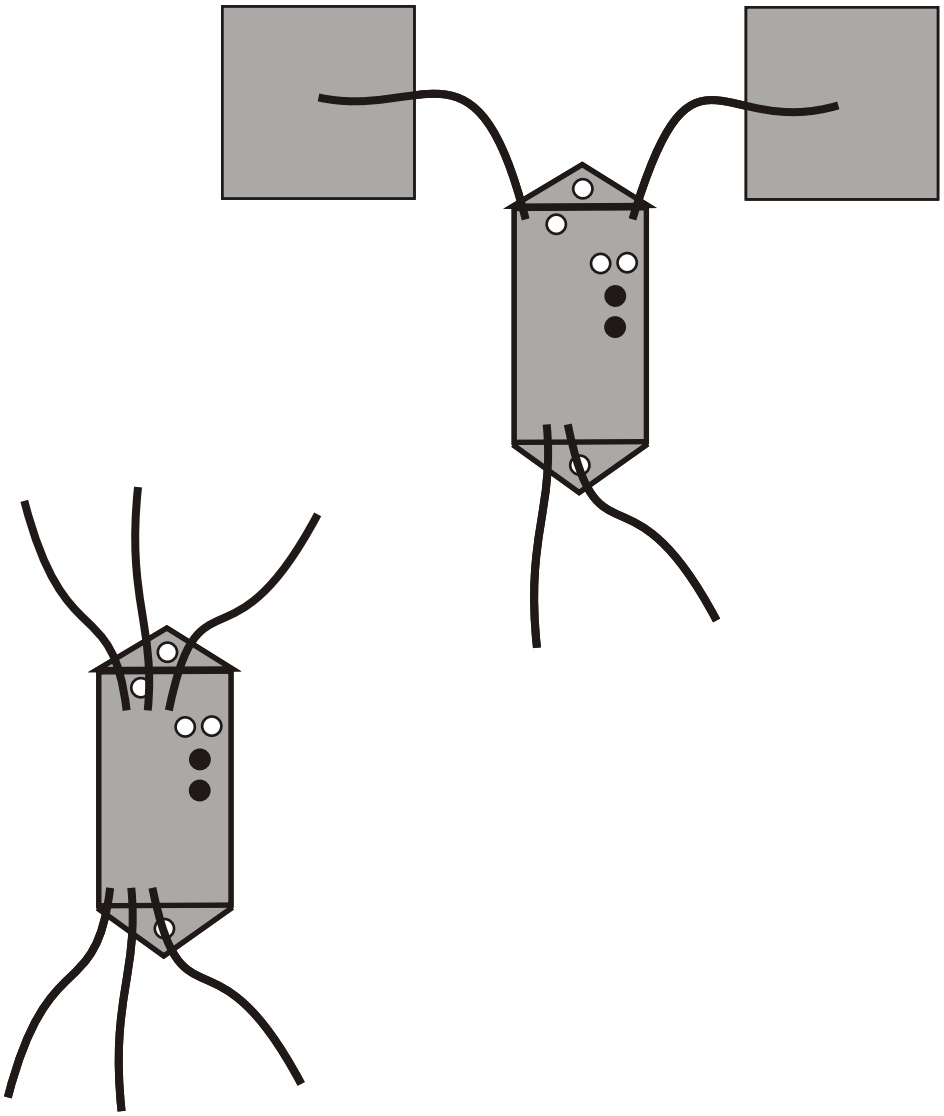
NEEDLE GAUGE DRIVING SENSORS AND ADAPTER MODULES



New Providence Marine Systems

NEEDLE GAUGE DRIVERS

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Introduction

This sensor is one which I had in mind for awhile. This sensor is one which has been requested several times per year: one which offers the same advantages of our current external sensor but would be compatible with existing mechanical needle gauges. It is also offered as a module which functions as a calibratable module to bridge between our PVC rod sensors and mechanical needle gauges.

