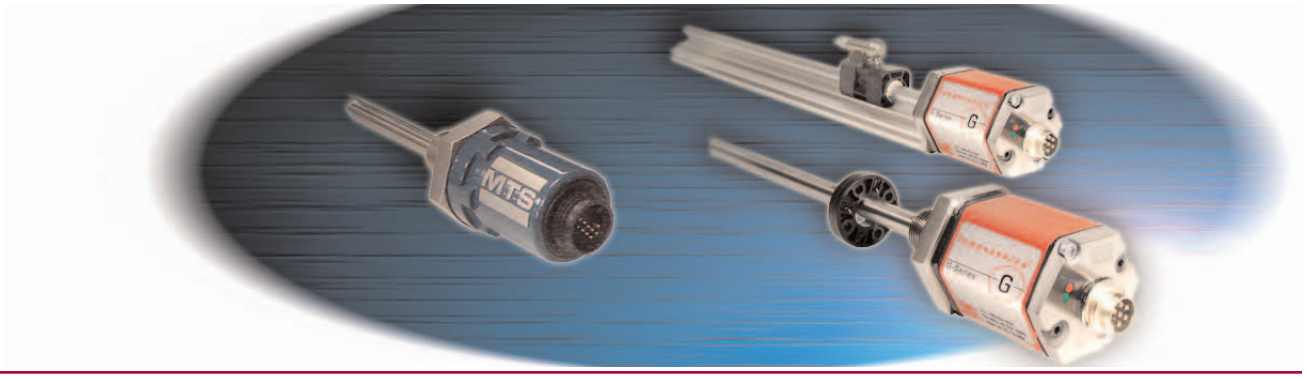
Temposonics®

Magnetostrictive Position Sensors

G-Series Linear Position Sensor
Analog and Digital Pulse Outputs

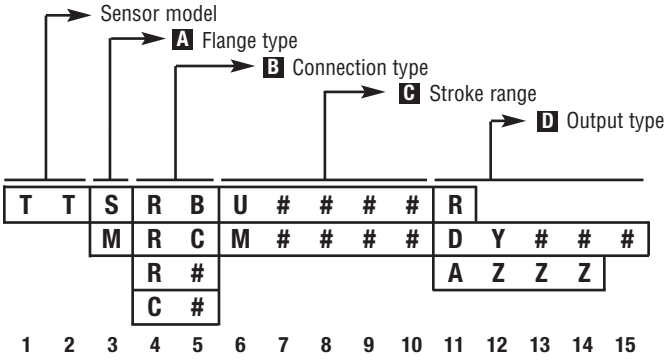
550967 A

Cross Reference

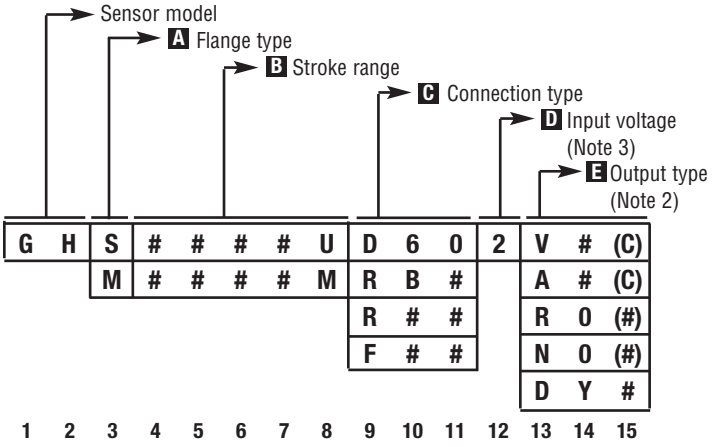


Replacement and retrofit options for the Tempo II sensor

Tempo II model number descriptors



G-Series model number descriptors (Tempo II retrofit options)



Notes:

1. Many of the G-Series “backwards compatible” options shown on page 2 are not included in other G-Series literature.
2. The characters (C) and (#) in parenthesis, as shown above, indicate model number characters that are not usually needed, and are used only for certain options.
3. G-Series input voltage option 2 is used for backwards compatibility for +15 Vdc power supplies.

