 5: Setting the Alarm point



The display will now show % full:

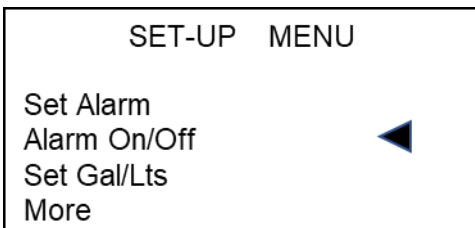


The alarm point % is the point where the tank will alarm you.- typically 10 to 20% for fuel and fresh water and 80 to 90% for grey and black tanks.

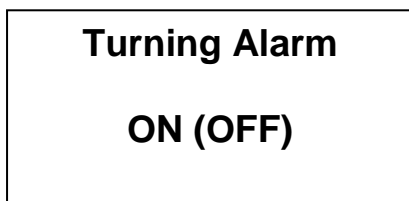
NOTE: This also sets the % full for a black tank application, where toilet flushing is disabled to prevent over-filling the waste tank. See page7 – step 8 for description of how to convert alarm output to the toilet disable function.

Use the Scroll or Mute key to move the alarm point to the desired level. Press the Enter key to set this as your alarm point.

Step 6: Audible Alarm On /Off (default is On)



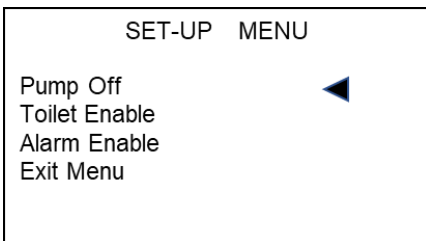
Press the Enter Key, if the Alarm is On this will turn it Off - if it is Off this will turn it On
The display will now show:



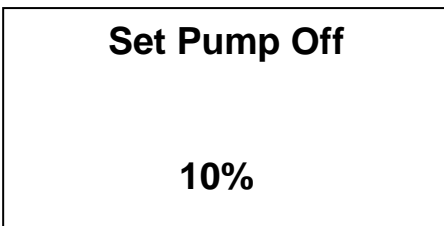
Select *More* for more settings

Step 7: Pump Off

The Pump Off point is the point where the Pump will turn Off. - e.g. almost empty or almost or full
Use the Scroll or Mute key to move the Pump Off point to the desired level. Press the Enter key to set this as your Pump Off point. For black tank macerator pumps, this feature prevents pump's continued running with empty tank, and possible pump damage.



The display will now show:



If the Pump key is pressed the pump output will turn on and automatically turn Off when the Pump Off point is reached.

If the tank name is either Black or Grey the pump will stop when the tank is equal to or less than the programmed stop point.

If the tank name is either Fresh or Fuel the pump will stop when the tank is equal to or greater than the programmed stop point.

Step 8: Enable Toilet

The Alarm output controls the included alarm buzzer. If you choose to use this output to disable a toilet rather than for an alarm buzzer, you must remove the buzzer and wire this output from the TD-1000 to an input on the electric toilet controller. See page 4 for a description of the wiring for both SmartSwitch marine toilet controllers and other manufacturer's controllers.

If you want to **use the Alarm Output as a Toilet Disable** control instead of an Alarm then from the Set-Up Menu scroll down to "Toilet Enable" then press the Enter key. To turn output back into an alarm output Scroll to "Alarm Enable" then press the Enter key.

Exit Menu

Scroll to Exit and push the Enter key

Display Modes

The TD-1000 has two display modes: Hold the Scroll button down for 3 seconds to change between display modes



Sensor Installation

! WARNING !

PLEASE NOTE: For sensor Model SEN-100 The Maximum Tank Height is 1 Meter

PLEASE NOTE: For sensor Model SEN-250 The Maximum Tank Height is 2.5 Meter

The maximum surge and safe pressure is 28psi.