As a sensor: Like our other external sensors, thiis sensor is designed for use with plastic (HDPE or LDPE) or fiberglass walled fluid tanks. It is not suitable for use on metal tanks. Wood-cored fiberglass walled fluid tanks might give mixed results due to the extra thickness of the tank wall and to the possibility of varying humidity levels within the wood core. For tanks of this type and metal tanks we recommend the installation of our internal rod-style sensors.

Ever have a float sensor foul and fail in a waste tank? Our solid-state non-contact level sensors solve this problem entirely because it is installed on the outside of the tank and has no contact with the tank contents. No moving parts. No fouling. No problem.

Due to its external installation, this sensor is also great for installation by do-it-yourselfer. Installation of the sensor can also be done in just a few minutes with common tools and materials, and since no holes are required in the tank, there is no chance of a leaking tank as a result of sensor installation.

As a calibratable adapter: this module will convert the analog voltage of our PVC sensor rods to the current driven output required to drive mechanical needle gauges. This module also regulates the power for the rod to provide maximum sensor accuracy.

We have taken considerable time and effort to ensure that you have purchased the best marine tank monitoring system possible. Our Engineering and Sales staff has over 20 years experience in the Marine Industry and has launched several highly successful marine products. In order to ensure continuing product quality we build all of our products on our state of the art electronics production line and test and inspect each and every sensor several times prior to packaging and shipping to the customer.

Installation Guide

This sensor has been designed to be installed with common tools and materials by both marine professionals and boat owners. The installation process is fairly involved, but can be accomplished as a series of simple steps. We highly recommend you read this manual in its entirety and familiarize yourself with each step prior to beginning the installation. You should also read the owners manual for the display panel you are installing and become familiar with it as it contains important wiring instructions required to completely setup your system. If you have any questions at all about the installation or setup process please contact our technical support staff, they will be happy to answer any questions you have to ensure a successful installation.

Included parts

The calibratable foil sensor variant kit contains the sensor module and a length of aluminum foil sensor tape as shown below:

Figure 1: Sensor Variant kit.

