

### G-Series Linear-Position Sensor Grounded External Interrogation Lines

551023 A

#### Technical Tip

**Observed Behavior:** Intermittent sensor ‘failures’; controller reporting ‘fault’ conditions.

**Root Cause:** G-Series sensor negative interrogation line is grounded.

**Solution:** Correct wiring per G-Series sensor specifications.

#### Summary

Field failures have been reported where G-Series sensors are replacing older Temposonics II sensors and where the wiring to the control systems was originally configured for Temposonics II with “neutered” outputs or Digital Personality Modules (DPM’s). MTS Applications Engineering has observed that many of these installations have had the Negative Interrogation Line grounded (Pin 10 on an RB style connector). See table 1.

When this condition exists, the G-Series sensor diagnostics will indicate a functional sensor until a controller “fault” condition occurs, then the diagnostics will alert the user to the problem by having the LEDs flash for “Missing External Interrogation”.

The G- Series sensor will work with one Interrogation line; however, the G-Series sensor was designed to improve upon the performance of the TII and it relies on a true differential input to maximize noise cancellation in harsh environments. Grounding the Negative Interrogation Line disables this feature and in certain conditions will result in intermittent signal interruptions.

An example of this condition was recently observed in a wood mill in the Southeastern US. In this case, the machine controller used the “QB” module made by Allen Bradley. The QB modules would go into fault conditions (briefly) at even intervals of time, resulting in “Tempo” faults on the controller. This fault condition required the user to reset the QB module in order to resume operation.

During troubleshooting, the technician used an Oscilloscope at the QB module and observed an Interrogation signal, leading to a false conclusion that he had a bad sensor.

However, the G-Series sensor diagnostics indicated that the sensor was “missing external interrogation”. Examination of the wiring junction box revealed that the negative interrogation line was tied to ground. Once this was corrected, sensor operation returned to normal, and all controller fault conditions ended.

#### Technical Detail

Temposonics II Transducer with Digital Personality Module (PDM) EXTERNAL Interrogation ONLY (P/N TTSRXXXXXDXXXX)			
Pin No.	Cable w/Striped Leads	Cable w/Solid Leads	Functional Description
1	White/Blue Stripes	White	DC Ground
2	Blue/White Stripes	Brown	Frame
3	White/Orange Stripes	Gray	(-) Gate Output
4	Orange/White Stripes	Pink	(+) Gate Output
5	White/Green Stripes	Red	+ 15 Vdc
6	Green/White Stripes	Blue	- 15 Vdc
7	White/Brown Stripes	Black	No Connection
8	Brown/White Stripes	Violet	No Connection
9	White/Gray Stripes	Yellow	(+) 1 $\mu$ s Int. Pulse
10	Gray/White Stripes	Green	(-) $\mu$ s Int. Pulse

Table 1 Wiring for Temposonics II with DPM Output

This problem is not unique to the QB module (it was used for illustrative purposes only). Different modules or interface cards may behave differently depending on where the signal is grounded, what kind of cable is used...etc. The bottom line is: **Always verify that both of the Interrogation lines are getting to the sensor as specified in table 2.**

D6 Pin Numbers	RB Pin Numbers	Signals
1	3	- Gate
2	4 and 8 (jumpered)	+ Gate
3	9	+ Int
4	10	- Int
5	5	+Vdc
6	1	Gnd

Table 2 Pin to Pin wiring for G-Series Sensor digital adapter cables.

All specifications are subject to change. Please contact MTS for specifications that are critical to your needs.

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Additional patents are pending.  
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