SLOVENSKI STANDARD
SIST EN 1434-2:1997

01-junij-1997

Toplotni števci - 2. del: Konstrukcijske zahteve

Heat meters - Part 2: Constructional requirements

Wärmezähler - Teil 2: Anforderungen an die Konstruktion

Compteurs d'énergie thermique - Partie 2: Prescriptions de fabrication

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Ta slovenski standard je istoveten z: **EN 1434-2:1997**

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ICS:

17.200.10 Toplota. Kalorimetrija Heat. Calorimetry

SIST EN 1434-2:1997 **en**

2003-01.Slovenski inštitut za standardizacijo. Razmnoževanje celote ali delov tega standarda ni dovoljeno.

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EUROPEAN STANDARD **EN 1434-2**

NORME EUROPÉENNE

EUROPÄISCHE NORM February 1997

ICS 17.200.10

Descriptors: metrology, measuring instruments, thermal energy meters, equipment specifications, design, manufacturing, marking

English version

Heat meters - Part 2: Constructional requirements

Compteurs d'énergie thermique - Partie 2: Prescriptions de fabrication

Wärmezähler - Teil 2: Anforderungen an die Konstruktion

This European Standard was approved by CEN on 1997-01-27. CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration.

Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the Central Secretariat or to any CEN member.

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CEN

European Committee for Standardization
Comité Européen de Normalisation
Europäisches Komitee für Normung

Central Secretariat: rue de Stassart,36 B-1050 Brussels

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Foreword

This draft European Standard has been prepared by Technical Committee CEN/TC 176 "Heat meters", the secretariat of which is held by DS.

The other parts are:

Part 1 - General requirements

Part 3 - Data exchange and interfaces

Part 4 - Pattern approval tests

Part 5 - Initial verification tests

Part 6 - Heat meter installation, commissioning, operational monitoring and maintenance

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 1997, and conflicting national standards shall be withdrawn at the latest by August 1997.

According to the CEN/CENELEC Internal Regulations, the national standards organizations of the following countries are bound to implement this European Standard: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, Switzerland and the United Kingdom.

1 Scope

This European Standard applies to heat meters, that is to instruments intended for measuring the heat which, in a heat-exchange circuit, is absorbed or given up by a liquid called the heat-conveying liquid. The heat meter indicates the quantity of heat in legal units.

Electric safety requirements are not covered by this standard

Meters with surface mounted temperature sensors are not yet included in this standard

Part 2 specifies constructional requirements.

2 Normative references

This European Standard incorporates by dated or undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this European Standard only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

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EN 1434-1:1997	Heat meters - Part 1: General requirements
EN 1434-3	Heat meters - Part 3: Data exchange and interfaces
EN 60751:1995	Industrial platinum resistance thermometer sensors (IEC 751:1983)
ISO 228-1	Pipe threads where pressure tight joints are not made on the threads - Part 1: Dimensions, tolerances, and designation
ISO 4903	Information technology - Data communication - 15 - pole DTE/DCE interface connector and contact number assignments
ISO 7005-1	Metallic flanges - Part 1: Steel flanges

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ISO 7005-2 Metallic flanges - Part 2: Cast iron flanges.

ISO 7005-3 Metallic flanges - Part 3: Copper alloy and composite flanges

3 Temperature sensors

3.1 General

The temperature sensor sub-assembly shall consist of platinum resistance temperature sensors selected as matched pairs.

Other types of temperature sensor pairs may be used, where the sub-assembly consists, inseparably, of temperature sensors and calculator.

The maximum admissible working pressure shall be declared by the supplier.

Where no dimensional tolerance is specified, the values shall be taken from table 1.

