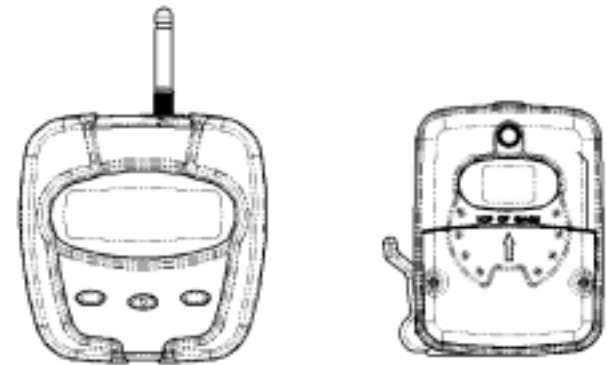


FLUENT

Smartlink™



**Anhydrous Ammonia Fluid
Monitoring System**

Owner's Guide

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Instruction to the User

This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates uses and can radiate radio frequency energy and if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is not guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception which can be determined b turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna
- Increase the separation between the equipment and the receiver.
- Consult dealer or an experienced radio/TV technician for help.

This equipment has been certified to comply with the limits for a class B computing device, pursuant to FCC rules. In order to maintain compliance with FCC regulations, shielded cables must be used with the equipment. Operation with non-approved equipment or unshielded cables is likely to result in interference with radio and TV reception. The user is cautioned that changes and modifications made to the equipment without the approval of the manufacturer could void the user's authority to operate this equipment.

Introduction

Congratulations on your purchase of the Smartlink (tm) monitoring system from Fluent Systems. Smartlink (tm) is an innovative electronic system that allows you to continuously monitor the application of anhydrous ammonia fertilizer from within the tractor cab. This patent-pending product utilizes modern RF and electromagnetic sensing technologies in a novel and revolutionary way and dramatically improves the process by which anhydrous ammonia is applied to your field.

The Smartlink (tm) is a two-module system composed of a tank module that sits atop the field tank and a cab module that is positioned within the tractor cab.

The tank module can be set directly on top of the existing fluid level gage with no modifications required to the tank and no tools necessary.

The tank module continuously monitors the fluid level within the field tank and then sends it in a wireless fashion to the display module mounted inside the tractor cab. The display module receives the signal from the tank module, decodes the information and displays fluid level to the user via a liquid crystal display.

The cab module allows the farmer to quickly input implement and tank size. This information is processed along with groundspeed data from the tractor to output other useful information to the farmer including application rate per acre, time remaining until tank is empty and a "tank-empty" audible alert. The Smartlink (tm) is a capable agricultural aid that provides convenience and added functionality not present today.

The Smartlink (tm) is a useful addition to the existing process of applying anhydrous ammonia to farmland worldwide. It solves the difficult task of measuring fluid in a hazardous environment while remaining completely safe to use. Information gathered by the Smartlink (tm) can be used during application to increase operator efficiency and decrease common problems associated with the current method. It also accurately reports fertilizer application rate per acre, which adds greatly to the farmer's information.

The Smartlink (tm) is a system that includes one display module and one tank module, along with necessary groundspeed interface, power cable and cab mounting hardware. The product carries a one-year limited warranty.

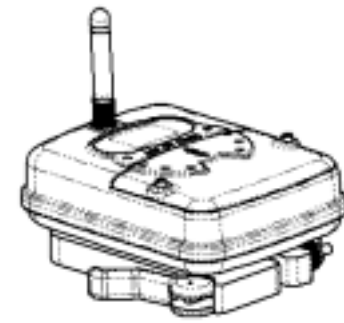
Features and System Components

Your Smartlink (tm) System comes complete and ready to use with the following components:

Cab Module

Tank Module

Windshield Adaptor



Ground Speed Adaptor

12 V Cigarette Lighter Adaptor

Carrying Case

Operation:

General Operating Conditions:

	Tank Unit	Cab Unit
Maximum Temperature	XX degrees F	XX
Minimum Temperature	XX degrees F	XX

The Smartlink (tm) system has been designed for durable, robust operation and should withstand years of use. The unit does contain precision electronic components and should be treated carefully to ensure trouble free operation.

