



APPLICATION NOTE

APP #046

Revision History

Date	Author	Description
02-13-09	EAC	Create Initial Version
04-17-18	dew	Change format

MCS-T300, MCS-T300HT, and MCS-T300LT Temperature Sensor Input to MCS-MAGNUM

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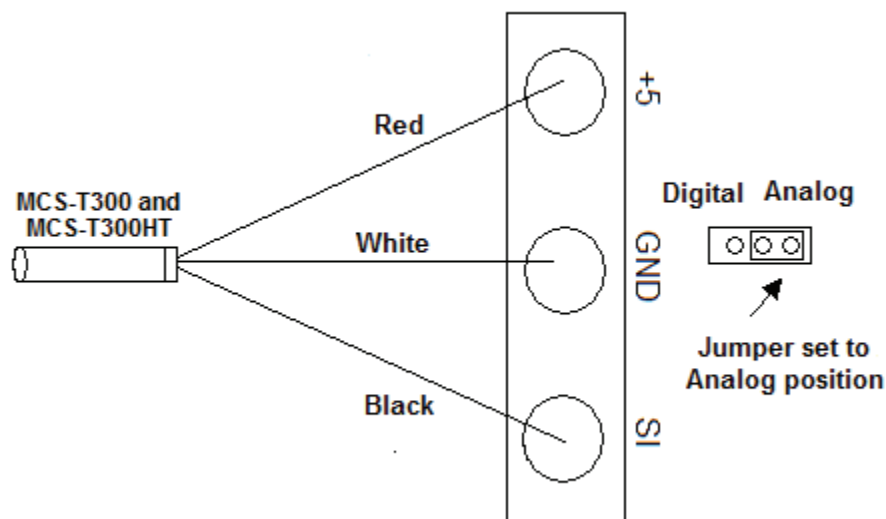
Product Description

The MCS-T300 series of temperature sensors are constructed with an extremely accurate double thermistor packaged in a water tight thin walled nickel -plated brass Deep Drawn Tube. The sensors are potted with a thermal transfer epoxy to guarantee durability and response. The accuracy of the sensors are $\pm 0.4^{\circ}$ F which allows sensors to be interchanged in the field. These sensors provide a linear response across its range. The sensors input is 5.00 vdc and the voltage output range is 0.807 to 3.525vdc.

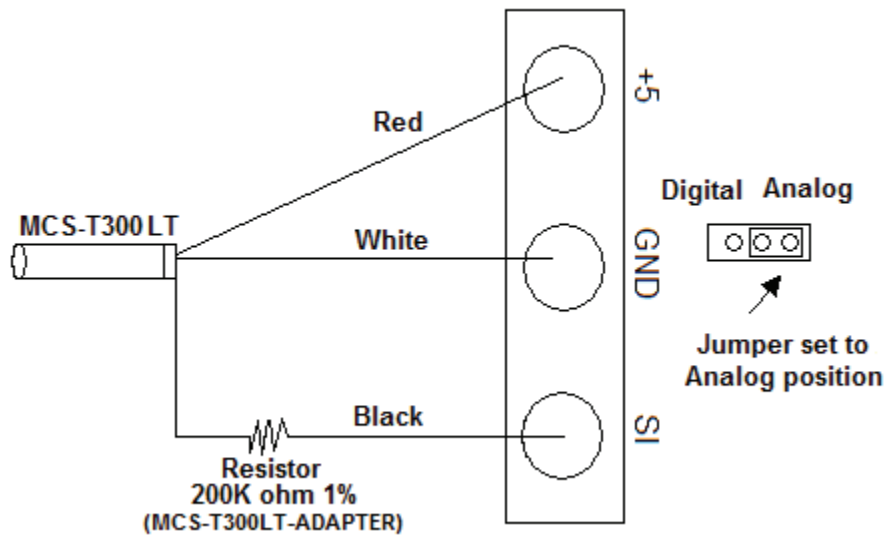
Wiring of MCS-T300, MCS-T300HT, and MCS-T300LT Temperature Sensor to a magnum

1. Wire to the analog sensor input selected through the Magnum config.
2. The Red wire of the Probe should be wired to +5 vdc of the Magnum sensor input terminal block.
3. The White wire of the Probe should be wired to the GND of the Magnum sensor input terminal block.
4. The Black wire of the Probe should be wired to SI of the Magnum sensor input terminal block. For the MCS-T300LT a MCS-T300LT-ADAPTER must be wired in series and then to the SI of the Magnum sensor input terminal block. **(See Wire Diagram For MCS-T300LT)**

Magnum Sensor Input Wiring Diagram for MCS-T300 and MCS-T300HT



Magnum Sensor Input Wiring Diagram for MCS-T300LT



Magnum MCS-T300, MCS-T300HT, and MCS-T300LT Temperature Sensor Setup

During the building of the Magnum Configurer the T300 temperature sensor is setup as follows:

1. In the SI Info tab determine where you want to wire the T300 sensor.
2. In the 'Display Type' section select User Defined. **(See Figure 1.)**
3. When you select User Defined you will be prompted with the SI calculation wizard, **(See Figure 2)** do not put anything in the fields just click cancel.
4. On the right side of this line where you setup the sensor under Multiple, Divide & Offset enter the values that match your sensor type. **(See Figures 3a. and 3b.)**
5. On the far right, under Select Display Type, select Temp.