Contact MTS Applications Engineering for any Tempo II options that are not cross referenced in this document.

ISO 9001 CERTIFIED

G-Series Cross Reference

A Flange Type (and pressure housing)

Tempo II model number example:

T	T	S												
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

G-Series equivalent model number example:

G	H	S									2			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Tempo II	GH	Description
S	S	US cust. threads, flat-faced hex
M	M	Metric threads, flat-faced hex

B Connection Type

Tempo II model number example:

T	T	S	R	B										
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

G-Series equivalent model number example:

G	H	S						R	B	1	2			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Tempo II GH retrofit options

RB Your Tempo II has an integral RB male connector. To retrofit, the GH model has 3 options available:

1. Select option "D60" for integral 6-pin DIN male connector, AND replace your complete extension cable (sold separately), or replace just the extension cable connector with the field-installed in-line 6-pin DIN female connector, part no. 370423, soldering required, (sold separately). See Table A on page 3.
2. Select option "D60" for integral 6-pin DIN male connector, AND use the adapter cable part no. 253243-x or 253244-x, (sold separately). See Table B on page 3.
3. Select option "RB#" for integral cable with in-line RB male connector. Select "RB1" for 1 foot integral cable length, (standard), or "RB2" for 5 foot integral cable length.

RC Your Tempo II has an integral RC male connector. To retrofit, the GH model has 2 options available:

1. Select option "D60" for integral 6-pin DIN male connector, AND replace your complete extension cable (sold separately), or replace just the extension cable connector with the field-installed in-line 6-pin DIN female connector, part no. 370423, soldering required, (sold separately). See Table A on page 3.
2. Select option "RB#" for integral cable with in-line RB male connector. Select "RB1" for 1 foot integral cable length, (standard), or "RB2" for 5 foot integral cable length, AND use the adapter cable part no. 401327 (sold separately).

R0 Your Tempo II has an integral cable, 5 foot length, pigtail termination. To retrofit, the GH model has 1 option available:

Select option "R05" for integral cable, 5 foot length, pigtail termination.

R1 or R2 Your Tempo II has an integral cable, 5 foot length, and an in-line 6-pin MS male connector. To retrofit, the GH model has 2 options available:

1. See Table C on page 4 or contact MTS Applications Engineering to see if you can connect the GH model sensor directly to your controller / interface card, and no longer use the Analog Output Module (AOM), or the Digital Interface Box (DIB) that is in your system.
2. If the AOM or DIB is still required in your system, select option "R05" for integral cable, 5 foot length, pigtail termination, AND install an in-line 6-pin MS female connector, part no. 370015, soldering required, (sold separately). See Table D on page 4.

R3 Your Tempo II has an integral cable, 5 foot length, and an in-line 10-pin MS male connector. To retrofit, the GH model has 3 options available:

1. Select option "D60" for integral 6-pin DIN male connector, AND replace your complete extension cable (sold separately).
2. Select option "D60" for integral 6-pin DIN male connector, AND use the adapter cable part no. 253245-3, (1 foot length), or 253246-3, (5 foot length), (sold separately)
3. Select option "R05" for integral cable, 5 foot length, pigtail termination, AND install an in-line 10-pin MS male connector, part no. 370160, soldering required, (sold separately). See Table E on page 4.

C0 Your Tempo II has an integral cable, custom length (1 to 99 feet), pigtail termination. To retrofit, the GH model has 1 option available:

Select option "R##" for integral cable, encode ## from 01 to 99 feet, pigtail termination.

