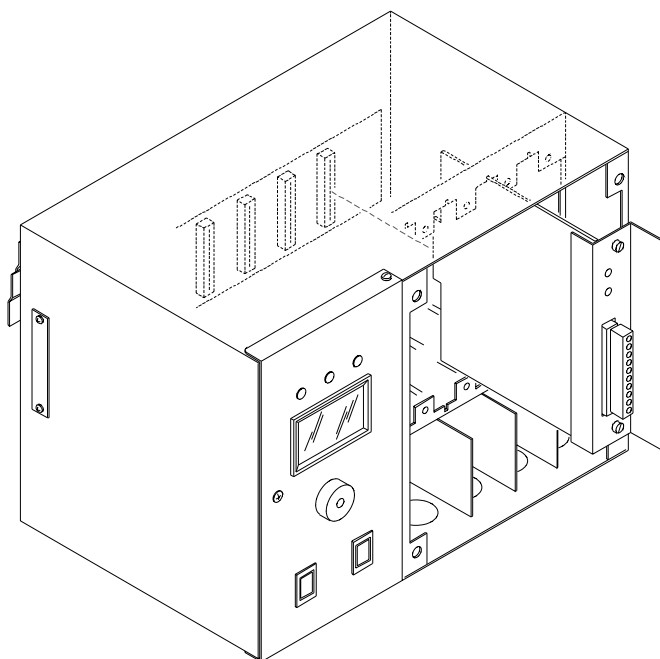




Mag Network Card Installation Manual



ProLink Fuel Management System

RE260-265
Rev C
June '00

Mag Network Card Installation Manual

RE260-265 ♦ Rev C ♦ June '00

Certifications and Listings

Marley Pump Company is ISO 9001 certified.

Red Jacket's Prolink system has been approved by Underwriters Laboratories to carry the UL Listing Mark.

Red Jacket's Prolink system has been approved by Underwriters Laboratories of Canada to carry the ULC Listing Mark.

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About This Manual

This preface describes the organization of this manual, explains typographical conventions used, and defines vital terminology.

Organization

This manual is organized into seven chapters:

- Chapter 1: Before You Start
- Chapter 2: Overview and Installation Requirements
- Chapter 3: Conduit, Direct Bury, and Retrofit Installations
- Chapter 4: Installing the Mag Inventory Probe
- Chapter 5: Installing the Mag network card
- Chapter 6: Pathway Plus Setup
- Chapter 7: Troubleshooting

It also includes an Index.

Typographical Conventions

The various symbols and typographical conventions used in this manual are described here.

Numeric Formats	A numeric zero looks like 0 in this document. An uppercase letter “oh” is rendered as O. A numeric one looks like 1 in this document. A lowercase letter “ell” is rendered as l. However, to prevent confusion, the abbreviation for milliliter includes a capital letter (mL).
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Terminology

The following terms are used throughout this manual to bring attention to the presence of hazards of various risk levels, or to important information concerning use of the product

Danger!!

Indicates the presence of a hazard that will cause severe personal injury, death, or substantial property damage if ignored.

WARNING!

Indicates the presence of a hazard that can cause severe personal injury, death, or substantial property damage if ignored.

Caution

Indicates the presence of a hazard that will or can cause minor personal injury or property damage if ignored.

Notice

Indicates special instructions on installation, operation, or maintenance that are important but not related to personal injury hazards.

Chapter 1: Before You Start

This Chapter Explains:

- Intrinsic Safety
- Installation DOs and DON'Ts

Intrinsic Safety Information

ATTENTION INSTALLER

READ THIS IMPORTANT SAFETY INFORMATION BEFORE BEGINNING WORK

Portions of this product will be installed and operated in the highly combustible environment of a petroleum product storage tank. It is essential that you carefully read and follow the warnings and instructions in this manual to protect yourself and others from serious injury, explosion, electrical shock, or death.

WARNING!	All installation and programming of Red Jacket ProLink enclosures should be performed by factory trained personnel only. Before beginning any installation procedure, carefully read and understand all instructions.
	Failure to follow these guidelines can result in severe personal injury, death, or substantial property damage. Retain a copy of this manual on site with the ProLink enclosure system as required by EPA regulations in paragraph 40CFR 280.45. Installations must comply with section 504, article 300 of the N.E.C. which defines intrinsic safety.



Precautions must be taken in the installation of this product to limit power in the wiring to the fuel tanks and to keep that wiring physically separated from any other wiring (intrinsically safe)

All intrinsic wiring has to be routed through separate wireways and conduit from standard 120/240VAC wiring. Slot dividers are required to ensure UL separation between intrinsically safe wires and standard 120VAC wiring.

Notice

It is your responsibility to maintain the effectiveness of the safety features by installing this product in accordance with the instructions and warnings that follow. Failure to do so could create danger to life and property and will result in voiding all warranties connected with this product

Installation DOs and DON'Ts

WARNING!

Failure to follow these guidelines could result in severe personal injury, death, or substantial property damage.

DOs

The following list represents the **DOs** for installing the Mag network card. Please read through this list before beginning the installation.

- DO plan all conduit or direct-bury runs and contractor's box installations before mounting the Prolink main data chassis.
- DO install the system to meet the National Electric Code(section 504, article 300); federal. State, and local codes; and any applicable safety regulations.
- DO disconnect all power before making final connections.
- DO maintain intrinsic safety. Sensor wires must be separated from all other non-intrinsically safe wiring. Install the safety tag on all intrinsically safe contractor's boxes.
- DO use Red Jacket Mag interconnect cable ONLY for conduit or direct bury applications. See table in Appendix A: Parts List.
- DO observe proper conduit access into the Prolink enclosure.
- DO mount the Prolink main data chassis in a dry, climate controlled environment.
- DO hardwire Prolink to a dedicated, isolated, circuit breaker.
- DO print all setup reports and store them on-site (after final programming is complete).
- DO install a station ground rod (if one is not present) and verify that it is connected to the Prolink main data chassis.

WARNING!

Failure to verify this ground connection **CAN** cause **SEVERE** personal injury, death, or substantial property damage

WARNING!

Failure to comply with these installation requirements will void product warranty and payment of startup fees.

DON'Ts

The following list represents the DON'Ts for installing the Mag network card. Please read through this list before beginning the installation.

- DON'T short circuit the power supply.
- DON'T handle the Mag network card or other circuit boards without proper grounding straps.
- DON'T allow unauthorized field service personnel to work on the internal circuits of Prolink or the Mag network card. Unauthorized work will adversely affect the intrinsic safety of the system and void product warranty.
- DON'T run any other lines or power devices through the Prolink enclosure. The Prolink main data chassis is a low-voltage device.
- DON'T hammer the cable into the sawcut.
- DON'T drill any holes in the Prolink enclosure.
- DON'T pull inventory sensor wires more than 1,000 feet maximum from Prolink.
- DON'T use cold water pipe as earth ground.
- DON'T cross barriers of low voltage with high voltage wire.
- DON'T run intrinsically safe inventory sensor wiring in conduit or troughs containing non-IS wiring and/or AC wiring.
- DON'T use any cable other than Red Jacket supplied and approved cable for interconnect between the magnetostrictive inventory sensors and the Mag Network Card.
- DON'T run cabling beyond the maximum length specified for the type of cable installed.

Chapter 2: Overview and Installation Requirements

This Chapter Explains

- **Mag Network Card Overview**
- **Installation Requirements**
 - The Mag Network Card
 - The Mag Inventory Probe
 - Conduit and Direct Bury Cable Installations

Mag Network Card Overview

The Mag network card is designed to provide the interface between the Mag inventory probe and the Prolink network. This network card can control up to four Mag probes. More than one Mag network card can be installed on a Prolink network. Information collected and reported by the Mag network card consists of tank gauging, leak detection, delivery, and theft detection.

- **Tank gauging:** Consists of reporting current height, gross volume, net volume, temperature, water and ullage to the Prolink.
- **Leak detection: Tank leak testing will occur during shutdown only.**
- **Alarms:** Alarms such as overfill, high-water, low product, and theft can be routed to the Prolink main data chassis, Piezo alarm, Pathway Plus, an external alarm, or any combination of the above.



Installation Requirements

The Mag Network Card

Requires an open network slot in a Prolink chassis.

The Mag Inventory Probe

The Mag inventory probe used with the Mag network card requires a dedicated riser on the underground storage tank (UST). It cannot be installed in any other type of riser.

Notice

The maximum number of tanks that can be manifolded together is four. If there is more than one Mag network card installed in a single Prolink chassis, ALL Mag probes from tanks that are manifolded together **MUST** be connected to the same Mag network card.

Conduit and Direct Bury Installation

DANGER!!

Conduit or wiring troughs connecting wiring between the Mag inventory probe and the Mag network card must not contain **ANY** non-intrinsically safe wires.

All conduits must enter the Prolink enclosure through the pre-formed factory supplied knockouts.

- In Direct Bury applications, all interconnect cable must be encased in rigid conduit from the end of the sawcut until it enters the Prolink enclosure
- The interconnect cable used in conduit applications **MUST** be Red Jacket Mag Cable.
- The interconnect cable used in direct bury applications **MUST** be Red Jacket Direct Bury Mag Cable.
- The use of **ANY** other cable will void product warranty and startup fees.

Caution

Splicing an interconnect cable should be considered only in emergency situations. A splice will cause degradation to the system performance and will void the normal warranty.

Chapter 3: Conduit and Direct Bury Cable Installation

This Chapter Explains

- Conduit Installation
- Direct Bury Cable Installation

Conduit Installation

When installing the Mag inventory probe cable in conduit, see *Figure 3.1*. Refer to Appendix A for a list of Red Jacket supplied cables for conduit installations. The cable should be selected in accordance with the length of the run. Under no circumstances should any run exceed the maximum run length specified in Appendix A for each Red Jacket supplied cable type.

Notice	Conduit from the Mag inventory probe to the Mag network card MUST NOT contain ANY NON-INTRINSICALLY SAFE wires. Only Red Jacket supplied cable is authorized for use with the Mag inventory probe (refer to Appendix A).
---------------	---

Step 1: Run the proper interconnect cable from the inventory probe to the Prolink chassis. *Do Not* drill any holes in the Prolink chassis. Use the appropriate knockouts to access the enclosure. Follow all local, state, and federal codes.

Step 2: Allow for a 3-ft. to 4-ft. service loop on the inventory probe side of the cable. Refer to the section **Connections at the Junction box, Conduit Installations** in **Chapter**

4 for detailed instructions on connecting the Mag inventory probe to the interconnect cable.

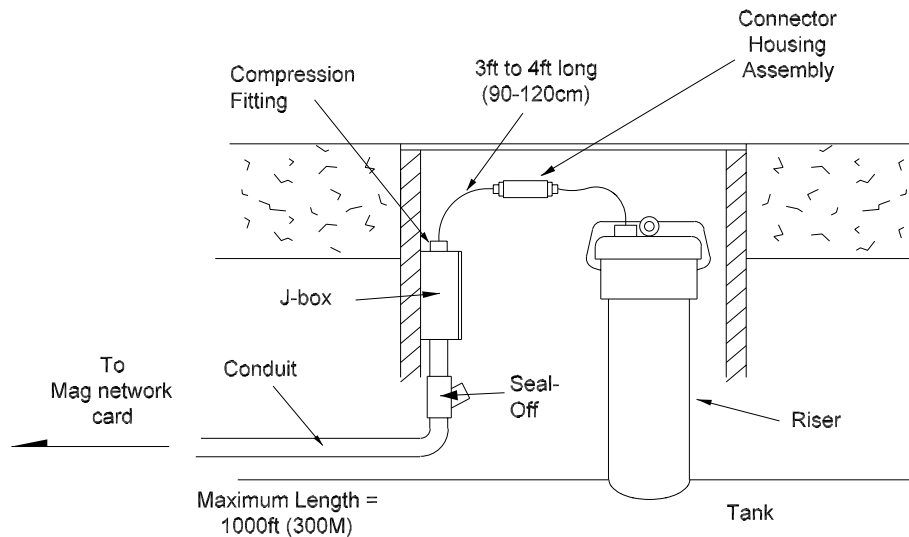


Figure 3.1 Installation Diagram for Conduit

Notice

If this is a retrofit installation, using existing cable and conduit, it is important to realize that the connections at the J-box in the sump between the cable and an existing mag probe are different from the previous installation. Follow the connection instructions in Chapter 4 to make the necessary changes.

If you have questions about your specific application, call Red Jacket Technical Support.

Direct Bury Cable Installation

Notice	Only Red Jacket supplied cable is authorized for use with the Mag inventory probe (refer to Appendix A).
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The dimensions of the sawcut are approximately 1/4-in. x 2 - 3in. The depth of the sawcut is determined by the number of cables being inserted into the sawcut, (one cable per probe is required).