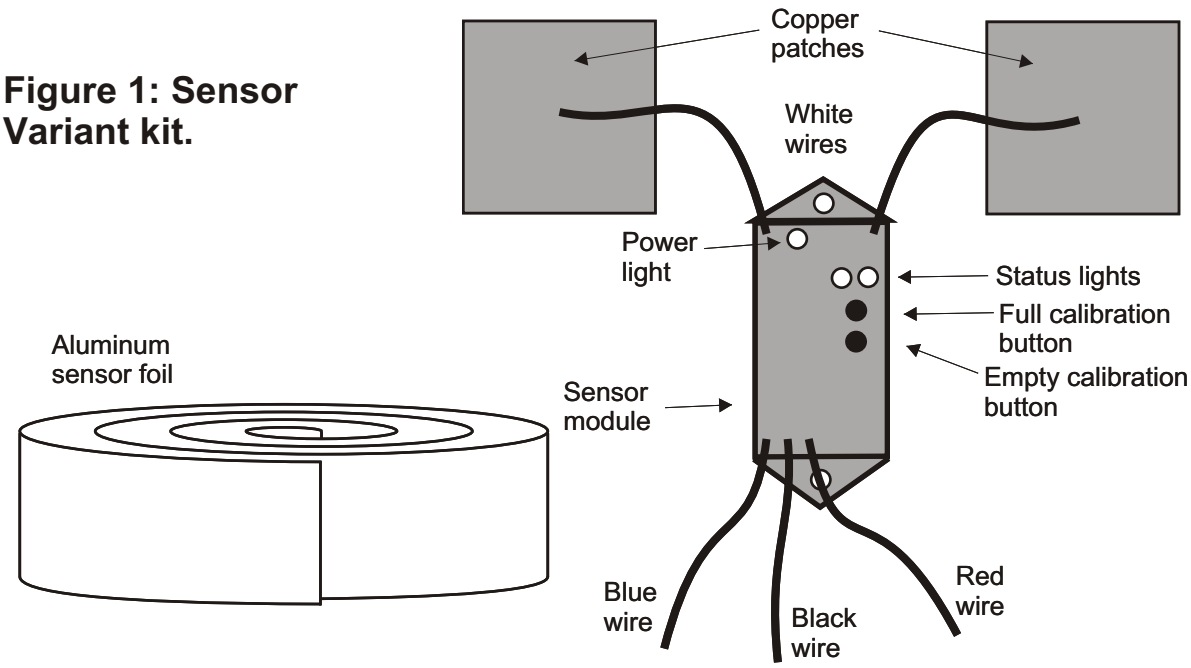
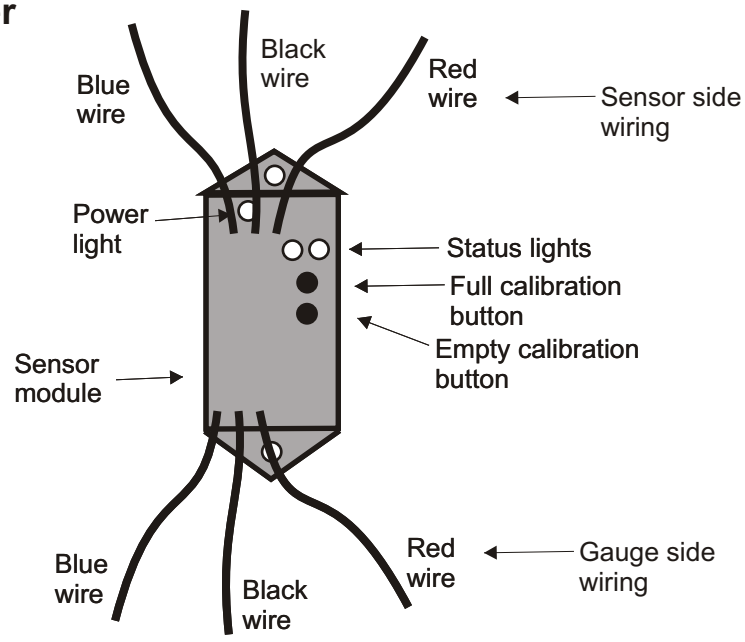


Figure 2: Adapter Variant kit.



Required additional tools and materials

In addition to the contents of this sensor kit and that of the monitoring panel kit, you will need to provide the following tools and materials to install these sensors on your tanks:

1) Tape measure
2) Pencil or permanent marker
3) Isopropyl alcohol
4) Wire sufficient to reach between the gauge and sensor location.
5) Wire cutter, stripper and terminal crimper for 18 AWG wire (inexpensive combination tools are usually available at most auto parts or hardware stores)
6) Crimpable insulated butt connectors for 18 AWG wire (you will need 3 for each sensor variant and 6 for each adapter variant you are intending to install)
7) Optional: Flex Seal brand clear spray sealant (locally available at most hardware stores)

Installation: Sensor variant wiring

The first step in installing the module is to pull the wires from the gauge location to the monitored tank. This module requires wires for power, sensor return, and ground. Recycle any wires already in place to simplify this step (for example reuse wires already in place for a float sensor which you may be replacing with this module).

Installation: Sensor variant foil application

This sensor requires the application of a pair of 2” wide sensor foils to the outside of each tank you want to monitor. You should select a wall of the tank which gives you good access to apply the sensor foil and has adequate clearance to install the sensor module. A good location will also allow sensing of the entire tank volume so select a wall that goes from the lowest part of the tank to the highest part. Care should be taken to select a location which also keeps the sensor foils away from conductive objects such as metal frame work or large metal objects, water supply lines or drains, and wiring harnesses. Proximity of the sensor foils to these objects can affect accuracy so the more clearance you can provide the better.

Once you have selected the location for the sensor, measure the height of the tank there and cut 2 sensor foil strips which are 1” shorter than the height measurement (i.e. if the height of the tank is 18” you should cut the sensor strips 17” long). This kit provides you with approximately 60” of aluminum tape which should be enough material for two 30” sensor strips. Now flatten out the cut strips to minimize any folding that might interfere with the application of the sensor foil to the tank wall.

Once the sensor location is selected and the sensor strips are cut, you need to wipe down the face of the tank with isopropyl alcohol to clean it and remove any residues which might prevent proper adhesion of the aluminum tapes. Wipe this area down with the alcohol and allow to completely dry.

Note: refer to Figure 3 as you read the steps below, it will make this procedure much easier to understand.

The sensor strips should be positioned 3” to 4” apart on the tank wall; they should also be positioned ½” from the top and bottom of the tank. Use your tape measure and permanent marker to mark the positions on the tank wall. Now you can remove the paper backing from each aluminum foil strip and apply it to the tank using your marks as a guide.. Apply the foils as flat as possible to the wall to ensure good adhesion, but do not worry if you can not get it perfectly flat as it should not affect the sensor output.

Now remove the paper backer from the back of the sensor module itself and apply it in between both of the sensor foils. Once it is securely in place, remove the paper backing from each of the copper patches and apply them over the top of each of the aluminum sensor foils. Figure 3 shows a typical sensor installation with positions shown for each part described in this section.

Note: due to variances in tank shape and the possibility of restricted access to suitable tank walls, you may not be able to follow these instructions exactly. In this case, try to get your installation as close as possible to our recommendations..

Installation: Sensor variant wiring

Complete the module wiring with the crimable butt connectors. The module red wire from the gauge side of the module (see Figure 1 and Figure 3) should be attached to 12VDC, the black wire to Ground, and the blue wire to the input of your gauge.

Installation: Sensor variant final Installation

It would be helpful to leave all the sensor exposed until you are finished testing and calibrating your module. Once everything is working well, you can replace any panels or covers for each tank. Note: the plastic material used to construct some tanks can exude a waxy substance which could cause the aluminum tape to shed off of the tank wall over time. To ensure permanent adhesion of the sensor foil to the tank wall as a final step you can optionally over-spray the edges of the aluminum sensor foil with the Flex Seal brans clear sealant (locally available at most hardware stores). This step optional step can be performed later if you observe the aluminum tape peeling up from the tank wall spontaneously.

Calibration: Both Sensor and Adapter variants

These modules, whether a sensor variant attached directly to a tank or an adapter variant attached to an installed sensor, require calibration to function accurately. Calibration stores empty and full sensor outputs and stores them and uses these calibration values to calculate output for display.

Full calibration: Fill tank to full. Make sure power to sensor is on (this is evidenced by the power light being lit). Press and hold the full button for 5 seconds until one of the status lights blinks then release the button.

Full calibration: Drain tank to empty. Make sure power to sensor is on (this is evidenced by the power light being lit). Press and hold the empty button for 5 seconds until one of the status lights blinks then release the button.

Note: It does not matter the order full or empty calibrations are performed but both are required.

Installation: Adapter variant wiring

The first step in installing the module is to pull the wires from the gauge location to the monitored tank. This module requires wires for power, sensor return, and ground.