C1 or C2 Your Tempo II has an integral cable, custom length (1 to 99 feet), and an in-line 6-pin MS male connector. To retrofit, the GH model has 2 options available:

1. See Table C on page 4 or contact MTS Applications Engineering to see if you can connect the GH model sensor directly to your controller/interface card, and no longer use the Analog Output Module (AOM), or the Digital Interface Box (DIB) that is in your system.
2. If the AOM or DIB is still required in your system, select option "R##" for integral cable, encode ## from 01 to 99 feet, pigtail termination, AND install an in-line 6-pin MS male connector, part no. 370015, soldering required, (sold separately). See Table D on page 4.

C3 Your Tempo II has an integral cable, custom length (1 to 99 feet), and an in-line 10-pin MS male connector. To retrofit, the GH model has 2 options available:

1. Select option "D60" for integral 6-pin DIN male connector, AND replace your complete extension cable.
2. Select option "D60" for integral 6-pin DIN male connector, AND use the adapter cable part no. 253245-3, (1 foot length), or 253246-3, (5 foot length), (sold separately).
3. Select option "R##" for integral cable, encode ## from 01 to 99 feet, pigtail termination, AND install an in-line 10-pin MS male connector, part no. 370160, soldering required, (sold separately). See Table E on page 4.

H0 Your Tempo II has an integral cable, heavy duty, 30 foot length, pigtail termination. To retrofit, the GH model has 1 option available:

Select option "F30" for integral cable, PUR jacket, 30 foot length, pigtail termination. See Tables F, G on page 5, and H on page 6.

G-Series Cross Reference

C Stroke length

Tempo II model number example:

T	T	S	R	B	U	0	1	2	0					
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

G-Series equivalent model number example:

G	H	S	0	1	2	0	U	R	B	1	2			
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Tempo II	GH	Description
U __ __ __ . __	__ __ __ . __ U	Stroke length in inches and tenths, 1 to 300 in. (Encode in 0.1 in. increments)
M __ __ __ __	__ __ __ __ M	Stroke length in millimeters, 25 to 7620 mm. (Encode in 5 mm increments)

D Output type

Tempo II model number example:

T	T	S	R	B	U	0	1	2	0	D	E	0	0	4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

G-Series equivalent model number example:

G	H	S	0	1	2	0	U	R	B	1	2	D	E	4
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15

Tempo II	GH	Description
Start/Stop		
R	R0(#)	Start/Stop output. If the sensor has more than one magnet, the (#) denotes number of magnets in hexadecimal, (i.e. 2 - F). If the sensor has only one magnet, leave the 15th character in the model number blank.
Pulse-Width Modulated (PWM)		
D __ __ __ __ (a b c d)	D __ __ (a b)	PWM output. The first character (a) indicates the type of interrogation, (E = external, I = internal), for both Tempo II and the GH model. The other characters (b-d) for Tempo II indicate the number of circulations. For the GH model encode this value, (now limited between 1 and 15, see Note 1), for the single character (b) using hexadecimal, (1 to F).

Analog	Output Range (Note 2)	
AS1Z (Note 3)	V0	0 to +10 Vdc
AS2Z	V2	-10 to +10 Vdc
AS3Z	V7	0 to -10 Vdc
AS4Z	V1	+10 to 0 Vdc.
AS5Z	V3	+10 to -10 Vdc
AS6Z	V6	-10 to 0 Vdc.
AC0Z	V_C	Non-standard output. Consult MTS Application Engineering. Usually signifies custom analog setpoints.

Notes:
1. When replacing Tempo II sensors with more than 15 circulations, consult MTS Applications Engineering.
2. Format shown is: [value at Null (Setpoint 1)] to [value at Span (Setpoint 2)].
3. The G-Series does not utilize Tempo II type "performance mode" options. Therefore, the character shown as "Z" is not needed for the GH models.