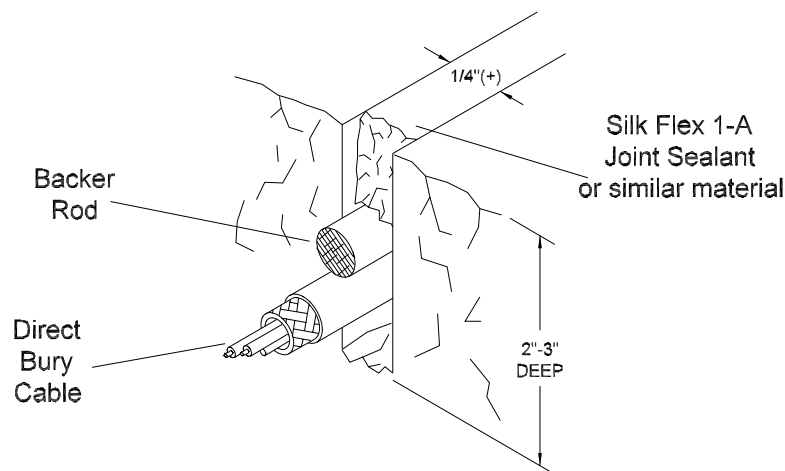


Figure 3.2 Installation Diagram for Direct Bury or Sawcut

Use normal industry standards when cutting the pavement slit or trenching. Teflon cable may be required in order to comply with local codes. All steps taken to prevent damage to the conductors will help maintain the electrical characteristics of the cable. Sawcut all corners at a 45° angle. The cable is not designed to make a 90° bend. Exercise caution when inserting the cable into the sawcut. Do not use sharp objects, such as screwdrivers. A backer rod may be used to help fill the sawcut after the cable has been inserted.

The cable must be **concealed in rigid conduit** from the end of the sawcut **until it enters the Prolink chassis**. Follow all local, state, and federal codes when performing direct bury installations. Allow for a 3-ft. to 4-ft. long service loop on the inventory probe side of the cable. Maximum distance is determined by the cable type specified in Appendix A.

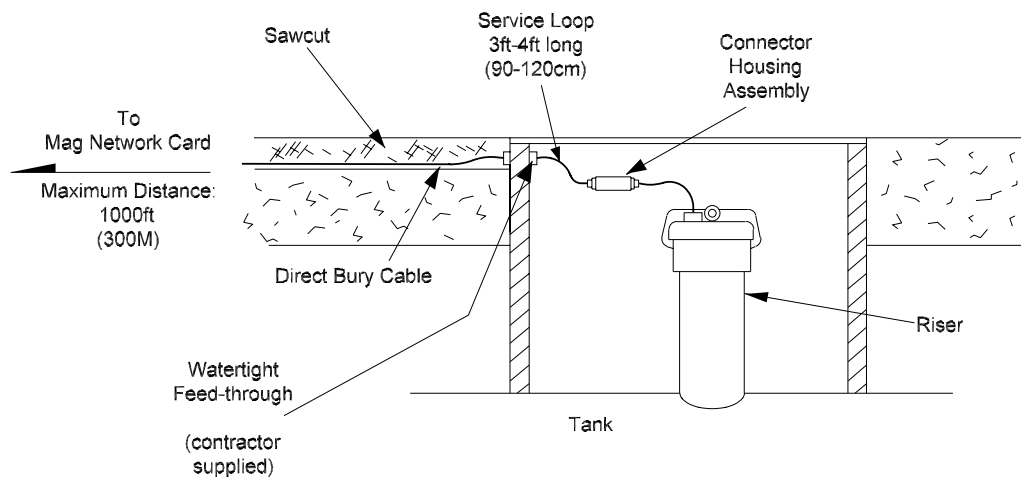


Figure 3.3 Diagram for Direct Bury Cable Installation

Refer to the section **Connections at the Junction box, Conduit Installations** in **Chapter 4** for detailed instructions on connecting the Mag inventory probe to the interconnect cable.

Notice

If this is a retrofit installation, using existing cable and conduit, it is important to realize that the connections at the J-box in the sump between the cable and an existing mag probe are different from the previous installation. Follow the connection instructions in Chapter 4 to make the necessary changes.

If you have questions about your specific application, call Red Jacket Technical Support.

Chapter 4: Installing the Mag Inventory Probe

This Chapter Explains

- **Mag Inventory Probe Installation**
 - Connections to the Interconnect Cable
- **Mag Inventory Probe configuration worksheet information**

Mag Inventory Probe Installation

Notice	The Mag inventory probe must be installed in a dedicated riser. It cannot be installed in any other type of riser. The Mag inventory probe must be installed such that it rests on the bottom of the tank. The Mag inventory probe must be electrically isolated from the tank and riser. The Mag inventory probe length must allow the probe head to reside completely within the riser.
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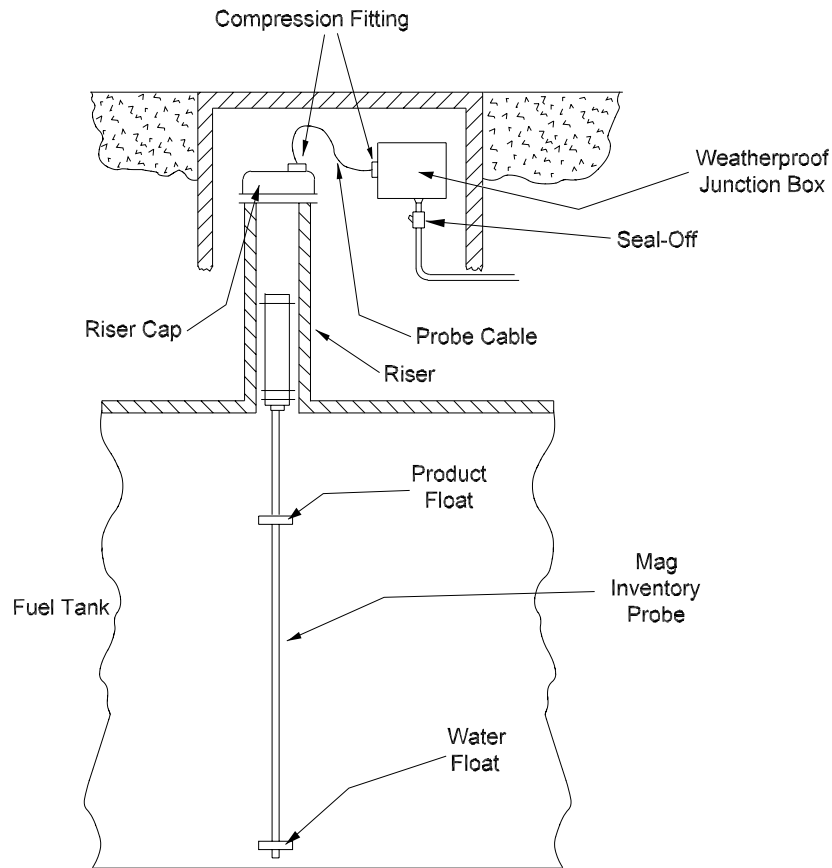


Figure 4.1 Mag probe conduit installation

Step 1: Unpack the inventory sensor float hits, noting the markings which indicate the fuel (gas or diesel) float and the interface (water) float.

Step 2: Install the fuel float onto the probe end, followed by the water float.

Step 3: Unpack the inventory probe isolation boot and install it securely on the bottom of the probe.

Notice

Failure to install the plastic sleeve may allow the probe to electrically conduct to the tank through any water present at the tank bottom. The sleeve and rubber grommet also prevent the floats from sliding off the probe end during installation and extraction.

- Step 4:** Roll the rubber grommet up the sleeve at the bottom of the probe a few inches. The grommet should be positioned such that the water float extends flush to the end of the probe when stopped by the rolled up grommet.
- Step 5:** Feed the probe cable through the compression fitting in the riser cap from the bottom.
- Step 6:** Carefully lower the mag inventory probe into the riser until it rests on the bottom of the tank.
- Step 7:** Visually inspect the probe in the riser to verify that the metal of the sensor does not touch the riser. (Sensor Lead should only touch the riser with the plastic tabs)
- Step 8:** Install the riser cap on the riser.
- Step 9:** Gently pull the probe cable through the compression fitting in the riser cap. This procedure should not lift the probe off the bottom of the tank. Tighten the compression fitting.

Notice

UL-Classified pipe thread sealant is required on the threads of the riser pipe for easier removal in the future. DO NOT cut off excess cable!

Connections at the Junction box, Conduit Installations

The following procedures should be used to make the electrical connections between the Mag inventory probe and the interconnect cable in the junction box. See *figure 4.2*.

- Step 1:** Install a watertight junction box per local regulatory requirements.
- Step 2:** Connect the **CLEAR** and **UNSHIELDED** conductors from the inventory probe cable to the **C** cable conductor from the conduit.
- Step 3:** Connect the inventory probe cable **BLACK** conductor to the **G** cable conductor.
- Step 4:** Connect the inventory probe cable **RED** conductor to the **+** cable conductor.
- Step 5:** Seal the connections with Scotchcast epoxy.

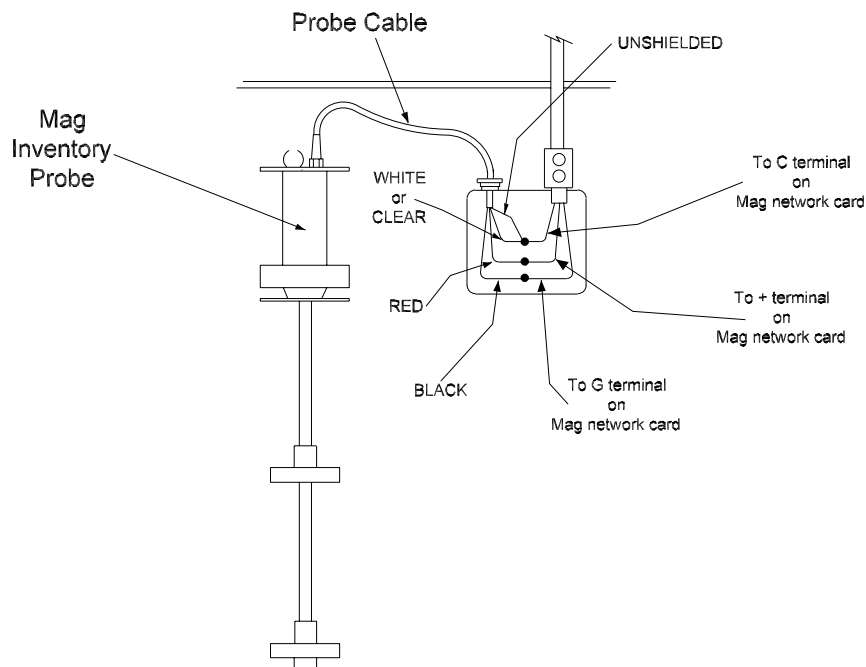


Figure 4.2 Mag inventory probe to cable connections, conduit installation

Connections at the Connector Housing, Direct Bury Installations

The following procedures should be used to make the electrical connections between the Mag inventory probe and the interconnect cable in the connector housing. See *figure 4.3*.

Step 1: Remove both threaded end caps of the Connector Housing. Feed the cable from the Mag network card through the compression fitting in one end of the housing. Strip the conductors back 1/8". Connect each of the conductors to one terminal on one side of the connector board. See *figure 4.3*.

Step 2: Feed the inventory probe cable through the compression fitting in the other end of the housing. Strip the conductors back 1/8".

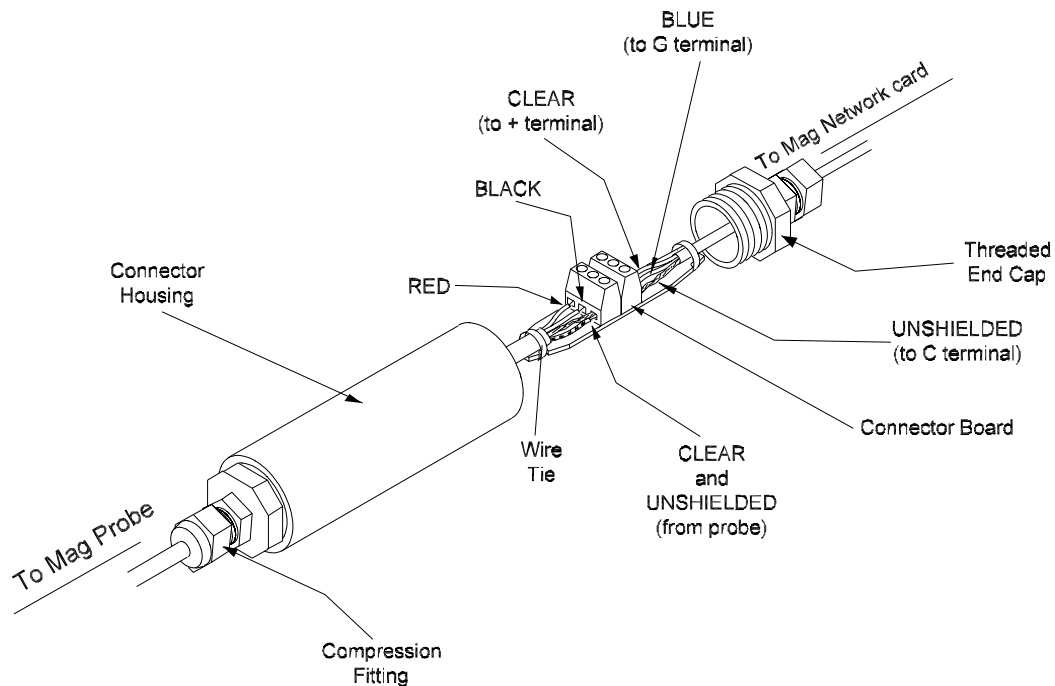


Figure 4.3 Connector Housing and Connector Board

- Step 3:** Connect the **CLEAR** or **WHITE** and **UNSHIELDED** conductor from the inventory probe to the connector board terminal corresponding to the **UNSHIELDED** conductor from the Mag network card. This conductor connects to terminal **C** on the mag network card.
- Step 4:** Connect the inventory probe cable **BLACK** conductor to the terminal corresponding to the interconnect cable **BLUE** conductor. This conductor connects to terminal **G** on the mag network card.
- Step 5:** Connect the inventory probe cable **RED** conductor to the terminal corresponding to the interconnect cable **CLEAR** conductor. This conductor connects to terminal **+** on the mag network card.
- Step 6:** Install wire ties around both cable ends and the connector board. This will provide strain relief for this connection.
- Step 7:** Carefully slide the connector board back into the housing. Insert the desiccant pouches into the housing. Using a *UL approved* thread sealant on the threads, install both threaded end caps.

