

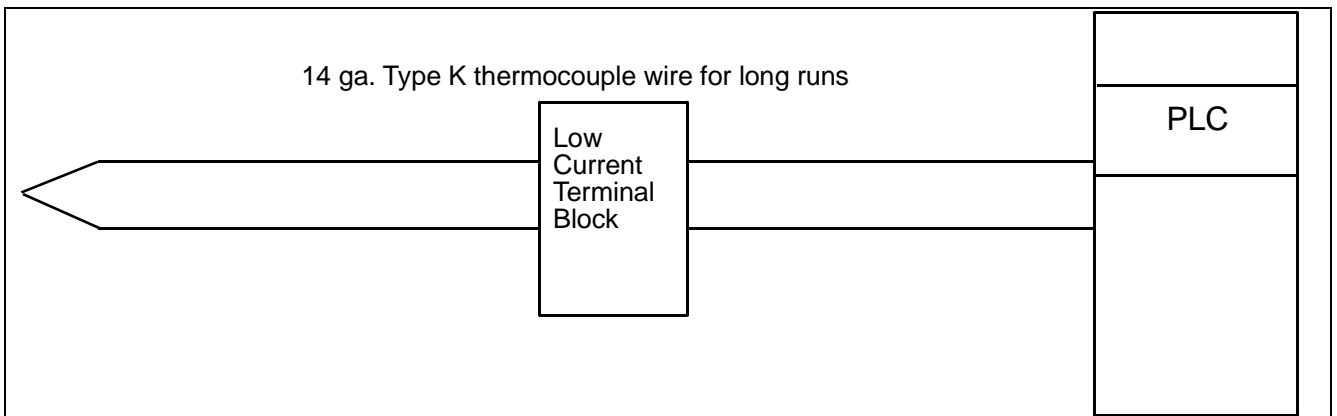


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# Bryan's Tech Check-up

## Lower installed cost, improve performance and reliability while eliminating expensive long thermocouple wires . . . here's how,

In many applications, PLCs and/or temperature controllers are mounted in cabinets far away from the temperature monitored device or zone. Often long lengths of thermocouple wire are used to span this distance; requiring 16 gauge thermocouple wire instead of the typical 24 gauge wire. The 16 gauge thermocouple wire is often very costly to install. This tech tip provides an alternate solution that can lower the installed cost by 60% and improve performance and reliability.



### The Engineering Dynamics

In many installations long distance between the PLC and a thermocouple probe cannot be avoided. Since the thermocouple provides a millivolt signal, spanning long distances can mean excessive electrical noise, confusing the signal. With such low voltage and current, special terminal blocks are required for all connections.

### A Better Solution

Placing a thermocouple converter module, like the ABB CC-E TC/I, close to the monitored device or location, allows connection of a very short length of Type K wire or a standard probe, to the converter module's input terminals.

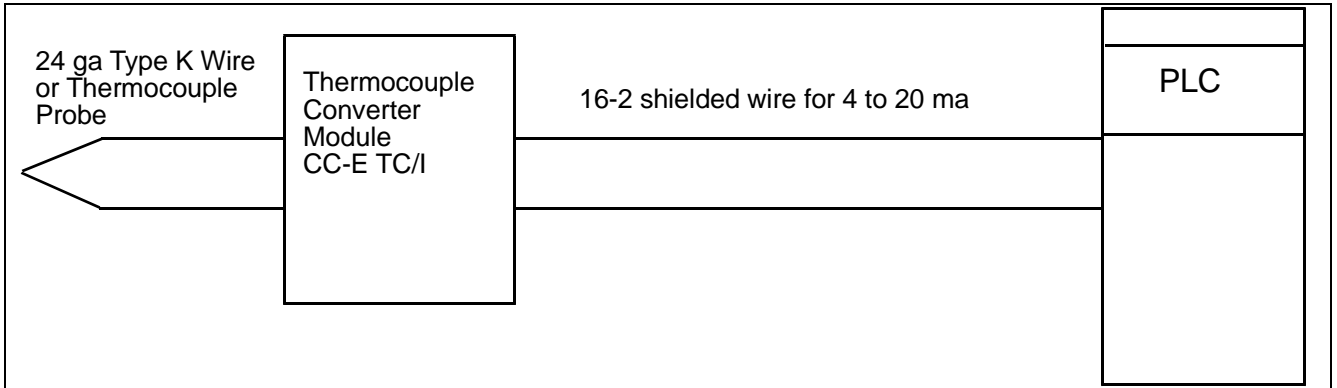
The converter module processes the millivolt analog input signal from the temperature probe and converts it into a 4 to 20 mA output current, proportional to the input signal. After conversion the long run from the output of the converter module to the PLC or temperature controller can be an inexpensive twisted pair of copper wire.

By spanning the long distance with a 4 to 20 ma current signal instead of the thermocouple's millivolt signal, the system has a much higher immunity to electrical noise. The 4 to 20 ma signal is not affected by the voltage drops typical over long wire runs.

Although the converter has an associated installed cost, the savings from decreasing the length of 16 gauge type K thermocouple wire pays for the temperature converter module. The overall cost decreases and the system is more reliable.



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**Cost Comparison Example:** Type K unshielded thermocouple wire at 24 gauge is \$112.00 per 100 ft. while 14 gauge is \$222.00 per 100 ft. This means an increase in cost of \$100 per 100 ft. for the wire

This example illustrates the difference in cost when there is a 300 ft span between the temperature controller and the monitored device or location:

Method	Type K Wire (ga.)	Length (ft)	Cost	16-2 Wire (ft)	Cost	Converter Cost	Total
Long T couple wire	14	300	\$ 666	N/A	\$0	N/A	\$ 690
Short T- couple wire & converter	24	25	\$ 28	275	\$ 102	\$196	\$ 326
Savings							\$ 364

Assumes:

16-2 shielded at \$0.37 /ft, ABB converter P/N 1SVR011755R2200

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