For more information see "Calibration Tips & Tricks" on our web site www.smartswitch.co.nz

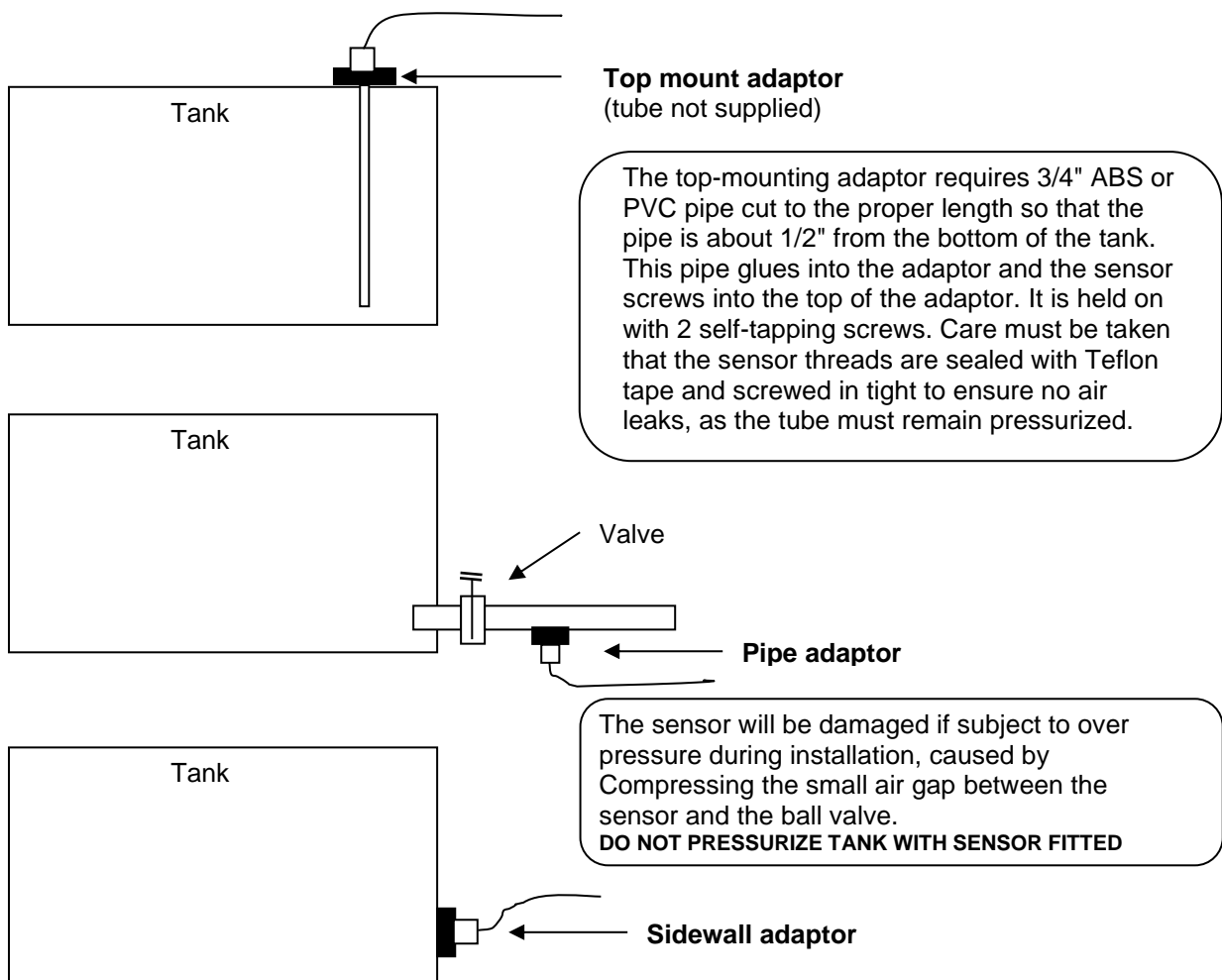
Mounting Adaptors Available:

A range of mounting adaptors are available which includes flat sidewall, top mount, 1.5" pipe, 2" pipe, 3" pipe and drain valve. **Ask your dealer for details.**

Should a 4 to 20-milliamp loop sensor supplied by another manufacturer be used, then the adaptor (part number SM-420) will need to be installed.