Table 1: Tolerances

Dimension mm	0,5 up to 3	over 3 up to 6	over 6 up to 30	over 30 up to 120	over 120 up to 400
Tolerance mm	± 0,2	± 0,3	± 1	± 1,5	± 2,5

3.2 Mechanical design

For pipe sizes up to and including DN 250, 3 different temperature sensor types are standardised:

Direct mounted short probes - Type DS
Direct mounted long probes - Type DL
Pocket mounted long probes - Type PL

Types PL and DL can be either head probes or have permanently connected signal leads. Type DS shall have permanently connected signal leads only.

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3.2.1 Materials of temperature probe sheath and pocket

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The temperature pocket and the protective sheath of direct mounted probes shall be of a material, that is adequately strong and resistant to corrosion and has the requisite thermal conductivity.
A suitable material has been shown to be EN 10088-3 - X6 Cr Ni Mo Ti 17 12 2

3.2.2 Dimensions of direct mounted short probes - Type DS

The dimensions shall be as given in figure 1.
Further non-normative information is given in annex A, figure A.1

3.2.3 Dimensions of direct mounted long probes - Type DL

The dimensions shall be as given in figure 2.
Further information is given in annex A, figure A.2 and A.3

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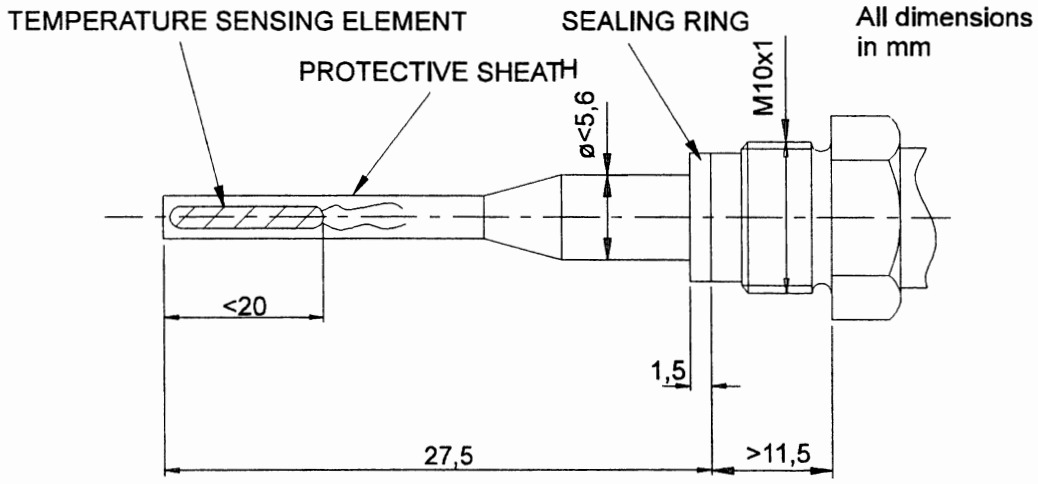
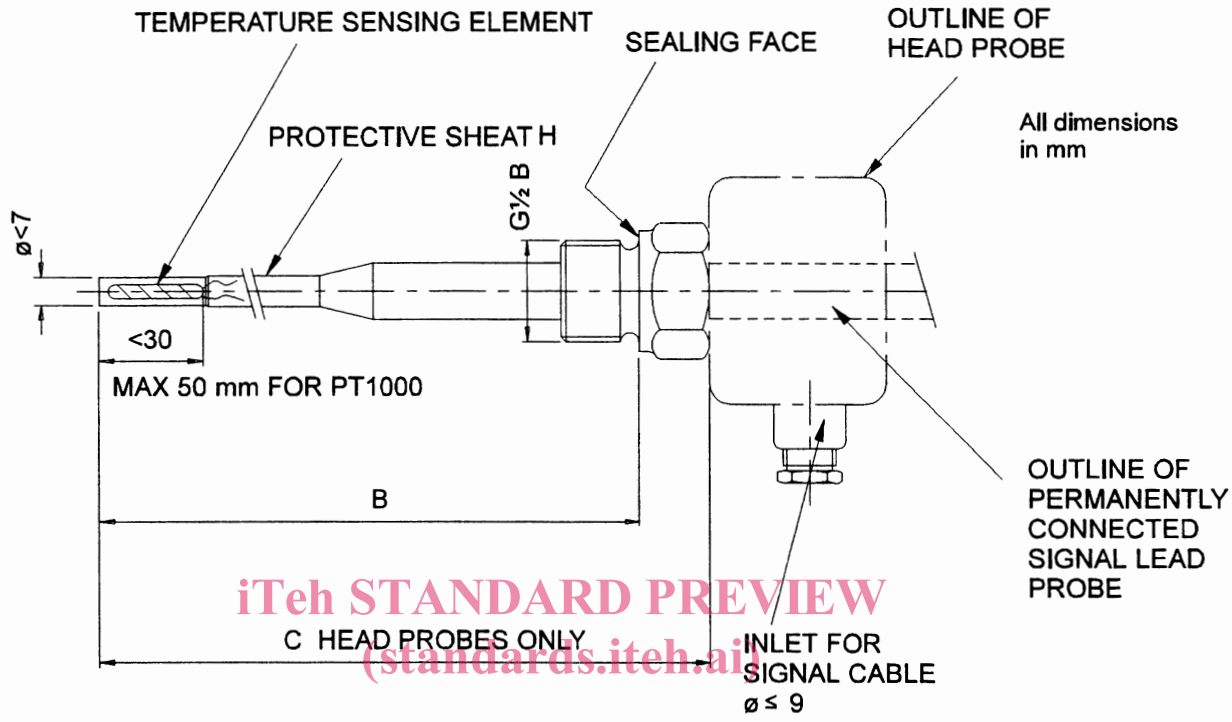