Do not expose the either Cab or Tank unit to excessive heat or cold.

The Tank unit has been designed to be water and dust resistant. Prolonged exposure to driving rain, excessive sleet or snow should be avoided.

If the Tank unit will not be used for extended periods of time, the unit should be removed from a tank and stored inside it's protective case. The batteries should be removed to prevent leakage.

Do not leave the Cab Unit in excessive heat or cold or direct sunlight for prolonged periods of time. The user should be aware that extreme temperatures inside tractor cabs can cause damage to the Cab Unit.

Avoid exposing the Cab Unit to extremely dusty conditions.

Avoid dropping either the Cab or Tank unit. While both units have been designed for shock and vibration resistance, sensitive electronic components can be damaged due to excessive shock or vibration.

Tank Unit Batteries

The Tank unit runs on three AA sized batteries. Do not mix old batteries with new batteries. Do not use different types of batteries together. There is no need to turn the tank unit on or off. Under normal use, the tank unit will run three months before needing to change batteries. If the tank unit will be left unused for prolonged periods of time, the batteries should be removed to prevent leakage and damage to the unit.

If battery leakage occurs, wipe off any deposits in the battery compartment and install new batteries.

Installation of the Tank Unit

The Tank Unit has been designed with a “Quick Release Clamp” intended to allow for easy installation to your existing tank gage without modifications or tools.

The Tank Module has been optimized to specifically work with Rochester brand gages. While the tank module may operate acceptably with other type of gages, the optimal operation cannot be assured. For best results, ask your distributor to replace the fluid gage with Rochester brand, model XXXX gages.

The Quick release clamp can be adjusted to accommodate variations from clamp to clamp. Use a tool to adjust the nut until the unit is securely fastened to the gage with the clamp lever thrown closed.



Top of Gage



!Important! For proper operation, the Tank Unit **MUST** be mounted on the gage with the top of the unit facing the top of the gage. Failure to mount the Tank Unit in the correct orientation will result in incorrect readings.

Tank Unit Operation

When the tank unit is placed on the gage it will momentarily flash a letter code indicating that it has recognized the type of gage it is mounted on. This letter code can be used by factory personnel in troubleshooting your unit should you experience any problems. Once the tank unit is placed onto the tank it will immediately display the volume of fluid currently in the tank, as reported by the existing gage. Before tightening down the gage you should ensure that the reading on the LCD display of the tank module agrees with the reading on the gage. If they do not agree, refer to the Troubleshooting section of this manual.

A blinking dot on the LCD display indicates every time the tank volume is sampled by the tank unit. The tank unit will sample the tank volume approximately every second. Approximately every ten seconds, the tank module will broadcast the average reading from the tank to the cab unit. This averaging is one of the ways that the Smartlink (tm) system compensates for the sloshing of the ammonia within the tank.

Cab Unit Power

The display unit will operate on either 3AA batteries or a 12Volt Power adaptor supplied with the unit.

Use only the 12 Volt power adaptor supplied with the Smartlink (tm) system. Do not use any other kind of adaptor or damage to the unit can occur.

Do not mix old batteries with new batteries. Do not use different types of batteries together. Under normal use, the tank unit will run eight hours before needing to change batteries. If the Cab unit will be left unused for prolonged periods of time, the batteries should be removed to prevent leakage and damage to the unit.

If battery leakage occurs, wipe off any deposits in the battery compartment and install new batteries.

For best operation, the Cab Unit should be connected using the 12 Volt Power Adaptor provided with you system. The 12 volt Adaptor can be connected at any time, without having to turn off your unit.

Installing the cab unit using the windshield adaptor

A windshield adaptor with convenient suction cup has been supplied with your Smartlink (tm) system. For best results, carefully clean your windshield with the alcohol pad provided before securing the suction cup.

