

# Site-Specific Management Guidelines

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## Trouble-Shooting Yield Monitor Systems

### Summary

In spite of extensive calibration, yield monitors can still have problems recording the data. When yield monitors stop working, trouble-shooting to solve the problem can be difficult, especially when the time to harvest the crop is at hand. The objective of this guideline paper is to provide information for trouble-shooting yield monitors.

### Introduction

Typical accuracy expected for most yield monitor systems is 3 percent. However, accuracy levels of +/- 1 percent are possible when systems are calibrated correctly and maintained on a regular basis. Yield monitor accuracy can be evaluated by comparing yield monitor estimates with elevator weigh tickets. If the accuracy changes, recalibration may be required. Maintaining a logbook of calibration information may be useful to track problems. For example, information in a logbook may include calibration data and Differential Global Positioning System (DGPS) subscription dates.

Most yield monitors function without problem. However, problems can occur and solving these technical problems can be one of the most frustrating components of precision agriculture. To obtain good results, the monitor must be calibrated correctly. Information on yield monitor calibration is provided in Guideline #31.

We quizzed six manufacturers about the most common problems observed with their monitors. These problems are listed below.

- Ground speed is incorrect, erratic, zero, or does not register;
- The yield monitor display is blank;
- Area is incorrect;
- No grain flow registers or yield values are high, low or negative;
- High moisture readings or moisture readings do not change or remain near zero;
- Problems may occur when talking on a two-way radio;
- DGPS problems can occur such as 'no signal' or 'no differential correction' error messages;

- Trouble with the PCMCIA card, such as unable to write data to the card.

Solving some of these problems may be as simple as checking the connections. In other cases the solutions may be specific to the yield monitor system or a problem that you cannot fix. A general recommendation for troubleshooting is that the problem needs to be isolated. For example,

- If the DGPS and monitor are working correctly, but the yield monitor is obtaining erroneous DGPS information, then the problem may be associated with the cables or connections.
- If the yield monitor is functioning properly, but the yield monitor is reporting low yields, and the moisture sensor information is very high, then the moisture sensor may need cleaning or recalibration.

Solutions to problems may not be yield monitor specific, i.e. if no differential correction is being received by the DGPS and a satellite subscription is used, ensure that the subscription has been paid. In trouble-shooting yield monitors, equipment such as a multi-meter or voltmeter can be used for checking wire continuity. A computer toolkit can be useful when working on the yield monitor or desktop computer system that operates the yield monitor software. It is also important to make sure that all components are properly connected. It is important to understand that you may not be able to fix the problem because electronics can fail. Learning how to trouble-shoot electrical equipment takes time. Do not hesitate to contact the help line.

Specific recommendations are listed in **Table 1**.

Yield monitor manufacturers provided the information listed in the following table. This information was not created by South Dakota State University.