Step 8: Tighten the compression fittings around both cables enough to ensure a liquid tight seal. **DO NOT OVERTIGHTEN!**

Mag Inventory Probe Configuration Worksheet Information

When installing the Mag inventory probe, there are several pieces of information that should be recorded. This information will be used later in order to configure the probe as part of the setup process. This information includes:

- **Probe Length:** The length of each probe as listed on the probe head metallic label.
- **Probe Gradient Number:** Each probe is calibrated at the factory and this reading is recorded. Each probe will vary slightly from all other probes. This number is critical when programming because if this factor is incorrect it will cause all measurements made by the probe to be inaccurate.
- **Water Float installed:** Note the installation or lack thereof of the water float.
- **Location and ID of probe**
- **Information on the Mag network card that this probe is connected to:**
 - Channel number on the Mag network card
 - Chassis number for the Mag network card
 - Slot number for the Mag network card

This information should be entered on the Prolink Installation Configuration Worksheet. (WAF03) Refer to *figure 4.4*.

Prolink Installation and Configuration Worksheet Sample

Prolink Configuration Worksheet– SAMPLE

Chassis # _____		Slot 1
Type of Network Card Installed		MAG NETWORK CARD _____ 12/15/98 _____ 123456789 _____ REXXX-XXX _____
CHANNEL 1 PROBE/SENSOR TYPE		MAG PROBE _____ TANK 2 _____ 12/15/98 _____ 123456789 _____ ABCD12345 _____ 144" _____ WTR FLT YES _____
CHANNEL 2 PROBE/SENSOR TYPE		MAG PROBE _____ TANK 4 _____ 12/15/98 _____ 123456789 _____ ABCD12345 _____ REXXX-XXX _____ WTR FLT YES _____
CHANNEL 3 PROBE/SENSOR TYPE		MAG PROBE _____ TANK 3 _____ 12/15/98 _____ 123456789 _____ ABCD12345 _____ REXXX-XXX _____ WTR FLT YES _____
CHANNEL 4 PROBE/SENSOR TYPE		MAG PROBE _____ TANK 1 _____ 12/15/98 _____ 123456789 _____ ABCD12345 _____ REXXX-XXX _____ WTR FLT YES _____

Figure 4.4 Mag probe required information

Chapter 5: Installing the Mag Network Card

This Chapter Explains

- Installing the Mag network card in a Prolink chassis
- Mag network card configuration worksheet information
- Connecting the Mag network card to the inventory probe

Installing the Mag Network Card in a Prolink chassis

The following procedure demonstrates how to install the Mag network card into a slot in a Prolink chassis.

Step 1: Disconnect power to the Prolink chassis at the electrical panel and the On-Off switch on the Prolink chassis power supply circuit board. Open the network card access panel and select an open slot for installation. Refer to figure 5.1.

WARNING!

Failure to disconnect AC power can cause severe personal injury, death, or substantial property damage.

Step 2: Remove slot cover from the selected slot.

DANGER!!

The short dividers in the lower section of the chassis may be removed for access but **MUST** be reinstalled to maintain intrinsic safety and complete the installation.

Step 3: Remove one of the conduit knockouts underneath the selected slot and install a conduit connector and conduit.

Step 4: Slide the Mag network card into the selected slot. Note the orientation of the card in *figure 5.1*. Make sure that the card connects completely with the backplane board. Tighten the two hold-down screws to fully secure the card in position.

Notice

Do not attempt to install the card backwards.

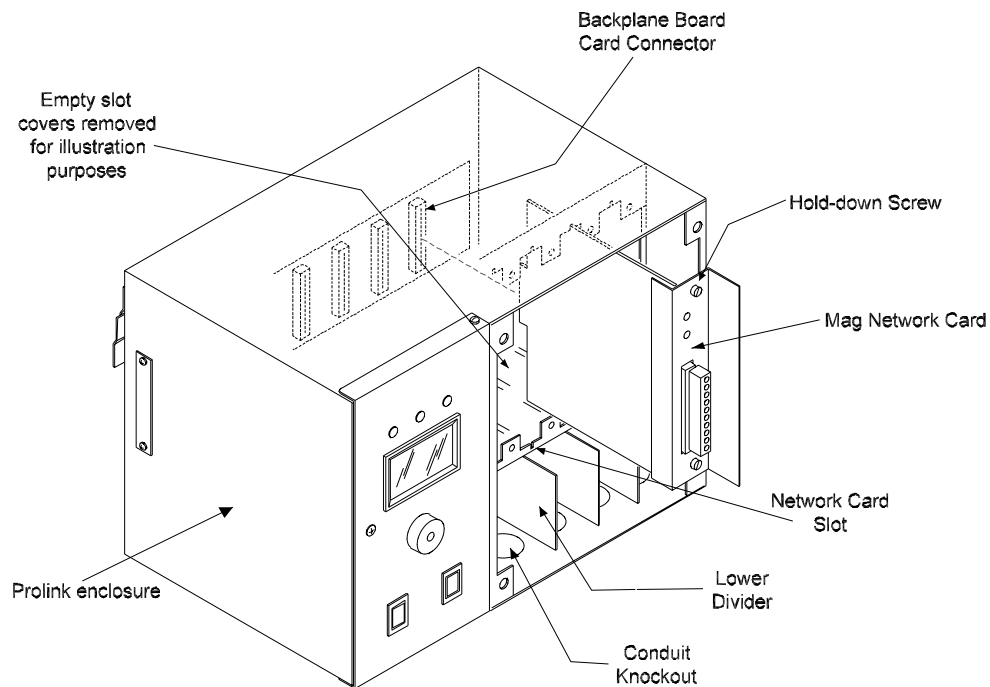


Figure 5.1 Installation of the Mag network card

This information should be entered on the Prolink Programming Configuration Worksheet (WAF03). Refer to *figure 5.2*.

Connecting the Mag Network Card to the Inventory Probe

Connections at the Mag network card

The following procedure demonstrates how to connect a Mag probe to the Mag network card. Refer to *Figure 5.2* for sample connections.

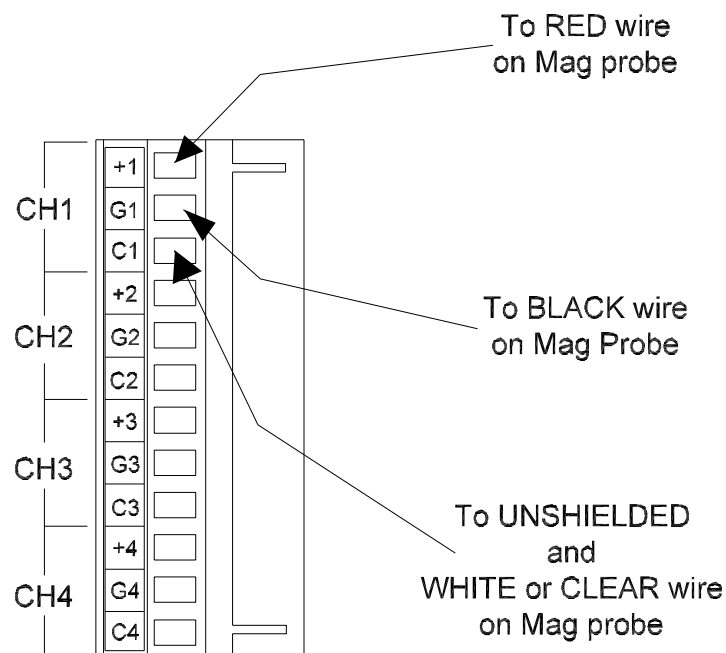


Figure 5.2 Sample Mag network card connections

Step 1: Route the cable into the Prolink chassis.

Step 2: Connect the cable conductor which is connected to the **UNSHIELDED** and **WHITE** or **CLEAR** conductor to the common (C) terminal.(ex. Channel 1)



Step 3: Connect the cable conductor which is connected to the **RED** conductor to the plus (+) terminal.

Step 4: Connect the cable conductor which is connected to the **BLACK** conductor to the ground (G) terminal.

Chapter 6: Pathway Plus Setup

This Chapter Explains

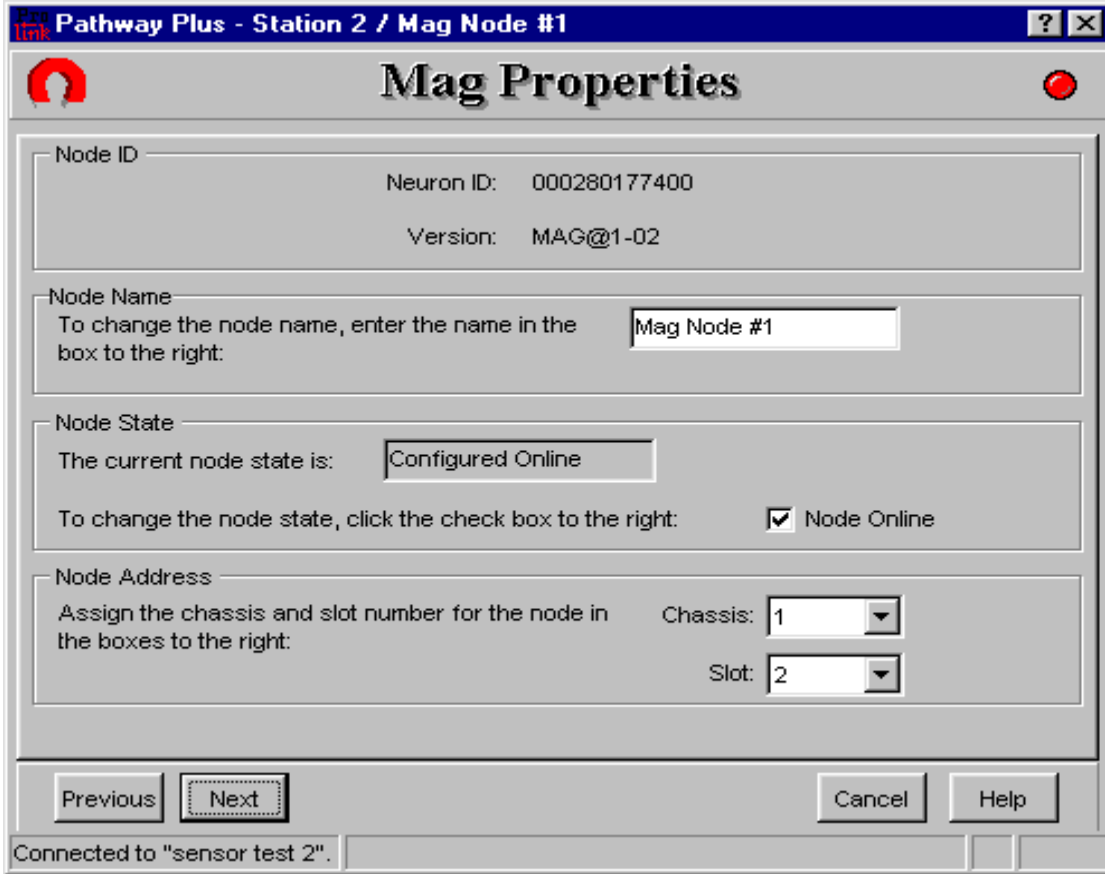
- Mag Network Card Setup in Pathway

Mag Network Card Setup in Pathway



Wink: Click on this button to blink the service LED on the node. This is helpful in situations where there is more than one network card of the same type installed in the same chassis. Blinking this LED will identify the specific card that is being configured.

The **node name** represents the current name of the card you will be working with. The **neuron id** is a series of numbers and letters that uniquely identifies the card being configured.



Pathway Plus - Station 2 / Mag Node #1

Mag Properties

Node ID
 Neuron ID: 000280177400
 Version: MAG@1-02

Node Name
 To change the node name, enter the name in the box to the right:

Node State
 The current node state is:
 To change the node state, click the check box to the right: ☒ Node Online

Node Address
 Assign the chassis and slot number for the node in the boxes to the right:
 Chassis:
 Slot:

Connected to "sensor test 2".

Node ID: Neuron ID: The neuron ID is a read only field that contains a unique set of numbers and letters that identify the device. (No two Prolink devices have the same neuron ID) The neuron ID should match the printed label found on the device as well as the corresponding label on the configuration worksheet.