Tables

Table A

Existing extension cable wire color code		Installing 6-pin DIN female connector, part no. 370423		
If cable has striped colors	If cable has solid colors	Pin-out for Analog output	Pin-out for Digital-Pulse output	Pin-out for Neuter output only
White/Blue Stripe	White	6	6	6
Blue/White Stripe	Brown	No Connection	No Connection	No Connection
White/Orange Stripe	Gray	2	1	1
Orange/White Stripe	Pink	1	2	No Connection
White/Green Stripe	Red	5	5	5
Green/White Stripe	Blue	No Connection	No Connection	No Connection
White/Brown Stripe	Black	3	No Connection	No Connection (note 1)
Brown/White Stripe	Violet	4	No Connection	2
White/Gray Stripe	Yellow	No Connection	3	3
Gray/White Stripe	Green	No Connection	4	4

Note 1: If the White/Brown Stripe (or Black) wire was used as DC ground for the Tempo II or L-Series sensor being replaced then the DC ground connection at the controller must be changed to use the White/Blue Stripe (or White) wire.

Table B

Female straight exit D6 to male RB connection adapter cables	
1 ft. cable length, standard, for G-Series analog output sensors	Part no. 253243-1
1 ft. cable length, standard, for G-Series digital-pulse and neuter output sensors	Part no. 253243-2
5 ft. cable length, for G-Series analog output sensors	Part no. 253244-1
5 ft. cable length, for G-Series digital-pulse and neuter output sensors	Part no. 253244-2

G-Series Cross Reference

Tables continued

Table C

If your system has an Analog Output Module (AOM)	If your system has a Digital Interface Box (DIB)
You can connect the GH model sensor directly to your controller/interface card (bypassing the AOM) if: 1. The AOM output is displacement only (voltage or current). 2. There is no velocity output from the AOM. 3. There are no dual channel outputs from the AOM. 4. There are no external null or scale adjustment potentiometer inputs to the AOM. Contact MTS Applications Engineering for the appropriate retrofit GH model number, or if you have questions.	You can connect the GH model sensor directly to your controller/interface card (bypassing the DIB) if: The DIB is configured to use 15 or less recirculations. Contact MTS Applications Engineering for the appropriate retrofit GH model number, or if you have questions.

Table D

GH Model		**Installing 6-pin MS female connector, part no. 370015**	
Integral Wire Color Code	Output for "Square Wave" Neuter (Using "+Stop")	For "R1" connection type: (positive interrogation)	For "R2" connection type: (negative interrogation)
Gray	(-) Stop	No Connection (note 1)	No Connection (note 1)
Pink	(+) Stop (Compatible Neuter Output Pulse)	C	C
Yellow	(+) Start	E	B (note 2)
Green	(-) Start	B (note 2)	E
Red or Brown	Supply Voltage (+Vdc)	F	F
White	DC Ground (for supply)	B	B

Notes:
1. The G-Series output signal, "(-) Stop", is not used when providing the backwards-compatible neuter type connection. However, this signal wire is required for "RS-422 TX –" during serial programming of the sensor. Pin A of the 370015 connector can not be used for this signal since the Analog Output Module (AOM), or the Digital Interface Box (DIB), provides +12 to +14.5 volts output on this pin when connected. Upon installing the 370015 connector the gray wire must be left disconnected, and the serial programming feature of the sensor is no longer available.
2. When connecting to an AOM, or to a DIB, or to a custom interface/controller that requires single-ended interrogation, always connect the unused interrogation lead to ground.

Table E

GH Model		**Installing 10-pin MS male connector, part no. 370160**
Integral Wire Color Code	Digital pulse Output	Pin No.
Gray	(-) Gate for PWM (-) Stop for Start/Stop	K
Pink	(+) Gate for PWM (+) Stop for Start/Stop	G
Yellow	(+) Interrogation for PWM (note 1) (+) Start for Start/Stop	E
Green	(-) Interrogation for PWM (note 1) (-) Start for Start/Stop	D
Red or Brown	Supply Voltage (+Vdc)	H
White	DC Ground (for supply)	A

Note:
1. When using PWM output with internal interrogation, both of the interrogation input signals are not used, and can be left unconnected or connected to ground.

