

TECH NOTE: TT-3/100 - Using Foil Sensors for Temperature Measurement

Version: 2019-04-26

Abstract

Foil resistors can also be used as temperature sensors.

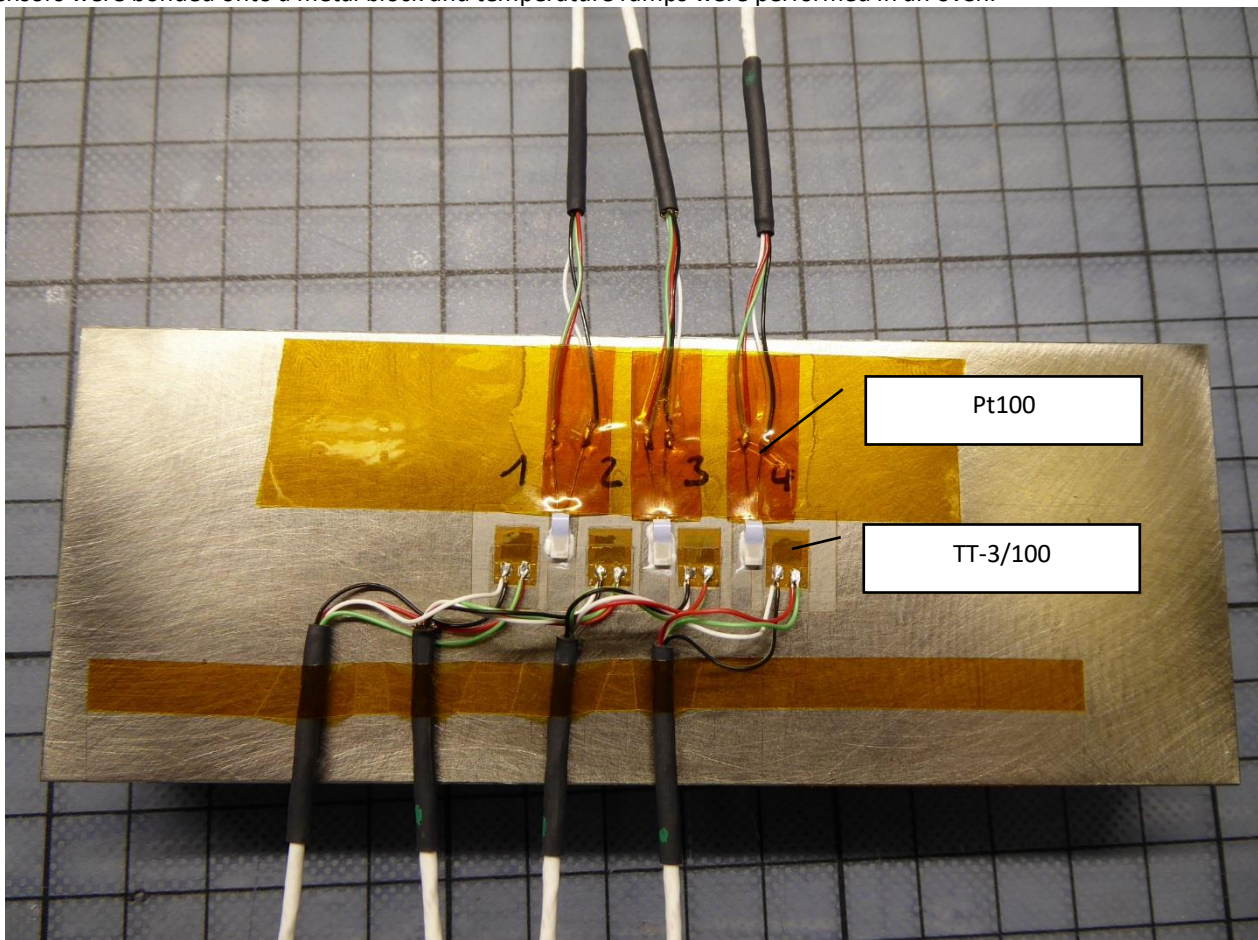
The TT-3/100 is an RTD (Resistance Temperature Detector) based on Nickel that has a linear temperature coefficient, which allows performing accurate temperature measurements.