MCS-CONFIG SI Info Example

Step #2

#	Name (1 to 8 char)	Display Type	Offset	Manual Value or NC/NO (select to change)	Display Text (select to change)	Temperature sensor
M-1	T-300L	User Defined	0	0	Not Used	Not Used
M-2	T-300	User Defined	0	0	Not Used	Not Used
M-3	T-300H	User Defined	0	0	Not Used	Not Used
M-4	T100	MCST100	0	0	Not Used	Not Used
M-5	OIL PSI	TI-500	0	0	Not Used	Not Used
M-6	AMPS	CT-250	0	0	Not Used	Not Used
M-7	SUCT TMP	MCST100	0	0	Not Used	Not Used
M-8	DISC TMP	MCST100	0	0	Not Used	Not Used

(Figure 1)

Step #3

SI Calculation Wizard
(Sensor type must be selected)

Voltage Value

Point #1 =

Point #2 =

Value or (select to change)	Display Text (select to change)	Temperature sensor	Humidity Sensor	Auto Manual (select to change)	Circuit Index	Multiplier	Divisor	Off Set
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	117	531	-95.2
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	54	203	-50.7
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	99	301	-12.3
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
Not Used	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used

(Figure 2)

Step #4

	Multiplier		Divider		Offset	
	(°F)	(°C)	(°F)	(°C)	(°F)	(°C)
T300	54.0	30.0	203.0	204.0	-50.7	-45.6
T300LT	66.0	30.0	1000.0	76.0	-98.9	-75.0
T300HT	99.0	60.0	301.0	317.0	-12.3	-27.3

(Figure 3a.)

#	Name (1 to 8 char)	Display Type	Offset	Manual Value or NC/NO (select to change)	Display Text (select to change)	Temperature sensor	Humidity Sensor	Auto Manual (select to change)	Circuit Index	Multiplier	Divisor	Off Set
M-1	T-300	User Defined	0	0	Not Used	Not Used	Not Used	Auto	Not Used	54	203	-50.7
M-2	T-300L	User Defined	0	0	Not Used	Not Used	Not Used	Auto	Not Used	666	1000	-98.9
M-3	T-300H	User Defined	0	0	Not Used	Not Used	Not Used	Auto	Not Used	99	301	-12.3
M-4	T100	MCS1100	0	0	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
M-5	OIL PSI	T1-500	0	0	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
M-6	AMPS	CT-250	0	0	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used
M-7	SUCT TMP	MCS1100	0	0	Not Used	Not Used	Not Used	Auto	Not Used	Not Used	Not Used	Not Used

(Figure 3b.)

MCS-T300 Temperature Conversion Chart

T°F (°F)	T°C (°C)	Rt (K)	Vo (Volts)
-22.0	-30.0	134.900	0.595
-13.0	-25.0	105.944	0.734
-4.0	-20.0	84.993	0.883
5.0	-15.0	69.557	1.0380
14.0	-10.0	57.945	1.1970
23.0	-5.0	49.002	1.356
32.0	0.0	41.935	1.515
41.0	5.0	36.199	1.675
50.0	10.0	31.425	1.8360
59.0	15.0	27.363	1.999
68.0	20.0	23.848	2.166
77.0	25.0	20.772	2.337
86.0	30.0	18.064	2.512
95.0	35.0	15.678	2.688
104.0	40.0	13.578	2.866
113.0	45.0	11.736	3.042
122.0	50.0	10.129	3.214

MCS-T300LT Temperature Conversion Chart

T°F (°F)	T°C (°C)	Rt (K)	Vo (Volts)
-76.0	-60.0	1116.99	0.187
-67.0	-55.0	834.66	0.241
-58.0	-50.0	642.90	0.300
-49.0	-45.0	508.66	0.362
-40.0	-40.0	411.25	0.426
-31.0	-35.0	337.68	0.492
-22.0	-30.0	279.87	0.559
-13.0	-25.0	232.89	0.629
-4.0	-20.0	193.78	0.703
5.0	-15.0	160.82	0.779
14.0	-10.0	132.96	0.859
23.0	-5.0	109.50	0.939
32.0	0.0	89.87	1.019

MCS-T300HT Temperature Conversion Chart

T°F (°F)	T°C (°C)	Rt (K)	Vo (Volts)
50.0	10.0	16.918	0.921
59.0	15.0	14.290	1.054
68.0	20.0	12.230	1.190
77.0	25.0	10.591	1.325
86.0	30.0	9.264	1.459
95.0	35.0	8.170	1.593
104.0	40.0	7.253	1.724
113.0	45.0	6.470	1.856
122.0	50.0	5.790	1.987
131.0	55.0	5.191	2.119
140.0	60.0	4.659	2.252
149.0	65.0	4.181	2.387
158.0	70.0	3.751	2.522
167.0	75.0	3.361	2.659
176.0	80.0	3.009	2.796
185.0	85.0	2.691	2.933
194.0	90.0	2.404	3.068
203.0	95.0	2.146	3.201
212.0	100.0	1.914	3.331
221.0	105.0	1.706	3.456
230.0	110.0	1.521	3.575
239.0	115.0	1.357	3.689
248.0	120.0	1.210	3.797