Connecting the Ground Speed Adaptor Cable

In order to make full use of the reporting features of your Smartlink (tm) System you will need to connect your tractor groundspeed radar to the back of the Cab Unit with the cable provided. Connecting your Smartlink (tm) system to the groundspeed radar will allow Smartlink (tm) to calculate useful information including your acres covered, tractor ground speed and average application rate. Without tractor ground speed you will still have be able to monitor the fluid level in your ammonia tank, but will not be able to see this other information. This groundspeed adaptor cable plugs into the phone style jack in the back of the Cab Unit and connects to the output from your existing groundspeed radar unit. If the cable does not match the connector inside your Cab, see your distributor.

Calibrating your Groundspeed Radar

Before using your Smartlink (tm) System with your Groundspeed Radar Unit you must first calibrate the Radar. This compensates for different types of radar and differences in the way in which your radar is mounted on your tractor.

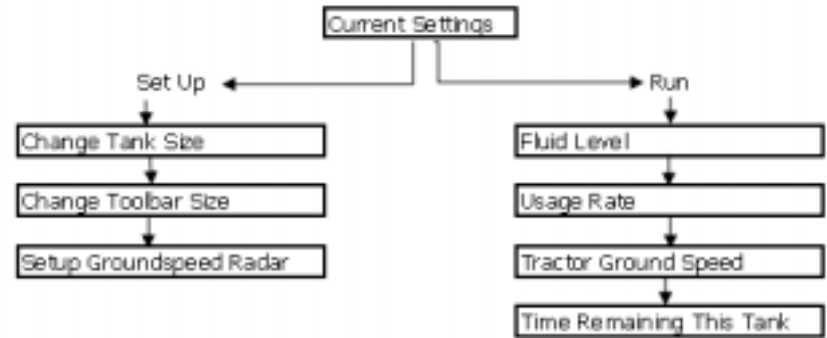
You **MUST** calibrate the groundspeed radar on YOUR tractor. This calibration must be repeated any time you move the radar to a different tractor, even if they use the same brand of radar. Once completed however, the calibration is stored in the Cab unit and does not have to be repeated even if the unit is turned off or the batteries are removed.

To calibrate you groundspeed radar, access the SETUP GROUND SPEED RADAR routine through the SETUP menu on the Cab Unit.

Connect your cable
Mark off EXACTLY 200 feet on the ground.

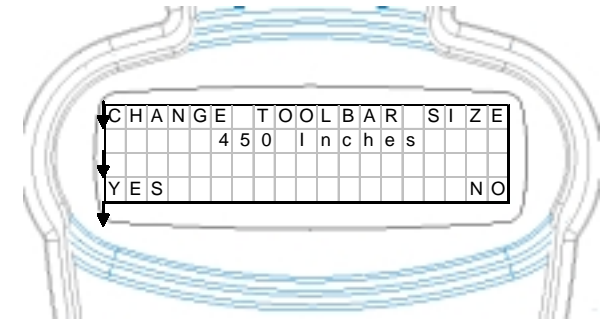
Drive your tractor to the start of your 200 foot path and press START
Drive your tractor to the end of the 200 foot path and press Finish
Go to the TRACTOR GROUNDSPEED menu and make sure the unit is reading out correctly.

Cab Unit Quick Reference Guide



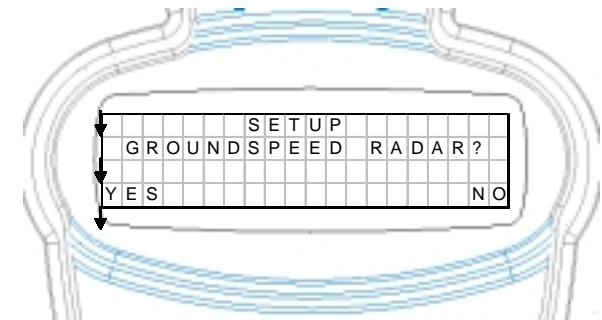
Change ToolBar Size

Selecting NO from the CHANGE TANK SIZE screen access the Change Toolbar Size Screen. This menu is used to select the proper tank that you are currently using. The size of the tank is used for application rate calculations. Selecting YES at this menu allows you to scroll between common tank sizes. When you've selected the correct size, press DONE to confirm your setting. The tank size is stored in the memory of your Cab Unit and will remain the same until you change it. It is, therefore, not necessary to re-enter the toolbar size unless you change to a field implement



