

**User manual**  
**for**  
**Resistance Thermometers for**  
**Harsh Operational and Ambient**  
**Conditions**

**Version:TNK**



## 1. Contents

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1. Contents.....	2
2. Note .....	3
3. Unit inspection.....	3
4. Intended use .....	3
5. Operation .....	4
6. Mechanical connection.....	4
7. Electrical connection .....	5
8. Maintenance .....	6
9. Technical data.....	6
10. Order data.....	7
11. Dimensions .....	8

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## **2. Note**

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Please read and observe the guidelines in this user manual before unpacking and initially operating the unit.

The units are to be used, maintained and serviced solely by persons familiar with this user manual and the current regulations applying to occupational health & safety and accident prevention.

### **In line with the EU machine directive 2006/42/EU**

When installed in machines, the measuring unit TNK should only be used, if the machine fulfils the EU machine directive.

## **3. Unit inspection**

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The units are inspected before distribution and dispatched in perfect condition. Should there be visible damage to a unit, we recommend a thorough inspection of the delivery packaging. In the event of damage, please inform the parcel or dispatch service, as the transport company assumes liability for damage during transport.

### **Scope of services:**

The standard scope of services includes:

- Resistance thermometer Version: TNK
- User manual

## **4. Intended use**

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Faultless operation of the unit can only be guaranteed, if all points in the user manual are observed. We offer no guarantee against damage that arises due to non-compliance with this manual.

## 5. Operation

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Resistance thermometers are electric temperature measuring transducers which, when used in conjunction with the corresponding evaluation devices, display and regulate temperatures. They contain temperature-dependent measurement resistors that are housed in one of the valves adapted for this purpose.

TNK resistance thermometers are specially designed for use in shipbuilding and mechanical engineering and meet the high demands for robustness, reliability, impact resistance, shock and vibration resistance in accordance with the specifications set by Germanische Lloyd and Deutsche Bahn. Particularly suitable for temperature measurements on diesel engines.

The resistance thermometer sensor is made of brass, saltwater-resistant bronze or stainless steel. The connecting head is made of saltwater resistant aluminium and is available with various cable inlets. The sensor can be built onto the machine or into the pipeline using different threaded nipples or clamp screws.

The measurement resistors can be replaced without having to remove the valve. For more critical applications, the sensor can also be used as a dual precision resistor.

## 6. Mechanical connection

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### **Before installation:**

- Remove all transportation locks and ensure that there are no packaging materials left in the unit.
- Ensure that the permissible max. operating pressure and operating temperature for the unit are not being exceeded (see technical data).

### **During installation:**

- Install the resistance thermometer in the system at zero potential.
- Protect the measurement sensor from mechanical damage during the process
- Seal the mounting thread or the mounting flange with appropriate sealant.
- If possible at this point, a check should be carried out after the mechanical installation, to determine if the connecting fittings are completely sealed.
- If the resistance thermometer is mounted in an exposed location, the connecting head should be protected from exterior damage.

## 7. Electrical connection



**Warning!** Ensure that the voltage values in your system correspond to the voltage values for the measurement unit.

The electrical connection should only be carried out by competent staff with the relevant expertise.

Choose a suitable cable for the electrical connection:

Version TNK-...P: Cable diameter 5-10 mm

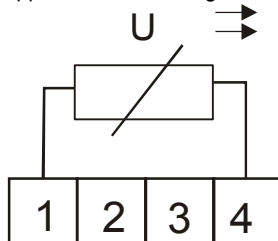
Version TNK-...M: according to DIN 89280 with internal thread M18x1.5 for cables with a cap, diameter: 8-10.5 mm (For shipping use)

Version TNK-...M: according to VG 88812 with internal thread M18x1.5 for cables with a cap, diameter: 11.5-12.5 mm (For military use)

### Circuit diagram for plug-in socket

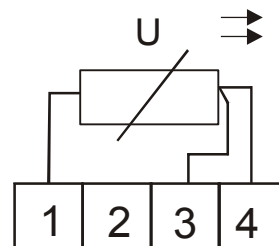
#### 2 conductor (TNK-1xxx xx x2x) x3x)

The conductor resistance is read as a measurement error approx. 30 m and longer



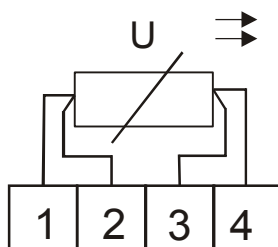
#### 3 conductor (TNK-1xxx xx

Measurement deviations can arise from a cable length of



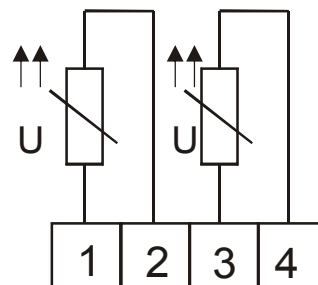
#### 4 conductor (TNK-1xxx xx x4x)

The internal conductor resistance of the connecting wires **B(D)2x** can be ignored



#### 2x 2 conductor (TNK-1xxx xx 2(6)2x)

#### 2x 2 conductor (TNK-1xxx xx



We recommend connection to suitable transmitter/evaluation devices (see brochure Z2)

## 8. Maintenance

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The resistance thermometers do not require maintenance.  
The measurement inserts are interchangeable with the resistance sensors.