**Table 1. Trouble-shooting yield monitor problems.**

<b>Problem</b>	<b>AFS (Case IH)</b>	<b>Ag Leader</b>	<b>Green Star (Deere)</b>
Ground Speed Incorrect	<ol style="list-style-type: none"> <li>1. Check monitor to ensure correct ground speed set.</li> <li>2. Change display: speed-wheel/tracks/radar if needed to set correct ground speed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check connections.</li> <li>2. Check PLS/100 value under DIST key. Should be between 2000 and 4000.</li> <li>3. Change display: speed-wheel/tracks/radar if needed to set correct ground speed.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check combine rolling radius.</li> </ol>
Blank Display	<ol style="list-style-type: none"> <li>1. Check connection to monitor.</li> <li>2. Check for damaged connections or cables.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check to ensure power is supplied to the yield monitor.</li> <li>2. Check for damaged connections or cables.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check display connections.</li> </ol>
Area Determination Incorrect	<ol style="list-style-type: none"> <li>1. Check that acre counter is on.</li> <li>2. Check correct swath width.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check that area count switch is on.</li> <li>2. Check speed sensor selection.</li> <li>3. If using GPS, turn VTG string on.</li> <li>4. Check correct swath width.</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify correct header width.</li> <li>2. If using platform, use width of cut, not width of head.</li> <li>3. Verify that ground speed is accurate.</li> </ol>
Yield Determination Incorrect	<ol style="list-style-type: none"> <li>1. Check flow sensor; make sure it is mounted properly and is not defective.</li> <li>2. Check flow sensor cable for loose connections, damage, continuity and/or shorts.</li> <li>3. Check sensor pin.</li> <li>4. Isolate the cause. (i.e. factors for yield calculations, moisture, weight, cut width, speed, etc.)</li> </ol>	<ol style="list-style-type: none"> <li>1. Check flow sensor connections.</li> <li>2. Check elevator speed under FLOW key (should be 250 – 600 rpm).</li> <li>3. Check calibration values.</li> </ol>	<ol style="list-style-type: none"> <li>1. System is out of calibration.</li> <li>2. Incorrect head width, incorrect crop selection, dirt or mud on the impact plate.</li> <li>3. Clean grain elevator chain not adjusted.</li> <li>4. No elevator speed or no ground speed.</li> </ol>
Moisture Readings Incorrect	<ol style="list-style-type: none"> <li>1. Moisture sensor readings may decrease when talking on a two-way radio. Move the radio antenna as far from the moisture sensor and cable as possible.</li> <li>2. High soybean moisture readings: Set MOIST=MAN for problem areas. Change the “xx.x avg.%” to actual known moisture for that area.</li> <li>3. Clean any build-up from the inside auger tube and moisture sensor blade.</li> </ol>	<ol style="list-style-type: none"> <li>1. If moisture readings are high, check the sensor to ensure no debris is on the sensor.</li> <li>2. Also, check the ground strap and ensure it is attached.</li> <li>3. Ensure that all connections for the sensor are coupled together.</li> <li>4. Verify the moisture offset number.</li> <li>5. Check proximity switch sensitivity.</li> <li>6. Keep the antenna for the 2-way radio and the moisture sensor cable as far apart as possible.</li> </ol>	<ol style="list-style-type: none"> <li>1. If moisture data is inaccurate, change the moisture correction.</li> <li>2. If moisture data does not change, (a) check for obstructions in the sensor or (b) the paddle wheel has stopped running.</li> <li>3. Moisture always reads zero. Check the sensor connection.</li> </ol>
DGPS Not Functioning	<ol style="list-style-type: none"> <li>1. Mount antenna at highest point of combine.</li> <li>2. Verify connection of 5-pin GPS data cable to wiring harness inside right hand side service door.</li> <li>3. Verify that the receiver has power.</li> <li>4. Verify differential correction is set to receive proper signal</li> </ol>	<ol style="list-style-type: none"> <li>1. Check sum.</li> <li>2. Verify data strings are turned on (GGA, VTG).</li> <li>3. Check cable connections.</li> </ol>	<ol style="list-style-type: none"> <li>1. No differential correction. Check for expiration date of differential license.</li> <li>2. Combine may have voltage problem.</li> <li>3. Interference with two-way radio.</li> </ol>
PCMCIA Card Not Working	<ol style="list-style-type: none"> <li>1. Ensure that the correct type of card is being used for the yield monitor. Monitors prior to 1999 use SRAM Cards. Monitors for 1999 and after use ATA Flash Cards.</li> </ol>	<ol style="list-style-type: none"> <li>1. Set log device to memory card.</li> <li>2. Make sure the card is not full.</li> <li>3. YM 2000 uses only SRAM cards. PF3000 uses either SRAM or Flash cards.</li> <li>4. Make sure the card was inserted properly.</li> <li>5. Make sure the card has been formatted.</li> <li>6. Check card memory size. The card memory size must be at least one megabyte to log GPS data.</li> </ol>	<ol style="list-style-type: none"> <li>1. Verify that the correct firmware versions are saved to the moisture sensor and processor.</li> <li>2. Check processor connection.</li> </ol>
Website for further information	For further assistance: <a href="http://www.casecorp.com/agricultural/afs/index.html">http://www.casecorp.com/agricultural/afs/index.html</a>	Manual available online at: <a href="http://www.agleader.com">http://www.agleader.com</a>	Manual available online at: <a href="http://www.stellarsupport.com">http://www.stellarsupport.com</a>