Setup Ground Speed Radar

Selecting NO from the CHANGE TOOLBAR SIZE screen will access the screens necessary to setup the ground speed radar. Before using your Smartlink (tm) System with your Groundspeed Radar Unit you must first calibrate the Radar. This compensates for different types of radar and differences in the way in which your radar is mounted on your tractor.



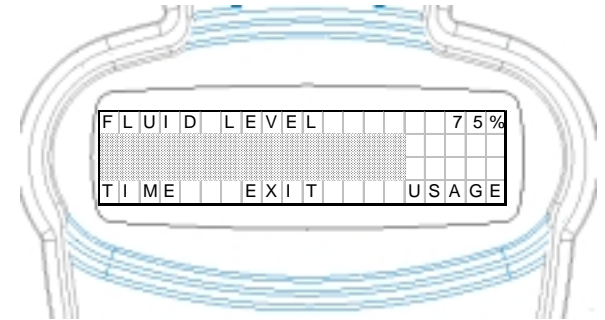
You MUST calibrate the groundspeed radar on YOUR tractor. This calibration must be repeated any time you move the radar to a different tractor, even if they use the same brand of radar. Once completed however, the calibration is stored in the Cab unit and does not have to be repeated even if the unit is turned off or the batteries are removed.

Monitoring Fluid Level with the Smartlink (tm) System

There are four monitoring screens available with the Smartlink (tm) System that are all accessed through the RUN selection on the current settings screen.

Fluid Level Screen

The Fluid Level Screen acts as a digital level gage, showing the current level of the ammonia in the tank as both a percentage and a graphic bar. The fluid level will be displayed any time the Cab unit is receiving signals from the Tank Unit and does not depend on setting the tank size, toolbar size or calibrating the groundspeed radar.

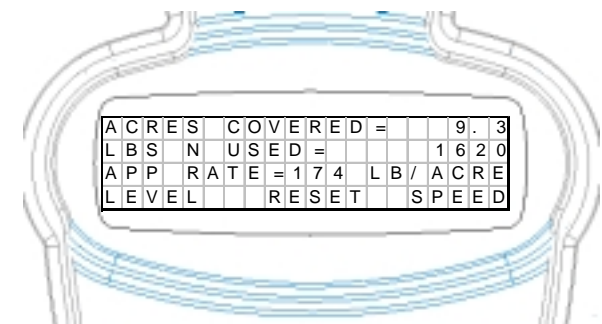


Note that the fluid level reported on the Fluid Level Screen represents an average of the last fluid level reported by the tank gage over several minutes. Your Smartlink (tm) system contains software that smoothes out the fluctuations caused in the tank due to sloshing or driving up and down inclines. For this reason, you may notice a slight delay in the response of the Fluid Level as tank empties. In addition, you may notice a change in the recorded fluid level if your drive up or down a pronounced incline for an extended period of time.

From the Fluid Level Screen you can scroll forward to the Usage Screen or scroll back to the Time Remaining Screen

Usage Screen

Selecting USAGE from either the Tractor Ground Speed or the Fluid Level screens brings you to the Usage Screen. The usage screen is one of the most useful



and valuable features of the Smartlink (tm) system. It provides you with access the acres you have covered, the lbs nitrogen you've used and calculates your average application rate.

To make effective use of the application rate screen, please note the following:

The usage calculations are computed by dividing the acres covered by the lbs N. used as determined by the change in fluid volume.