## 9. Technical data

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Measurement sensors:	Pt100, Ni100, Pt1000, NTC (5 kΩ at 25 °C)
Measurement range:	-80...+150 °C
Accuracy (Pt):	class A or B according to DIN EN 60751
Accuracy (Ni):	Class B
Accuracy (NTC)	class B, (± 0.2°C in range 0 -70 °C)
Basic values:	<b>PT100/Pt1000</b> specified in DIN EN 60751 The nominal value is 100 Ω (or 1000 for PT1000 at 20°C) <b>Ni100:</b> specified in DIN 43 760 <b>NTC:</b> (5 kΩ at 25 °C) It can be calculated using the following formula. $RT = R25 * e^{B \left( \frac{1}{T} - \frac{1}{TN} \right)}$ RT = Resistance in Ω at a falling temperature R25 = Resistance in Ω at 25°C (5 kΩ) e=Euler's number (approx. 2.71828) B = coefficient Beta (25/85°C): 3976 K T = Operating temperature in Kelvin TN = Nominal temp. in Kelvin (298.16 K = 25°C)
Max. Temperature:	150 °C
Max. Pressure:	16 bar (Connection code: D5, G4, M5, N4) (Clamping screws) 50 bar
Sensor material:	Nickel plated brass, saltwater resistant bronze or stainless steel 1.4571
Connection housing:	saltwater resistant aluminium
Clamping screws:	Galvanised steel, stainless steel
Double nipple:	Nickel plated brass, stainless steel, saltwater resistant bronze
Mechanical Connection:	M18 x1.5, G 1/2, 1/2 NPT
Electrical Connection:	Screw terminals in connecting head
Thread cable inlet:	PG11
Protection class:	IP65
Weight:	approx. 350 g (50 mm sensor)
Approval:	GL approval

## 10. Order data

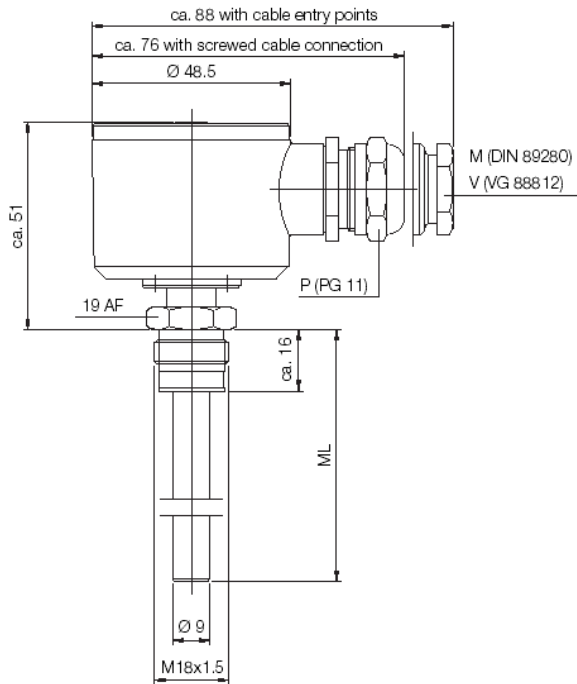
Sensor length	Version			Mechanical connection	Sensor type/class	Sensor version	Cable screw connections
	Nickel plated brass	Stainless steel	Bronze saltwater resistant				
50 mm	TNK-1105	TNK-1405	TNK-1705	<b>Thread, pivoting</b> <b>D5= M18x1.5</b>  <b>Double nipple</b> <b>M5= M18x1.5</b> <b>G4= G 1/2</b> <b>N4= ½ NPT</b>  <b>Clamping screws, galvanised brass</b> <b>S5*= M18x1.5</b> <b>S4*= G ½</b> <b>P4*= ½ NPT</b>  <b>Clamping screws stainless steel 1.4571</b> <b>V5*= M18x1.5</b> <b>V4*= G 1/2</b> <b>Q4*= ½ NPT</b>	<b>class B</b>  <b>1= 1xPt 100</b> <b>2= 2xPt 100</b> <b>5= 1xPt 1000</b> <b>6= 1xPt 1000</b> <b>7= 1xNi 100</b> <b>N= 1xNTC</b>  <b>class A</b>  <b>A= 1xPt 100</b> <b>B= 2xPt 100</b> <b>C= 1xPt 1000</b> <b>D= 2xPt 1000</b>		<b>P=</b> for Cable-Ø 5-10mm  <b>2***=</b> 2 m Rubber cable  <b>M =</b> according to DIN 89280  <b>V=</b> according to VG 88812
75 mm	TNK-1107	TNK-1407	TNK-1707				
100 mm	TNK-1110	TNK-1410	TNK-1710				
150 mm	TNK-1115	TNK-1415	TNK-1715				
Custom length (max. 300 mm)	-	TNK-14xx	-				