Node Name: Name: Each device has a default name assigned to it. If you want to change this name, enter it in this field. The name in this field will be displayed by Pathway Plus anywhere this node appears. (Max. of 12 characters)

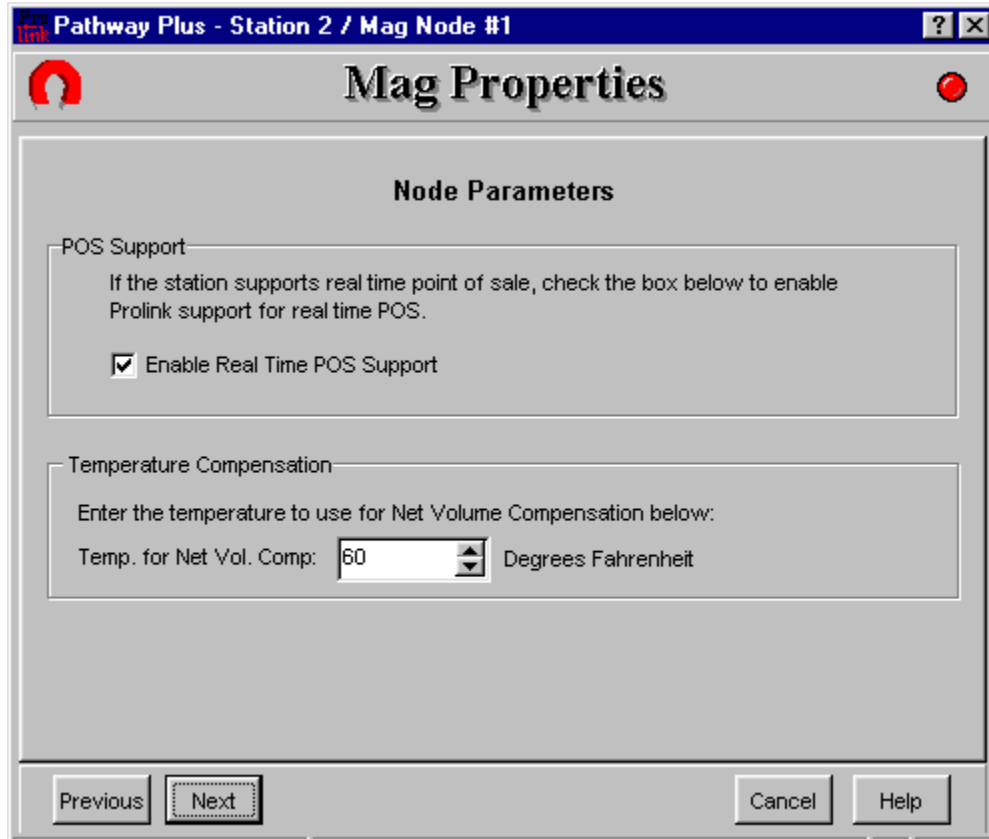
Node State: Current Node State: This is a read only field that shows the current node state.

Online Configured-This is the normal operating state. In this case the application is loaded, configured, and connected to the Prolink network.

Soft Offline-In this case the application is loaded and configured, however the application is not running. This state would be used when performing service at the station to prevent this node from going into alarm. For example, a mag node would be taken offline to allow the mag probe to be pulled from the tank for inspection or replacement without sending an alarm to the network.

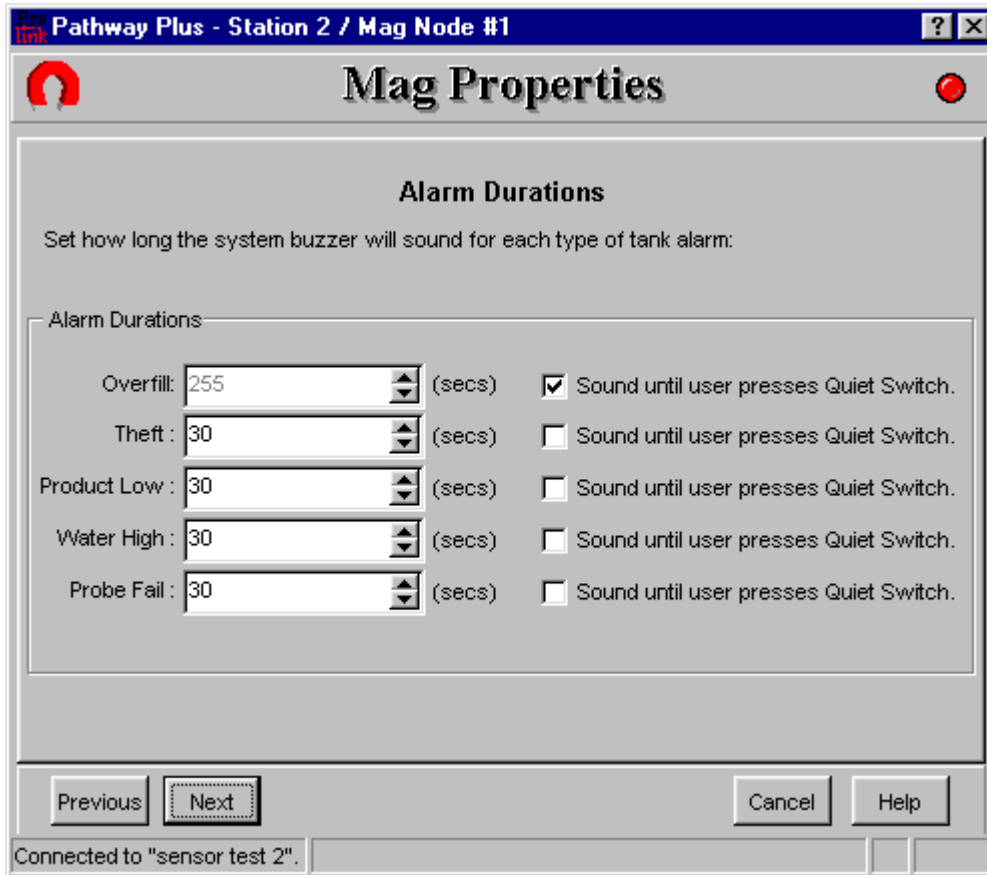
Node Online: In most cases this check box should remain selected. To take the node offline to allow service work to be performed at the station, uncheck this box.

Node Address: The address is used to identify which chassis and slot the card is in. It identifies the physical location.



POS Support: If this network also includes a Dispenser Network Card (TIMI or G-SITE), the Mag Network Card can use the dispensed information to improve the accuracy of reported deliveries. Check this box if the POS terminal type supports real time reads from the dispensers, i.e. totals can be read during the sale.

Temperature Compensation: This field allows the installer to modify the default temperature at which net volumes are normalized and reported.



Overfill: Specify the number of seconds (0 to 254) that the piezo will sound on an overfill condition.

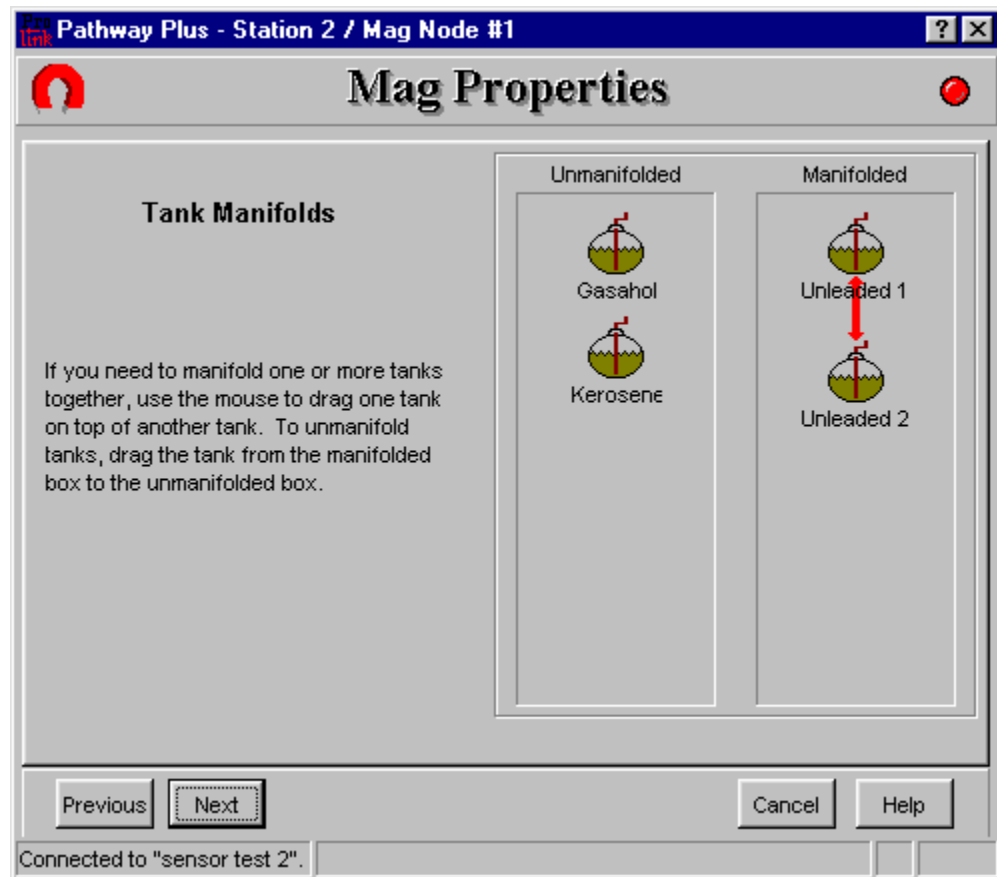
Theft: Specify the number of seconds (0 to 254) that the piezo will sound on a theft condition.

Product Low: Specify the number of seconds (0 to 254) that the piezo will sound on a low product condition.

Water High: Specify the number of seconds (0 to 254) that the piezo will sound on a highwater condition.

Probe Fail: Specify the number of seconds (0 to 254) that the piezo will sound on a probe fail condition.

If the checkbox is checked, the piezo will sound indefinitely until the user acknowledges the alarm by pressing the 'Quiet' button on the Prolink Annunciator panel.

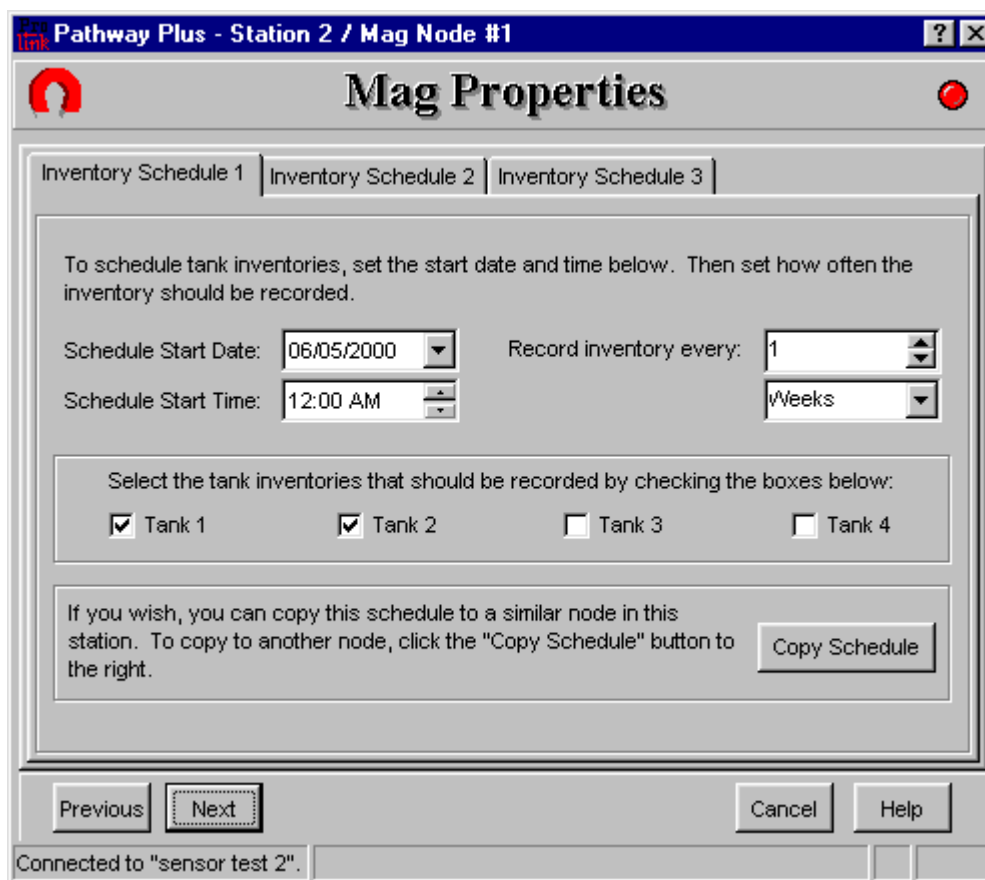


Drag and drop two or more tank icons together to indicate that these tanks are manifolded or siphoned together. Note that a maximum of four tanks can be manifolded together, and that all siphoned tanks must be wired up to the same mag network card.



