

1. Q: How to select my power supply for my TE application?

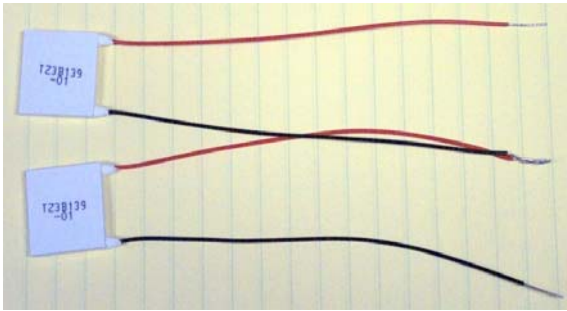
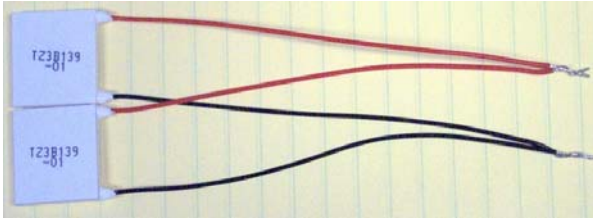
A: The FTC100 kit does not contain the power supply for the TE modules. It depends on the configuration of your TE connection to decide your power supply spec. You can use the variable power supply but that is expensive and usually doesn't have high current rating. An off-the-shelf AC/DC switching power supply can be easily purchased. You can get a good selection of voltage and current rating with a reasonable cost. We use either MEAN WELL or COSEL power supply in house. But Accuthermo does not endorse either one of them and you can choose any name brand AC/DC power supply to fit your need. Here are several ways to connect your TE module to your H-bridge amplifier.

1. Single TE Module used:

Check the V_{max} and I_{max} specification of the TE module you are using. You would choose a power supply voltage which is Less than the V_{max} but Larger than the I_{max} . For example: if a 9500/127/040B TEM is used. The V_{max} is 17.5V and I_{max} is 4.0Amp. The power supply should have at least 4 amp and voltage can be either 12V or 15V DC power supply.

2. Multiple TE Modules used:

There are two ways to connect multiple modules, serial or parallel connection:

	
<p><i>Serial Connection:</i> V_{max} multiple, I_{max} stay the same. In this example, two TE modules have serial connection. The power supply should have Voltage less than 2x V_{max}; current rating should larger than I_{max}.</p>	<p><i>Parallel Connection:</i> V_{max} stay the same, I_{max} multiple. In this example, two TE modules have parallel connection. The power supply should have Voltage less than V_{max}; current rating should larger than 2x I_{max}.</p>

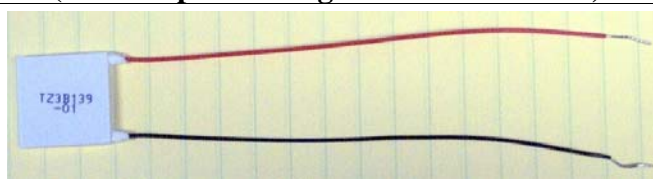
3. Multiple TE Modules used with both serial and parallel connections:

You can mix serial and parallel connection methods to connect more than 4 TE modules that fit your power supply budget. Just follow the rule described from #1 and #2 to calculate the proper power requirement for your power supply.

Summary: The power supply should has voltage rating less than the total V_{max} of TE module and has current rating larger than the total I_{max} of TE modules.

2. Q: Which side is the cold side of TE module? (an example of using a Ferrotec module)

A: This is our prefer way of doing it: If you have the label side of the TE face up, connect the Red wire with +V and Black wire with -V(GND). The label side of the TE is the cold side.



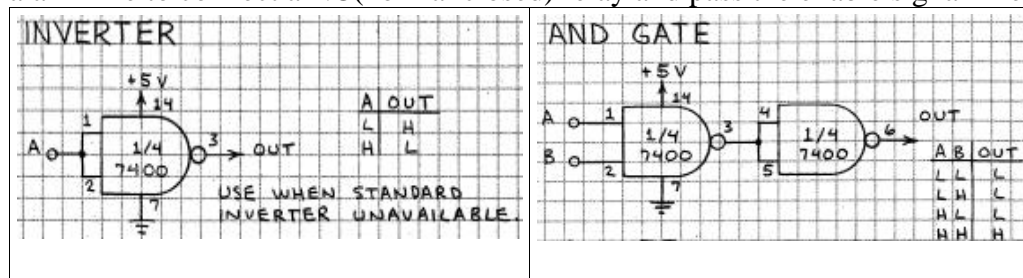
3. Q: What is the optimized temperature range for different sensors for FTC100?

A: The FTC100 kit come with a high quality 2252 ohm 1% thermistor. But you need to select the proper sensors according to your temperature requirements. If Accuthermo does not carry or sell the specific T/C or RTD sensors you need, you can be purchased easily from other sources; like Omega.

Sensor Type	Temperature Range	Comment
Thermistor	-3C ~ +100C	very good accuracy, decrease after 100C free with the kit
Thermocouple (T/C)	-50C ~ +150C	good accuracy
RTD (PT100)	-50C ~ +150C	very good accuracy

4. Q: Can I shut down my controller when alarm is triggered?

A: When the alarm is triggered, it turns on the internal relay and short to the connector #11 (COM) and you can hear the latching sound of that relay. You can use an inverter connect to the alarm output. Use an AND gate to connect the Enable line from the Enable and Inverter Alarm line of the FTC100; then connect the output of the AND gate to the Enable connection of the H-bridge amp. So when alarm is triggered, it turn the Inverter Alarm low and disable the output of the AND gate. There are other ways as well, such like use the alarm line to connect a NC(normal closed) relay and pass the enable signal line.



5. Q: What is the difference between PWM and Analog power output?

A: please see the table for a general comparison of the power output technology to the TE modules.

	TE performance	Cost	Power handling
PWM (pulse width modulation)	Good	Low	Wide range
Analog (variable voltage or current)	Better	High	Low Current

6. Q: The FTX700 only handle power larger than 9V DC, but I have a TE module which has Vmax less than 9V. What should I do with it?

A: There are **FTX300** and **FTX100** that handle smaller TE modules. Here is the comparison table for you to select the proper bridge amplifier for the specific TE modules you're using.

	Power	Voltage (DC)	Max Power	Dimension(mm)	Comment
FTX700	High	9~36Vdc	25A	127 x 102 x 38	available
FTX300	Middle	7~15Vdc	12A	79 x 70 x 32	available
FTX100	Low	0~7Vdc	7 A	65 x 50 x 32	available

If still want to use FTX700, you can connect a dummy TE module and your TE module in serial. The dummy TE should be sandwiched with two heat sinks. For example, if I want to run a 8.7Vmax 8.5Amp TE, I serialize it with a dummy TE that has 4.0Vmax 1.2Amp TE. Than my total Vmax become 12.5V, and then I can choose a 12V power supply with sufficient current rating. Remember, this is NOT a permanent way but if you really want your project get going. And be careful about over heating the dummy TE if the heat sink cannot perform well.

The other way is to connect the TE to a power resistor in serial and create a voltage drop. Caution: be careful about the heat generated from the power resistor.