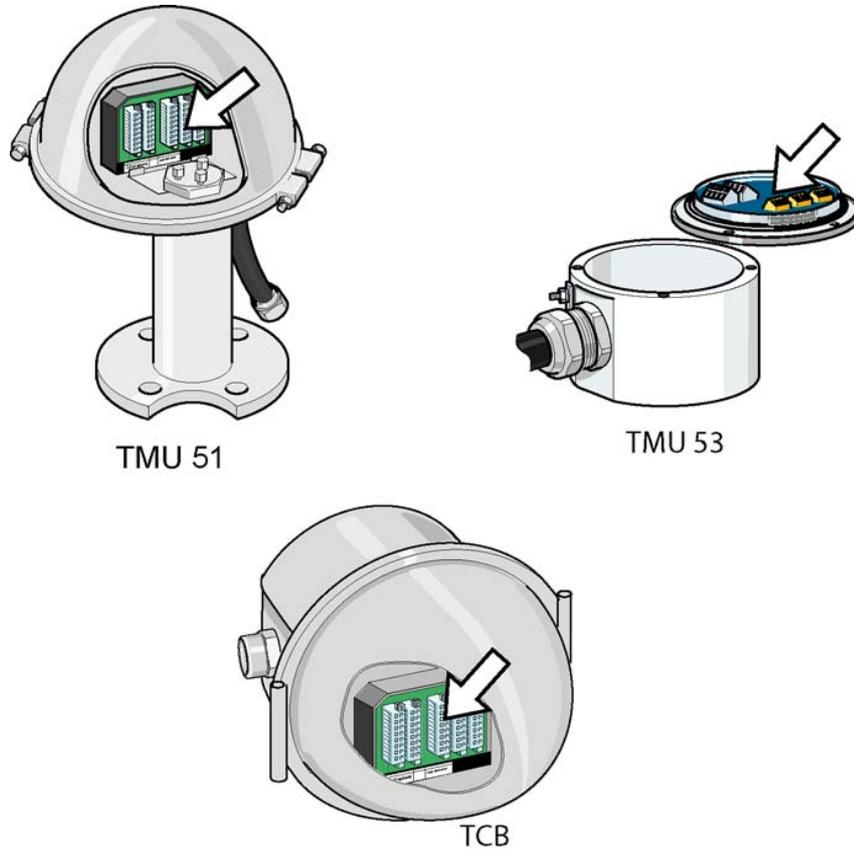


## TMB and TMS General Service Information



*The Temperature Measuring Block (TMB) can be placed in the TMU or in the Tank Connection Box (TCB).*

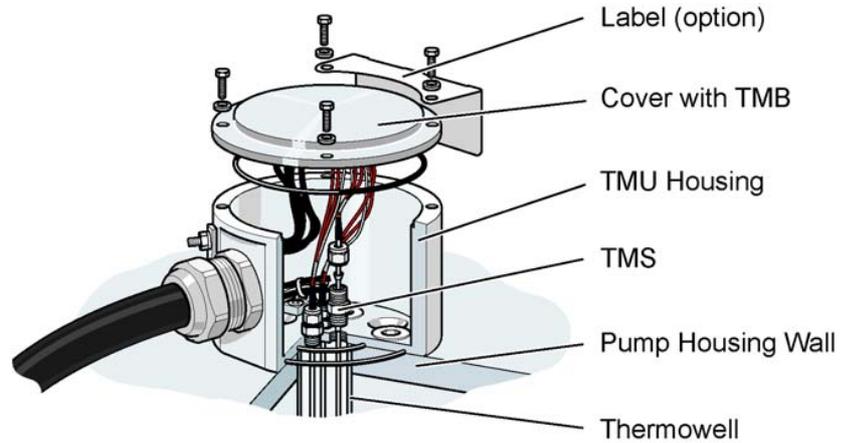
### TMB and TMS

The Temperature Measuring Sensors (TMS) are connected to the Temperature Measuring Block (TMB) inside the Temperature Measuring Unit (TMU) or a Tank Connection Box (TCB).

