Instruction Manual

version 1.4

Resistance thermometers and thermocouples for group I category M1

TOP-PKGKbm-21/Exi M1
TOP-PKbm-32/Exi M1

TER-PKbm-40/Exi M1
TER-PKGKbm-91/Exi M1

1. Data sheet.

1.1 Technical parameters.

1.2 Ordering information.

(Space for catalogue card)

2. Application

Resistance thermometers type TOP-.../Exi M1 and thermocouples type TER-.../ Exi M1, together with particular instruments are used under surface of mines or installations on the surface, where is a danger of methane and/or carbon dust explosions. The instruments are group I category M1 with designation Ex I M1, Exia – KDB 04 ATEX 037X.

Assignation acc. to directive ATEX Ex I M1

coal mining

device category; for use in explosion atmosphere

Antiexplosion Construction Ex ia

electrical instruments with explosion protection

shock proof device

The end of the sensor cable have to find in terminal chamber with internal protection grade IP54.
In the place of measurment sensors could be:

- screw with use of screwed connector (TOP-PKGKbm-21/Exi M1, TER-PKGKbm-91/Exi M1)
- Directly placed in the atmosphere of temperature measurment under the term of normal atmosphere pressure (TOP-PKbm-32/Exi M1, TER-PKbm-40/Exi M1)

2.1 Therms of special use.

- Ambient temperature of sensor -40ºC...+50ºC,

3. Principle of operation.

The measuring elements of the resistor thermometer are the Pt-100, Pt-1000 having characteristics complying to EN 60751.

A thermocouple consists of two electric heterogeneous thermoelectrodes, connected together. Spot of the connection acts as hot measuring junction. If measuring junction is situated in a environment of different temperature than cold junction, a thermoelectric power appears between junctions. This power is proportional to difference between temperatures, according to thermoelectric characteristic specified in the norm PN-EN 60584.

The particular medium temperature measurement is done by resistance or thermoelectric power measurement.

4. Design.

A temperature sensor is composed of (as is shown on the figures in catalogue cards) metal outer protection tube with or without process connection fitting and with connection cable.

Inside protection tube the resistor or hot junction are placed. Sensor can be threaded using process connection fitting or bayonet socket for fast assembling to a tag point. Cable, which is fixed for good to the sensor, is made of Cu cord with or without screen, with rubber, silicone, teflon or glass fibre insulation of 2, 3 or 4 wire configuration. Cable is finished with endings allowing to connect cooperative instruments.

5. Cooperative instruments.

Sensors can cooperate with any instruments adjusted to work with resistance thermometer or thermocouple. For intrinsic safe versions of resistance thermometer type TOP-.../Exi M1 and thermocouple TER-.../Exi M1 retain „ia" intrinsic safe category only cooperating with approved circuits of „ia" category acc. PN-EN 60079. In case of cooperation with „ib" category circuits, the intrinsic safe category must be lowered to „ib".

6. Equipment.

Basic equipment of thermometer consists of:

- Instruction manual
- Guarantee card
- Certification ATEX (for intrinsic safe version)
- Declaration of conformity (for intrinsic safe version)

7. Technical acceptance.

Approval and authorization for operation by Quality Control Department of manufacturer is done basing on control sensor conformity with norms EN 60079-0; EN 60079-11; EN 50303; EN 61241-11.

8. Quarantee.

Manufacturer guarantees proper operation of resistance thermometer and thermocouples under condition of operating instrument according to requirements issued in this instruction manual.

9. Storage and transportation.

Temperature sensors should be stored in closed rooms at temperature from +5°C to +50°C and humidity maximum 80%.Transport of goods should be done by canvas cover means of transport.

10. Mounting.

Resistance thermometers type TOP-.../Exi M1 and thermocouples type TER-.../ Exi M1, together with particular instruments are used under surface of mines or installations on the surface, where is a danger of methane and/or carbon dust explosions.

