smartswitch
INFORMATION = CONTROL

SMARTSWITCH

TM-4000
Tank Monitor/Controller
Ver 9.5
Installation Manual

Table of Contents

Introduction	3
System Overview	3
System Overview (cont.)	4
Wiring Block Diagram	5
Wiring Diagram for Master Display Unit	6
Display Functions	6
Wiring Diagram for Input/Output unit	7-10
Installation Steps	11
Sensor Installation	12
Sensor Programming Instructions	13
Sensor Programming Instructions (cont.)	14
Setting Rotary Switches	15
Master Display Programming Instructions	16-18
Output Relays	19
Operating Instructions	20

Electrical Specifications TM-4000

Supply Voltage	12 to 32 Volts DC (Auto-Sensing)
Quiescent Current	0.03 Amps
Data Retention	50 years (without power)

Electrical Specifications HB-200 replacesHT-100

Supply Voltage	12 to 32 Volts DC (Auto-Sensing)
Quiescent Current	0.024 Amps
High Relay Load	3 amps Inductive

Electrical Specifications HB-200/P replacesHT-100/P

Supply Voltage	12 to 32 Volts DC (Auto-Sensing)
Quiescent Current	0.024 Amps
High Relay Load	3 amps Inductive
Pump Output	88 amps

Network (RS-485)

The cable connecting the Master Display Unit to the Input/Output Units is referred to as the network cable and may run up to 1000 meters in total length.

TM-4000 Tank Monitor System

Introduction

Thank you for purchasing the TM-4000 Tank Monitor System. Smartswitch is very proud to be able to provide this product to you. You have selected a capable system designed to provide years of reliable service under the most demanding conditions.

Smartswitch is a pioneer in the design and development of distributable intelligence controller systems for the marine industry. The TM-4000 Tank Monitor System is a versatile, compact, modern, stylish, user-friendly intelligent network system. Our Research and Development Team have developed this system specifically for the marine environment using proven techniques and materials, which will ensure a long life at sea.

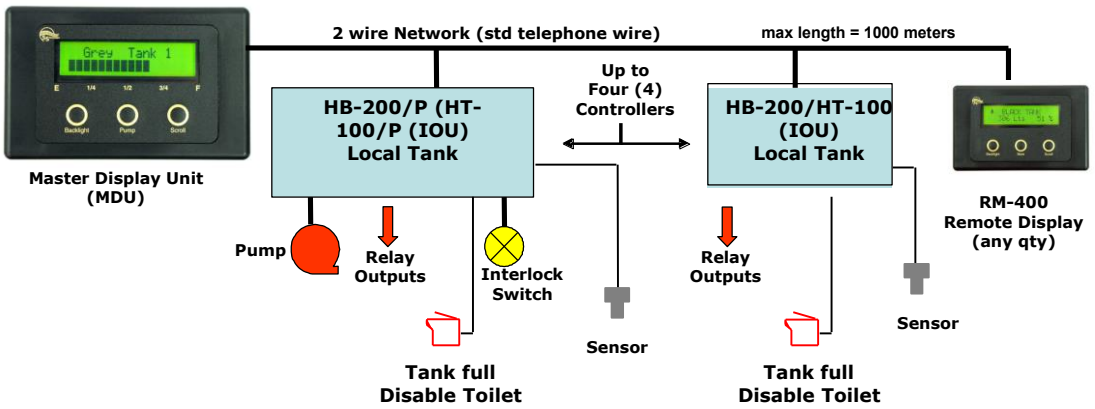
The TM-4000 allows builders and retrofitters to offer a system with maximum functionality thereby providing boat owners with easy and accurate management.

System Overview

The TM-4000 Tank Monitor System has been developed to allow monitoring of fluid levels and provide intelligent intervention for controlling pumps in up to 4 tanks. It is a network system, consisting of the TM-4000 Master Display Unit (MDU) and up to 4 Input/Output Units (IOU).
In addition, and as an option, any number of RM-400 Remote Display Units (RDU) may be added to provide tank status displays throughout the vessel.

A 2-wire network cable similar to that used for telephone installations interconnects all devices. The Master Display Unit (MDU) controls communication with all attached I/O Units (IOU) and provides monitoring of tank levels, interlock valve status and pumps status as well as pump control - all from a central location. System components may be located anywhere on the network and the cable may be up to 1000 meters in length.

These features, unique to the TM-4000, provide maximum flexibility in locating components onboard the vessel while minimizing wiring costs.



TM-4000 Master Display Unit (MDU)

Provides the following functions:

- **full control from one central location on your boat**
- **visual indication of tank level (bar graph or lts / gals & percentage)**
- **visual indication of seacock position & pump status**
- **ability to turn holding tank macerator pump on & off manually**
- **ability to turn holding tank macerator pump on manually & off automatically**
- **ability to turn water maker on manually & off manually or automatically**
- **all tanks are name programmable e.g. (Aft-Grey) (Port Fuel) (Aft-Fuel)**
- **audible alarm**
- **backlight**

HB-200 replaces (HT-100) or HB-200/P replaces (HT—100/P) Input/Output Unit:

Is a controller which provides an input for the fluid level sensor. Each tank on the network requires an IOU. The HT-100 or HB-200 allow for monitoring only while the HT-100/P or HB-200/P provide monitoring and management of pumps connected to them.

The HT-100 or HT-100/P is to be used if using the pressure sensor.
The HB-200 or HB-200/P is to be used if using the ultra-sonic sensor.

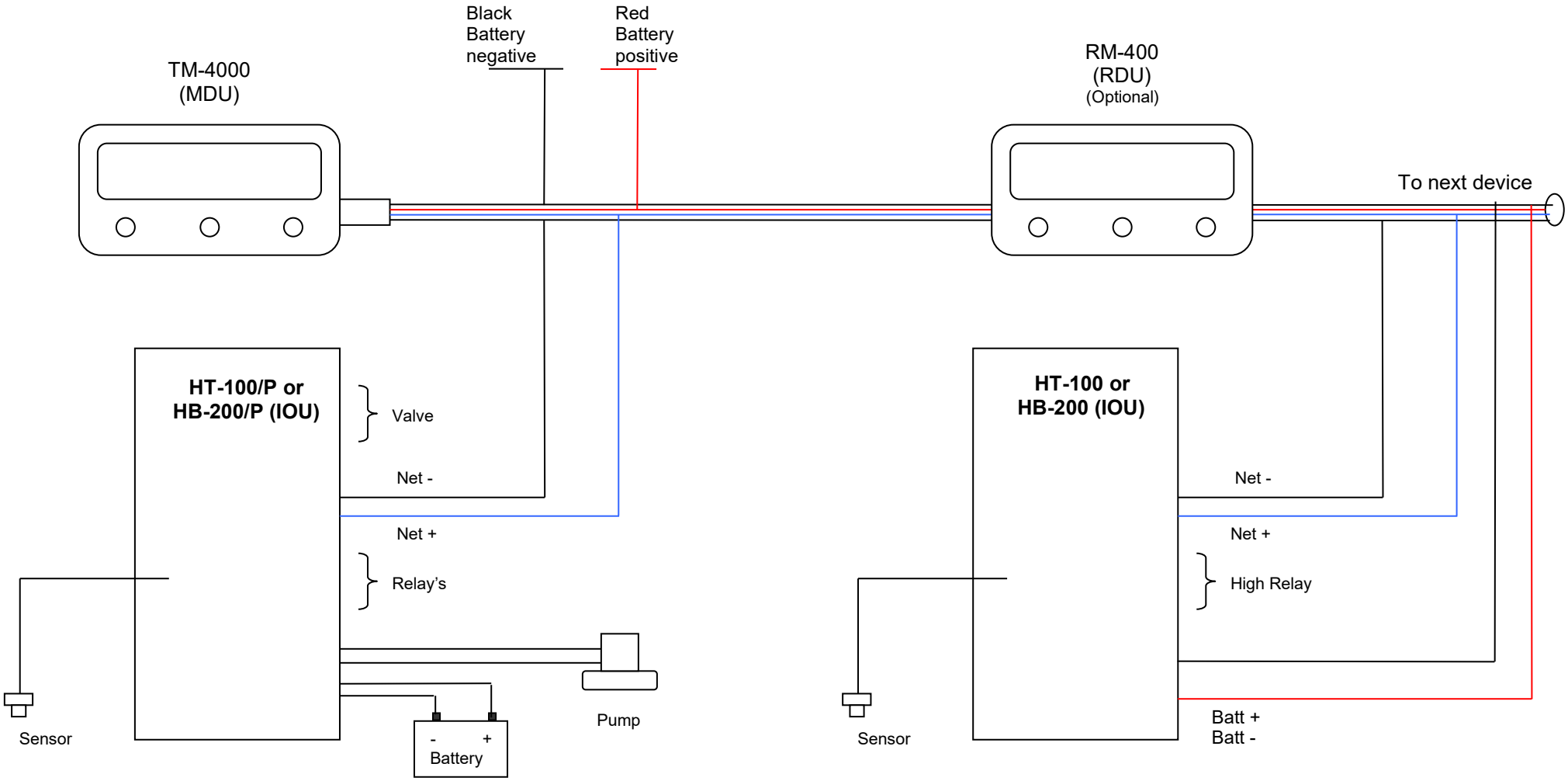
Features include:

- **teach-in level sensor with 5 point interpolation for irregular shaped tanks**
- **controls the pump and provides the input for the level sensor**
- **reversed output for tanks programmed as either fresh water or fuel, enabling for water maker or fuel transfer pumps to turn on when empty and off when full**
- **tank high level output which can be connected to the Aus/Sea toilet controller and will disable the toilet when the holding tank is full**
- **an internal pump on/off override switch for tank servicing and cleaning**
- **supplied in two different models:**
  HT-100 or HB-200 features level sensor and tank high output
  HT-100/P or HB-200/P features level sensor, tank high output, pump & electric seacock control

RD-400 Remote Display Unit (RDU)

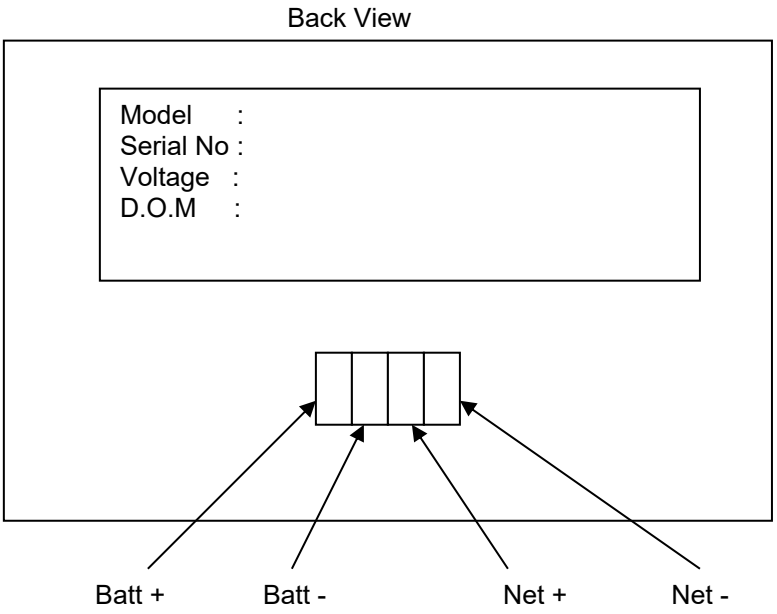
The RD-400 Repeater Display is an optional extra.
Any number of these may be connected throughout the vessel for convenient tank monitoring. Note: The RDU is for monitoring only and will not allow control.

Wiring Block Diagram

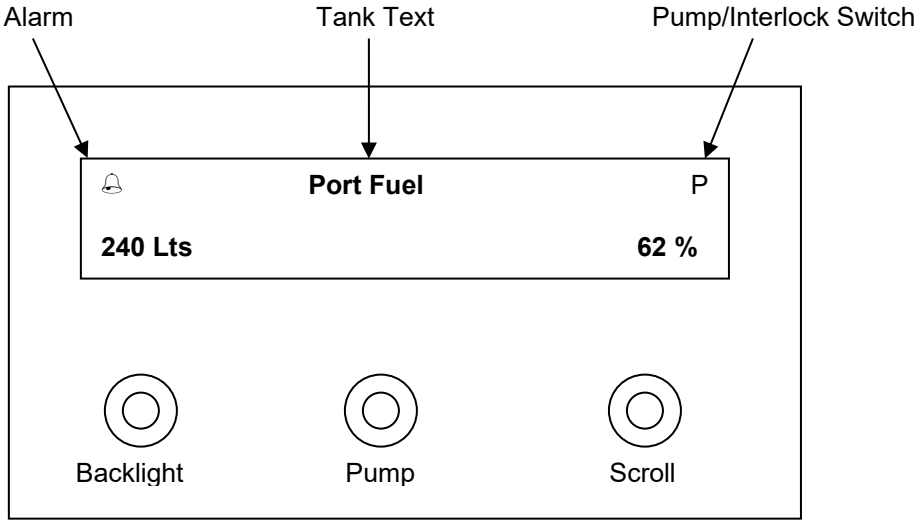


WARNING: As the HT-100/P & HB-200/P supply power for the pump, the supply cables & fuse need be rated as per the pump manufacturer's specifications.

Wiring Diagram for TM-4000 (MDU)



Display Functions



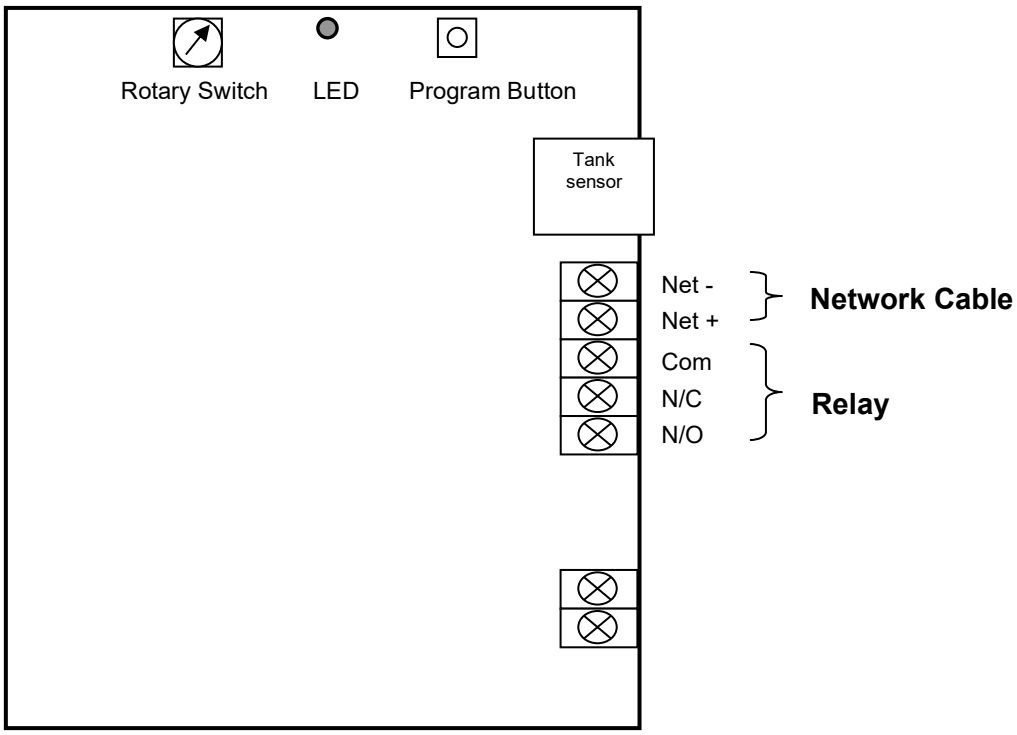
This system has two Display Modes. To change these see point 3 on page 20-Operating Instructions.

Note 1: The Lts/Gal & Percentage will ONLY work with HT-100/P & HT-100 with a manufacture date from 1st July 2007.