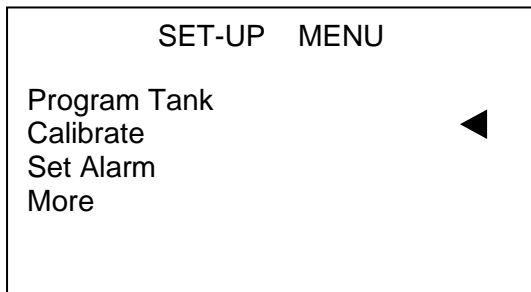
Sensor Installation:

The sensor should be mounted as low in the sidewall as possible using a 3/4" spin-in or the flat sensor adaptor. If the sensor adaptor is used it will require drilling a 5/8" hole in the sidewall. Apply silicon glue liberally to the bottom of the adaptor. Using #10 x 1/2" stainless steel self-tapping screws attach the adaptor to the sidewall. Once the adaptor is attached make sure that the hole in the adaptor is clear of any excess glue. Allow drying as per the instructions for the glue. Wrap the threads of the sensor using Teflon plumbers tape and install the sensor. Tighten by hand. It is not recommended to install the sensor in the bottom of the tank. Although the sensor will operate correctly it will provide an area for debris to collect which would be difficult to flush out.



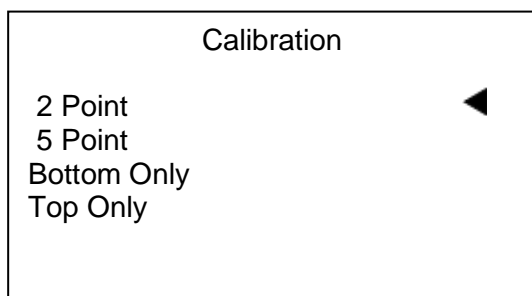
Sensor Programming Instructions

Press and hold down the Scroll key now press and hold the Mute key. Hold together for 3 seconds. This will bring you to the Set-Up Menu.



Use the Scroll or Backlight key to scroll to “Calibrate” and press the ENTER Key. This will bring you to the Calibrate Menu.

The display will now show:



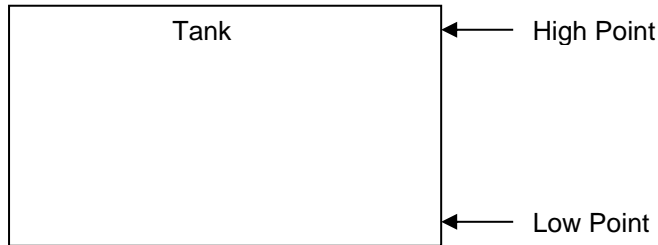
Use the Scroll key to scroll to switch between them, then press the Enter key.

Two different methods of tank programming are available if using the pressure sensor:

2 Point Calibration: sets tank low and high points which can only be used if the tank is a regular shape.

5 Point Calibration: sets tank low, tank quarter, tank half, tank three quarters and tank full points, offering more accuracy if the tank is an irregular shape.

2 Point Calibration: (Bottom & Top)



The display will now show:

```
Set
Low Level
Input = ??????? V
```

Fill the tank to the required TANK LOW LEVEL, minimum suggested is liquid just covering the sensor. Wait for approx. 60 seconds for the fluid to settle and press the Enter key. The display will show "Setting Level Please Wait".

