

18.05.2022 Version 1.00 T4B PT1000	Product Specification Temperature Sensor	
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Product Specification

T4B PT1000 Temperature Sensor

Last Revision: Rev. 1.00, 18th May 2022

Confirmation Customer

Name:

Title:

Date:

.....
(Signature)

Confirmation Supplier

Name:

Title:

Date:

.....
(Signature)

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Product Specification

T4B PT1000 Temperature Sensor

Status: Sensor Software V01.00

Valid 18/05/2022

Part Numbering

Q-Level	Systec serial no.	Customer ident no.	
Series	T4BPT – (YY) (WW) (NNNN)	T4B-PT1000	

Note: production date: year: 20YY; WW= calendar week;
NNNN= Sensor number

[illegible]

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1 Description

The external temperature sensor (type T4B PT1000) was developed to measure the fluid temperature. This sensor consists of PT1000 thermometer connected with integrated electronics in order to correct the measured analog signal (calibration functions) and to convert the calibrated data to CAN output.

This Sensor could be used at any industrial or automotive application where a high temperature range, accurate measurement and a CAN signal output are needed.

2 Installation and Assembly

2.1 Installation

The T4B PT1000 Temperature sensor can be mounted freely on a vertical or horizontal support. The sensor is fixed by the use of two M6 screws.

Before installing the tyco HDSCS connector plug, care must be taken that the sensor pins and the connector are clean. Note that the tyco HDSCS connector plug must be gas tight. Suitable wires and special sealing have to be used; unused pins have to be plugged. (c.f. tyco HDSCS specification).

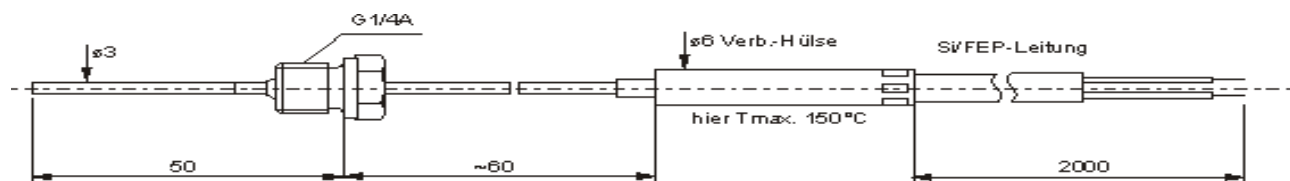
The customer must ensure that the cable connection between the sensor and Temperature Probe is not damaged during installation.



2.2 Temperature Probe

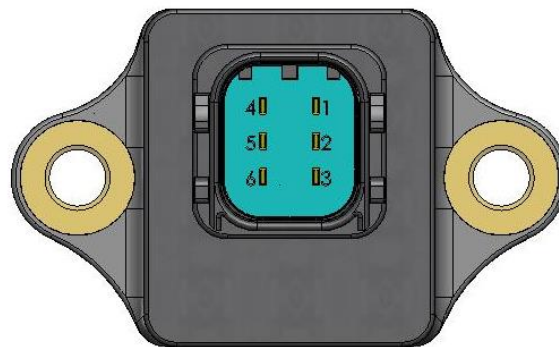
The temperature probe connected to the sensor has the following specifications

Description	Dimension
Length to thread	50 mm
Thread extension	G1/4A
Thread material	1.4571
Probe diameter	ø3mm
Nut depth	6 mm
Si/FEP Cable length	2000 mm



2.3 Connector

The connector used for the T4B PT1000 sensor is a Tyco HDSCS-6 pin type that complies with IP6K6K and IP6K9K. The location of the output pins is shown in the subsequent drawing. Note that the connector's counterpart used to contact the sensor must be gas tight using suitable wires, wire sealings (tyco type code 964972-1) and plugs for unused pins (tyco code 963531-1).



