

### G-Series Linear-Position Sensor Grounded Positive Gate Signal Lines

551022 A

#### Technical Tip

**Observed Behavior:** Erratic Sensor/Controller behavior.  
**Root Cause:** G-Series positive gate signal 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 some installations have had the Temposonics II Raw Return Signal Line grounded (Pin 8 on an RB style connector). For Temposonics II sensors, this incorrect wiring typically results in a sensor that appears to function properly but often fails prematurely. When a G-Series sensor is substituted for a Temposonics II, the failure is immediate and appears as an erratic signal output. This leads many to conclude that the sensor is “bad”, when in fact the issue is incorrect wiring.

#### Technical Detail

Temposonics II Transducer with Digital Personality Module (PDM) EXTERNAL Interrogation ONLY (P/N TTSRXXXXXXDEXXX)			
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 µs Int. Pulse
10	Gray/White Stripes	Green	(-) µs Int. Pulse

Table 1 Wiring for Temposonics II with DPM Output

In table 1, notice that the violet wire (pin 8) is not connected (reads “not used” in some MTS literature) when wiring a Temposonics II with a DPM output. We have observed that some customers have grounded this wire instead of not connecting it.

On the G-Series sensor adapter cable for digital and neutered outputs, pin 4 and pin 8 are tied together with a jumper. This allows the cable to work with both neutered and PWM outputs of the G-Series sensor, so long as the wiring to the controller is correct per MTS specifications. Pin 4 is the + Gate signal and is connected to Pin 2 (also +Gate) on the G-Series sensor D6 connector via the adapter cable. Pin 8 is the raw return signal in the neutered output version of the TII; and if wired correctly, remains unconnected. However, if the original installation had pin 8 grounded then the +gate pulse coming out of the G-Series sensor is now tied to ground. This will result in erratic sensor behavior.

D6 Pin Numbers	RB Pin Numbers	Signals
1	3	- Gate
2	4 and 8 (jumped)	+ 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.

This problem can easily be solved by simply lifting the violet wire going to pin 8 (on the original TII cable) off of ground and not connecting it. In most cases, the technician can simply tape it back. It has been observed that this grounding is often found at a junction box on the machine, so all connection boxes should be checked for improper grounding if erratic sensor behavior is observed.

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

**Part Number: 02-05 551022 Revision A**  
 MTS and Temposonics are registered trademarks of MTS Systems Corporation. All other trademarks are the property of their respective owners.  
 All Temposonics sensors are covered by US patent number 5,545,984.  
 Additional patents are pending.  
 Printed in USA. Copyright © 2005 MTS Systems Corporation. All Rights Reserved.

**UNITED STATES**  
**MTS Systems Corporation**  
**Sensors Division**  
 3001 Sheldon Drive  
 Cary, NC 27513  
 Tel: (800) 633-7609  
 Fax: (919) 677-0200  
 (800) 498-4442  
 www.mtssensors.com  
 sensorsinfo@mts.com

**GERMANY**  
**MTS Sensor Technologie**  
**GmbH & Co. KG**  
 Auf dem Schüffel 9  
 D - 58513 Lüdenscheid  
 Tel: +49 / 23 51 / 95 87-0  
 Fax: +49 / 23 51 / 56 491  
 www.mtssensor.de  
 info@mtssensor.de

**JAPAN**  
**MTS Systems Corporation**  
**Sensors Technology**  
 Ushikubo Bldg.  
 737 Aihara-cho, Machida-shi  
 Tokyo 194-0211, Japan  
 Tel: + 81 (42) 775 / 3838  
 Fax: + 81 (42) 775 / 5512  
 www.mtssensor.co.jp  
 info@mtssensor.co.jp