Figure 1: Temperature probes - Type DS.



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ALTERNATIVE LENGTHS

B	C
85	105
120	140
210	230

Figure 2: Temperature probes - Type DL. (head or cable)

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3.2.4 Dimensions of pocket mounted long probes - Type PL

The dimensions shall be as given in figure 3.
Further information is given in annex A, figure A.4 and A.5

3.2.5 Dimensions of temperature pocket

The temperature pocket is designed for use with type PL temperature probes only. It is designed to be capable of being inserted through a pipe wall to which has been externally brazed or welded a boss (see annex A, figure A.6 a and b.) and in this respect only, it is interchangeable with a direct mounted long probe of corresponding insertion length.

The dimensions shall be as given in figure 4.

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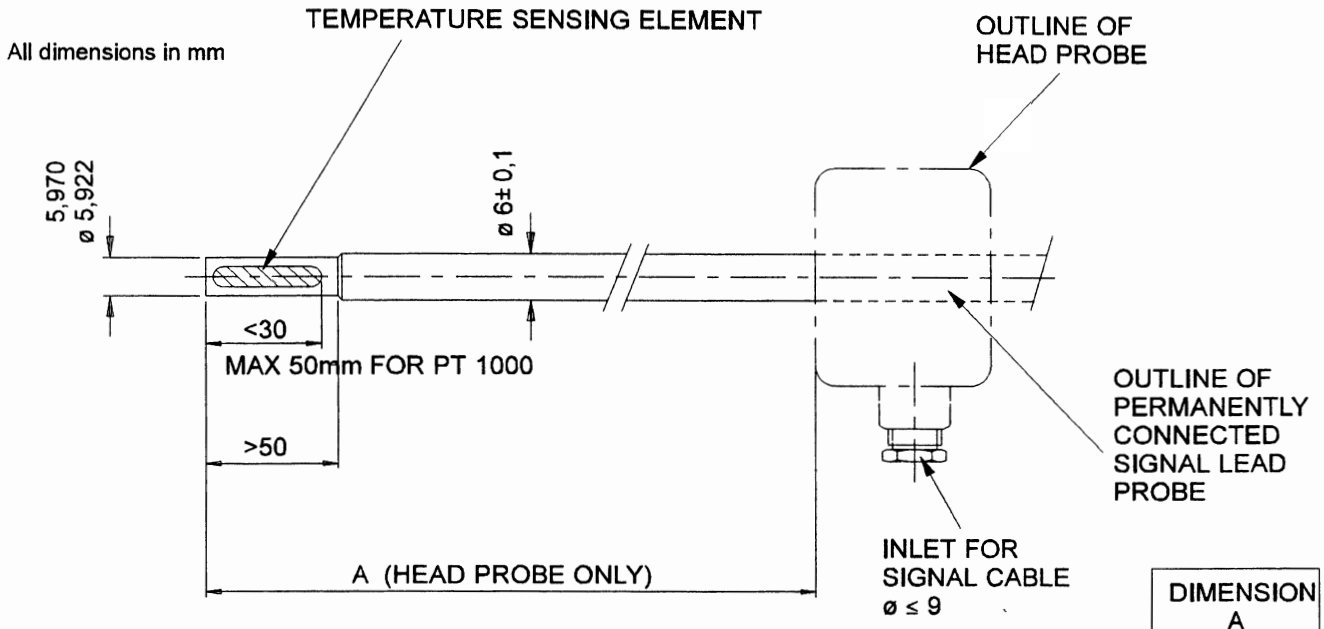
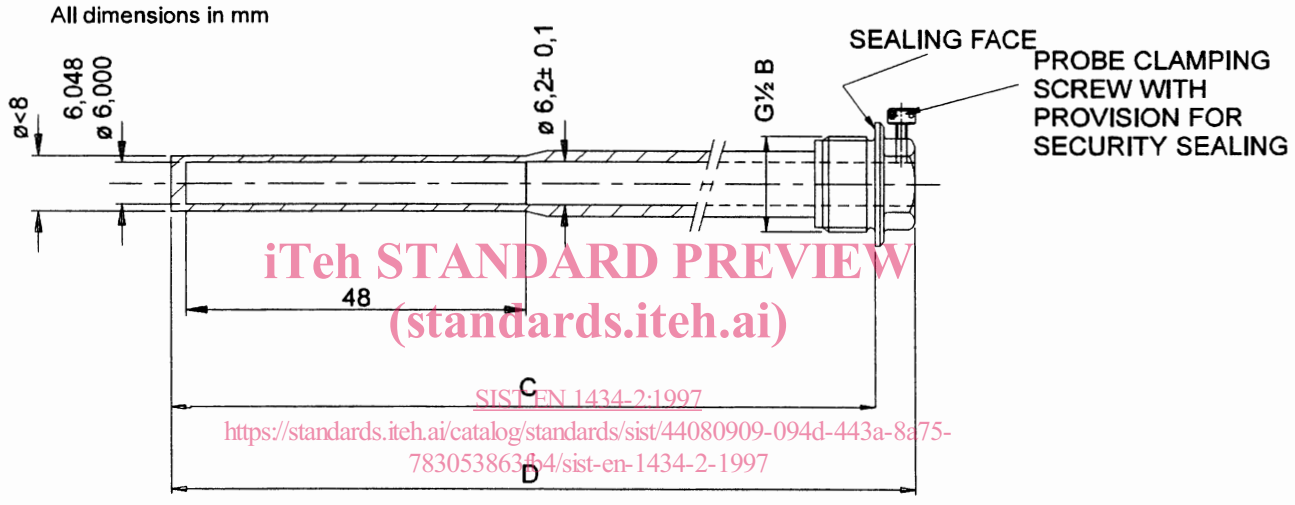


	DIMENSION A
ALTERNATIVE LENGTHS	105
	140
	230

Figure 3: Temperature probes - Type PL. (head or cable)



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G½ B THREAD ACCORDING TO ISO 228-1

	C	D
ALTERNATIVE LENGTHS	85	≤100
	120	≤135
	210	≤ 225

Figure 4: Temperature pocket

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3.2.6 Design of short probes with respect to installation

The sensor shall be mounted perpendicular to the flow and with the sensing element inserted to at least the centre of the pipe.