The pin out for the CAN-Bus sensor is shown below:

Pin	
1	CAN High
2	CAN Low
3	GND
4	do not connect !
5	do not connect !
6	Power Supply (5.0 to 24.0 VDC)

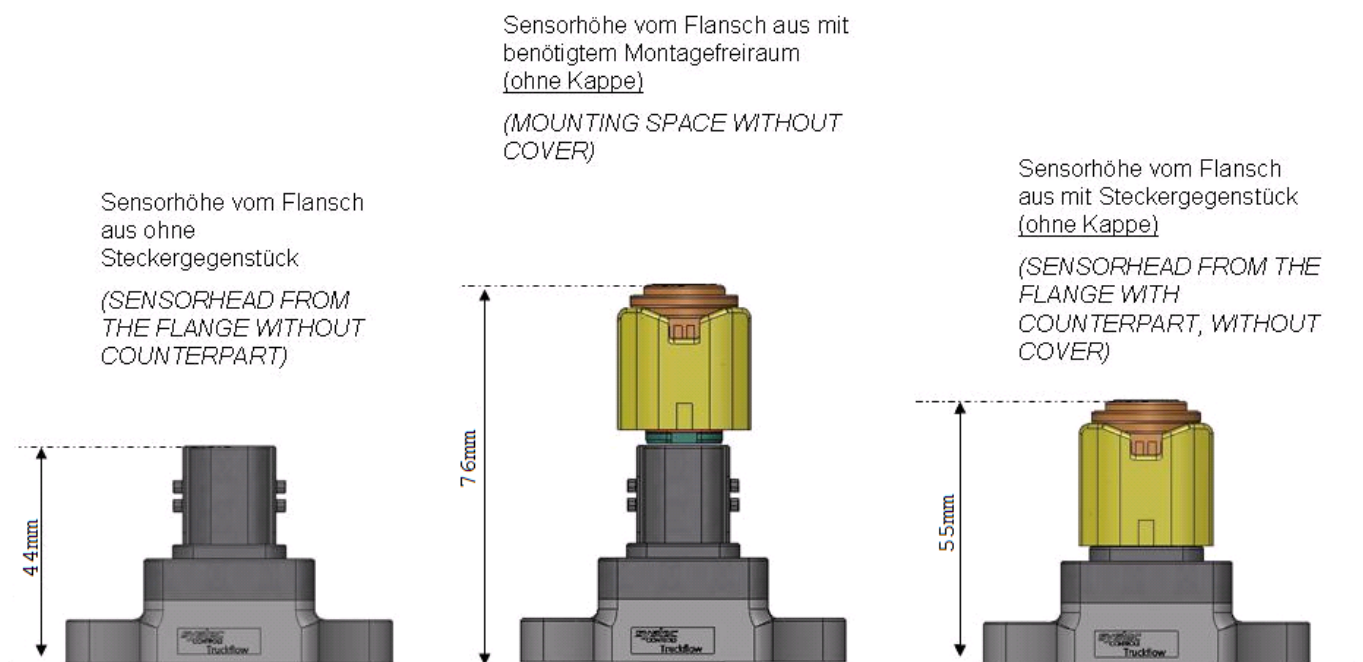
2.4 Label

The label placed on the sensor's housing shows customer logo(optional), sensor serial number, the Sensor identification number and a 2D data matrix code. The label is covered with a transparent plastic sheet to protect the label in case of varnishing the sensor.