This is where the user has the choice of assigning an inventory schedule or not. This card can be set up to archive inventory levels based on a schedule. The user can assign up to three independent schedules for taking inventory readings.

Note that this is for storage only. To schedule the printout of local reports on site, set up this schedule through the printer network card/printer serial link dialog boxes.



Pathway Plus - Station 2 / Mag Node #1

Mag Properties

Inventory Schedule 1 | Inventory Schedule 2 | Inventory Schedule 3

To schedule tank inventories, set the start date and time below. Then set how often the inventory should be recorded.

Schedule Start Date: 06/05/2000 Record inventory every: 1

Schedule Start Time: 12:00 AM Weeks

Select the tank inventories that should be recorded by checking the boxes below:

☒ Tank 1 ☒ Tank 2 ☐ Tank 3 ☐ Tank 4

If you wish, you can copy this schedule to a similar node in this station. To copy to another node, click the "Copy Schedule" button to the right. Copy Schedule

Previous Next Cancel Help

Connected to "sensor test 2".

Inventory Schedule #1:

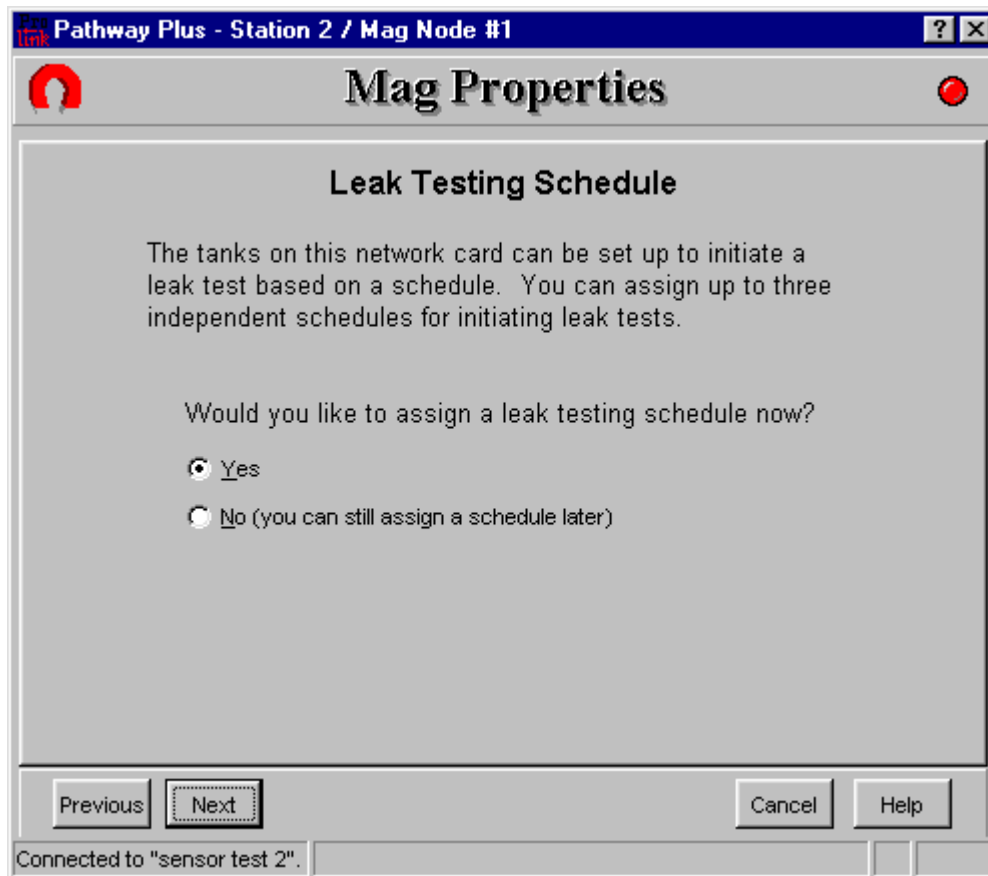
Schedule Start Date: The user can set the date of when they want inventory to begin.

Schedule Start Time: The user can set the time of when they want inventory to begin.

The user also has the choice of how often they want inventory checked. You can make this decision by putting your choice in the 'record inventory every' selections boxes.

The user also has the ability and option to choose which tank inventories should be recorded by checking the boxes that apply.

Copy Schedule: Allows the user to copy this schedule to a similar node in this station. To copy to another node, click on 'Copy Schedule.'



This is where the user can assign a leak testing schedule. The card can be set up to initiate a leak test based on a schedule. The user can assign up to three independent schedules for initiating leak tests.

Note that in order for a tank to test based upon a schedule the leak mode for the given tank must be set to 'scheduled' in the dialogs that follow. If auto-style facility closed or no leak detection is desired, bypass the schedules by selecting 'No' above.



Pathway Plus - Station 2 / Mag Node #1

Mag Properties

Leak Schedule 1 | Leak Schedule 2 | Leak Schedule 3

To schedule the start of tank leak tests, set the schedule start date, time and interval below.

Schedule Start Date: 06/07/2000 Schedule test every: 1

Schedule Start Time: 12:00 AM Weeks

Select the tanks that should be tested by checking the boxes below:

☒ Tank 1 ☒ Tank 2 ☐ Tank 3 ☐ Tank 4

If you wish, you can copy this schedule to a similar node in this station. To copy to another node, click the "Copy Schedule" button to the right. Copy Schedule

Previous Next Cancel Help

Connected to "sensor test 2".

Leak Schedule #1:

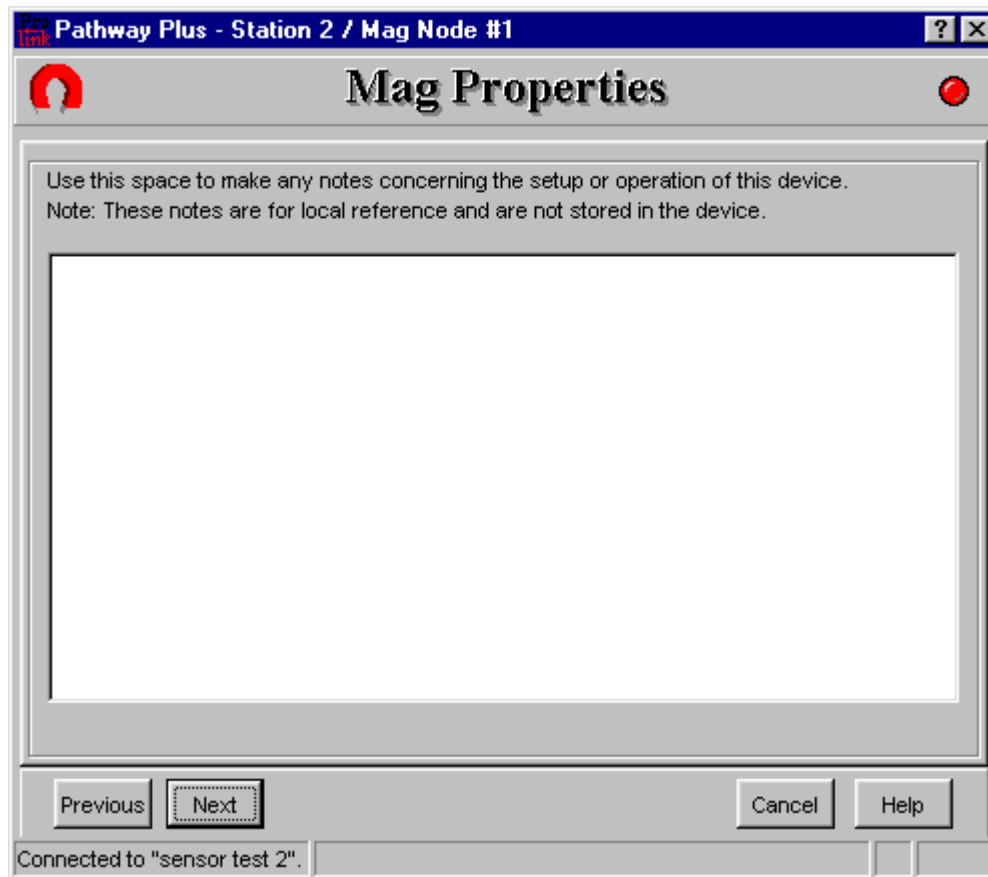
Schedule Start Date: The user can set the date of when they want leak tests to begin.

Schedule Start Time: The user can set the time of when they want leak tests to begin.

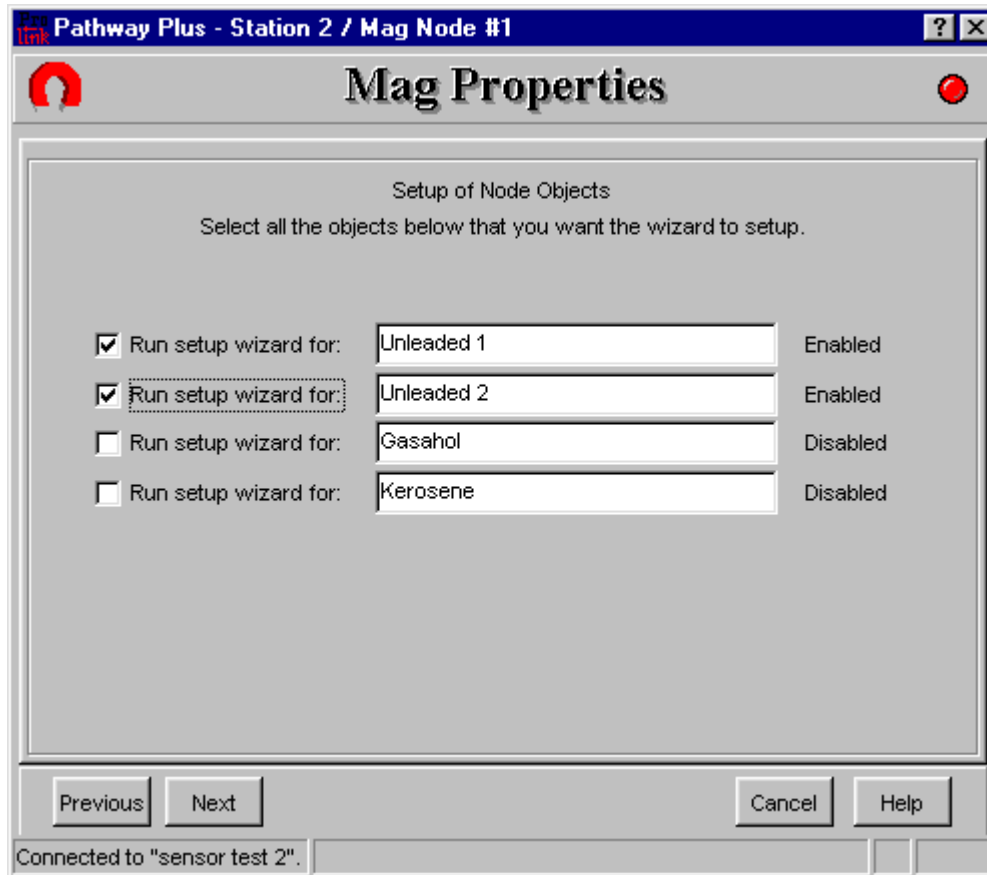
The user also has the option of how often they want leak tests to be performed. You can make this decision by placing your choice in the 'schedule test every' selections boxes.

The user also has the ability to choose which tanks should be tested by checking the appropriate boxes that apply.

Copy Schedule: Allows the user to copy this schedule to a similar node in this station. To copy to another node, click on 'Copy Schedule.'



This is the user's opportunity to make any notes to have for future reference. The notes from the dialog above are locally stored on the PC in Pathway Plus, and do not get stored to the station.



Pathway Plus - Station 2 / Mag Node #1

Mag Properties

Setup of Node Objects

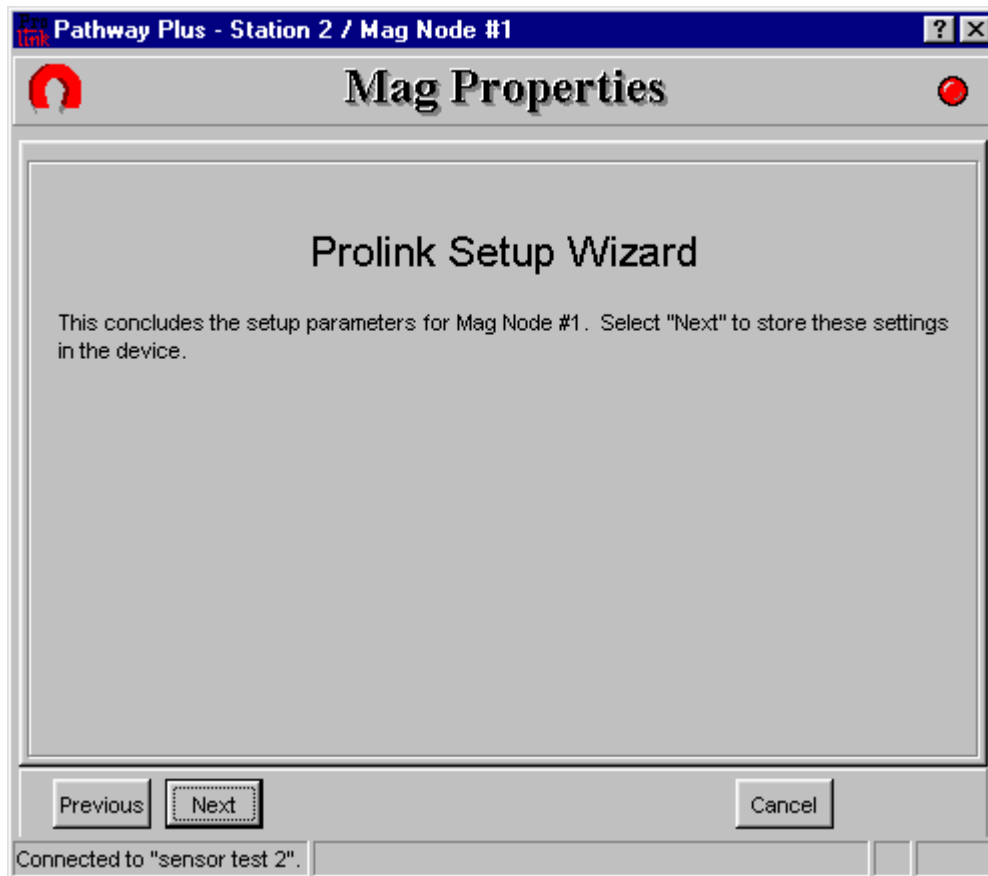
Select all the objects below that you want the wizard to setup.

