

Air Conditioning and Small Diameter Lines

APPLICATION



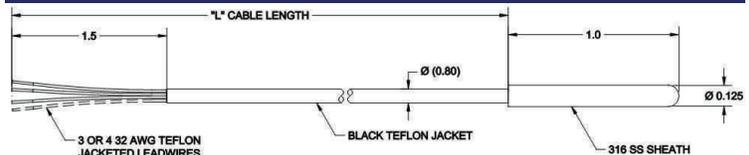
You never know when knowledge of temperature measurement will come in handy. Recently my home AC unit showed a large drop in cooling capacity and of course it happened during a very hot week. The repair shop responded promptly the next day and proceeded to check out the complete system. Everything inside was okay so it was outside to the compressor to check the temperature of the coolant line and pressure in the system. That's where the trouble started.

CHALLENGE



Part of the technician's procedure was to measure the temperature of the refrigerant as it leaves the compressor on its way to the evaporator usually located inside the furnace or other air handling device. Knowing the temperature and pressure of the refrigerant as it leaves the compressor, the amount of refrigerant in the system can be found in a look-up table. This all sounds very good, however his type K exposed junction thermocouple wasn't working right. Plus the technician did not cover it with insulation so the ambient conditions (100F) affected the reading. After giving up on his thermocouple, he switched to an infra-red temperature gun and recorded a temperature of 49F on the outside of the 3/4" copper line carrying the coolant. He decided that there was too much coolant in the system because the temperature should be in the low 50s. His diagnosis turned out to be wrong because of bad temperature data. He proceeded to adjust the refrigerant level by removing some, check again, add some back in, and shortly declared it fixed.

A01, A02, A03, A04



Mini RTDs .080" to 1/4" Dia.

SOLUTION



That evening I brought home one of the new Burns mini RTDs (A01) and a battery powered display (HD24) to see if I could verify the readings. I tucked the 1/8" diameter by 1.25" long sensor under some pipe insulation on the 3/4" line, fired up the compressor and waited. The temperature stabilized at 41.8F which was about 12F lower than what he had measured. No doubt now there was an incorrect amount of refrigerant in the system and another service call was required. Along with making the refrigerant adjustment I plan to have a short discussion with him about how to measure temperature accurately in small diameter lines!

For more information on measuring temperature accurately in small diameter lines refer to:

http://www.burnsengineering.com/document/papers/small_diameter_lines.pdf

or feel free to contact me at 800-328-3871 ext 13.

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