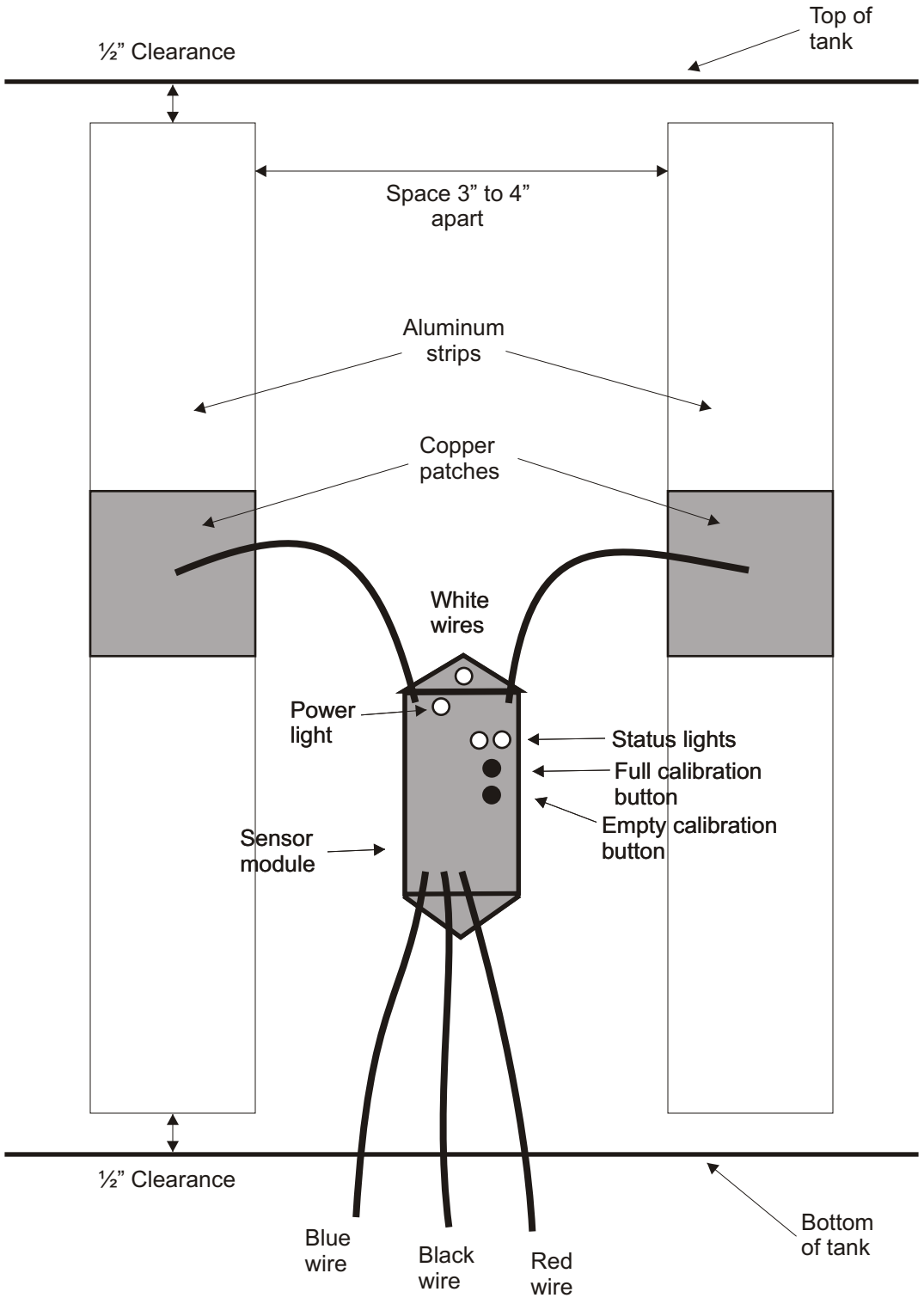
Installation: Adapter variant

Locate a clear spot near to the sensor to be attached to the adapter module, If the sensor is not yet installed, install per its included manual.

Now remove the paper backer from the back of the sensor module itself and apply the module to its intended location. Once it is securely in place attach the sensor side module wires to the sensors output wires. The wire colors should match up: attach red to red, black to black, and blue to blue. Attach each using climbable butt connectors. Add additional wire as required to attach the adapter module to the sensor.

