PROVISO™ PLUS

Simple Troubleshooting

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Proviso™ Plus P300-EM

Simple Troubleshooting

The Proviso™ Plus P300-EM, also called the P300, is a Control System for a Self-Steering Lift Axle on a Truck

Produced by:

WHEEL MONITOR® INC.
TECHNOLOGY FOR SAFE TRANSPORTATION

Safety Notices

IMPORTANT: WHEEL MONITOR, INC. (WMI) cannot anticipate every possible circumstance that might involve a potential hazard. Therefore, the warnings and cautions in this manual are not all inclusive. Use care and good judgment in the installation, removal, and operation of the equipment. Always take precautions to protect yourself and others. Follow all applicable national, local, and industry-specific safety regulations and standards. Always follow your company's safety procedures when installing, removing, operating, or troubleshooting this equipment.

⚠ CAUTION	**Read this manual carefully before attempting troubleshooting. Be sure that you understand all instructions before you begin.**

Important Notice

This manual describes the current recommended troubleshooting procedures for Proviso™ Plus P300-EM from WHEEL MONITOR, INC. (WMI) at the time of printing and are subject to change without notice or liability.

Scope

This document is to assist in the troubleshooting of a Proviso™ Plus P300-EM Control System. It will explain the solution to problems we have seen in the field.

Basic Principle

The Proviso™ Plus P300-EM (also referred to as the P300) is a control system for a self-steering lift axle on a truck. The P300-EM controls the position of the lift axle, UP or DOWN. It also controls the pressure/weight the lift axle is carrying.

Tools Needed

Multi-Meter and/or test light

Troubleshooting Procedure

When a truck with the P300-EM has been brought in for service, information from the operator will be important, including:

- What exactly is happening? (Axle is not lifting, axle is not lowering)
- When is the issue happening? (Empty, loaded, both?)
- Does it always happen or is it intermittent?
- How long has the issue been happening?
- Has the system worked correctly for some time before this issue?

Basic Troubleshooting Procedure

The Proviso™ Plus P300-EM is equipped with multiple diagnostic Light Emitting Diodes (LEDs). They are labeled with “D,” “W,” “L,” and “P” respectively. Locate the P300-EM module and visually identify the colour and the pattern of each Light Emitting Diode (LED). The LEDs may be dim—Shading the area around the LED may help you see them.

Figure 1: Proviso™ P300-EM’s LEDs

Table 1: LED Colour Chart

	Description	GREEN	AMBER	RED
D	Diagnostics	Flash – No Issue OFF – No Power	Flash – External Problem	Flash – Internal Problem
W	Wheel Sensor	Solid – Forward Flash– Stop OFF – Reverse	N/A	Solid– Wheel Sensor Issue
L	Lift Axle	ON = Axle Up OFF = Axle Down	N/A	N/A
P	Power	ON	N/A	N/A

If the LEDs on the P300-EM module are not coming on at all, make sure the module is receiving 12-volt power (Blue wire) and the ground (White wire) is properly grounded on the truck side of the 6-pin connector.

If the LEDs are not **GREEN** when the truck's power is ON, the module has detected an issue.

1. First, try restarting the truck to see if the problem returns.
2. If the problem returns, use the Wheel Monitor Inc (WMI) Communication software and cable to communicate with the P300 control module.

The software will show the cause to the LED colour and helpful messages to resolve the issue.

If you do not have access to the software, locate a service center equipped with the WMI Communication software. Contact Wheel Monitor to help locate a service center near you.

The P300-EM also has an in-cab display which can be useful for diagnosing issues. The bottom lines of the display's main screen are status messages. These messages will contain what the system is doing and why. If the system has detected a fault of some kind, information about the fault will be presented on the display.

