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Diagnostic Troubleshooting: Wheel Counter System, standard main module, 4Q firmware.

In normal conditions with the switch machine enabled, the #6 LED (power on) and the #1 LED (switch enabled) should be lit. If the #1 LED is not lit and the switch area is clear of rail traffic, the wheel counter system is in a fault or failsafe condition.

The first step in diagnosing a system that has locked up is to observe the main module to see if the diagnostic LED's 7, 8, and 9 are lit or blinking. This can be the first bit of information that can steer you in the right direction for an accurate diagnosis. If none of the LED's on the main module are lit, the system fuse is possibly blown from shorted or damaged communication cable.

The explanation for the diagnostic LED's are as follows:

LED #7 ON, #8 OFF, #9 OFF: Count limit of protection zone exceeded by more than -2 counts.

LED #7 ON, #8 ON, #9 OFF: Sensor framing error after 16 retries from Main Module. Check wheel sensors on Diagnostic Tab of the wheel counter software for failed wheel sensor before powering system down.

LED #7 ON, #8 flashing, #9 OFF: Main Module Watch Dog timer has timed out.

LED #7 ON, #8 OFF, #9 flashing: Output at pin 1 has been externally forced high (connected/shorted to + 12VDC).

LED #7 flashing, #8 OFF, #9 OFF: The LED# 7 blink count indicates the ID# of the unresponsive sensor anytime or after reset. After reset, the main module checks the health of each wheel sensor and it will also blink LED #7 if any of the wheel sensors are not healthy. Also, the main module now monitors the threshold level of the wheel sensors. If for any reason, the threshold level changes in any wheel sensor due to lightning or short circuit, the main module will disable the system and blink the ID# of the sensor with the incorrect threshold levels. To correct the threshold levels, use the wheel counter software on the "Wheel Sensor" tab to reset the threshold levels to factory settings. Remember to power the sensor down after resetting the threshold levels to lock in the changes.

If LED #7 and #8 are on, or if #7 is flashing there may be damage to a wheel sensor or the communication cable. All wheel sensors and com cable should be visually inspected for damage from dragging chains or equipment. During inspection, wheel sensors should be checked for loose or missing mounting bolts. Sensors that are loose on the rail will continually create a fault situation.

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The next step in diagnosis is using the wheel counter diagnostic software to analyze the main module and wheel sensors to determine their health.

Main Module Tab: Open the wheel counter software and on the main module page, click the "read" button. This should show the ID numbers that are programmed into the module. If the power to the main module has not been cycled since the system was faulted, the event count column will have the last event of wheel counts showing beside the ID numbers. This information can be used to determine if a wheel sensor is missing wheels. Also, there should not be any wheel count numbers that end in an odd number (1,3,5,7, etc.). This would indicate that the sensor with the odd wheel count is missing wheels. The installed height of this wheel sensor should be checked that it is within 1/16" of the factory recommended height of 1-3/4" from the top of the rail.

Diagnostics Tab:
Click the "check now" button to perform a sensor health scan. The scan is most useful before doing a power down reset of the system. When the software has completed the sensor scan, The ID numbers, internal parameters, and a "pass" or "fail" of each wheel sensor will be displayed in the information box at the bottom of the page. If any of the listed wheel sensors failed the scan, the parameters of that failed sensor should be written down for future reference. The failed sensor may be the reason the system was in a fault condition but the system should at this time be powered down to recalibrate the wheel sensors and another scan performed on the sensors. If the same sensor fails the scan again or multiple times, that wheel sensor should be replaced. If the same sensor shows a "pass" after a power down, the sensor can be put back into service and monitored to see if it will cause another fault condition. If the sensor faults a second time in the same manner, the sensor should be replaced.

Wheel Sensor Tab:
This tab can be used to change the ID numbers on single sensors or multiple sensors hooked up to a main module. You would select "Single sensor" if only one sensor is connected to the main module or you are using a wheel sensor programming cable with a 9 volt battery to change the ID number of a wheel sensor. Enter the new sensor ID number and click "Send". A message box saying to "verify connection option" will appear, click OK. Another message box saying to "Cycle Power to complete the procedure" will appear. Click OK, then power the system down to lock in the new ID number. The "Wheel Sensor Auto Detect" function at the bottom right of the page can be used to verify the ID number change. If you are changing the ID number of a wheel sensor with several other wheel sensors hooked to a main module, you would select "Multiple Sensor", then enter the current sensor ID number. Then enter the new sensor ID number. Click "Send". You will get the two message boxes as in the "Single Sensor" procedure. Cycle the power to lock the changes then verify the change with "Auto Detect".