For internal pressures up to PN 16, the sensor shall be designed to fit in a pipe fitting (see annex A, figure A.7).

3.2.7 Design of long probes with respect to installation

The sensor shall be mounted with the sensing element inserted to at least the centre of the pipe.

The sensor shall be designed to fit in the following types of installation, (for internal pressures up to PN16):

a) in a pipe ≤ DN 50 mounted with the tip pointing into the flow in a bend (see annex A, figure A.8B), using welded-in boss (see annex A, figure A.6 b).

b) in a pipe ≤ DN 50 mounted at an angle 45° to the direction of the flow with the tip pointing into the flow (see annex A, figure A.8 C), using a welded in boss (see annex A, figure A.6 b).

c) in a pipe DN 65 to DN 250, mounted perpendicular to the flow (see annex A, figure A.8 D), using a welded-in boss (see annex A, figure A.6 a).

3.3 Platinum temperature sensor

3.3.1 Specialised definitions for 2 wire temperature probes

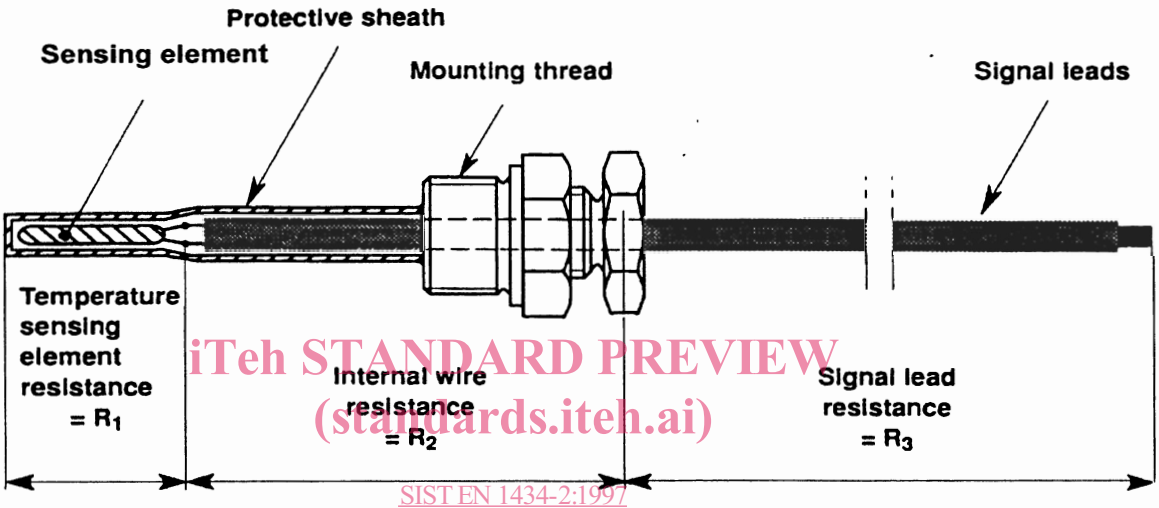

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Figure 5: Temperature probe with permanently connected signal leads

Overall resistance of temperature probe	R_{tot}	$= R_1 + R_2 + R_3$
Measurement resistance of temperature probe	R	$= R_1 + R_2$
Manufacturer shall specify resistance of signal leads	R_3	

The resistance to be used in all calculations is the measurement resistance of the temperature probe, R.

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NOTE: When the 4 wire system of connecting is used, the resistance of the temperature probe signal leads is not required.