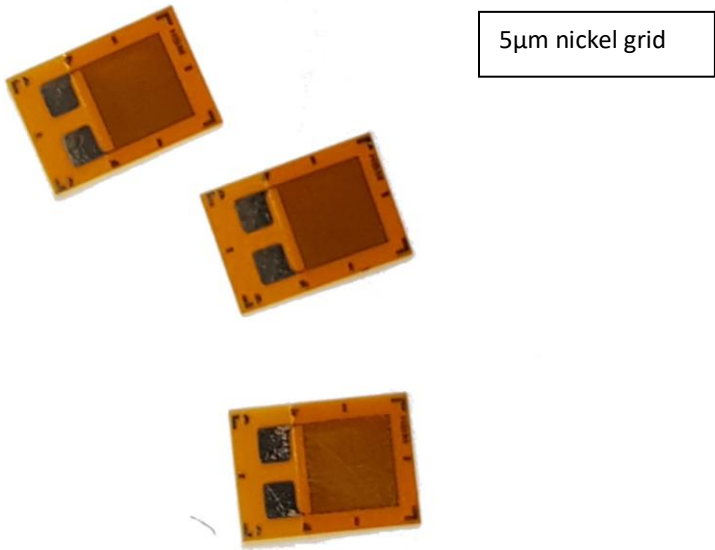
The Nickel resistor has a specific resistance, e.g. 113 ohms, at a reference temperature. Additionally, a polynomial is delivered with each sensor package which needs to be considered when calculating the temperature value.

The advantages of a TT-3 sensor are:

- ➔ Can be used on radial surfaces easily
- ➔ Flat.
- ➔ Provides Short reaction time.

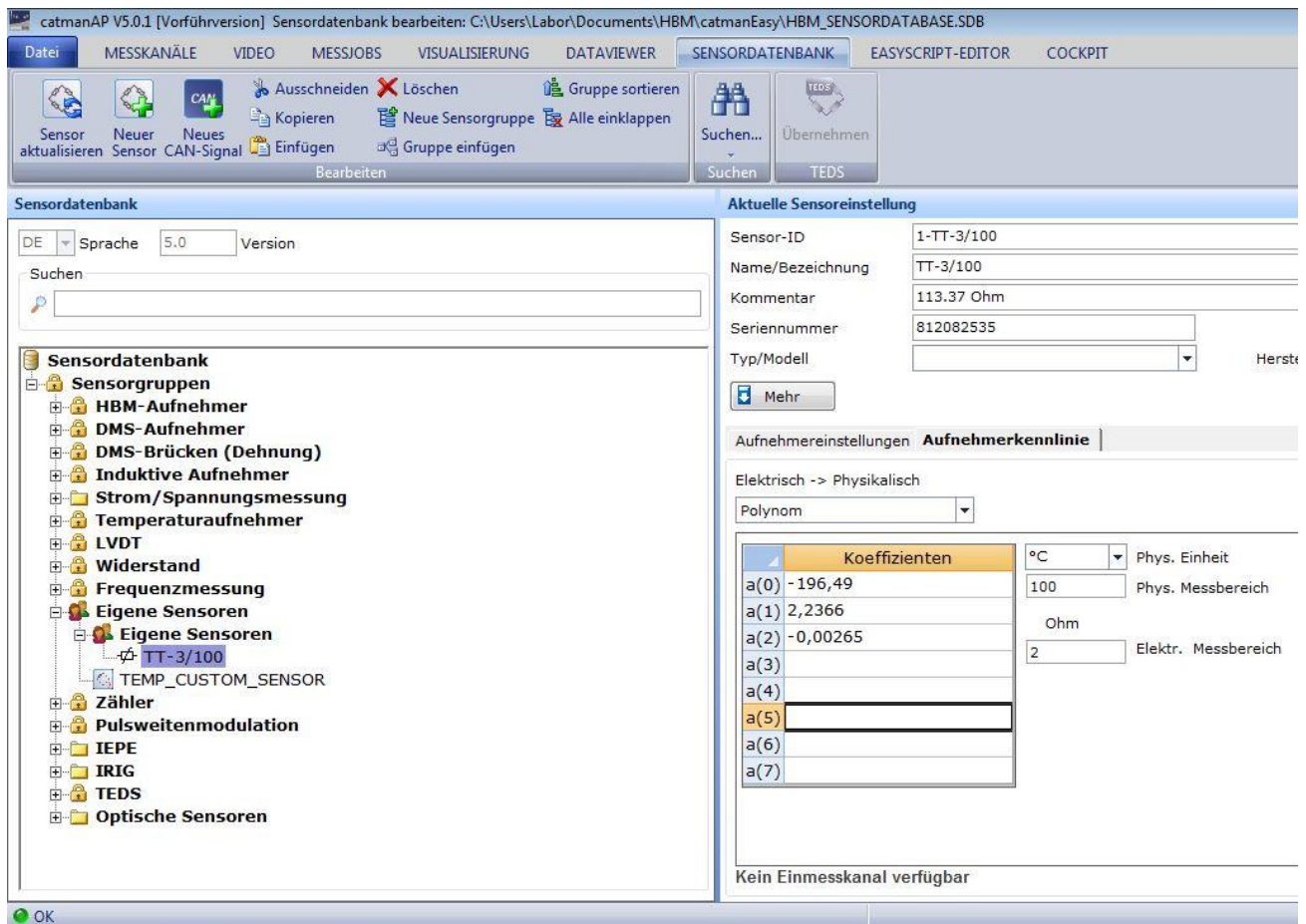
We performed an experiment with Pt100 sensors as a reference to show how accurate a TT-3 sensor can work. The sensors were bonded onto a metal block and temperature ramps were performed in an oven.