Installation: Adapter variant wiring

Complete the module wiring with the crimpable butt connectors. The module red wire from the gauge side of the module (see Figure 1) should be attached to 12VDC, the black wire to Ground, and the blue wire to the input of your gauge.



Wiring to gauge and power.

Figure 3: Sensor installation on tank.

Limited Warranty

New Providence Marine Systems (New Providence) warrants to the original purchaser that this product is free of defects in materials or workmanship for a period of one year from the product's date of purchase. Should this product prove defective by reason of improper workmanship and/or materials within the warranty period, New Providence shall, at its sole option, repair or replace the product.

1. TO OBTAIN WARRANTY SERVICE, Consumer must deliver the product prepaid, together with a detailed description of the problem, to:

New Providence Marine Systems
Attn: Warranty Service
PO Box 2272
Pocatello, ID 83206-2272

When requesting warranty service, purchaser must present a sales slip or other document which establishes proof of purchase. THE RETURN OF THE PRODUCT REGISTRATION FORM IS NOT A CONDITION PRECEDENT OF WARRANTY COVERAGE. However, please complete and return the Product Registration Form so that New Providence can contact you should a question of safety arise.

2.THIS WARRANTY DOES NOT COVER defects caused by modifications, alterations, repairs or service of this product by anyone other than New Providence; defects in materials or workmanship supplied by others in the process of installation of this product; defects caused by installation of this product other than in accordance with the manufacturer's recommended installation instructions or standard industry procedures; physical abuse to, or misuse of, this product. This warranty also does not cover damages to equipment caused by fire, flood, external water, excessive corrosion, or Act of God.

3. ANY EXPRESS WARRANTY NOT PROVIDED HEREIN, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH BUT FOR THIS PROVISION MIGHT ARISE BY IMPLICATION OR OPERATION OF LAW, IS HEREBY EXCLUDED AND DISCLAIMED. ALL IMPLIED WARRANTIES SUCH AS THOSE OF MERCHANTABILITY AND OF FITNESS FOR A PARTICULAR PURPOSE, IF APPLICABLE, AS WELL AS ANY IMPLIED WARRANTIES WHICH MIGHT ARISE BY IMPLICATION OF LAW, ARE EXPRESSLY LIMITED TO A TERM OF ONE YEAR. SOME STATES DO NOT ALLOW LIMITATIONS ON HOW LONG A LIMITED WARRANTY LASTS, SO THE ABOVE LIMITATION MAY NOT APPLY TO YOU.

4. UNDER NO CIRCUMSTANCES SHALL NEW PROVIDENCE BE LIABLE TO PURCHASER OR ANY OTHER PERSONS FOR ANY SPECIAL OR CONSEQUENTIAL DAMAGES, WHETHER ARISING OUT OF BREACH OF WARRANTY, BREACH OF CONTRACT, OR OTHERWISE. SOME STATES DO NOT ALLOW THE EXCLUSION OR LIMITATION OF INCIDENTAL OR CONSEQUENTIAL DAMAGES, SO THE ABOVE LIMITATION OR EXCLUSION MAY NOT APPLY TO YOU.

5. No other person or entity is authorized to make any express warranty, promise or affirmation of fact or to assume any other liability on behalf of New Providence in connection with its products except as specifically set forth in this warranty.

6. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Product Registration Form

In order for us to notify you about possible safety issues or to notify you about possible product upgrades we request the following information. Having this dated form on file in our offices also serves to establish your purchase date for warranty issues.

Owner Information:

Name:_____.
Address 1:_____.
Address 2:_____.
City:_____State:_____ZIP:_____.
Phone: (_____)_____-_____.
Email:_____.

Product Information:

Product(s) Purchased:_____.
Date Purchased (MM/DD/YY):____/____/____.
Where Purchased From:_____.
Make/Model of Boat:_____.
# of Tanks Monitored:_____.

Please fill out as clearly as possible and return to:

New Providence Marine Systems
Attn: Product Registration
PO Box 2272
Pocatello, ID 83206-2272