Before using the USAGE RATE calculations you must first "RESET" the Smartlink (tm) System. Resetting the Smartlink (tm) System 'zeros' the acres covered and the lbs N used. You will be prompted to reset the Smartlink (tm) System when the first time you access the USAGE screen after turning on your unit.

YOU SHOULD RESET THE SMARTLINK (TM) SYSTEM EVERY TIME YOU CHANGE TANKS. THIS ALLOWS THE SMARTLINK (TM) TO BEGIN THE USAGE CALCULATIONS AGAIN. IF YOU DON'T RESET THE SYSTEM WHEN YOU CHANGE TANKS, THE USAGE CALUCLATIONS WILL BE INCORRECT.

WHEN RESETTING THE USAGE RATE, YOU SHOULD PARK THE TANK ON LEVEL GROUND AND ALLOW THE SLOSHING IN THE TANK TO COME TO A REST. This will ensure an accurate reset of the tank volume.

You must have connected to your tractors groundspeed radar and correctly calibrated your groundspeed radar in order to use the Usage Screen. If your groundspeed radar has not been calibrated, you will be prompted to do so. Failure to correctly calibrate your radar will result in incorrect application rate calculations.

When you first begin applying ammonia, the Smartlink (tm) system will begin calculating your application rate. It will take approximately 25% of the volume of the tank before the Smartlink (tm) will report the application rate. During this time, the Usage screen will report CALCULATING instead of an application rate. This delay is necessary to smooth out variation is reported fluid level caused by sloshing or driving up and down pronounced inclines. The longer you monitor your usage, the more accurate the calculations will be as the affect of sloshing and inclines is reduced.

The usage rate calculation shows the Lbs used divided by the Acres Covered SINCE THE LAST TIME THAT RESET WAS SELECTED. For this reason, if you make any adjustment to your application rate, you will need to RESET the Smartlink (tm) system and wait to re-calculate the usage rate. If you do not reset the usage rate after adjusting your flow, the reported usage rate will be the AVERAGE usage between your old and new application rates.

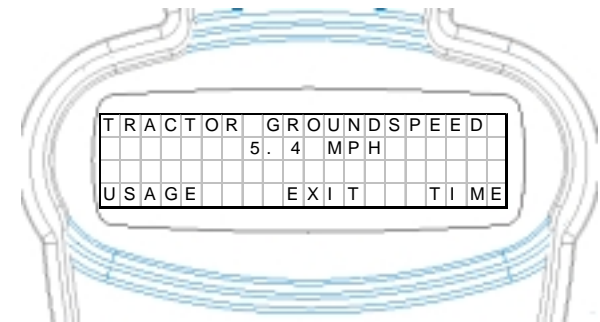
DRIVING UP AND DOWN PRONOUNCED OR EXTENDED INCLINES OR DRIVING OVER EXCESSIVELY ROUGH TERRAIN WILL ADVERSELY AFFECT THE ACCURACY OF THE USAGE CALCULATIONS.

The application of Nitrogen fertilizer from Anhydrous Ammonia is dependent on a wide variety of variables including temperature, tank pressure, implement distribution and manifolding, etc.

THE USAGE RATE CALCULATIONS FROM THE SMARTLINK (TM) SYSTEM SHOULD BE USED FOR REFERENCE ONLY. CONSULT YOUR DISTRIBUTOR OR COOP FOR ADDITIONAL INFORMATION.