Figure 2: Status Messages

The error code numbers that may appear on the display as shown in the table below:

Error	Description	Likely Cause
100	Error saving the Setup data	Internal Failure
101	Error saving the Pressure data	Internal Failure
102	Setup data has been corrupted	Internal Failure
103	Pressure data has been corrupted	Internal Failure
104	Internal Reference Voltage gap out of range	Internal Failure
105	Temperature Sensor failure	Internal Failure
106	Pressure Sensor failure, Pilot	Internal Failure or not calibrated
107	Pressure Sensor failure, tan1	Internal Failure or not calibrated
108	Pressure Sensor failure, tan2	Internal Failure or not calibrated
109	Strain Sensor Connection, Front	Sensor issue or not connected
110	Strain Sensor Connection, Tan1	Sensor issue or not connected
111	Strain Sensor Connection, Tan2	Sensor issue or not connected
112	Strain Sensor out of range, Front	Sensor issue
113	Strain Sensor out of range, Tan1	Sensor issue
114	Strain Sensor out of range, Tan2	Sensor issue
115	Encoder out of range, Tan1	Sensor issue
116	Encoder out of range, Tan2	Sensor issue
117	Front Sensor is not configured	Data corrupted or not setup
118	Tandem sensor type is not configured	Data corrupted or not setup
119	5V output is out of range	Internal issue or low battery
120	Axle cycling. Move the load forward	Weight Calibration may be wrong. Or sensors are not working. Or Truck is loaded improperly.
121	Current Overload on output wires	One of the outputs is drawing too much current, may be shorted
122	Lift Axle pressure is too high	Valve issue, LACM may have failed or Add solenoid leaks
123	Battery Voltage out of range	Power Connection issue
124	Wheel Sensor issue	Wheel sensor failure or installation
125	Reverse detected while at high speeds	Wheel sensor installation issue
126	Reserved (not used yet)	
127	Front weight over limit	Sensor issue or too much weight
128	Lift weight over limit	Sensor issue or too much weight
129	Tandem weight over limit	Sensor issue or too much weight
226	Front temperature sensor issue	
227	Rear temperature sensor issue	
228	Front and Rear temperature sensor may be swapped	

Scenarios

If the LEDs are **GREEN** and there is still an issue, the following scenarios will cover the most likely causes and solutions.

Scenario #1: The lift axle will not lift in reverse but lifts when going forward (but works backwards).

Verify the direction is not being read correctly using the in-cab display status message.

Check the wheel sensor installation.

1. Locate which wheel the sensor is installed on and inspect the sensor. In most cases, this involves pulling the wheel and brake assembly to get access to the sensor.
2. First, check the sensor alignment.
    - The molded point on the back of the sensor should be pointing away from the center of the axle.
    - If the sensor is mounted in the 12 o'clock position on the axle, the molded point should also be pointed in the 12 o'clock position.