These sensors can be set up quickly. For example, using catman software:

- ➔ Create a customer-specific sensor and assign a name (e.g. "TT-3/100")
- ➔ Enter the polynomial printed on each TT-3 sensor package

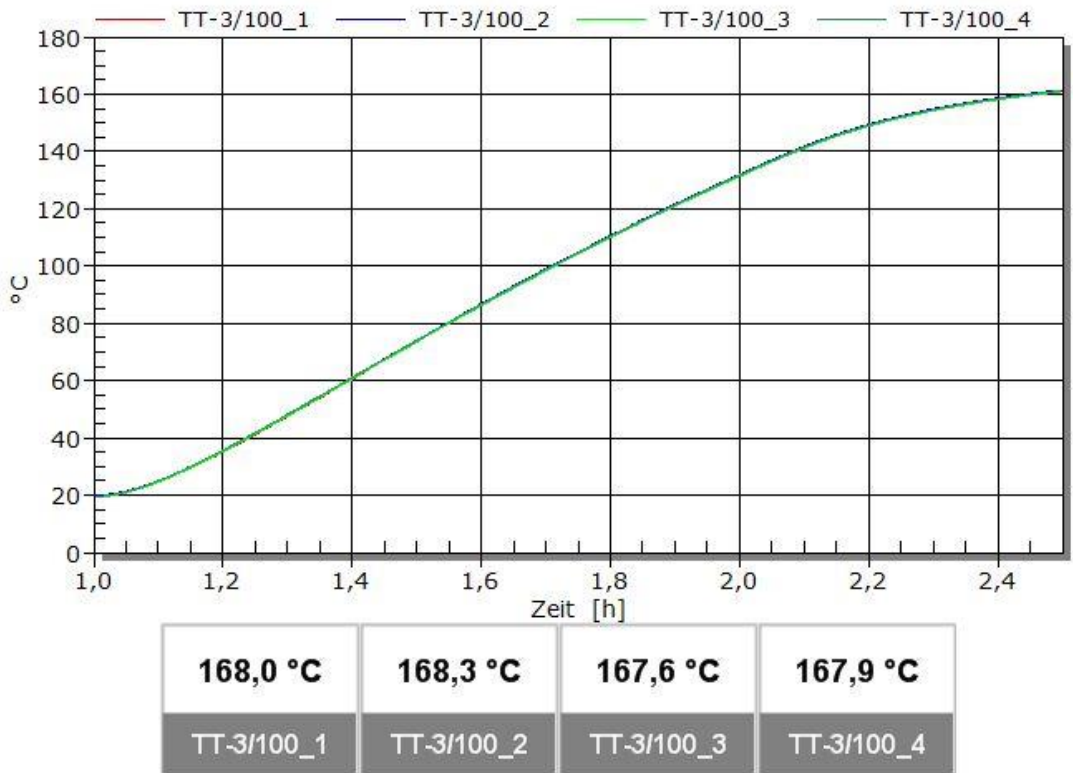


➔ Assign the sensor to the relevant channel

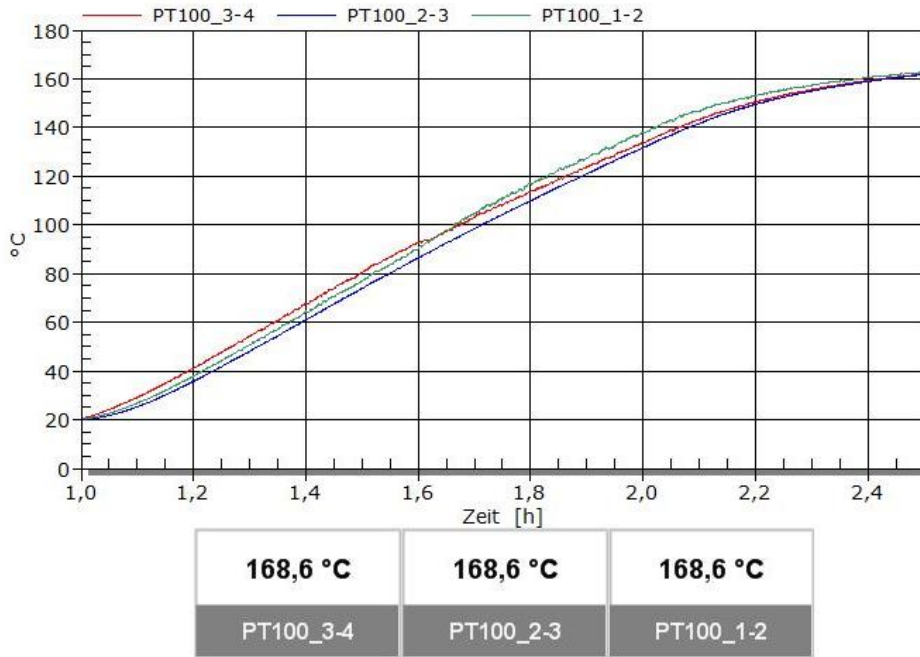
Kanalname	Messwert	Messrate/Filter	Slot	Sensor/Funktion
MX1615_DMS				
TT-3/100_1	21,96 °C	1 Hz / BE 0.05 Hz (Auto)	1	TT-3/100 (812082535)
TT-3/100_2	22,15 °C	1 Hz / BE 0.05 Hz (Auto)	2	TT-3/100 (812082535)
TT-3/100_3	21,55 °C	1 Hz / BE 0.05 Hz (Auto)	3	TT-3/100 (812082535)
TT-3/100_4	21,72 °C	1 Hz / BE 0.05 Hz (Auto)	4	TT-3/100 (812082535)
x_0	No signal	1 Hz / BE 0.05 Hz (Auto)	5	Widerstandsmessung
x_1	No signal	1 Hz / BE 0.05 Hz (Auto)	6	Widerstandsmessung