Tractor Ground Speed Screen

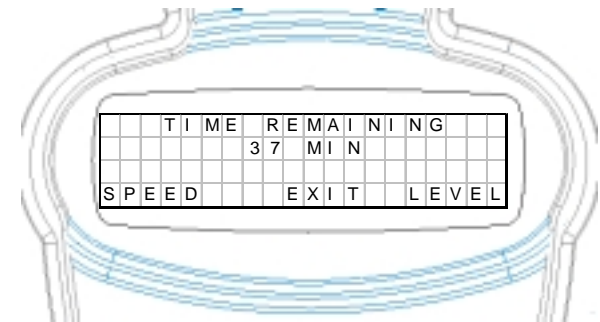
Selecting SPEED from either the USAGE or TIME REMAINING screens will access the Tractor Ground Speed screen. The Tractor Ground Speed screen is used to show your tractor's speed as reported by your ground speed radar unit. Your ground speed radar unit must be connected to the Cab unit and correctly calibrated for this screen to work properly.



Time Remaining Screen

Selecting TIME From the USAGE or TRACTOR GROUND SPEED screens will access the time remaining before your existing tank runs out of ammonia.

YOU MUST RESET THE SMARTLINK (TM) SYSTEM EVERY TIME YOU CHANGE TANKS FROM WITHIN THE USAGE SCREEN. THIS ALLOWS THE SMARTLINK (TM) TO BEGIN THE TIME REMAINING CALCULATIONS AGAIN. IF YOU DON'T RESET THE SYSTEM WHEN YOU CHANGE TANKS, THE TIME REMAINING CALCULATIONS WILL BE INCORRECT.



When you first begin applying ammonia, the Smartlink (tm) system will begin calculating your time remaining. It will take approximately 25% of the volume of the tank before the Smartlink (tm) will report the time remaining. During this time, the TIME REMAINING screen will report CALCULATING. This delay is necessary to smooth out variation in reported fluid level caused by sloshing or driving up and down pronounced inclines. The longer you

monitor your usage, the more accurate the calculations will be as the affect of sloshing and inclines is reduced.

At approximately 5% remaining fluid, the Smartlink (tm) system will cease printing the TIME REMAINING and will instead show a LOW TANK WARNING. An audible buzzer will sound alerting you to the possibility of a low tank.

VARIATIONS IN GROUND TERRAIN AND GAGE ACCURACY CAN AFFECT THE ACCURACY OF THE TIME REMAINING IN THE TANK CALCULATIONS. THESE TIME REMAINING NUMBERS SHOULD BE USED AS REFERENCE. IT IS POSSIBLE TO RUN OUT OF AMMONIA BEFORE THE TIME REMAINING REACHES ZERO DUE TO THESE AFFECTS. YOU SHOULD LEAVE SOME RESERVE BEFORE CHANGING TANKS TO ENSURE THAT YOU DON'T RUN OUT OF AMMONIA.

Troubleshooting

Tank Module readings do not agree with the amount of ammonia known to be in the tank

Ensure that the tank module is placed correctly on the gage with the top of the tank module towards the top of the gage.

Ensure that the tank has a functioning gage in proper working condition. Since the tank module is electronically monitoring the tank fluid level by sensing the position of the gage, an inoperable or damaged gage will lead to improper measurements.

Ensure that the tank module is firmly seated on the gage. If non-standard bolts are used to mount the gage, the tank module can be prevented from sitting firmly on the gage which can lead to incorrect readings. Excessive paint buildup, rust or fittings which interfere with the position of the tank module can also cause this problem.

No Tank Signal shown on Cab Unit

Check to make sure fresh batteries are in the Tank Module

Check to make sure that the antennas on both the tank module and Cab Module are present and have not been damaged.

Try re-positioning your Cab Unit to a different location within your cab.

Cab Unit does not display tractor ground speed

Ensure that the ground speed cable is correctly connected to the back of the cab unit.

Ensure that you have correctly calibrated your groundspeed

Cab Unit displays the incorrect tractor speed

Application Rate Calculations are incorrect

Check to make sure you have correctly entered the tank size and toolbar size.

Ensure that you pressed RESET when changing tanks.

Allow sufficient time to average out the affects of sloshing or driving up and down inclines.

Notice to Owner

Please retain this booklet for future reference. Use the space below to write in the serial number for identification and accurate reporting in the event that service of your unit is required. The serial number is located on labels on your Cab and Tank units.



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