Resistance thermometers and thermocouples with process connection fitting type TOP-PKGKbm-21/Exi M1 and TER-PKGKbm-91/Exi M1 are installed in systems aggregates, pressure vessels and pipelines of industry and laboratory installations, using threaded connection fitting for a tag point fixing (Fig. 1). TOP-PKbm-32/Exi M1 and TER-PKbm-40/Exi M1 sensors are placed directly in measurment atmosphere.

For assembling sensors of intrinsic safe version and to assure appropriate temperature class, one should take under consideration a heat conductivity of sensor protection tube and ambient temperature „Ta". Mounting sensors in explosion dangers zones should be followed according to operating rules of flame proof instruments included in EN 60079-14 „Electrical instruments in explosion danger zones. Choice, installation, maintenance and repair of electrical instruments used in explosion danger zones."

User, after rebuilding them in a future place of work, should check if maximum ambient temperature of the sensor protection tube, under maximum measuring temperature, do not exceed an authorized temperature value of 150ºC.

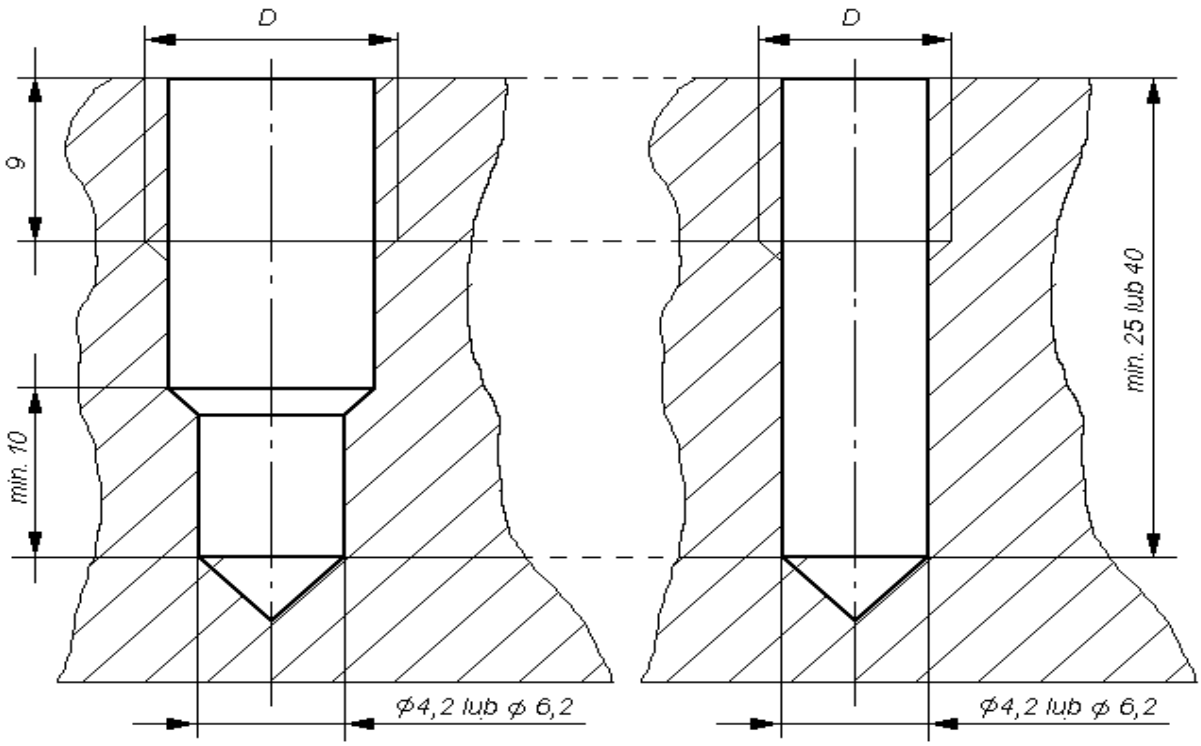

Fig. 1
Tag point

10.1 Electrical parameters for Exi devices with maximal cable length 50mb

Ui = 10V, Ii = 8mA, Pi = 0,1 W, Ci = 80 nF, Li = 40µH
Uo = 50 mV, Io = 100 mA – for thermocouples