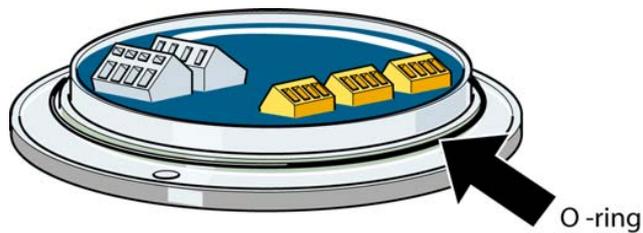
The TMB communicates with the TGU through a sensor bus.

The TMS is a Pt100 element with three (standard) or four (high accuracy) wire connections. The temperature of the cargo and vapor in the tank can be measured with up to five sensors for the tank deck mounted TMU 51 and three sensors for the pump mounted TMU 53. The TMS are distributed over the tank height. The TMS shall be located in a thermowell extended through the tank below the TMU.

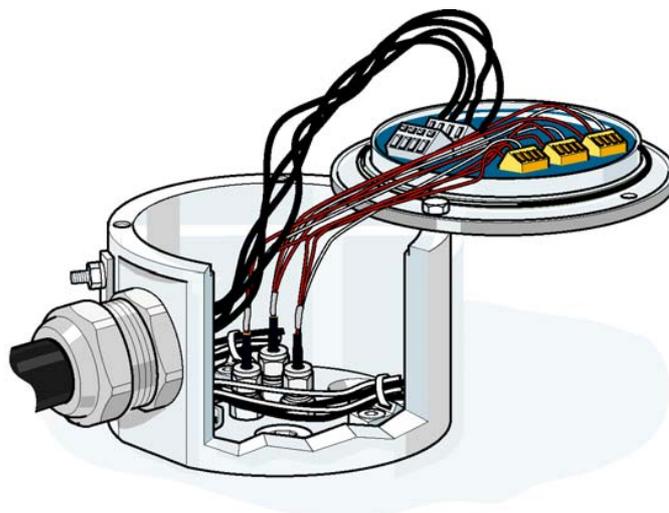
## Replace TMB in TMU 53



1. Remove the bolts from the cover and the label of the TMU.
2. Lift the cover from the housing and check that the O-ring at the underside of the cover not is damaged, otherwise replace it.



3. Fasten the cover with the TMB upside down on the side of the TMU housing with one bolt.



4. Disconnect the wires from the old TMB and connect them, one after one, to the new TMB.

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**Note!** Make sure that the wires stay in the same place as before.

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5. Remove the old TMB from the cover and replace it with the new one.

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**Note!** Make sure that the TMU housing is clean and dry.

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6. Fit the outer label into place and bolt the cover to the housing.

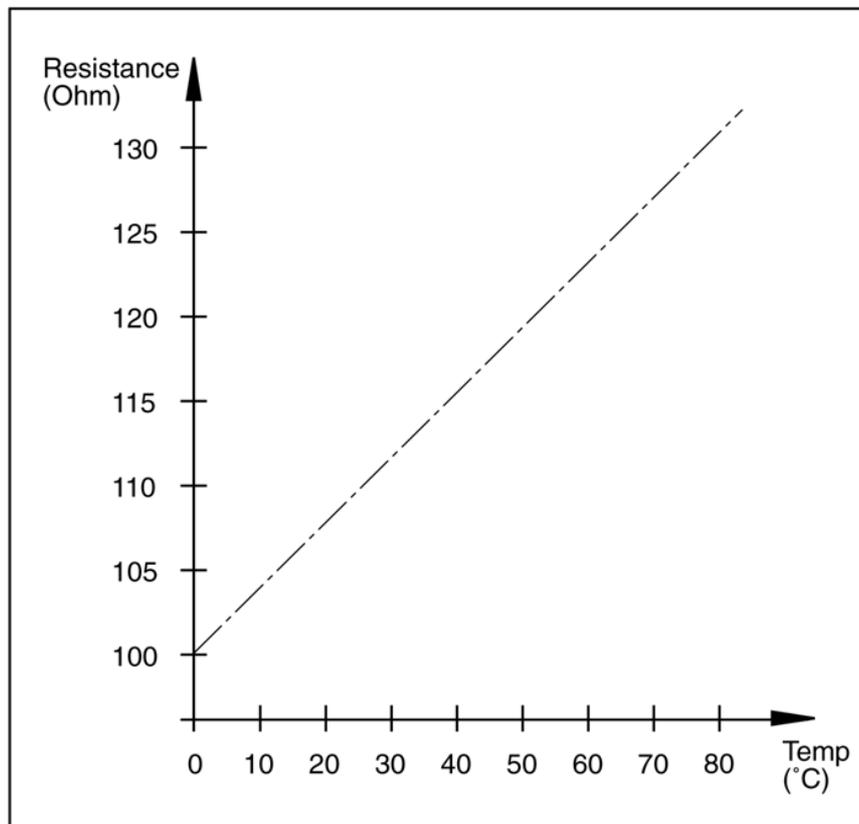
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**Note!** Make sure that the O-ring stays in place at the underside of the cover when it is bolted.