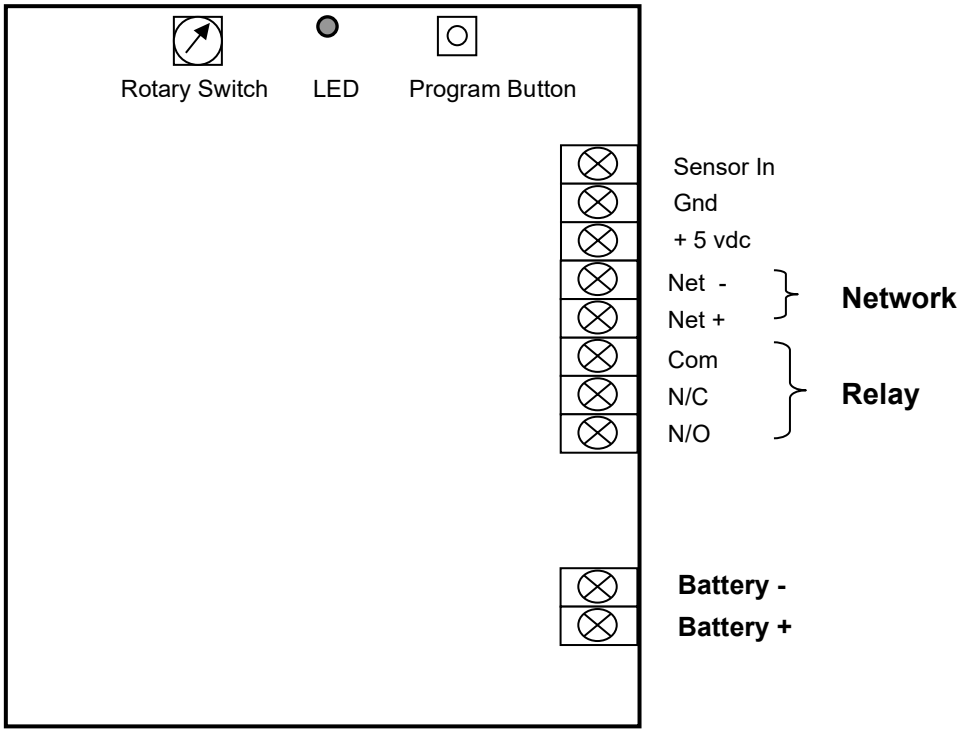
Display Mode 1

Display Mode 2

Wiring Diagram for Model HT-100



Wiring Diagram for Model HB-200



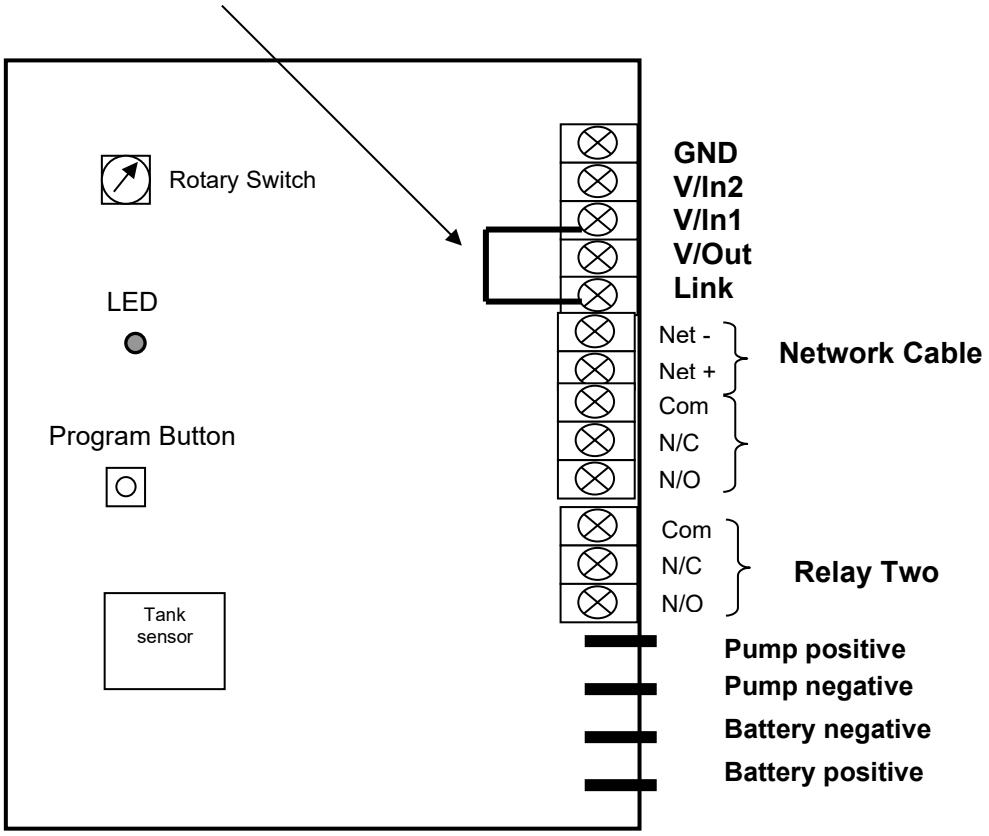
Wiring For Ultra-Sonic Sender

Gnd = Black on Ultra-Sonic Sensor
Sensor In = Green on Ultra-Sonic Sensor
Battery + = Red on Ultra-Sonic Sensor

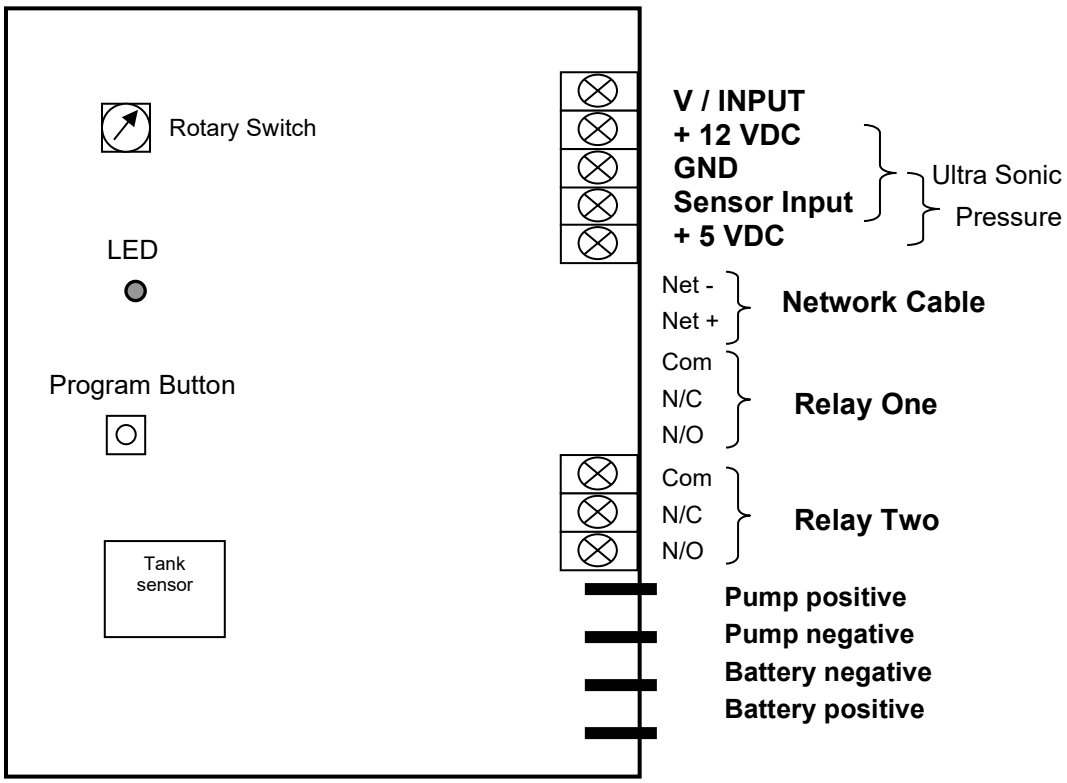
Wiring For Pressure Sender SEN-B300

Gnd = Black on Pressure Sensor
Sensor In = Green on Pressure Sensor
+ 5 vdc = Red on Pressure Sensor