11. Wires connection.

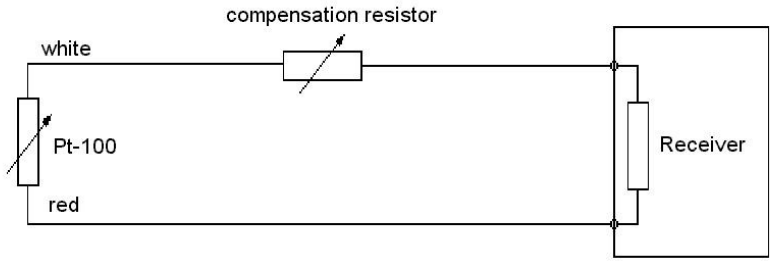

Fig. 2
Connection of 2-wire line.
Adjust compensation resistor value to value specified in receiver instruction manual.
Usually it is value 10Ω or 20Ω.

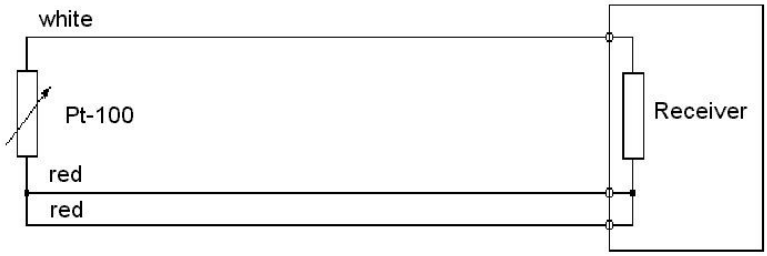

Fig. 3
Connection of 3-wire line

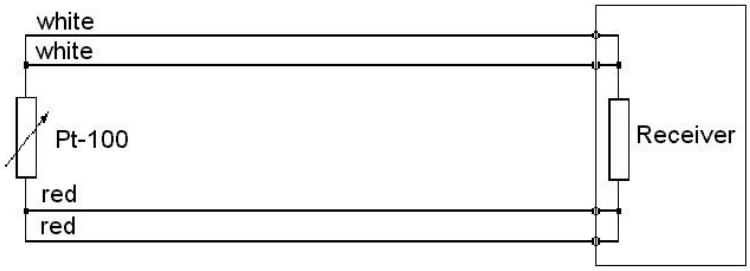

Fig. 4
Connection of 4-wire line
This line totally eliminates connection cable resistance influence,
particularly useful for switching configurations.

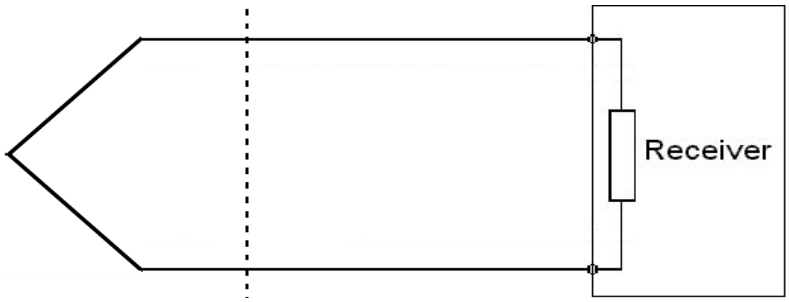

Fig. 5
Connection of thermocouple

12. Operating instruction.

When device is used as it is write in instruction and data sheet, they do not need any other conservation. If user notice that device is working wrong, he should check the device in known temperature for example in 0ºC, measure impedance and check with value shown in norm EN 60751 or EN 60584.

FINAL REMARK

In case of any troubles in starting or operation of thermometers, our company will provide you technical information or advices related to the encountered problems.