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## Check Temperature Measuring Sensor (TMS)

The PT 100 Temperature Measuring Sensor (TMS) has a near linear relation between resistance and temperature. 0°C corresponds to 100 Ohm and 100°C corresponds to 138,5 Ohm. The relation between the temperature and the resistance is shown in the figure below.



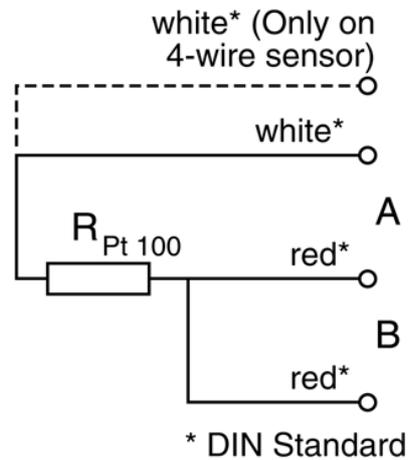
*Relation between temperature and resistance.*

When checking the resistance of a Pt100 sensor, observe the additional resistance of the connecting leads, which can be either in a 3-wire or 4-wire configuration.

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**Note!** For service of temperature sensors, strictly observe the safety regulations for intrinsic safety see “Intrinsic Safety” on page 24.

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Use a certified battery operated multipurpose instrument to check the resistance of the Pt100 element. The cable leads are colored according to the DIN standard - white, (white), red and red.

1. Open the cover of the Temperature Measuring Unit (TMU) and disconnect the leads to the Pt100 element you want to check.
2. Measure the resistance between the two red cable leads to establish the lead resistance (B). Then measure the resistance between the white and red leads to get the total resistance (A). The resistance of the Pt100 elements are:

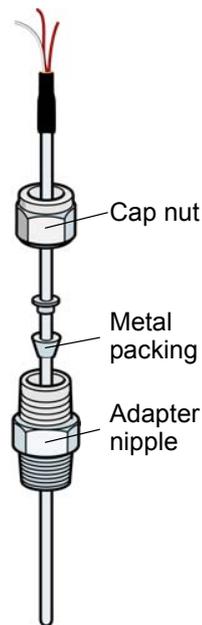
$$R_{Pt} = A - B \text{ Ohm}$$

Check corresponding temperature in the figure "Relation between temperature and resistance." on page 220. If the derived temperature ( $R_{Pt}$ ) is not equal to the actual temperature then replace the Pt100 element.

3. Check the insulation to ground. Measure the resistance from each of the leads to the TMU housing. If any resistance is below 10M $\Omega$ , replace the Pt100 element. Also see "Finding Cause of Ground Failure Warning" on page 286.

## Replace a Temperature Measuring Sensor (TMS)

1. Remove the cover of the Temperature Measuring Unit (TMU) and identify the faulty sensor.
2. Disconnect the TMS from the Temperature Measuring Block (TMB).



3. Loosen the Cap nut.
4. Loosen the Adapter nipple.
5. Pull out the TMS.
6. Insert a new TMS of identical length and tighten the Adapter nipple.
7. Lower the TMS as much as possible. Make sure the conical metallic packing is correctly fitted in the cap nut and then tighten the Cap nut.
8. Connect the TMS to the TMB.

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**Note!** Make sure the TMU housing is clean and dry.

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9. Mount the cover.