<input checked="" type="checkbox"/>	Run setup wizard for:	Unleaded 1	Enabled
<input checked="" type="checkbox"/>	Run setup wizard for:	Unleaded 2	Enabled
<input type="checkbox"/>	Run setup wizard for:	Gasahol	Disabled
<input type="checkbox"/>	Run setup wizard for:	Kerosene	Disabled

Previous Next Cancel Help

Connected to "sensor test 2".

This section allows the user to select which type of objects that they want the Prolink Setup Wizard to configure at this time.



Setup parameters for Mag Node #1 are complete! To move on select 'Next' and this will store these settings in the device.



Wink: Click on this button to blink the service LED on the node. This is helpful in situations where there is more than one network card of the same type installed in the same chassis. Blinking this LED will identify the specific card that is being configured.

The **object name** represents the current name of the device you will be working with. The neuron id is a permanent number, and it does not change.



Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1

Tank Properties

Object ID

Object Number: 1

Object Name

To change the object name, enter the name of the object in the box to the right: Unleaded 1

Enabled State

To enable the object, check the box to the right: ☒ Object Enabled

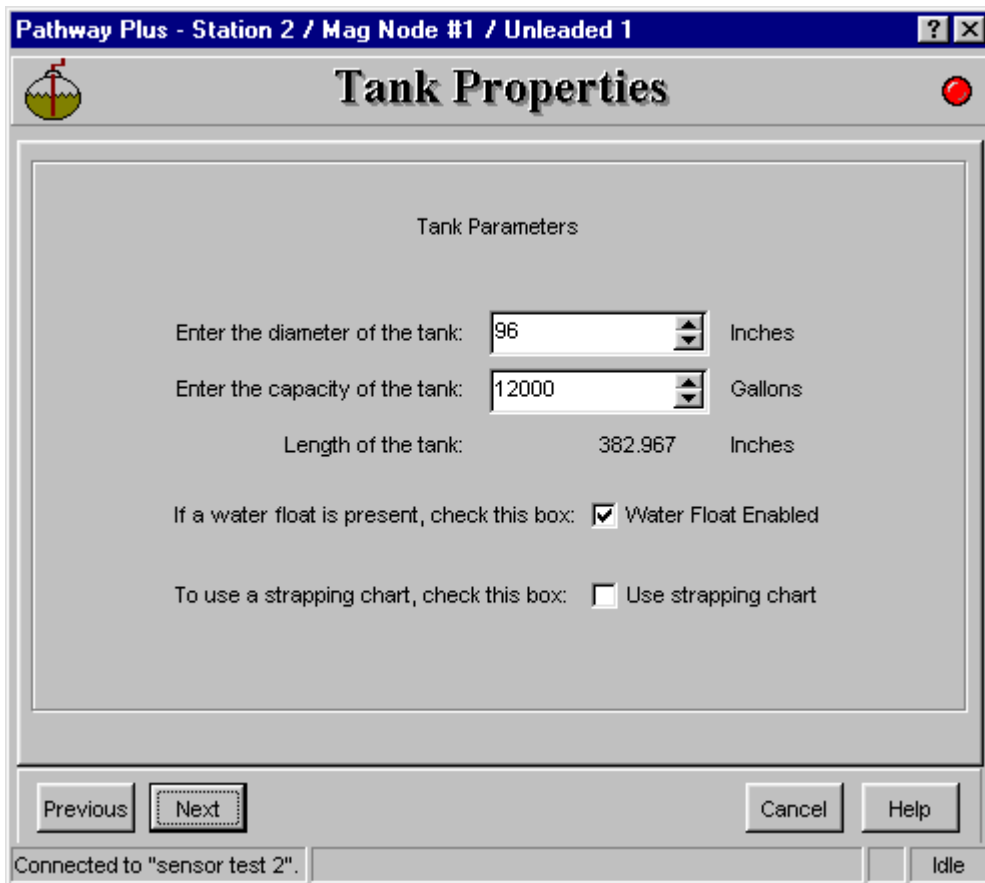
Previous Next Cancel Help

Connected to "sensor test 2". Idle

Object ID is uniquely identified by the specific object by number in this screen. The Object ID property indicates which object is open for configuration or setup, and is a read only field.

Object Name displays the name of the object. This field may be changed (max. 12 characters) or left at default.

Enabled State box must be 'checked' to enable operation of the tank.



Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1

Tank Properties

Tank Parameters

Enter the diameter of the tank: 96 Inches

Enter the capacity of the tank: 12000 Gallons

Length of the tank: 382.967 Inches

If a water float is present, check this box: ☒ Water Float Enabled

To use a strapping chart, check this box: ☐ Use strapping chart

Previous Next Cancel Help

Connected to "sensor test 2". Idle

Enter the correct tank diameter and capacity. Pathway will also display the tank length for user reference.

Water float: If the water float is installed on the inventory probe, check the checkbox.

Strapping chart: If this tank is non-cylindrical, check this checkbox in order to enter the tank chart on the succeeding dialog.

Pathway Plus - Gas Land / Mag #1 / Super

Tank Properties

Object Configuration | Tank | **Strapping Chart** | Leak Mode | Fuel Parameters | Recon Lin

Number of Points
☒ 16 Points
☐ 32 Points

Height in: Inches
 Volume in: Gallons

Copy Chart | Load Tank Chart | Save Tank Chart

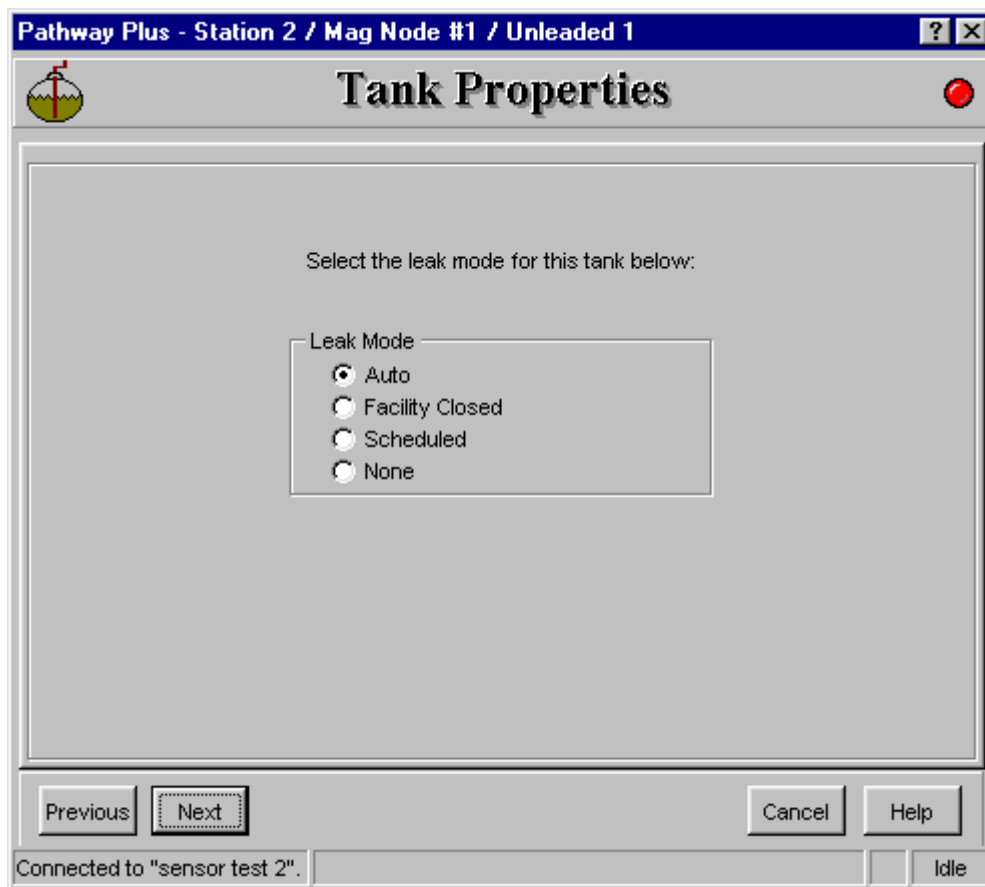
Enter Information

Height	Volume	Height	Volume
006	50	054	450
012	100	060	500
018	150	066	550
024	200	072	600
030	250	078	650
036	300	084	700
042	350	090	750
048	400	096	800

OK | Cancel | Apply | Help

Connected to "Gas Land". | Idle

Strapping Chart: Use the tank strapping chart for the tank in question to enter the volume points at each corresponding height.



Leak Mode: Use this dialog to select the leak detection method for this tank. Selecting 'Auto' requires that a Pump Control, Pump Sense, CPT or LineMaster be installed on the network to provide the Mag Network Card with pump status information. Use of 'Facility Closed' requires the programming of the facility open and close times in the station properties dialog box. Use of 'scheduled' requires the configuration of the leak testing schedule in the proceeding dialogs.



Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1

Tank Properties

Fuel Parameters

Select the type of fuel: UNLEADED

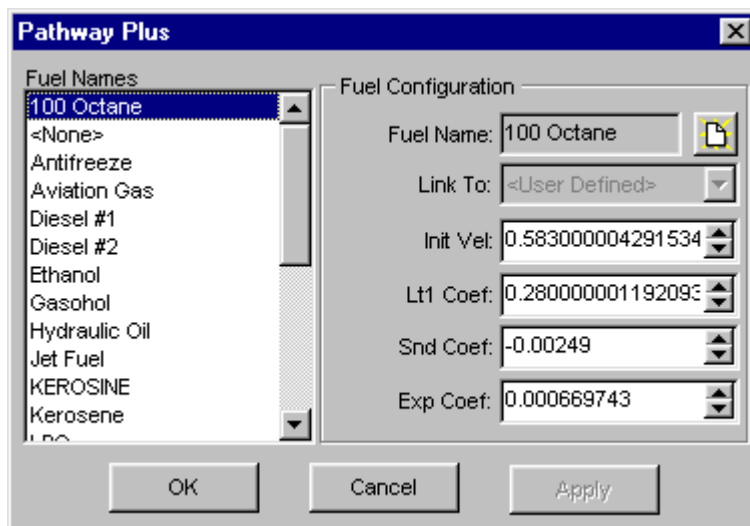
Product Coefficient: 0.000669743

New Fuel Type

Previous Next Cancel Help

Connected to "sensor test 2". Idle

This section allows the user to select the type of fuel that is being used. Depending on what type of fuel is being used determines the product coefficient. Product coefficients change automatically along with the selections of fuel. If there is no available fuel type for the product in question, select 'New Fuel Type' to create a custom fuel type for this tank.