**Table 1. Trouble-shooting yield monitor problems (continued).**

<b>Problem</b>	<b>Caterpillar</b>	<b>Fieldstar® (AGCO)</b>	<b>Grain Trak (Micro-Trak)</b>
Ground Speed Incorrect	<ol style="list-style-type: none"> <li>1. Check the ground speed for impulses per 100 meters (109 yds.). See manual or the "help" section within the CEBIS monitor.</li> <li>2. Check the ground speed sensor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for correct gear ratio under system setup.</li> <li>2. Check wheel circumference value is correct.</li> <li>3. Check connections and sensor at gear transmission and combine tachometer.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure wheel circumference value is entered.</li> <li>2. Check cables for damage or non-connections.</li> <li>3. Check sensors to ensure correct installation.</li> </ol>
Blank Display	<ol style="list-style-type: none"> <li>1. CEBIS monitor requires activation of yield monitor and/or GPS. See included activation forms. (contact Cat dealer)</li> </ol>	<ol style="list-style-type: none"> <li>1. Check all sensor connections.</li> <li>2. Check for damage to cables and connections. Check voltage.</li> </ol>	<ol style="list-style-type: none"> <li>1. No power.</li> <li>2. Display screen out of contrast or insufficient backlighting.</li> <li>3. Poor connection at battery.</li> </ol>
Area Determination Incorrect	<ol style="list-style-type: none"> <li>1. Verify correct impulses used for ground speed.</li> <li>2. Verify "Cutting height limits" have been learned, correct header width used and "Working position" set.</li> <li>3. Planned record has been started.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check header size. May have input incorrect header width.</li> <li>2. Check automatic on/off of recording system. May need to adjust for different crops.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure system is in RUN mode, not HOLD mode.</li> <li>2. Check row width, number of rows, and wheel circumference.</li> </ol>
Yield Determination Incorrect	<ol style="list-style-type: none"> <li>1. Select crop to be harvested on CEBIS.</li> <li>2. Measure the crop's test weight using the graduated cylinder and hand scale located under the seat. Input change into CEBIS.</li> <li>3. Check the 'photo eyes' (located in the upper portion of the clean grain elevator) for proper connection to harness.</li> <li>4. Ensure correct photo eye operation by checking each sensor to determine if the flashing red LED on receiver (outer side of elevator) and green LED on transmitter (inner side of elevator) are active. Check the quality of the protective lenses over the sensors.</li> <li>5. Ensure that correct tension has been applied to the clean grain elevator chain.</li> </ol>	<ol style="list-style-type: none"> <li>1. Zero yield sensor.</li> <li>2. Recalibrate to a known scale weight.</li> <li>3. Incorrect header width.</li> <li>4. Check connections and build-up on sensor.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for obstruction at grain flow sensor.</li> <li>2. Reset the null frequency (zero flow condition) of grain flow sensor.</li> <li>3. Check flow sensor cable for damage or bad connections.</li> <li>4. Verify that the null frequency is around 400 Hertz (<math>\pm 25</math> Hz).</li> <li>5. If the null frequency drops by <math>\pm 20</math>, sensor may need repair.</li> </ol>
Moisture Readings Incorrect	<ol style="list-style-type: none"> <li>1. Ensure proper calibration (see manual).</li> <li>2. Alarm "Moisture sensor defective" (check connection/sensor, contact dealer).</li> <li>3. Check the cables and connections.</li> <li>4. Check quantimeter fuse for quality on circuit.</li> </ol>	<ol style="list-style-type: none"> <li>1. If moisture readings are high, check the sensor and/or funnel for build-up or obstruction.</li> <li>2. Check connections at sensor lead for zero reading.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check calibration, see Step 7 in manual. Select 'yes' if the moisture sensor is installed.</li> <li>2. Check for cable damage or sensor damage.</li> <li>3. Ensure the moisture sensor is grounded.</li> </ol>
DGPS Not Functioning	<ol style="list-style-type: none"> <li>1. No signal. Landstar satellite is not visible. Relocate the antenna.</li> <li>2. Inspect antenna for damage and secure connection.</li> <li>3. DGPS LED is off. Locate combine with free sight to the south.</li> <li>4. Subscription for differential correction might be expired.</li> <li>5. Ensure that CEBIS has been activated to operate with a GPS receiver installed (see dealer)</li> <li>6. Ensure correct power supply to receiver (12v).</li> </ol>	<ol style="list-style-type: none"> <li>1. Check for null modem installation at the comm-unit connection.</li> <li>2. Verify receiver is functioning properly with LED lights or terminal/screen.</li> <li>3. Check power and antenna connections.</li> </ol>	<ol style="list-style-type: none"> <li>1. Make sure file number is selected in calibration set-up.</li> <li>2. Ensure that the correct software program formatted the PCMCIA card.</li> <li>3. Check Data-Trak's LED for error messages.</li> <li>4. Set for 4800 baud, 8-N-1.</li> <li>5. Set for strings GGA, GSA, VTG, ZDA.</li> <li>6. If using beacon for differential correction, ensure that good beacon signal can be received in harvest location.</li> <li>7. If using satellite, ensure subscription fees have been paid.</li> </ol>

*Table continued on page 4.*

**Table 1. Trouble-shooting yield monitor problems (continued).**

<b>Problem</b>	<b>Caterpillar</b>	<b>Fieldstar® (AGCO)</b>	<b>Grain Trak (Micro-Trak)</b>
PCMCIA Card Not Working	<ol style="list-style-type: none"> <li>1. Ensure connection to power source (12v).</li> <li>2. Ensure proper installation of PC card.</li> <li>3. Ensure CEBIS activation for PC card reader (contact dealer).</li> <li>4. Ensure that field orders have been loaded to the PC card via desktop software (prior to harvesting) and that the field order has been started (write data) on CEBIS.</li> </ol>	<ol style="list-style-type: none"> <li>1. Format the Data Card using the software program.</li> <li>2. Ensure the Data Card is fully inserted.</li> </ol>	<ol style="list-style-type: none"> <li>1. Check that the PCMCIA card's write protect switch is in OFF position.</li> <li>2. Ensure that the correct software program formatted the PCMCIA card.</li> <li>3. Check Data-Trak's LED for error messages.</li> <li>4. On computer, verify a system data file is present on PCMCIA card (MicroTrak's formatting string).</li> </ol>
Website for further information	For further assistance, contact your local Caterpillar dealer.	Yield monitor manual is not available online as of November 2000. Plans are underway at AGCO for a manual online.	Manual available online at: <a href="http://www.micro-trak.com/reference_manuals.html">http://www.micro-trak.com/reference_manuals.html</a>

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