TEMPERATURE SENSOR

Description D016

Figure 1. The Temperature Sensor

Short description
The temperature sensor allows for the registration of temperatures and temperature differences in the range of -20 °C to 110 °C. In a stainless-steel tube a transducer is positioned, which converts the temperature in a voltage value. Thermal contact between the transducer and the steel tube is realized by means of a heat conducting paste.
In liquids the response of the temperature sensor is quite fast (see specifications). In air the response is significantly slower since heat can only be transmitted or absorbed by means of radiation.

The temperature sensor is not suitable for measurements above 110 °C.

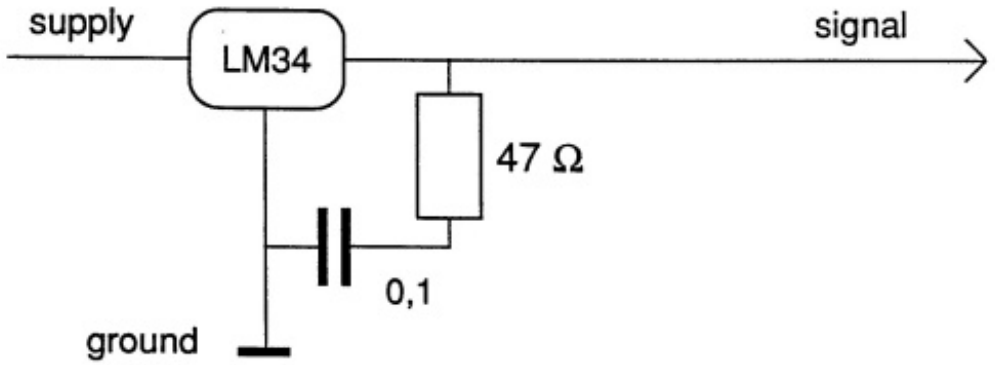

Figure 2. Electrical scheme of the temperature sensor

The temperature sensor is delivered with a BT-plug and can be connected to the following interfaces:

- UIA/UIB through Measuring console (via 0520 adapter)
- CoachLab
- CoachLab II
- SMI (via 0520 adapter)
- Texas Instruments CBL™ data-logger.

There is an adapter (art. 0520) to connect sensors with BT-plugs to 4-mm inputs.

Suggestion for experiments
The temperature sensor is a general-purpose laboratory sensor. It is designed to be used as you would use thermometer for experiments in Chemistry, Physics, and Biology.

Typical applications are:
- Measuring freezing and boiling points.
- Monitoring endothermic and exothermic reactions.
- Specific heat experiments.
- Solar energy studies.

Calibration

In figure 3 the variation in the temperature and the voltage is drawn for a sensor. For other sensors, this calibration curve can be shifted a few °C upwards or downwards. The slope has always the same value: 56 °C each volt (18 mV / °C).

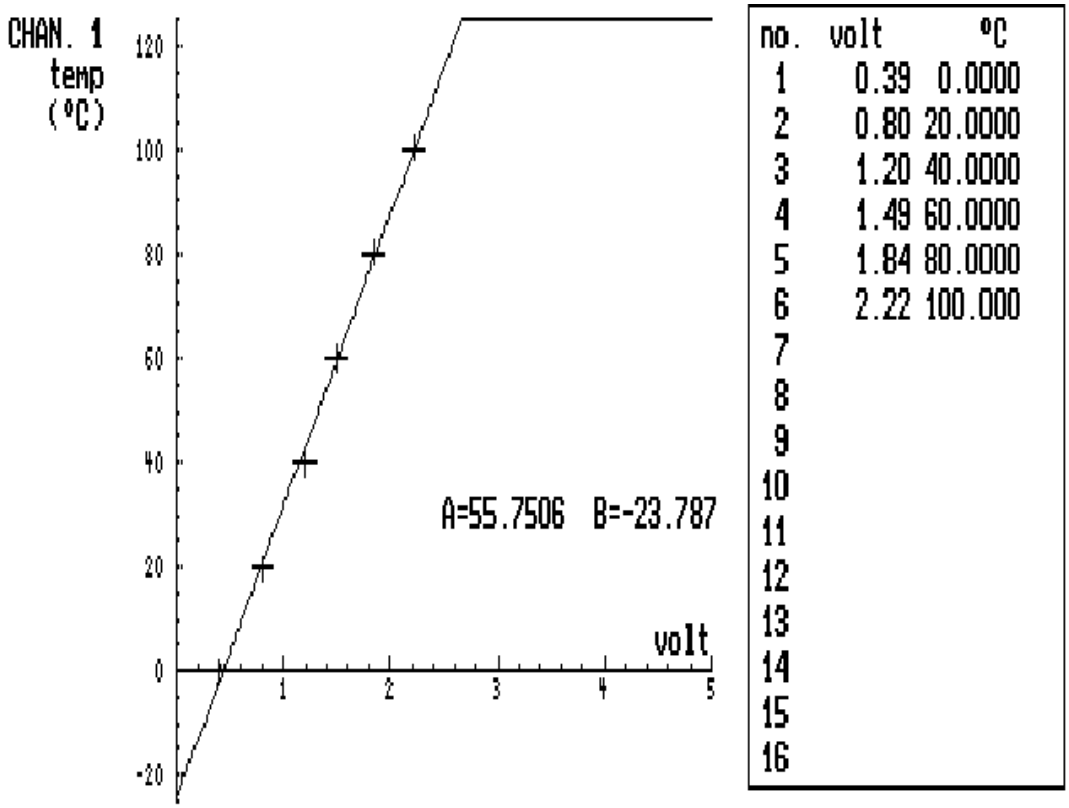

Figure 3. Calibration curve for the temperature sensor

The name of the temperature sensor in the sensor library of Coach 5 program is **Temperature sensor (016&bt) (CMA).**

Technical data

Warning

A strong acidic environment will corrode the housing slowly. After three days in 2.0 molar hydrochloric acid a slight loss of colour of the steel could be observed. This indicates a certain amount of corrosion.
The temperature sensor is not suitable for measurements above 110 °C. Use of the sensor above this limit falls outside the scope of the guarantee conditions.

Sensitivity	18 mV / °C
Output voltage	0 - 2.5V
Temperature range	-20 to 110 °C
Resolution using 12 bit 5V A/D converter	0.07 °C
Speed	When the temperature is changed in a stepwise fashion, the half-life value (= the time the sensor signal needs to tide over half the difference) amounts to circa 1.5 s (in between 1.3 and 2.0 s). This only holds for measurements in liquids.
Tube	Length = 13.5 cm Diameter = 6.4 mm Thickness = 0.28 mm
Connection	 BT (British Telecom) plug

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