G-Series Cross Reference

Table F

HO Cable Connections for Analog Output			**GH Model**	
Wire color Twisted Pair	Wire Color	Analog output	Wire Color	Analog output
White/Black	White	Displacement Out	Gray	-10 to +10 Vdc or reverse acting: +10 to -10 Vdc
	Black	Displacement Return	Pink	Return for Gray Wire
Red/Black	Red	+15 Vdc	Red or Brown	Supply Voltage (+Vdc)
	Black	DC Ground	White	DC Ground (for supply)
Yellow/Black	Yellow	-15 Vdc	N/A	No Connection
	Black	Frame	N/A	No Connection
Green/Black	Green	Not used	N/A	No Connection
	Black	Not used	N/A	No Connection
Blue/Black	Blue	Not used	Yellow	Programming (RS-485 +)
	Black	Not used	Green	Programming (RS-485 -)

Table G

HO Cable connections for digital-pulse output			**GH Model**	
Wire color twisted pair	Wire color	Digital-pulse output	Wire color	Digital-pulse output
White/Black	White	+ Gate	Pink	(+) Gate for PWM (+) Stop for Start/Stop, or Programming (RS-422 TX+)
	Black	-Gate	Gray	(-) Gate for PWM (-) Stop for Start/Stop, or Programming (RS-422 TX-)
Red/Black	Red	+15 Vdc	Red or Brown	Supply voltage (+Vdc)
	Black	DC Ground	White	DC ground (for supply)
Yellow/Black	Yellow	-15 Vdc	N/A	No connection
	Black	Frame	N/A	No connection
Green/Black	Green	Not used	N/A	No connection
	Black	Not used	N/A	No connection
Blue/Black	Blue	+ Interrogate	Yellow	(+) Interrogation for PWM (+) Start for Start/Stop, or Programming (RS-422 RX +)
	Black	- Interrogate	Green	(-) Interrogation for PWM (-) Start for Start/Stop, or Programming (RS-422 RX -)

G-Series Cross Reference

Table H

HO Cable connections for neuter output			**GH Model**	
Wire color twisted pair	Wire color	Neuter output	Wire color	Neuter output (Note 1)
White/Black	White	Not used	N/A	No connection
	Black	Not used	Gray	(-) Stop (note 2), or Programming (RS-422 TX -)
Red/Black	Red	+15 Vdc	Red or Brown	Supply voltage (+Vdc)
	Black	DC Ground	White	DC ground (for supply)
Yellow/Black	Yellow	-15 Vdc	N/A	No connection
	Black	Frame	N/A	No connection
Green/Black	Green	Output pulse	Pink	(+) Stop (Compatible Neuter output pulse), or programming (RS-422 TX +)
	Black	Not used	N/A	No connection
Blue/Black	Blue	+ Interrogate	Yellow	(+) Start (notes 3 & 4), or programming (RS-422 RX +)
	Black	- Interrogate	Green	(-) Start (Notes 3 & 4) or Programming (RS-422 RX -)

Notes:

1. The "(+) Stop" output is used for a compatible square wave neuter signal.
2. The G-Series output signal, "(-) Stop" is not used when providing the backwards-compatible neuter type connection. However, this signal wire/connector pin is used for "RS-422 TX-" during serial programming of the sensor. When the sensor output is active, (not in programming mode), this signal must be left unconnected to allow the proper neuter type output.
3. When connecting to an Analog Output Module (AOM), or to a Digital Interface Box (DIB), or to a custom interface/controller that requires single-ended interrogation, always connect the unused interrogation lead, "(+) Start" or "(-) Start", to ground at the AOM/DIB/Controller.
4. For improved noise rejection when using external interrogation, use the positive and negative interrogation signals, "(+) Start" and "(-) Start", to provide differential inputs to the sensor.

Part Number: 06-04 550967 Revision A

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
displacement@mtssensors.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
info@mtssensor.de
www.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