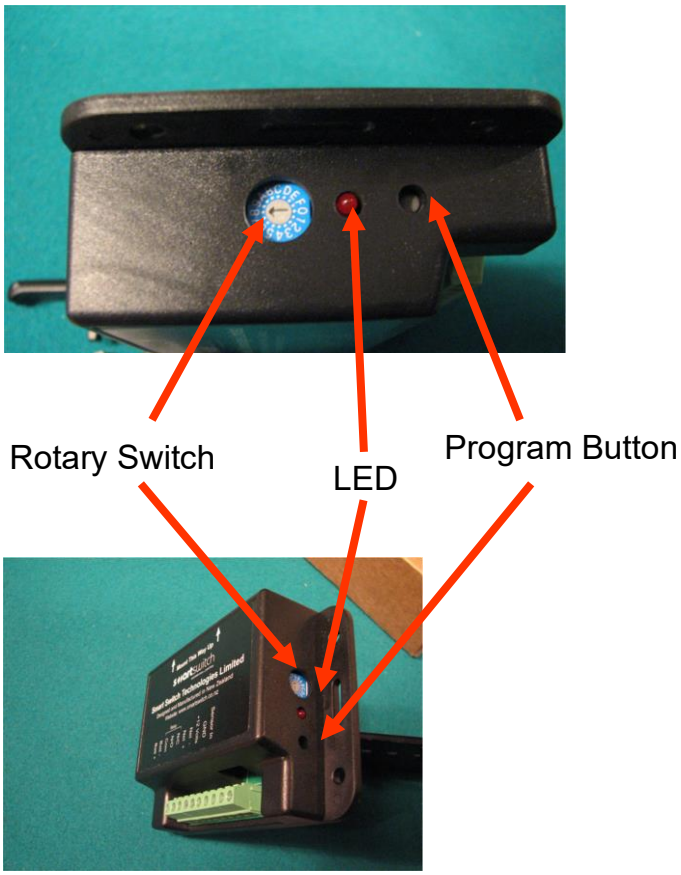
Wiring Diagram for Model HT-100/P



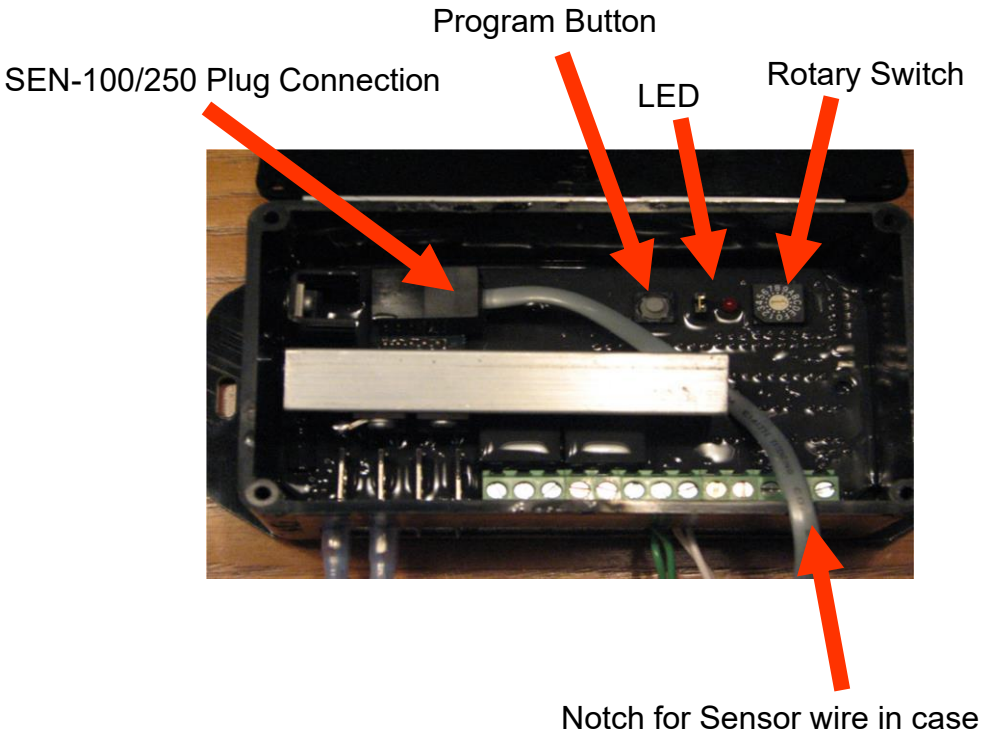
Wiring Diagram for Model HB-200/P



HB-200 Input/Output Unit



HT-100/P or HB-200/P Input/Output Unit

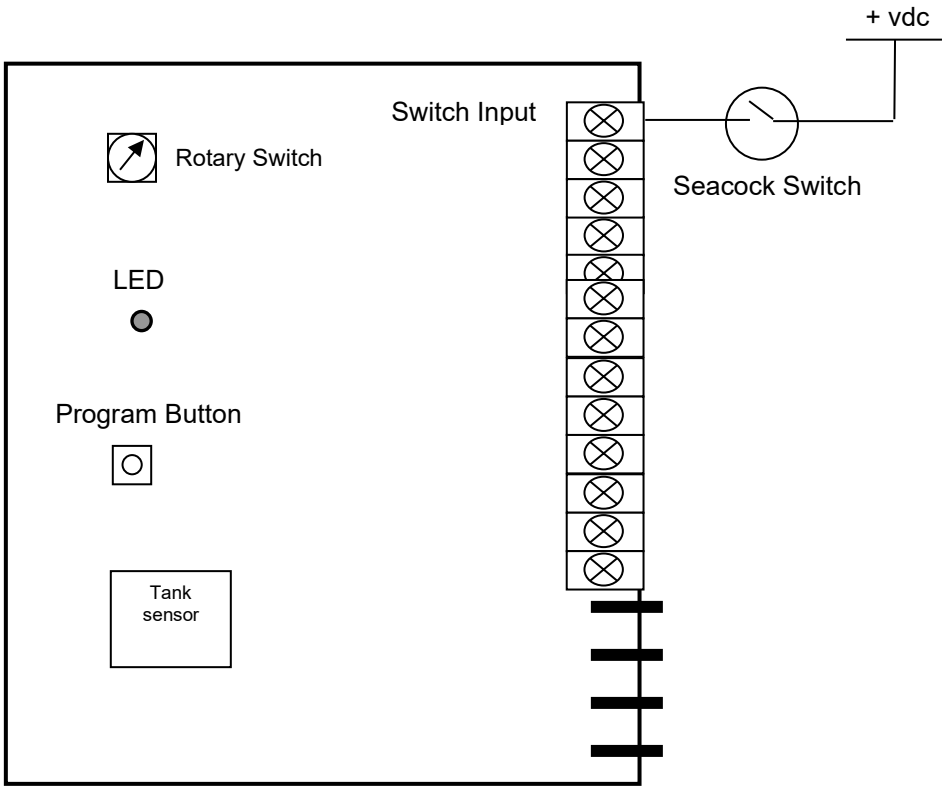


Seacock Interlock Switch Installation

Important: The HT-100/P and the HB-200/P provide for an interlock with a seacock valve to prevent the pump from starting in the event the seacock valve is closed. In the event there is no interlock contact on the seacock, the following procedure MUST be followed to allow the pump to operate in either manual or automatic mode.