The TFI4B systec Controls serial number reads:

TFI4B Type code	Production year 20YY	Production week WW	Sensor number
T4BPT	20 21 22	01..52	0001..9999

2.5 Mounting space



3 Specifications

3.1 Operating conditions

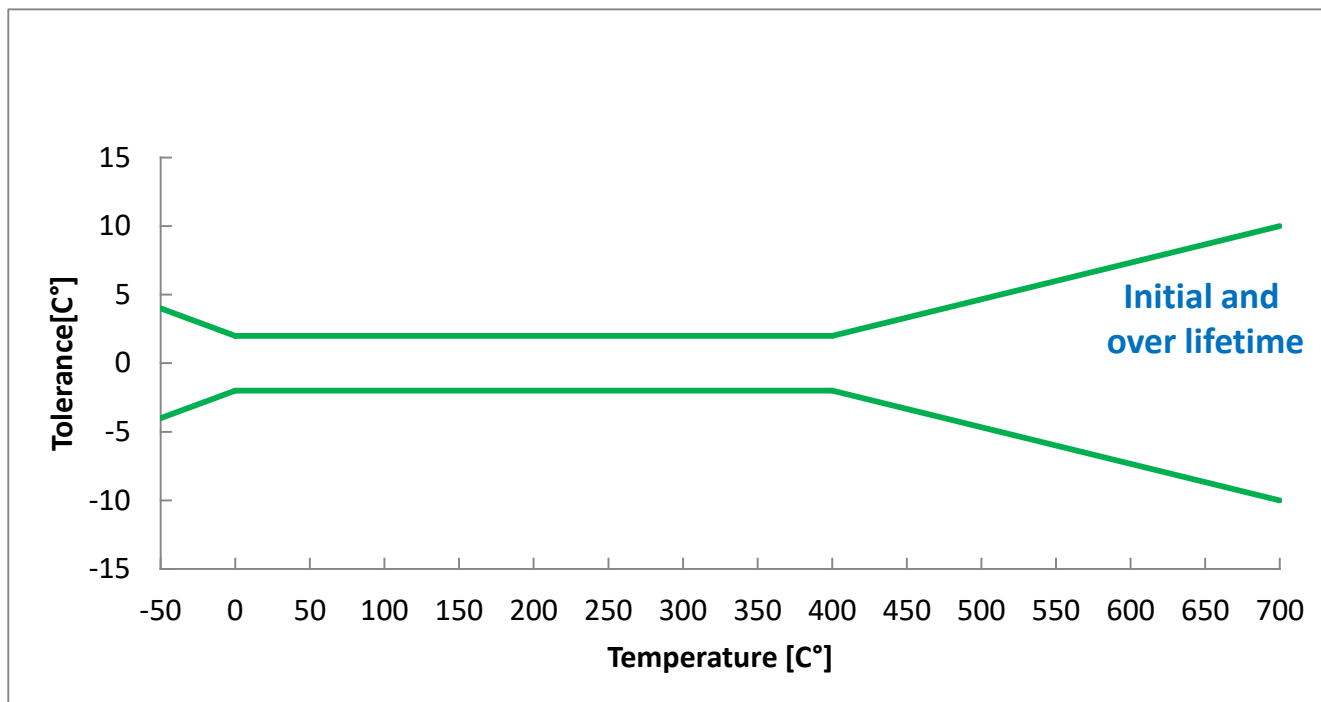
Parameter	Symbol	Value			Unit
		min.	typical	max.	
Supply voltage stabilized	U_s	4.9		24.1	V
Supply current at $U_s=5.0V$	I_s		25	27	mA
Temperature of medium	T_{medium}	-50		700	°C
Ambient temperature	T_{ambient}	-40		125	°C
Temperature at electronic board	T_{internal}	-40		125	°C

(*) Note: The sensor is protected up to a supply voltage of +36V on short term (<1 min). To avoid overheating of the sensor electronics the sensor must be operated in the operating supply voltage range given in the table.

The sensor is protected against reverse current up to -36V.

3.2 Accuracy of Temperature Sensor

The implemented Temperature sensor is by factory calibrated over the full measurement range at the temperature levels between -50°C and 700°C



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4 CAN-Bus Communication

4.1 General

The T4B PT1000 temperature sensor communicates with the ECU according to CAN 2.0B definition at a data rate of 500kbit/s (adjustable [4.3](#)). The CAN objects used have a 29bit identifier.