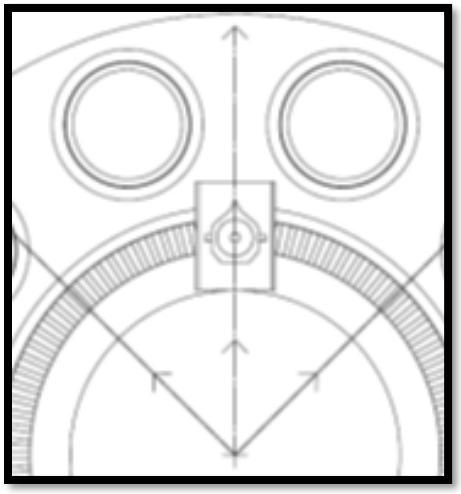

Figure 3: Position of the Wheel Sensor

3. Second, check the spacing between the sensor and the tone ring.

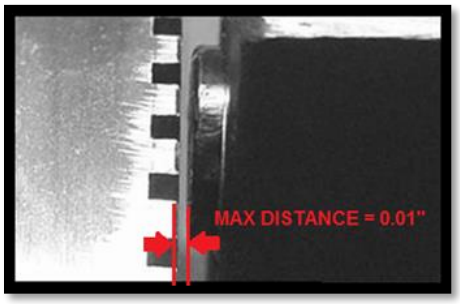

Figure 4: Distance between the Sensor and Tone Ring

4. Third, check that the sensor block is centered on the tone ring.

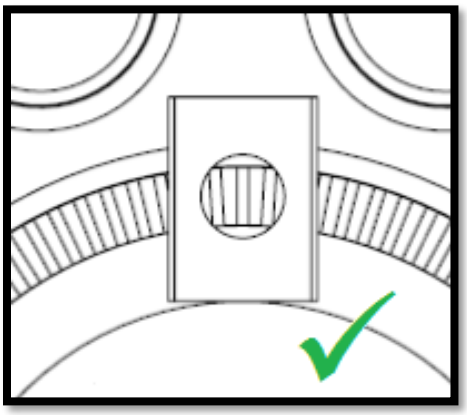

Figure 5:Correct Location of Center Block

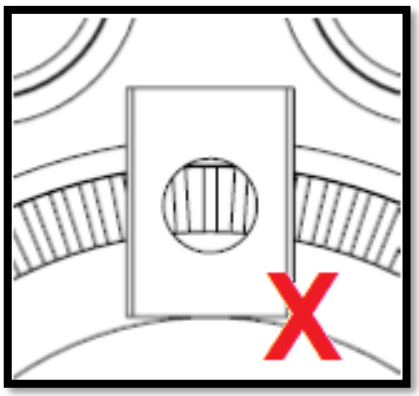

Figure 6: Example #1 of Incorrect Location of the Center Block

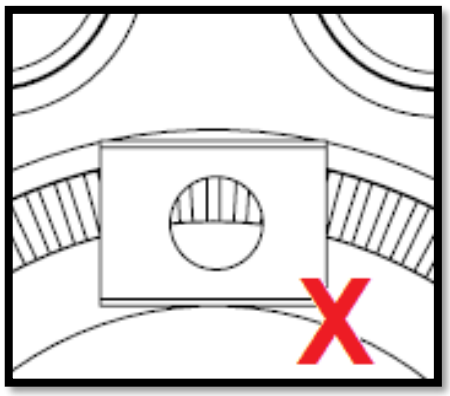

Figure 7: Example #2 of Incorrect Location of the Center Block

Scenario #2: The lift axle will not lift in reverse or forward.

1. Use the "W" LED to determine if the wheel sensor is detecting any speed or direction (or use the in-cab display).
   a. Locate which wheel the sensor is installed on and rotate the wheel.
   b. Watch the LED on the P300 while the wheel is rotating.
      - If the LED becomes **SOLID GREEN** while rotating and **FLASHES GREEN** while stopped, the sensor is detecting a partial signal. Refer to Scenario #1 to check the sensor installation.
      - If the LED continues to **FLASH GREEN** while the wheel rotates, continue to step 2.
2. Test the P300 Module.
   a. Verify the P300 module is correctly supplying power to the sensor.
   b. Disconnect the wheel sensor connector from the sensor and measure the pins/sockets on the P200ML side of the connection.

      Red = Battery voltage

      Black = Ground

      White = 10V approx.

      Green = 10V approx.
3. Check for bent pins on the wheel-sensor connector, both the P300 and sensor side of the connection.
4. Trace the wheel sensor cable from the P300 to the sensor, checking for damage along the cable.
5. Refer to Scenario #1 to check the sensor installation.
6. If all of the previous steps do not solve the issue, replace the wheel sensor. In extreme cases, the P300 module may need to be replaced.

Scenario #3: The lift axle will not lift with the Emergency Lift Axle Override.

This scenario is most likely caused by a wiring issue or misunderstanding of how the feature works.

1. Test the 4-way signal inputs from the truck.
    a. Turn the 4-way signals in the truck ON.
    b. Measure the signals on the yellow and green wire of the 6-pin connector on the truck side.
    c. Verify that both wires are turning ON and OFF at the same rate as the 4-way signals.
    d. Check that the Emergency Lift Axle Override Switch is ON, as it will cut-off one of the signals when OFF.
2. Inspect the 6-pin connector for any signs of corrosion or damage to either side.
3. Ask the user to explain how the feature works. The correct way to activate is:
    a. Drive between 0.3-60km/h (it doesn't work while stopped)
    b. Turn on both the Emergency Lift axle Override Switch and the 4-way Flasher Switch.

Note: If the user describes a different activation process, clear up the misunderstanding

4. Verify that the P300-EM is connected to the lift-axle control valve. The Brown wire on the P300-EM should be connected to a solenoid for controlling the lift axle position.
5. If all of the previous steps show no sign of issues, advanced troubleshooting is recommended using the Wheel Monitor Communication software.

Note: The P300-EM may be configured to use the 4-way enable switch method. Use the communication software to determine which setting the system is using.

Scenario #4: The lift axle will not lift when the truck is EMPTY.

This scenario is most likely caused by a calibration issue or a pneumatic issue.

1. Verify that the display is showing the correct weight on the axles. If not, perform an empty calibration offset.
2. Perform the empty calibration offset by pressing the **Options** button on the display, followed by the **Begin** button next to the **Reset to TARE** label.
3. Follow the instructions shown on the display, such as ensure the truck is empty and level ground.
4. Verify the procedure was successful by checking what the displayed axle weight is after the offset.
5. Use the Communication software to determine what is causing the axle to remain down while empty.

Figure 8: Display

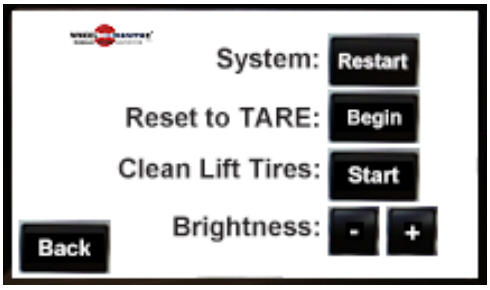

Figure 9: Reset TARE

Scenario #5: The lift axle will not lower when the truck is LOADED.

1. Verify that the manual override on the control valve is NOT ON.

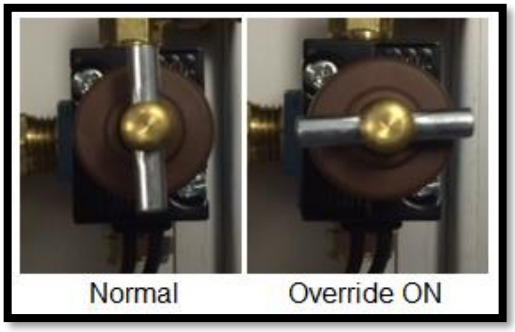

Figure 10: Override ON

2. Attempt the empty calibration offset procedure using the display. Refer to scenario #4 and make sure the truck is empty.
3. Use the communication software to determine what is causing the axle to remain up while loaded.

Scenario #6: The lift axle lowers randomly when the truck is EMPTY.

This scenario is most likely caused by intermittent power loss or a wiring issue.

1. Test the power and ground connection.
    a. Using a multi-meter, measure the Blue and White Wires on the truck side of the connection.
    b. Look for signs of voltage drops or fluctuating readings.
    c. Trace the wires back to the source looking for signs of corrosion or loose connections.
2. Verify that the P300-EM is connected to the lift-axle control valve.
3. Test the lift-axle solenoid using a battery to verify the valve is correctly functioning.
4. If all of the previous steps show no sign of issues, advanced troubleshooting is recommended using the Wheel Monitor Communication software.

Scenario #7: The lift axle lifts randomly when the truck is LOADED.

This scenario is most likely caused by the wheel sensor detecting reverse. In some cases, this can be caused by the user rolling back enough to trigger the reverse detection. In other cases, it can be a sign of wheel sensor alignment issues or a malfunction.

1. Trace the wheel sensor cable, checking for damage along the cable.
2. Check the wheel sensor installation. Refer to scenario #1.
3. If all of the previous steps show no sign of issues, advanced troubleshooting is recommended using the Wheel Monitor Communication software.

Contact Us

If you have any questions or comments, feel free to contact us at:

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