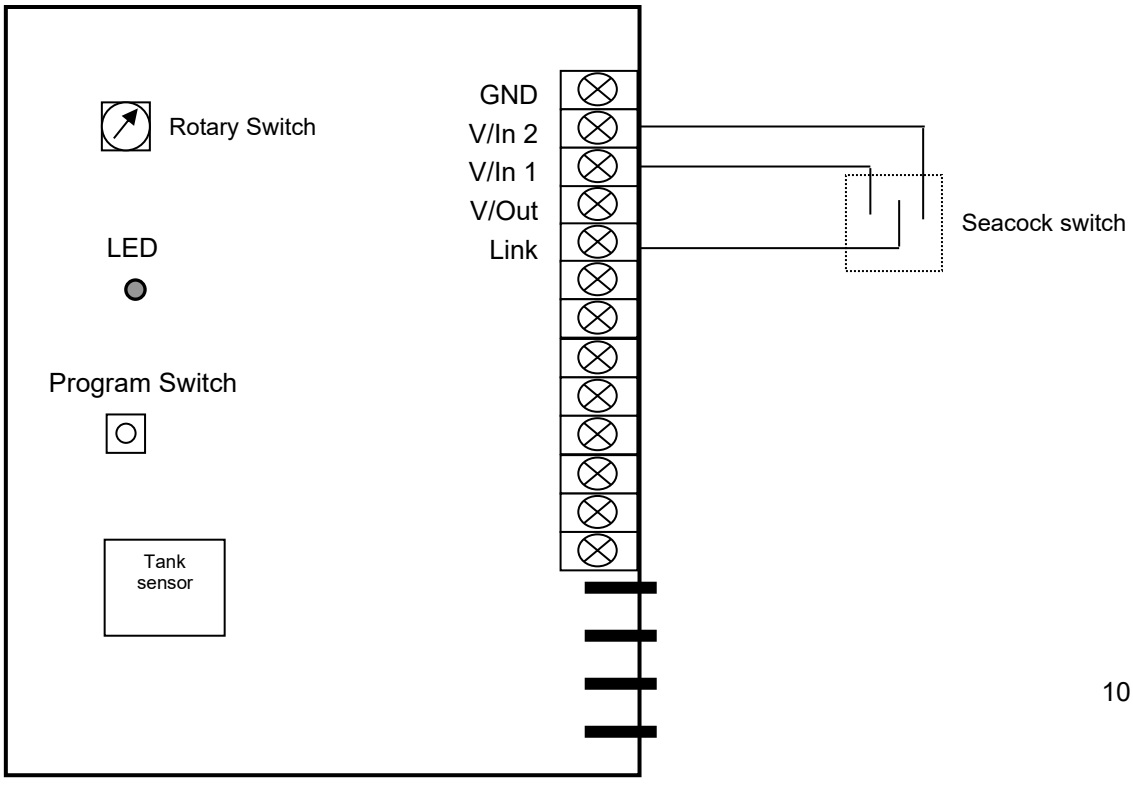
If an Interlock Switch is fitted then wire as follows. When the Seacock Valve is closed and the pump is activated, the pump will not turn on and the system will alarm you (see Alarms page 20).

HB-200/P



HT-100/P

If NO Interlock Switch is fitted:
Place a link wire between the Link & V/In 1 terminals (see page 8 for diagram)
If an Interlock Switch is fitted then wire as follows:
When the Seacock Valve is in the open position then connect N/C side of switch to V/In 1 and N/O side of switch to V/In 2. Connect the switch common to the Link terminal.



Sensor Installation

Installation Steps

Step 1:

Install and connect the Master Display Unit.

Step 2:

Install, connect and calibrate the tank sensors.

Step 3:

Install and connect the I/O units (HT-100, HB-200 or HT-100/P, HB-200/P).

Step 4:

Set-up Rotary Switches.

Step 5:

Program the Master Display Unit.

Step 6:

Test system.

Sensor Installation

! WARNING !

PLEASE NOTE: If a charcoal filter is fitted to the Black tank see Special Pump (page 18)

PLEASE NOTE: For sensor Model SEN-50 The Maximum Tank Height is .5 Meter

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.

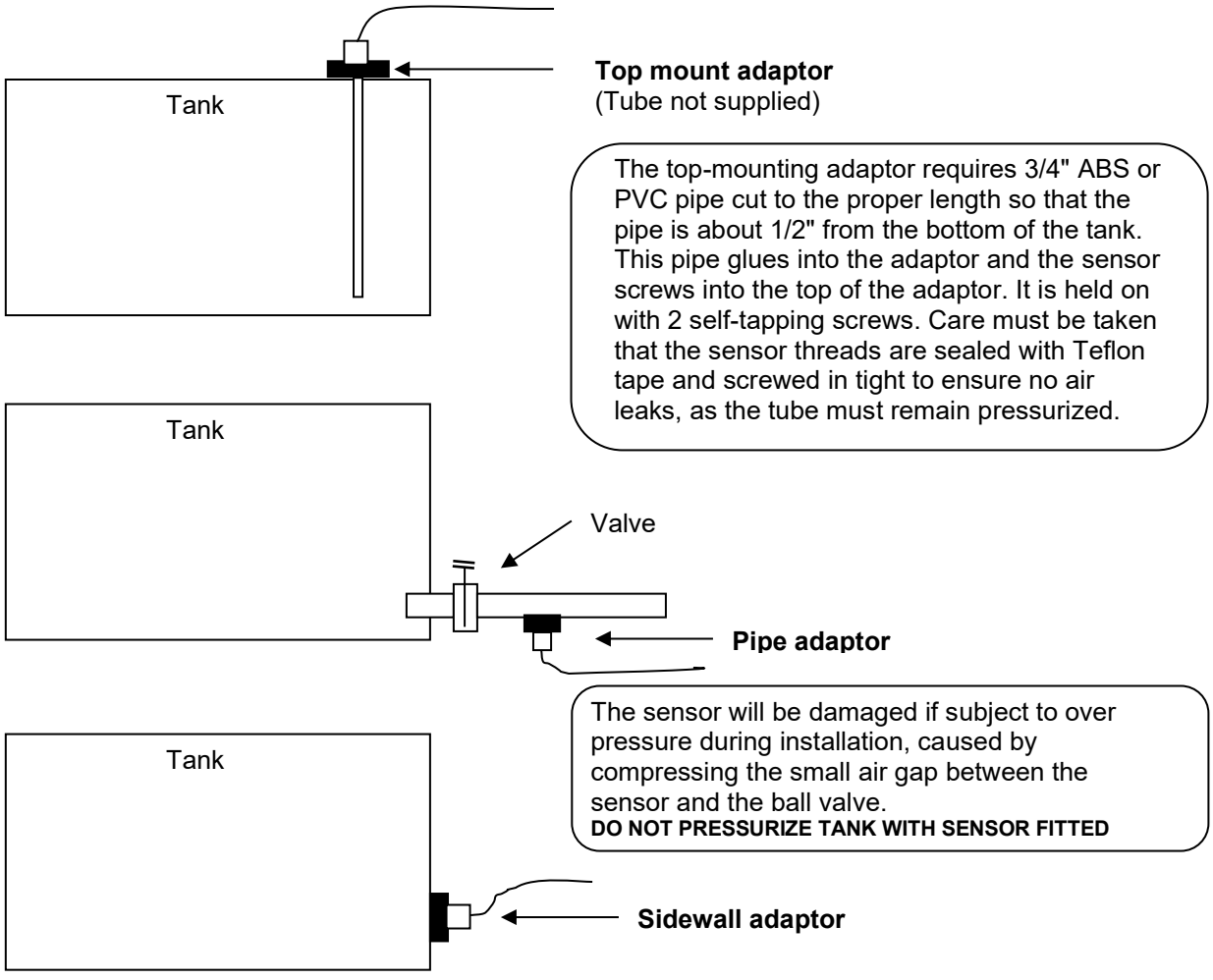
For more information see “Calibration Tips & Tricks” on our web site www.smartswitch.co.nz

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.**

Sensor Installation:

The sensor should be mounted as low in the sidewall as possible using a ¾” 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 ½” 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 (ALSO SEE PAGE 21)

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

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

2 Point Calibration:

Turn Rotary Switch on the I/O Box to position 0

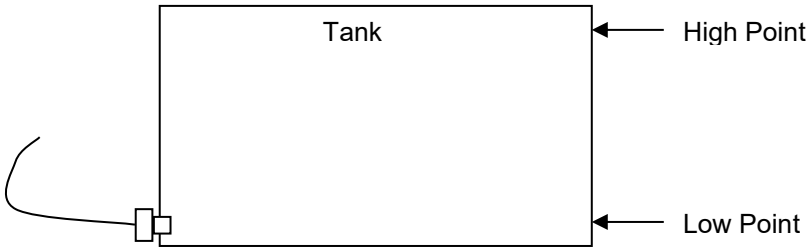
When calibration mode is entered (holding down the program button for 3 seconds) the LED will *flash very fast,* while the I/O Box is calculating the Empty point. Once this has finished you will see Three slow flashes and the LED will stay on indicating it has programmed the Empty point. It is now ready to set the Full point.

When the button is pressed again, to set the Full point, the LED will *flash very fast,* while the I/O Box is calculating the Full point. Once this has finished you will see Three slow flashes indicating it has programmed the Full point. The LED will then turn off.

NOTE: While the fast flashing continues it is indicating the tank contents have not settled enough for the unit to take a good reading (wait for the contents to settle).

NOTE: If you see 12 slow flashes this indicates the unit could not see any difference between the Empty point setting and the Full point setting. The Empty and Full points need to be different.

Turn Rotary Switch to correct position (see Setting Rotary Switch page 15)



Note: The Bottom Only, Top Only and Setting The Calibration From One IOU To Another, only applies to HT-100 or HT-100P units with manufacture dates after March 2007.