The sensor transmits the measured temperature and the status parameter. The sensor can receive a CAN message from the ECU in order to allow external control of the sensor's transmission time or CAN Baudrate.

4.2 CAN object sent by T4B PT1000

The sensor transmits 2 CAN objects to the ECU containing measurement data and status codes.

- The object identifier for the measured temperature is

Priority	Ext	DP	PDU	Group Extension	Source Address	29bit Identifier (Hex)
110	0	0	1111 1111	0011 0011	1001 0111	18FF3397

The data object uses 8 bytes.

Name	Start bit	Number of bits	Format	Value type	Unit	Scale factor	Offset	Min.	Max
T Temperature	0	16	Intel	unsigned	°C	0,03125	-273	-50	700

The output T provides the measured temperature signal as follow:

$$T [^{\circ}\text{C}] = T \cdot 0.03125 - 273^{\circ}\text{C}$$

$$T [\text{K}] = T \cdot 0.03125$$

- The object identifier for the Status code is

Priority	Ext	DP	PDU	Group Extension	Source Address	29bit Identifier (Hex)
110	0	0	1111 1110	1100 1010	1001 0111	18FECA97

The data object uses 8 bytes.

Name	Start bit	Number of bits	Format	Value type	Unit	Scale factor	Offset	Min.	Max
T Status	8	16	Intel	unsigned		1	0		

- No Error: T_Status = 0xFF
- T < -50°C: T_Status = 0x0F
- T > 700°C: T_Status = 0x8F
- Internal HW Error: T_Status = 0xF0

4.3 CAN object received by T4B PT1000

The sensor can receive a CAN object from the ECU containing commands and parameters to control the sensor. It is not required that the ECU constantly resends the message ("single shot" is sufficient). The object identifier reads:

Priority	Ext	DP	PDU	Group Extension	Source Address	29bit Identifier (Hex)
110	0	0	1111 1111	0011 0001	0000 0000	18FF3100

The data object is defined having 8 data bytes:

Byte	Function	Start bit	Number of bits	Format	Value type	Unit	Scale factor	Offset	Min	Max
D0	Command	0	8	Intel	unsigned		1	0	0	255
D1	Reserved	8	8	Intel	unsigned		1	0		
D2	Reserved	16	8	Intel	unsigned		1	0		
D3	Reserved	24	8	Intel	unsigned		1	0		
D4	Reserved	32	8	Intel	unsigned		1	0		
D5	Reserved	40	8	Intel	unsigned		1	0		
D6	Reserved	48	8	Intel	unsigned		1	0		
D7	Reserved	56	8	Intel	unsigned		1	0		

The following commands are defined:

Command 58 (CAN Baudrate)

This command is used to change the CAN Baudrate of the sensor.

After sending this command, the sensor start automatically sending the data with the new set Baudrate.

D0 = 58

D1 = 0x37 and D2 = 0xA5 are security bytes

D3 = M

M = 5 (set CAN baudrate to 250kbit/s)

M = 6 (set CAN baudrate to 500kbit/s)

Command 72 (CAN cycle time)

This command is used to change the transmission cycle time of the measured temperature CAN object.

D0 = 72

D1 = 0x37 and D2 = 0xA5 are security bytes

D3 = M (MSB) and D4 = M (LSB)

M = Cycle time(ms) * 2

**Cycle time should be > 100 ms (M>200) and lower than 5000 ms (M<10000)

Note: Others Commands than the defined above are reserved for Systec Controls and must not be activated!

5 Nomenclature

Symbol	Parameter	Unit
I_S	Supply Current	[A]
T_K	Fluid absolute temperature (in Kelvin!)	[K]
T	Fluid temperature	[°C]
$T_{ambient}$	Ambient temperature	[°C]
$T_{internal}$	Electronic temperature	[°C]
T_{medium}	Medium temperature	[°C]
U_S	Supply Voltage	[V]

6 Contact

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