Pathway Plus

Fuel Names

- 100 Octane
- <None>
- Antifreeze
- Aviation Gas
- Diesel #1
- Diesel #2
- Ethanol
- Gasohol
- Hydraulic Oil
- Jet Fuel
- KEROSINE
- Kerosene

Fuel Configuration

Fuel Name: 100 Octane

Link To: <User Defined>

Init Vel: 0.583000004291534

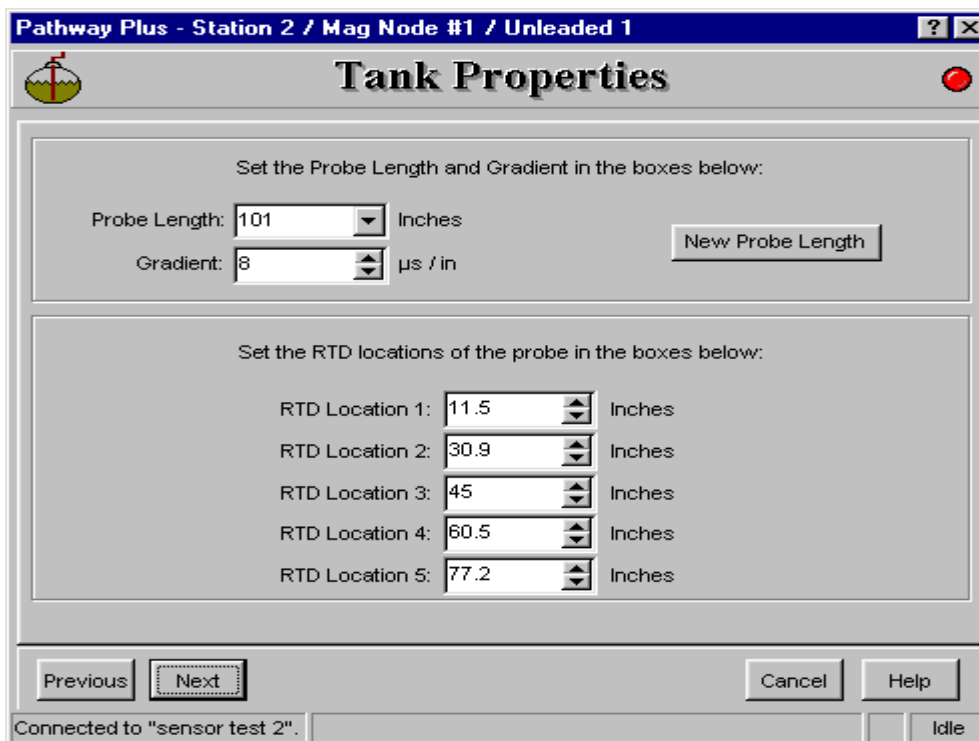
Lt1 Coef: 0.280000001192093

Snd Coef: -0.00249

Exp Coef: 0.000669743

OK Cancel Apply

To create a custom fuel type, click the 'New' button (folded page) and supply a unique name. For fuel types used with Mag inventory sensors, the exp. coef. must be properly defined as well. Failure to include an accurate exp. coef. will adversely impact leak detection and net volume reporting.



Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1

Tank Properties

Set the Probe Length and Gradient in the boxes below:

Probe Length: 101 Inches

Gradient: 8 $\mu\text{s} / \text{in}$

New Probe Length

Set the RTD locations of the probe in the boxes below:

RTD Location 1: 11.5 Inches

RTD Location 2: 30.9 Inches

RTD Location 3: 45 Inches

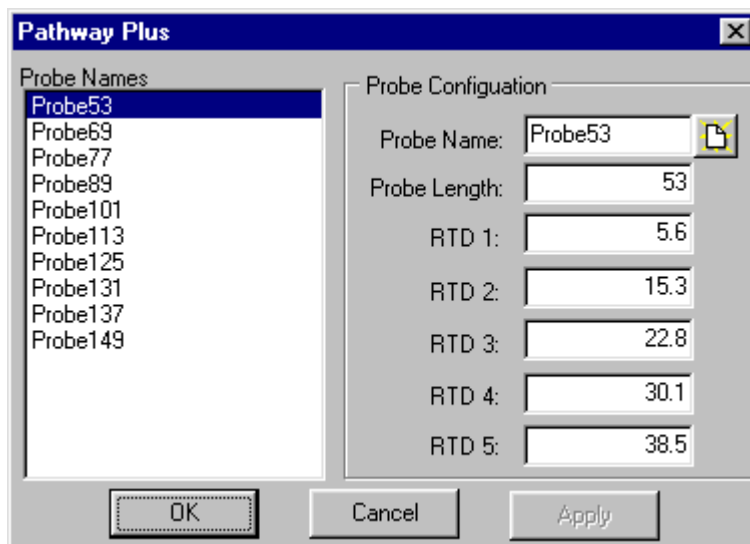
RTD Location 4: 60.5 Inches

RTD Location 5: 77.2 Inches

Previous Next Cancel Help

Connected to "sensor test 2". Idle

Use this dialog box to select the probe length and gradient. Both of these values can be found on the label on the probe head, and should also have been written onto the configuration worksheet as part of the probe installation. Pathway will automatically fill out the RTD positions based on the probe length chosen. If this probe is a custom length and does not have a corresponding selection, click on 'New Probe Length' to create a custom probe definition.



Pathway Plus

Probe Names

- Probe53
- Probe69
- Probe77
- Probe89
- Probe101
- Probe113
- Probe125
- Probe131
- Probe137
- Probe149

Probe Configuration

Probe Name: Probe53

Probe Length: 53

RTD 1: 5.6

RTD 2: 15.3

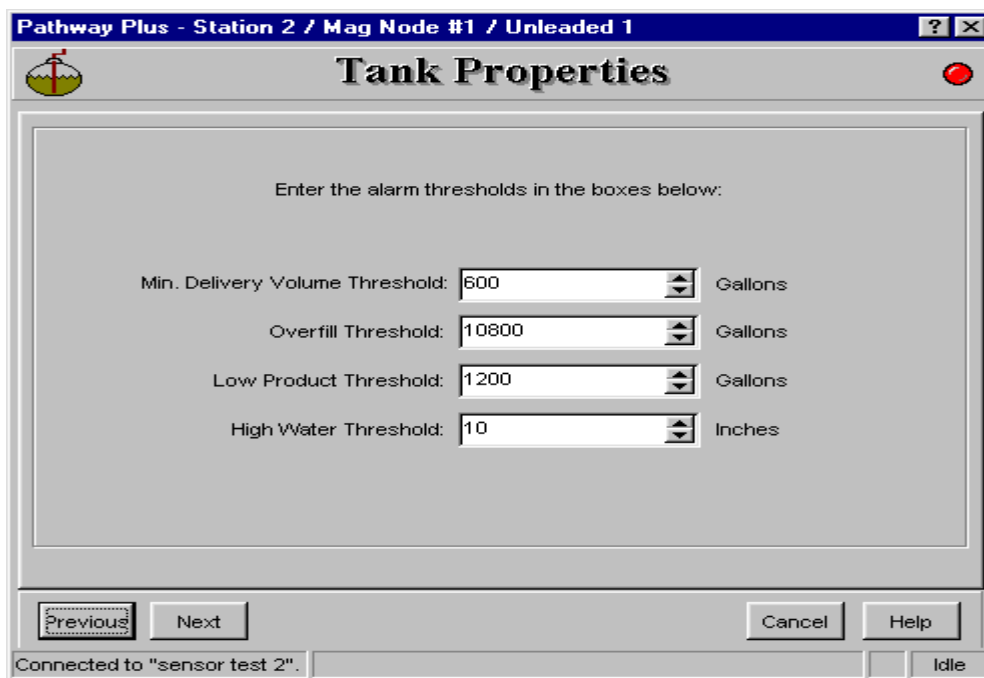
RTD 3: 22.8

RTD 4: 30.1

RTD 5: 38.5

OK Cancel Apply

To create a 'custom' probe definition select the 'New' button (folded page) and enter a unique name. The probe length and RTD positions should be entered here directly from the label on the probe head.



Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1

Tank Properties

Enter the alarm thresholds in the boxes below:

Min. Delivery Volume Threshold: 600 Gallons

Overfill Threshold: 10800 Gallons

Low Product Threshold: 1200 Gallons

High Water Threshold: 10 Inches

Previous Next Cancel Help

Connected to "sensor test 2". Idle

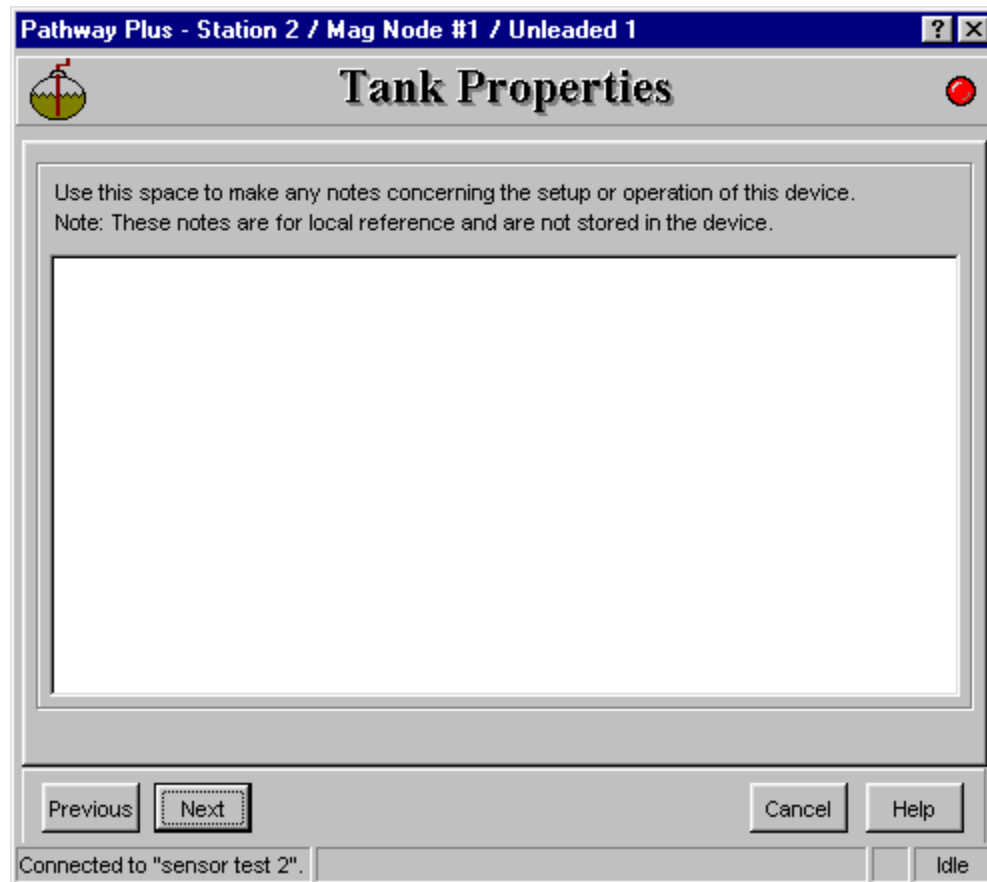
Min. Delivery Volume Threshold: This field displays the minimum volume increase required in order for incoming product to be registered and posted as a delivery.

Overfill Threshold: Use this field to set the volume at which the overfill alarm will sound. (Note, this cannot be set to a value <90% of tank capacity).

Low Product Threshold: Use this field to set the volume below which the Low Product

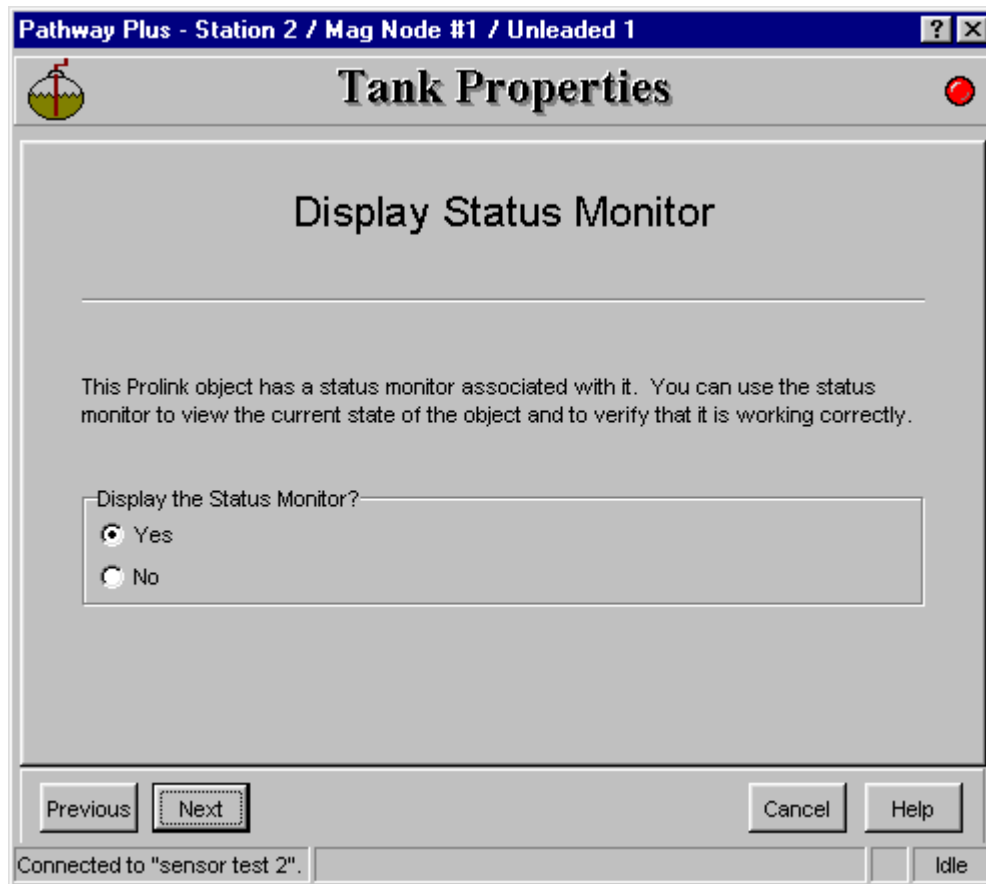
alarm will be issued.

High Water Threshold: Use this field to set the level at which a high water condition will alarm.



The screenshot shows a software window titled "Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1". Inside the window is a sub-dialog titled "Tank Properties". The "Tank Properties" dialog has a title bar with a question mark icon and a close button. Below the title bar is a red status indicator. The main area of the dialog contains a text box with the following text: "Use this space to make any notes concerning the setup or operation of this device. Note: These notes are for local reference and are not stored in the device." Below this text box is a large, empty rectangular area for notes. At the bottom of the dialog are four buttons: "Previous", "Next" (which is highlighted with a dashed border), "Cancel", and "Help". At the very bottom of the window, there is a status bar that says "Connected to 'sensor test 2'." and "Idle".



This is the user's opportunity to make any notes for future reference.




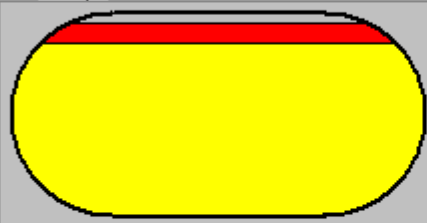
This section allows the user to select the Status Monitor. The Status Monitor is used to view the current state of the object and to verify that it is working correctly.




Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1

Tank Properties

 Stop Unleaded 1 - UNLEADED



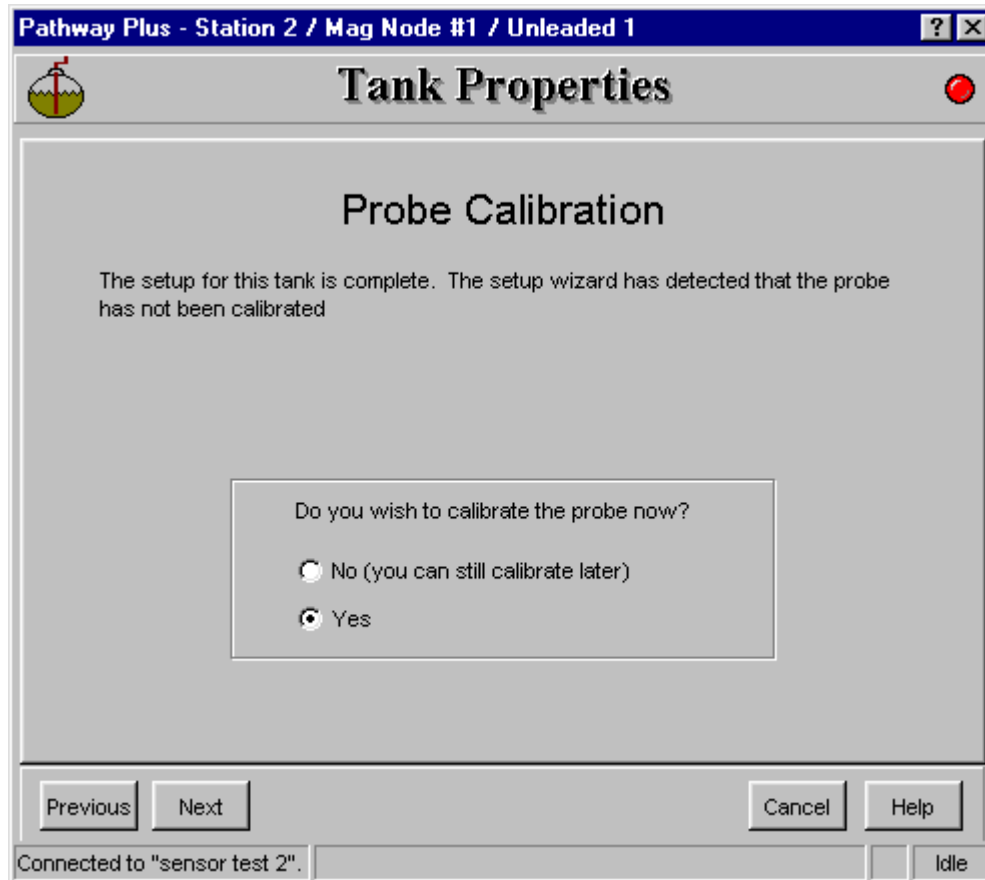
 LP
 HW
 OV

Leak Test Passed:

Grs Vol:	11,817.8	gal.	Height:	91.827	in.
Net Vol:	11,681.7	gal.	Water:	0	in.
Temp:	77.1	°F	Ullage:	(1,017.8)	gal.

Previous Next Cancel Help

Connected to "sensor test 2". Idle



This section acknowledges that setup for the tank is complete and that the probe has not been calibrated. The user has the option to calibrate the probe at this point.

Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1

Tank Properties

The current probe offset calibration values are below. Press "Enter new height" to calibrate the probe to a stick reading.

Probe Offset Calibration

Fuel: Inches

Water: Inches

Enter the threshold voltage for the probe comparator below:

Comparator Threshold Voltage:

Connected to "sensor test 2".

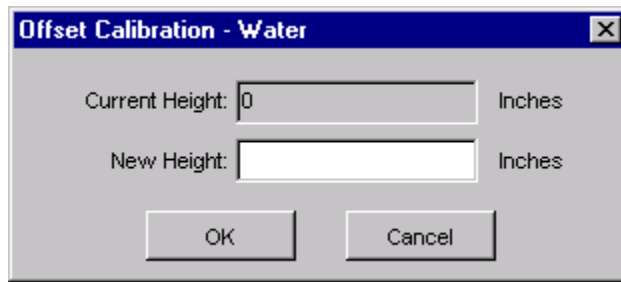
To calibrate either the product height or water height, select the corresponding 'Enter New Height' button.

Offset Calibration - Fuel

Current Height: Inches

New Height: Inches

The current height is displayed. Enter the stick reading height in the 'New Height' field provided.



A dialog box titled "Offset Calibration - Water" with a close button (X) in the top right corner. It contains two input fields: "Current Height:" with the value "0" and "Inches" to its right, and "New Height:" with an empty text box and "Inches" to its right. At the bottom are "OK" and "Cancel" buttons.

The current water level is displayed. Enter the stick water reading in the 'New Height' field provided.



A dialog box titled "Pathway Plus - Station 2 / Mag Node #1 / Unleaded 1" with a help button (?) and a close button (X) in the top right corner. The main title is "Tank Properties" with a red status indicator on the right. Below the title is a large text area containing the text "Prolink Setup Wizard" and "This concludes the setup parameters for Unleaded 1. The Prolink Setup Wizard has completed. Select 'Finish' below to exit." At the bottom are "Previous", "Finish", and "Cancel" buttons. A status bar at the very bottom shows "Connected to 'sensor test 2'".

Setup is complete!

Chapter 7: Troubleshooting

This Chapter Explains:

- Alarm Codes

Alarm Codes

This section describes typical alarm codes which the Mag network card may send to the Pro-link main data chassis display. A list of possible causes for these alarm codes is included.

Alarm Display

These alarm codes are displayed in the following format: Chassis #, Slot #, Object # and then the alarm code.

Prolink Alarm Display (sample)

1	4	2	1
This digit indicates that the network card producing the alarm is installed in Prolink chassis #1	This digit indicates that the alarm is coming from the network card installed in slot #4	This digit indicates the object or individual sensor connected to the network card identified by the first two digits that is in alarm	This is the specific alarm code which indicates the cause of the alarm

To read these alarm codes, you must know which network cards are installed in each chassis and slot. Refer to the Prolink Configuration Worksheet for the station.

The Prolink network continuously performs a self test and displays the results using the LEDs on the front panel. The green LED indicates that no alarms are active, the yellow LED indicates the presence of a system warning condition and the red LED indicates a system alarm.

The object number indicates which sensor or channel on the network card is in alarm. The alarm code number indicates what type of alarm has been detected. With this information and the table below, the Prolink alarm display can be read.

Prolink Alarm Codes

Network Card Type	Alarm Type & Description	Alarm Code
Mag network card	Overfill: Indicates that the liquid level in the tank has exceeded the programmed limit.	0
	Low Product: Indicates that the liquid level in the tank has dropped below the programmed limit.	1
	High Water: Indicates that the water level in the tank has exceeded the programmed level.	2
	Theft: Indicates that product has been removed from the tank during times that the station is closed.	3
	Probe Error: Indicates that the Mag network card is not communicating with the Mag Inventory sensor.	4
	Water Float: Indicates that the water float is not responding correctly. This may be caused by incorrect probe installation or the Prolink network is programmed to register a water float but no water float is installed.	5

Appendix A: Replacement Parts

Mag card and float kits

Part Number	Description
RJ400-596-5	Mag network card
RJ400-106-5	kit, 2" float, gas
RJ400-105-5	kit, 2" float, diesel
RJ400-101-5	kit, 4" float, gas
RJ400-102-5	kit, 4" float, diesel

Mag Probes

Part Number	Length	Description
RJ400-094-5	4' (53")	Mag inventory probe
RJ400-154-5	5'4" (69")	Mag inventory probe
RJ400-096-5	6' (77")	Mag inventory probe
RJ400-151-5	7' (89")	Mag inventory probe
RJ400-098-5	8' (101")	Mag inventory probe
RJ400-157-5	9' (113")	Mag inventory probe
RJ400-110-5	10' (125")	Mag inventory probe
RJ400-156-5	10'6" (131")	Mag inventory probe
RJ400-152-5	11' (137")	Mag inventory probe
RJ400-112-5	12' (149")	Mag inventory probe

Mag Cable

Part Number	Description	Max. Run Length
RJ400-696-5	Mag Cable, Conduit Applications, 250' Roll	<500' Run
RJ400-697-5	Mag Cable, Conduit Applications, 500' Roll	<500' Run
RJ400-698-5	Mag Cable, Conduit Applications, 750' Roll	<500' Run
RJ400-699-5	Mag Cable, Conduit Applications, 1000' Roll	<500' Run
RJ400-702-5	Mag Cable, Conduit Applications, 1500' Roll	<500' Run
RJ400-703-5	Mag Cable, Conduit Applications, 2000' Roll	<500' Run
RJ400-704-5	Mag Cable, Conduit Applications, 2500' Roll	<500' Run
RJ400-705-5	Mag Cable, Conduit Applications, 750' Roll	<1000' Run
RJ400-706-5	Mag Cable, Conduit Applications, 1000' Roll	<1000' Run
RJ400-707-5	Mag Cable, Conduit Applications, 1500' Roll	<1000' Run
RJ400-708-5	Mag Cable, Conduit Applications, 2000' Roll	<1000' Run
RJ400-709-5	Mag Cable, Conduit Applications, 2500' Roll	<1000' Run
RJ400-710-5	Direct Bury Mag Cable, 750' Roll	<1000' Run
RJ400-711-5	Direct Bury Mag Cable, 1000' Roll	<1000' Run
RJ400-712-5	Direct Bury Mag Cable, 1500' Roll	<1000' Run
RJ400-713-5	Direct Bury Mag Cable, 2000' Roll	<1000' Run
RJ400-714-5	Direct Bury Mag Cable, 2500' Roll	<1000' Run
RJ400-757-5	Direct Bury Mag Cable, 250' Roll	<300' Run
RJ400-758-5	Direct Bury Mag Cable, 500' Roll	<300' Run
RJ400-759-5	Direct Bury Mag Cable, 750' Roll	<300' Run
RJ400-760-5	Direct Bury Mag Cable, 1000' Roll	<300' Run
RJ400-761-5	Direct Bury Mag Cable, 1500' Roll	<300' Run
RJ400-762-5	Direct Bury Mag Cable, 2000' Roll	<300' Run
RJ400-763-5	Direct Bury Mag Cable, 2500' Roll	<300' Run

Notice

Select the proper cable from the table above depending on installation requirements (conduit or direct bury). Column three lists the maximum run length allowed between the sensor and the Prolink enclosure for each cable available.

Appendix B: Glossary

AC	Alternating current.
Ampere (A)	A unit of electric current equivalent to a steady current produced by 1 V applied across a resistance of 1 Ω .
Annunciator Panel	This panel provides a common interface for the network cards on the LonWorks based <i>ProLink</i> and provides a user interface to the archived data in storage.
DC	Direct current.
EMI	Electromagnetic interference; interference relating to the magnetism developed by a current of electricity.
EPA	U.S. Environmental Protection Agency. The EPA line leak test protocols include hourly, monthly, and annual testing.
Ground	A conductor that connects with the earth; to connect electrically with ground (earth ground, chassis ground, analog ground, and digital ground).
HDPE	High-density polyethylene.
Interstice, interstitial	A small space between things, in particular the space between the walls of a double-walled tank.
Intrinsically safe barrier	A barrier to keep intrinsically safe wiring physically separated from other wiring.
ISO	International Standards Organization, which sets requirements for product development.
LED	Light-emitting diode.
MAG	Magnetostrictive probe or sensor
NEC	National Electrical Code.
NIST	National Institute of Standards and Technology
Ohm (Ω)	A unit of electrical resistance equal to the resistance of a circuit in which a potential difference of 1 V produces a current of 1 ampere.
OSHA	Occupational Safety and Health Administration.
Peripheral	A device connected to the system that provides communication or auxiliary functions.
Sump	Cylinder around a tank riser to catch and contain any spills or overflow.
UL-classified	A designation for products that have been evaluated by Underwriters Laboratories with respect to one or more of the following: (1) specific hazards only — for example, flammability; (2) performance under specified conditions; (3) regulatory codes; or (4) other standards.

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