After calibrating the bottom and top settings of a tank you may wish to go back and change either of these settings individually:

The Bottom Only setting can be changed by turning the Rotary Switch to position A

Fill the tank to the required TANK LOW LEVEL, minimum suggested is liquid just covering the sensor. Wait approx. 30 seconds for the fluid to settle. Press and hold down the Program Button (on the IOU) until the LED comes on (approx. 3 seconds), this will set the tank low point. Press and release the program button, the LED will give 3 quick flashes. The tank low point has now been saved and the unit will automatically leave program mode. The device is now ready for use.
Turn Rotary Switch to correct position (see Setting Rotary Switch 15)

The Top Only setting can be changed by turning the Rotary Switch to position B

Fill the tank to the required TANK FULL LEVEL and wait approx. 30 seconds for the fluid to settle. Press and hold down the Program Button (on the IOU) until the LED comes on (approx. 3 seconds), this will set the tank high point. Press and release the Program Button, the LED will give 3 quick flashes. The tank high point has now been saved and the unit will automatically leave program mode. The device is now ready for use.
Turn Rotary Switch to correct position (see Setting Rotary Switch page 15)

5 Point Calibration:

Turn Rotary Switch on the I/O Box to position F

When calibration mode is entered (holding down the program button for 3 seconds) the LED will *flash very fast,* while the I/O Box is calculating the Empty point. Once this has finished you will see Six slow flashes and the LED will stay on indicating it has programmed the Empty point. It is now ready to set the 1/4 point.

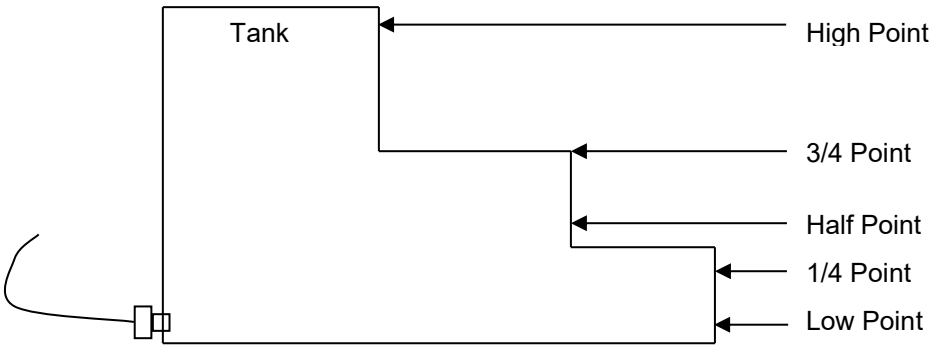
When the button is pressed again, to set the 1/4 point, the LED will *flash very fast,* while the I/O Box is calculating the 1/4 point. Once this has finished you will see Two slow flashes indicating it has programmed the 1/4 point. The LED will stay on indicating it has programmed the 1/4 point. It is now ready to set the 1/2 point.

When the button is pressed again, to set the 1/2 point, the LED will *flash very fast,* while the I/O Box is calculating the 1/2 point. Once this has finished you will see Three slow flashes indicating it has programmed the 1/2 point. The LED will stay on indicating it has programmed the 1/2 point. It is now ready to set the 3/4 point.

When the button is pressed again, to set the 3/4 point, the LED will *flash very fast,* while the I/O Box is calculating the 3/4 point. Once this has finished you will see Four slow flashes indicating it has programmed the 3/4 point. The LED will stay on indicating it has programmed the 3/4 point. It is now ready to set the Full point.

When the button is pressed again, to set the Full point, the LED will *flash very fast,* while the I/O Box is calculating the Full point. Once this has finished you will see Five flashes indicating it has programmed the Full point. The LED will then turn off.

NOTE: While the fast flashing continues it is indicating the tank contents have not settled enough for the unit to take a good reading (wait for the contents to settle).
Turn Rotary Switch to correct position (see Setting Rotary Switch page 15)



Setting The Calibration From One Input/Output Unit To Another:

Once the IO/Box has been calibrated you can transmit the calibration settings from that unit to as many more as required (tanks would need to be the same shape, size and content).

The I/O Box can transmit to, or receive from, any I/O Box and vice versa.
Note: This must be done independently from the complete system setup (only the 2 IOU's connected).
Step 1: Connect the power and network cable to both units.
Step 2: Turn the Rotary Switch to position C for the master transmitter (the unit that is calibrated).
Step 3: Turn the Rotary Switch to position D for the slave receiver (the unit that needs calibrating).

You will see both LED'S flashing, please wait (approx 20 seconds) for the LED'S to stop flashing, the slave receiver now has the same calibration setting as the master transmitter.

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

Ultra-Sonic sensor :

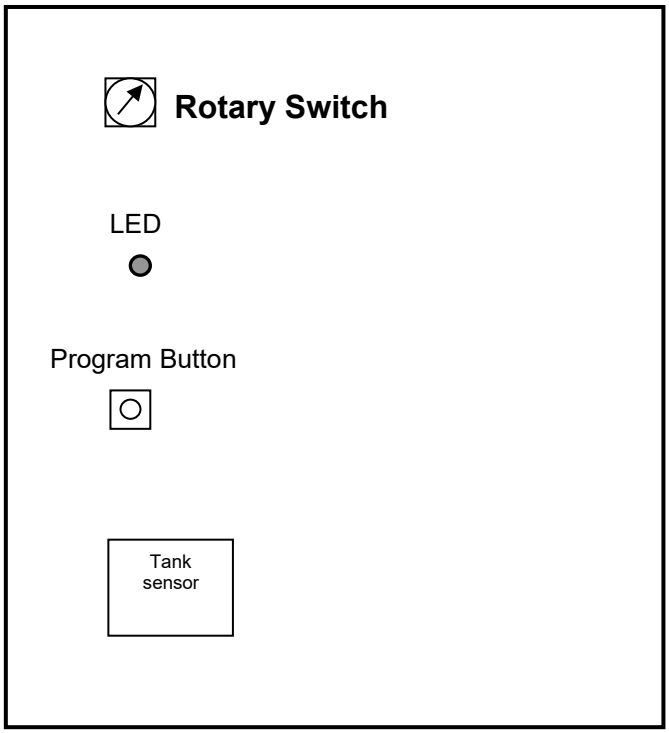
If using the Ultra-Sonic sensor turn the Rotary Switch to position 1
Press and hold down the Program Button for 3 seconds, the LED will flash 4 times and turn off.
Turn Rotary Switch to correct position (See Setting Rotary Switch page 15

Setting Rotary Switch

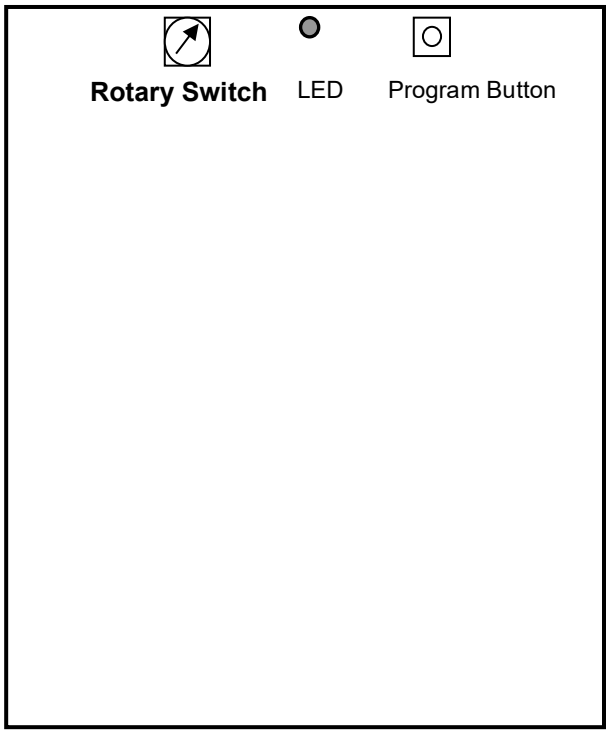
Each Input/Output Unit **(HT-100, HB-200 or HT-100/P, HB-200/P) on the network must have the Rotary Switch set to a unique number (from 2 to 5). NO two devices may share the same Rotary Switch number.**

The Rotary Switch is situated inside the Box of the Input/Output Unit as shown below:

HT-100/P & HB-200/P



HT-100 & HB-200



For your records please use the chart provided below, to note switch number and tank, as this will enable quick reference when programming the Master Display Unit.