x_2	No signal	1 Hz / BE 0.05 Hz (Auto)	7	Widerstandsmessung
x_3	No signal	1 Hz / BE 0.05 Hz (Auto)	8	Widerstandsmessung
x_4	No signal	1 Hz / BE 0.05 Hz (Auto)	9	Widerstandsmessung
x_5	No signal	1 Hz / BE 0.05 Hz (Auto)	10	Widerstandsmessung
x_6	No signal	1 Hz / BE 0.05 Hz (Auto)	11	Widerstandsmessung
x_7	No signal	1 Hz / BE 0.05 Hz (Auto)	12	Widerstandsmessung
x_8	No signal	1 Hz / BE 0.05 Hz (Auto)	13	Widerstandsmessung
PT100_3-4	22,30 °C	1 Hz / BE 0.05 Hz (Auto)	14	Temperaturmessung PT100
PT100_2-3	22,41 °C	1 Hz / BE 0.05 Hz (Auto)	15	Temperaturmessung PT100
PT100_1-2	22,43 °C	1 Hz / BE 0.05 Hz (Auto)	16	Temperaturmessung PT100

➔ Start the measurement

TT-3/100 measurement from 20°C to 160°C



In comparison, the Pt100 measurements show more scatter:



Further measurements show a very good correlation between the Pt100 and the TT-3/100 sensor:

