



Installation Instruction for TC201  
2 Channels EGT Amplifier

# Warning

THIS INSTALLATION MAY REQUIRE WELDING OR INTEGRATION INTO A VEHICLE'S ELECTRICAL SYSTEM. DAMAGE TO SENSITIVE ELECTRONICS, FIRE, OR EXPLOSION MAY OCCUR IF PROPER PRECAUTION IS NOT TAKEN. IF THERE IS ANY DOUBT, DO NOT ATTEMPT THE INSTALLATION AND CONSULT A PROFESSIONAL. NOTE: IT IS THE RESPONSIBILITY OF THE ENGINE TUNER TO ULTIMATELY CONFIRM THE CALIBRATION USE FOR ANY PARTICULAR ENGINE IS SAFE FOR ITS INTENDED USE. SPTRONICS HOLDS NO RESPONSIBILITY FOR ANY ENGINE DAMAGE THAT RESULTS FROM THE MISUSE OF THIS PRODUCT.

Spark Performance Electronics  
171 8<sup>th</sup> district, 6<sup>th</sup> of October City  
Giza, 12245  
Egypt  
[www.sptronics.com](http://www.sptronics.com)

# Warranty

SPTRONICS warrants to the consumer that all High Performance products will be free from defects in material and workmanship for a period of twelve (12) months from date of the original purchase. Products that fail within this 12-month warranty period will be repaired or replaced at SPTRONICS's option, when determined by SPTRONICS that the product failed due to defects in material or workmanship.

This warranty is limited to the repair or replacement of the SPTRONICS part. In no event shall

this warranty exceed the original purchase price of the SPTRONICS part nor shall SPTRONICS be responsible for special, incidental or consequential damages or cost incurred due to the failure of this product. Warranty claims to SPTRONICS must be transportation prepaid and accompanied with dated proof of purchase. This warranty applies only to the original purchaser of product and is non-transferable. All implied warranties shall be limited in

duration to the said 12-month warranty period. Improper use or installation, accident, abuse, unauthorized repairs or alterations voids this warranty. SPTRONICS disclaims any

liability for consequential damages due to breach of any written or implied warranty on all products manufactured by SPTRONICS.

SPTRONICS will not be responsible for electronic products that are installed incorrectly, installed in a non-approved application, misused, or tampered with.

Any SPTRONICS electronics product can be returned for repair if it is out of the warranty period.

There is a minimum charge of \$20.00 for inspection and diagnosis of SPTRONICS electronic

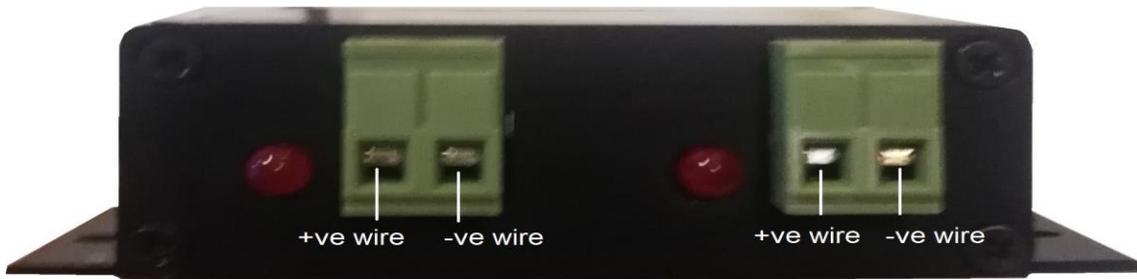
parts. Parts used in the repair of SPTRONICS electronic components will be extra. SPTRONICS will provide an estimate of repairs and receive written or electronic authorization before repairs are made to the product.

## TC201 Features & Specifications:

The TC201 is 2 channel EGT Probe Thermocouple Amplifier Module functions to convert the low output voltage signal from a Type K thermocouple EGT probe into a programmable 0 to 5 VDC output voltage. This output is ideal for interfacing to data loggers, aftermarket ECU's, temperature indicators, chart recorders, controllers, or other motorsports instrumentation equipment. The analog outputs are programmable via our software using USB port, moreover the CAN bus provide more accurate reading transfer to the ECU.

- EGT Probe Input: Type K Thermocouple
- 2 Programmable analog outputs 0 – 5V
- Built in cold junction compensation.
- Status LED
- CAN bus enabled
- USB port
- Comes with 1 meter harness and USB cable.

Input:	K type thermocouple (ungrounded)
Number of Input Channels:	2
Input Resistance:	60k ohm
Max Bias Voltage on Input:	5.8 V
Measuring Range:	+32 to +2282°F (0 to +1250°C)
Input Connection:	Mini Thermocouple Jack
Number of Output Channels:	2
Analog Output Range:	0 to +5 VDC
Scale Factor (nominal):	2.2 mV / °F (4.0 mV / °C)
Resolution:	Infinite
Response Time:	1 mS
Non-Linearity:	< +/- 2% FRO
Supply Voltage:	10 to 32 VDC
Current Draw	< 50 mA
Operating Temperature Range:	+32 to +125°F (0 to +85°C)
Humidity:	85% Max. RH (non-condensing)



## Harness Wiring Diagram:

Pin	Name	Wire Color	Comment
1	12V Battery supply	Red	9 – 18V
2	GND	Black	Connected to ECU GND
3	Analog Output 1	Yellow	0 – 5V
4	Analog Output 2	Blue	0 – 5V

## Installation:

Grounding:

The device must have an electrically secure ground connection, which means that the battery negative must be properly grounded to the chassis AND engine. The ground wire, whether it is from the battery or to the chassis and engine, must have perfect electrical conductivity. This means that there must not be any paint or rust under the wire terminal. Make sure that when you install the ground wire there is bare metal exposed where the wire contacts the vehicle component. Both of black wires should be connected to secure ground and we also recommend that the ground wire be as short as possible and to be connected directly to the same ECU ground.

## Power Requirement:

The TC201 requires a minimum supply voltage of 9V or greater to run. We recommend that the device be supplied with 13.8V nominal operating voltage. Ensure that the vehicle's charging system is in perfect operating condition prior to installation. The red wire should be connected to ignition switched and fused to the switched 12V source.

## Analog Outputs:

TC201 has 2 analog outputs that can be programmed through TC201 windows software to generate analog voltage from 0V to 5V according to the Temperature measured and based on 32x2 Temperature/Voltage table.

Name	Wire	Color	
Analog Output 1	3	Yellow	Programmable analog output 0 – 5V
Analog Output 2	4	Blue	Programmable analog output 0 – 5V

## Mini USB Connector:

The USB connector is used to connect the TC201 to the windows software to program the analog output, calibrate the sensor and to flash the device with new firmware if needed. The USB cable is included with the device package. The USB windows driver can be downloaded from here:

[https://www.silabs.com/documents/public/software/CP210x\\_Windows\\_Drivers.zip](https://www.silabs.com/documents/public/software/CP210x_Windows_Drivers.zip)

After installing the USB driver and connected the device to the 12V and GND supply, Please make sure that you can find the virtual COM port under the device manager

“Ports (COM & LPT)” menu with the name “Silicon Labs CP210x USB to UART Bridge (COMx)” before you start to connect the device to the windows application.

## CAN Bus Connector:

The CAN bus communication port sends the output Temperature reading to the ECU, Data transferred digitally is more accurate than analog output voltage. All the settings for the message transferred to the ECU can be adjusted from the SPTRONICS wideband windows software.

## Sensor Connector:

TC201 has 2 sensors connector for K-type thermocouple sensor, pin 1 on the sensor is for the –ve wire and pin 2 is for the +ve wire of the thermocouple sensor.

## Status LED:

Each sensor has status LED as in table:

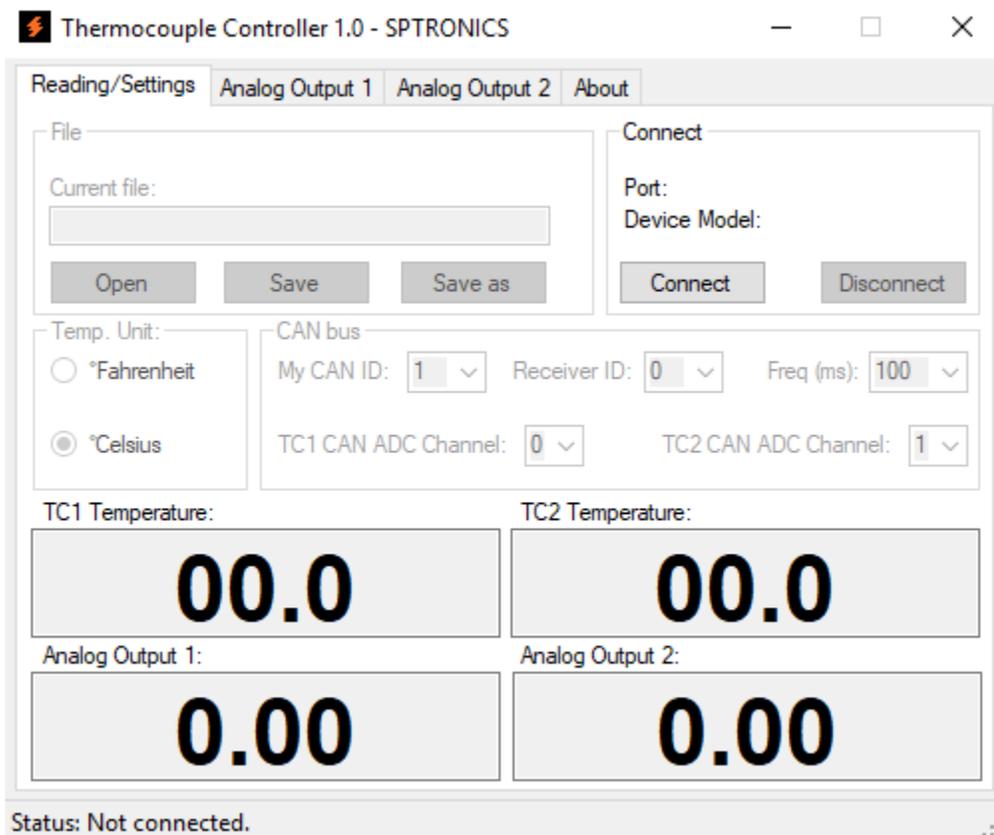
<b>LED Color</b>	<b>Status</b>
Solid RED	Sensor is connected and working probably.
OFF	Sensor not connected or faulty sensor.

# SPTRONICS Thermocouple Controller Software:

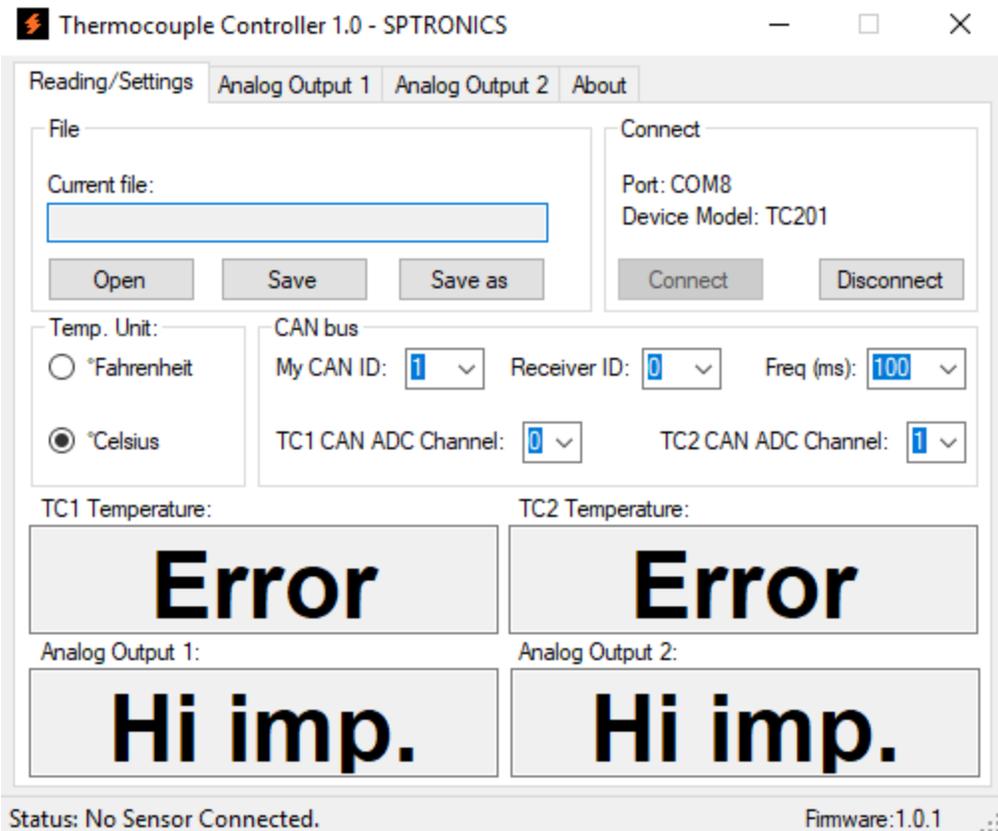
Thermocouple Controller software can be downloaded from the following link:

<http://www.sptronics.com/assets/images/SPTRONICS%20Thermocouple%20Controller%202010.rar>

After installing the software on your computer and run the application, this is the application picture:



Make sure the USB driver is installed as explained earlier before you try to connect to the TC201. By clicking on "Connect" the software will search on all available COM ports for TC201, once the software finds the device it shows the Port number the device connected to and the device model as in the picture below:



After successful connection all the data on the device will replace the current data shown on the software and all the dimmed tabs will be available, the status toolbar will show the current status of the device and the firmware version.

### 1 – “Reading/Settings” tab:

- “File” To save and restore data on local hard drive. Once you open a file all the data on the file will replace the data displayed on the software and replace the data stored on the device memory.
- “Connect” To search for the Thermocouple Controller and to connect on the first available one. The “Disconnect” is to release the port and the data communication between the software and the device.
- “Temp. Unit” To choose the unit to display the temperature value.
- “CAN bus” To determine the parameters needed to communicate with another device over CAN bus. TC201 send a CAN message on interval determine by “Transmitting freq” in millisecond. TC201 CAN ID, Receiver ID and ADC channel should be specified before the receiver can read TC201 message.

- “Temperature” displays the temperature values for both sensors, output unit can be changed from “Display” group box.
- “Analog Output” displays the analog value output on both analog outputs from the device’s main connector.

## 2 – “Analog Output 1 & 2” tabs:

- “Output value during faulty sensor or no sensor connected” to choose the output value during sensor is not connected or during any error, the output value can be high impedance or specific voltage.
- “Output values” to choose the output value during the sensor normal operation. The output value can be linear according to the minimum, maximum voltage and minimum, maximum temperature value, in this case the temperature table will be automatically generated. By clicking on Table tab, a custom table can be edited. The graph is only to display the relation between the voltage and temperature.
- “Default ” Set the output values to be linear from 0 to 5V and from 0 to 1250 degree.

Thermocouple Controller 1.0 - SPTRONICS

Reading/Settings Analog Output 1 Analog Output 2 About

Output values when no sensor connected:

High impedance

Voltage

Output values

Linear  Min Volt  Min Temp.

Table  Max Volt  Max Temp.

Default

Volt	0.00	0.16	0.32	0.48	0.65	0.81	0.97	1.13	1.29	1.45	1.61	1.77	1.94	2.10	2.26	2.42
°C	0	40	81	121	161	202	242	282	323	363	403	444	484	524	565	605

< >

Status: No Sensor Connected. Firmware:1.0.1