\*Clamping screws not in sensor materials, bronze \*\*3- or 4 conductor only for single sensor

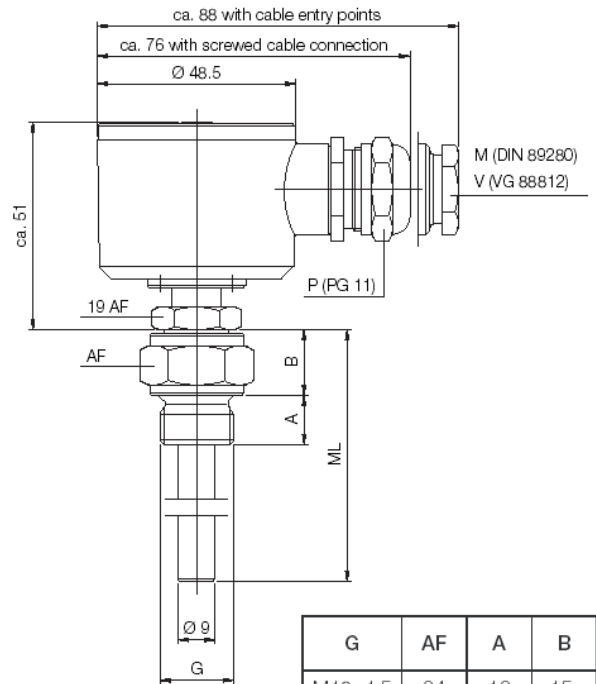
\*\*\* 2 m rubber cable only for 1x 2 conductor version

## 11. Dimensions

TNK with thread M18 x 1.5 (without nipple)

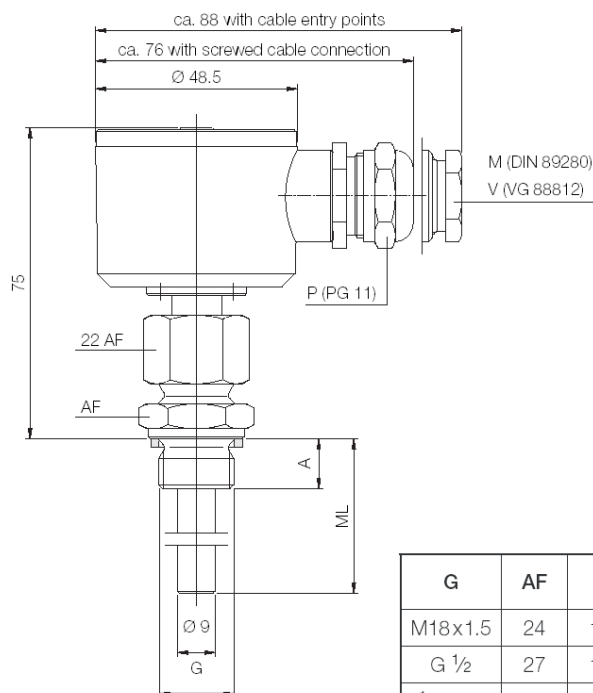


TNK with double nipple



G	AF	A	B
M18x1.5	24	12	15
G 1/2	27	14	15
1/2 NPT	24	19	13

TNK with compression fitting



G	AF	A
M18x1.5	24	12
G 1/2	27	14
1/2 NPT	22	19.8



# Type Approval Certificate



This is to certify that the undemoted product(s) has/have been tested in accordance with the relevant requirements of the GL Type Approval System.

Certificate No. **58 793 - 08 HH**

Company **KOBOLD Messring GmbH  
Nordring 22-24  
85719 Hofheim, GERMANY**

Product Description **Resistance Thermometer**

Type **TNK - x x x x x x x x x**

Environments Category **D**

Technical Data /  
Range of Application **Sensor: Pt 100, Pt 1000, Class A or B, Ni 100, NTC  
Measuring range: - 80...+ 150 °C  
Max. temperature: 150 °C  
Max. pressure: 16 bar, 50 bar with clamp connection  
  
Thread for cable entry points: PG 1", 1118 x 1.5 DIN 8940-1:2008-06 +  
VG 89812:2013-09  
  
Degree of protection: IP 65**

Test Standard **Guidelines for the Performance of Type Approvals, Chapter 2, Edition 2003**

Documents **Test report : Kobold Messring No. PBO803 dd. 26.05.2008;  
Electronic No. P082775 dd. 30.04.2008;  
paconsult No. 09-2015 dd. 17.06.2008.  
Drawing Nos.: 214.006 dd. 24.08.2006, 214.007 dd. 06.09.2006**

Remarks **None**

Valid until **2013-07-03**

Page **1 of 1**


Type Approval Symbol




File No. **1.0.02**

**Hamburg, 2008-07-04**

**Germanischer Lloyd**

  
Marco Rinkel

  
Guntar Demnig

This certificate is issued on the basis of "Guidelines for the Performance of Type Approvals Part 1 Procedure".