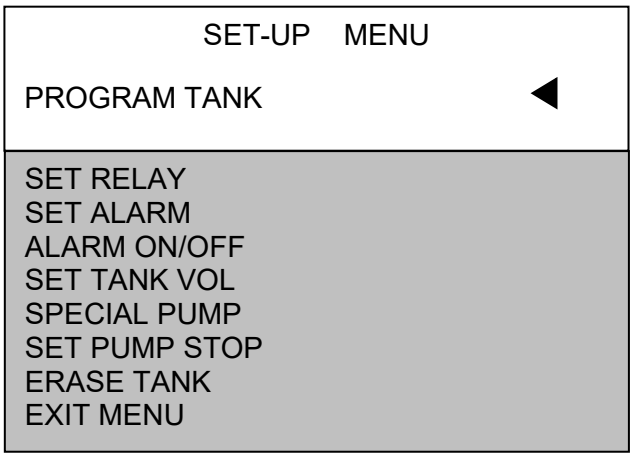
Table 1

	Switch #	Tank Position	Tank Type
Example	*2*	*AFTPORT*	*GREY*
	2		
	3		
	4		
	5		

Master Display Programming Instructions

Step 1: Placing the unit in Program Mode

Press and hold down the Backlight & Scroll keys together for 3 seconds. This will bring you to the Set-Up Menu and place the unit in program mode.



Use the Scroll key to scroll down to these.

Note: After a tank has been programmed any of these options can be changed by scrolling to the feature and pressing the Pump key.

Once you have completed programming or wish to leave the Set-Up Menu and place the system into monitoring mode, simply scroll down to “Exit Menu” and press the Pump key.

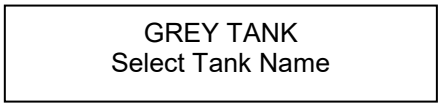
Scroll to “Program Tank” and press the Pump key.

Step 2: Programming a Tank

Once in program mode each tank can be individually programmed and the display will show: “ Select Switch # ” .Use the Scroll or Backlight key to change the Switch Number which corresponds to the I/O unit being programmed (refer to Table 1 on page 15) for Switch Number. Once the Switch Number has been selected, press the Pump key.

Step 3: Selecting Tank Name

The display will now show:



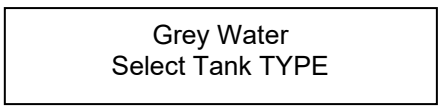
Use the Scroll or Backlight key to scroll through the pre-programmed tank names. Press the Pump key once the required name, or the name you would like to change, has been found. If you want the name on the display press the Pump key again, otherwise if you would like to change the name see next step 3a.

Step 3a: Changing Tank Name Text

The tank name text may be changed. After selecting the Tank (name), as above, use the Backlight key to move the cursor to each individual letter and the Scroll key to scroll through the alphabet. Press the Pump key to enter, once you have finished.

Step 4: Selecting Tank Type

The display will now show:



Use the Scroll or Backlight key to scroll through the tank various types. Press the Pump key once the appropriate tank type has been found.

Step 5: Setting Alarm Point

The display will now show:

```
      Alarm On Point
####################
```

Use the Scroll or Backlight key to scroll through the tank levels. Once you have selected the level you wish to be alarmed at, press the Pump key. This sets the alarm ON trigger point.

Step 6: Audible Alarm

The display will now show:

```
      Audible Alarm
< No                 Yes >
```

Press the Scroll key to select “Yes” or the Backlight key to select “No”.
If Yes is selected the audible alarm will sound based on the point set, as above.
If No is selected there will be no audible alarm associated with that tank, only a visual bell.

Step 7: Tank Volume (see Note 1 page 6)

The display will now show:

```
      Set Tank Volume
< No                 Yes >
```

This allows for displaying the tank volume in either Litres or Gallons. If this feature is required press the Scroll key to select “Yes”. Next select “Lts” for Litres or “Gals” for Gallons.

The display will now show: “Set Vol 00000”. Use the Backlight and Scroll keys to change the value, of each digit, and the Pump key to enter and move to the next digit. When the last digit is reached and the Pump key is pressed, the system will proceed to Step 8.

Otherwise press the Backlight key to select “No”. If No is selected the system will proceed to Step 8.

Step 8: Exit or Menu

You have now completed the programming of a particular tank. This must be repeated for all additional tanks. The display will now show: “ < Exit Menu > ”. To program additional tanks or make a change, press the Scroll key to select “Menu”. This will return you back to Step 1.

If this is the only, or last, tank on the network press the Backlight key to select “Exit”. This will save all associated data that has been set and take the system out of program mode and into monitoring mode. The TM-4000 is now ready for use!

Setting Relay Points

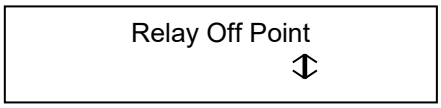
This feature allows you to control where the relay turns on and off.
This can be set up by selecting the “Set Relay” option from the Set-Up Menu.

The display will now show:

```
      Relay On Point
####################
```

Use the Scroll or Backlight key to scroll through the tank levels. Once you have selected the level you wish the relay to turn on at, press the Pump key. This sets the Relay 1 ON trigger point.

The display will now show:



A marker is left to show where the Relay On trigger point was set. Use the Scroll or Backlight key to scroll through the tank levels. Once you have selected the level you wish the relay to turn off at, press the Pump key. This sets the Relay 1 OFF trigger point.

Set Pump Stop:

This feature allows you to set when the Grey or Black pump will be turned Off (default = empty).
This can be set up by selecting the “Set Pump Stop” option from the Set-Up Menu and selecting the tank you wish to set this up on. Use the scroll key to set the pump stop point. Once this is complete press the Pump Key and you will return to the Set-Up Menu. Repeat for extra tanks that require this feature.

Special Pump:

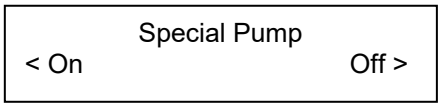
If the Black tank has a charcoal filter fitted and you are using a pressure sensor you will need to use this feature.

Explanation: When the pump is turned on liquid is removed from the tank quicker than air can replace it due to the constrictive nature of the air filter.

The Special Pump feature will allow the pump to run for a pre-set time without looking at the tank level (which will be wrong due to the above reason), the pump will then turn Off for one minute allowing the tank to equalize its pressure. The system will then look at the tank level and turn the pump back On for a time period. This time will be based on the tank level e.g. If the tank level is low the time period will be short. This will continue until the tank is empty.

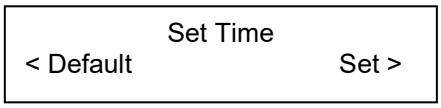
Scroll down to “Special Pump” and press the Pump Key.

The display will now show:



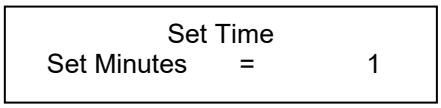
Press the Scroll key to select “Off” or the Backlight key to select “On”.
If Off is selected the feature will be turned Off and the system will return to the Set-Up Menu.

If On is selected, **The display will now show:**



This is the time period the pump will run (if full) before looking at the tank level.
Either Default or Set maybe selected.
If Default is selected the time period will be set to 3 minutes and the system will return to the Set-Up Menu.

If Set is selected, **The display will now show:**



Use the Scroll Key to scroll through the times 1 to 5 minutes. Press the Pump key to enter. The system will now return to the Set-Up Menu.

Erasing Tanks: From the Set-Up Menu scroll down (by pressing the Scroll key) to “Erase Tank” then press the Pump key. Press the Scroll key to scroll to the tank you want to erase and press the Pump Key. The tank’s data will be erased and the system will return back to the Set-Up Menu.

Relays:

The Output Relay 1 & Relay 2 are a 3-amp inductive load relay with common, normally open and normally closed contacts available.

HT-100 or HB-200 (Relay 1 & Alarm)

When the tank reaches the programmed ON point, the Alarm and Relay 1 will turn ON. When the tank reaches the programmed OFF point Relay 1 will turn OFF. This output could be used to disable the toilet controller or activate a tank full warning light/alarm. Pressing the Pump key will mute the alarm.

HT-100/P or HB-200/P (Pump Output, Relay 2, Relay 1 & Alarm)

Grey or Black Tank

When the tank reaches the programmed ON point, the Alarm and Relay 1 will turn ON. When the tank reaches the programmed OFF point Relay 1 will turn OFF. This output could be used to disable the toilet controller or activate a tank full warning light/alarm. Pressing the Pump key will mute the alarm.
Pressing the Pump Key again will activate the Pump Output and Relay 2, which will automatically turn OFF when the tank is empty or can be stopped at any time by pressing the Pump key again.

Fuel Tank

If a tank is programmed as 'Fuel' the Pump Output and Relay 2 will automatically turn ON when the tank reaches the programmed low-level point and OFF when full. Alternatively pressing the Pump key at any time will activate the pump, which will turn OFF automatically when the tank reaches full. It can be turned OFF at any time by pressing the Pump key again. The Alarm and Relay 1 will turn ON when the tank goes below the programmed low-level value and will turn OFF when the tank is 6 display bars above the programmed low-level. Pressing the Pump key will mute the alarm.

Fresh Tank

If a tank is programmed as 'Fresh' the Audio Alarm and Relay 1 will turn ON when the tank reaches the programmed low-level point, to indicate the tank is low, and will turn OFF when the tank is 6 display bars above the programmed low-level. Pressing the Pump key will mute the alarm. Pressing the Pump key again or at any time will activate the Pump Output and Relay 2, which will both turn OFF automatically when the tank reaches full. Or the Pump and Relay 2 can be turned OFF at any time by pressing the Pump key again.

H20-Maker Man 1 : Manual Mode

If a tank is programmed as 'H2O-Maker Man 1' the Audio Alarm will turn ON, when the tank reaches the programmed low-level point to indicate the tank is low, and OFF when the tank is 6 display bars above the programmed low-level point. Pressing the Pump key will mute the alarm. If connected to a water maker and the Pump key is pressed then Relay 1 will turn ON, and OFF when the tank reaches bars above this point. The Pump Output and Relay 2 will turn ON when the tank reaches full and OFF 2 bars below full. It can be turned OFF at any time by pressing the Pump key.

H2O-Maker Man 2 : Manual Mode

If a tank is programmed as 'H2O-Maker Man 2' the Audio Alarm will turn ON, when the tank reaches the programmed low-level point to indicate the tank is low, and OFF when the tank is 6 display bars above the programmed low-level point. Pressing the Pump key will mute the alarm. If connected to a water maker and the Pump key is pressed then Relay 1, Relay 2 and Pump Output will turn ON, and OFF automatically when the tank reaches full or can be turned off at any time by pressing the Pump key again

H2O-Maker Auto 1 : Auto Mode

If a tank is programmed as 'H2O Maker Auto 1' then Relay 1 will automatically turn ON when the tank reaches the programmed Relay 1 ON point and OFF 2 bars above this point. The Pump Output and Relay 2 will turn ON when the tank reaches full and OFF 2 bars below full. It can be turned OFF at any time by pressing the Pump key. Pressing the Pump key will also mute the alarm. This setting is useful for land based systems.
If connecting to Sea Recovery: Relay 1 = Low float, Relay 2 = High float, connect both between Com & N/C contacts on the relays, Program for H2O-Maker Auto 1 and program Relay 1 ON point where ever you want the water maker to start.

H2O-Maker Auto 2 : Auto Mode

If a tank is programmed as 'H2O Maker Auto 2' then Relay 1, Relay 2 and Pump Output will automatically turn ON when the tank reaches the programmed Relay 1 ON point and OFF when the tank reaches the programmed Relay 1 OFF point. It can be turned OFF at any time by pressing the Pump key. Pressing the Pump key will also mute the alarm. This setting is useful for land based systems.

Motor-Home Water

If a tank is programmed as 'Motor-Home Water' pressing the Pump key at any time will activate the Pump Output and Relay 2, which will turn OFF automatically when the programmed low-level point is reached. It can be turned OFF at any time by pressing the Pump key again. Relay 1 will turn ON when the programmed low-level point is reached and OFF when the tank is 3 bars above the programmed low-level point. Pressing the Pump key will mute the alarm, in the first instance.

Operating Instructions:

1/ Pressing the Backlight key will turn the backlight ON, press again to turn OFF.

2/ Press the Scroll key to alternate between tanks.

3/ Press and hold down the Scroll key for 4 seconds to alternate between display modes.

4/ Pressing the Pump key will turn a pump ON, press again to turn OFF.

The Pump key will also act as the Mute key if an alarm is on. E.g. if an alarm is ON the first press will mute the alarm, the second press will turn the pump ON, or OFF.

If a pump is turned ON a flashing “P” will be displayed in the top right section of the display. If the Scroll key is then pressed, to display another tank, the “P” will become solid, indicating there is a pump ON somewhere but it’s not the tank you are looking at.

If the Scroll key is pressed until the tank with the pump ON is reached the flashing “P” will reappear.

If a Seacock Interlock Switch is fitted and the valve is closed the pump will not turn ON, a flashing “V” will be displayed instead of the “P” and the Audio Alarm will sound (press the Pump key to mute).

If the Scroll key is then pressed to display another tank the “V” will stay on solid, indicating there is a valve closed somewhere but it’s not the tank you are looking at.

Once the valve is opened the “V” will change to a “P”. Pressing the Pump key again will turn the pump ON.

Audio Alarm:

The Audio Alarm can be turned ON or OFF by holding down the Backlight key for 3 seconds, you will hear a bleep after every second. After 3 bleeps you may release the key.

If the Audio Alarm is turned OFF there will still be a Visual Alarm (bell icon). The bell icon will flash when the tank with the alarm is being displayed, otherwise it will remain on solid. A solid bell indicates there is an alarm, but not for the tank being displayed.

Errors:

If a HT-100, HB-200 or HT-100/P, HB-200/P loses communication with the MDU, or power, the text “COMMS FAULT” will be displayed on the bottom line (tank level bar-graph) of the TM-4000 display unit. The display will resume normal operation once the problem has been rectified.

This Calibration method applies to I/O Units manufactured before 01/06/2009

2 Point Calibration:

Turn Rotary Switch on the I/O Box to position 0

Fill the tank to the required TANK LOW LEVEL, minimum suggested is liquid just covering the sensor. Wait for approx. 30 seconds for the fluid to settle. Press and hold down the Program Button (on the IOU) until the LED comes on (approx. 3 seconds) this has set the tank low point.

Fill the tank to the required TANK FULL LEVEL. Wait approx. 30 seconds for the fluid to settle. Press and release the Program Button, the LED will give 3 quick flashes. The tank high point has now been set and the unit will automatically leave program mode. The device is now ready for use.
Turn Rotary Switch to correct position (see Setting Rotary Switch page 15)

5 Point Calibration:

Turn Rotary Switch on the I/O Box to position F

Fill the tank to the required TANK LOW LEVEL, minimum suggested is liquid just covering the sensor. Wait for approx. 30 seconds for the fluid to settle. Press and hold down the Program Button (approx. 3 seconds), the LED will give 4 quick flashes and stay on. The tank low point has now been set.

Fill the tank to the required QUARTER LEVEL and wait approx. 30 seconds for the fluid to settle. Press and release the Program Button, the LED will give 1 quick flash. The tank 1/4 point has now been set.

Fill the tank to the required HALF LEVEL and wait approx. 30 seconds for the fluid to settle. Press and release the Program Button, the LED will give 2 quick flashes. The tank 1/2 point has now been set.

Fill the tank to the required THREE QUARTERS LEVEL and wait approx. 30 seconds for the fluid to settle. Press and release the Program Button, the LED will give 3 quick flashes. The tank 3/4 point has now been set.

Fill the tank to the required FULL LEVEL and wait approx. 30 seconds for the fluid to settle. Press and release the Program Button, the LED will give 4 quick flashes and turn off. The tank full point has now been set. The unit will automatically leave program mode. The device is now ready for use.

Turn Rotary Switch to correct position (see Setting Rotary Switch page 15)

©

All technologies, design and Intellectual property is owned by

Penguin Electronics Ltd
New Zealand

Email: sales@smartswitch.co.nz Web: www.smartswitch.co.nz