The display will now show:

```
Set
High Level
Input = ??????? V
```

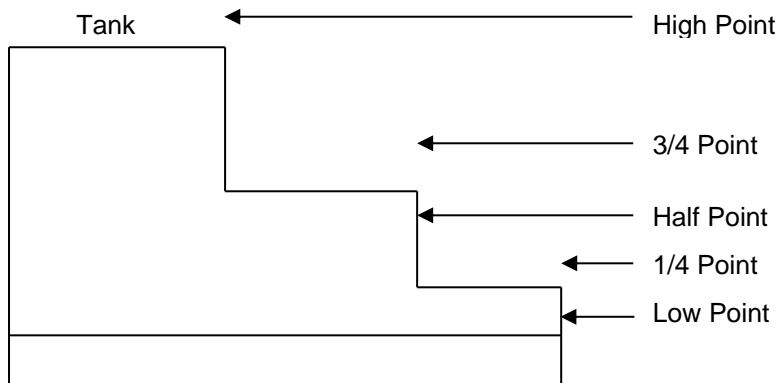
Fill the tank to the TANK HIGH LEVEL. Wait for approx. 60 seconds for the fluid to settle and press the Enter key. The display will show "Setting Level Please Wait".

If no fluid is added the display will show:

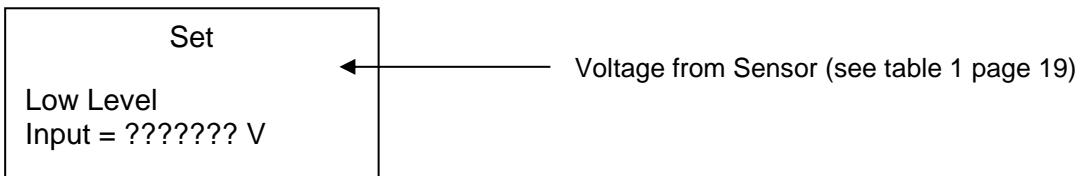
```
The High Level
is not greater
than the Low level
```

For more information see "Calibration Tips & Tricks" on our web site www.smartswitch.co.nz

5 Point Calibration: (Bottom, 1/4, 1/2, 3/4 & Top)

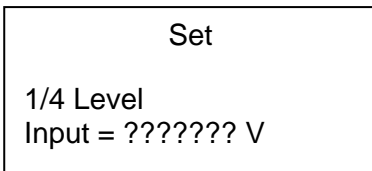


The display will show:



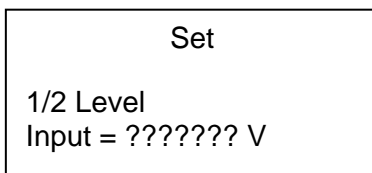
Fill the tank to the required TANK LOW LEVEL, minimum suggested is liquid just covering the sensor. Wait for approx. 60 seconds for the fluid to settle and press the Pump key. The display will show "Setting Level Please Wait".

The display will now show:



Fill the tank to the 1/4 LEVEL. Wait for approx. 60 seconds for the fluid to settle and press the Enter key. The display will show "Setting 1/4 Please Wait".

The display will now show:



Fill the tank to the 1/2 LEVEL. Wait for approx. 60 seconds for the fluid to settle and press the Enter key. The display will show "Setting 1/2 Please Wait".

The display will now show:

Set
3/4 Level
Input = ??????? V

Fill the tank to the 3/4 LEVEL. Wait for approx. 60 seconds for the fluid to settle and press the Enter key. The display will show "Setting 3/4 Please Wait".

The display will now show:

Set Full Point
Input = ??.? v

Fill the tank to the FULL LEVEL. Wait for approx. 60 seconds for the fluid to settle and press the Enter key. The display will show "Setting Level Please Wait".

If no fluid is added between each step the display will show:

The ??? Level is not greater than the Low level

For more information see "Calibration Tips & Tricks" on our web site www.smartswitch.co.nz

Table 1:

SmartSwitch strongly recommends that Table 1 be used to record voltages for each tank level at time of tank calibration. **These voltages will be displayed during the calibration setup.**

Reason: Should the TD-1000 ever need to be replaced the tank will need to be re-calibrated, but if table 1 has been filled out then creating these input voltages using a potentiometer can be done without the tank sender connected, making the process very simple.

Table 1

Input	Tank Name	Empty	1/4	1/2	3/4	Full
Level Sensor						

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Penguin Electronics Ltd
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