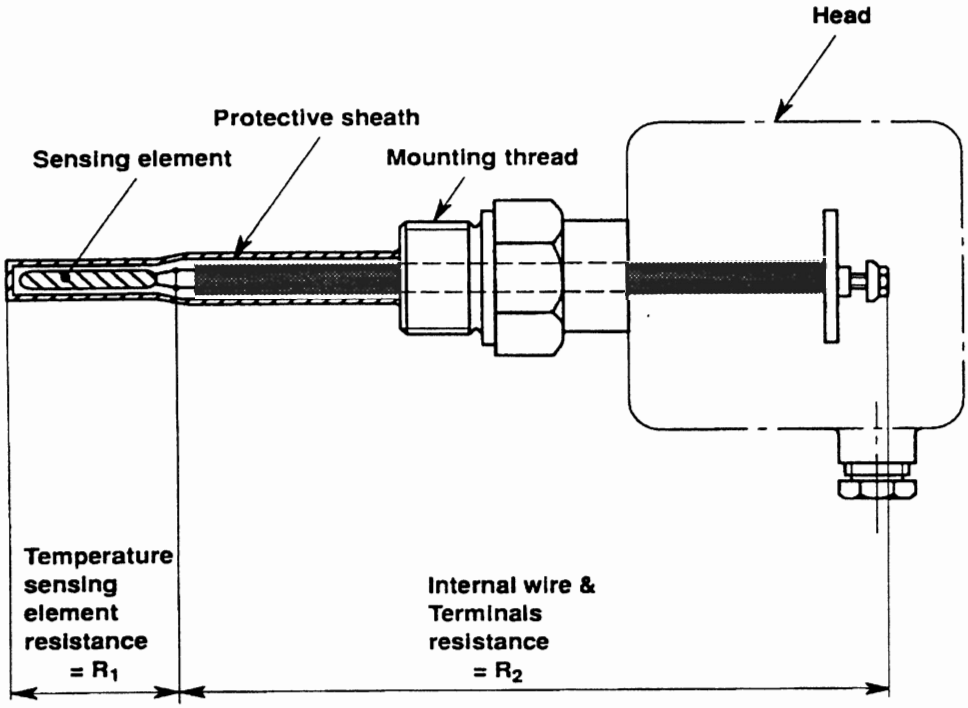

Figure 6: Head sensor temperature probe

Overall resistance of head sensor temperature probe	R_{tot}	$= R_1 + R_2$
Measurement resistance of head sensor temperature probe	R	$= R_1 + R_2$

The resistance to be used in all calculations is the measurement resistance of the temperature probe, R.

NOTE: When the 4 wire system of connecting is used, the resistance of the temperature probe signal leads is not required.

3.3.2 Resistance characteristics

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The calibration of temperature sensors shall be traceable to national temperature standards. The intermediate values of the heat meter temperature sensor shall be interpolated using the EN 60751 formula as follows:

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$$R_1 = R_0 (1 + At + Bt^2)$$

where:

R_1 is the resistance value at temperature t in Ω (excluding cable resistance - see figures 5 and 6)

R_0 is the resistance value at temperature 0 °C in Ω (base value) (excluding cable resistance)

A is $3{,}9083 \times 10^{-3}$ $°C^{-1}$

B is $-5{,}775 \times 10^{-7}$ $°C^{-2}$

Note: It is assumed, that the national temperature standards are established with reference to ITS-90 - The International Temperature Scale of 1990.

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3.3.3 Signal leads

For signal leads, leads with strands can be used, or in the case of head probes, solid wires. The lead ends shall be precisely trimmed, if strands are used (e.g. by lead end sleeves). Solder-coating of the lead ends to prevent splicing is not permissible.

A soldered joint to connect the temperature probe signal lead to the calculator is only permitted in the case of non-interchangeable temperature probes.

For screened cables for temperature sensors there shall be no connection between the screen and the protecting sheath.

3.3.4 Temperature sensors for the 2-wire method

The length and cross sectional area of signal leads of paired resistance sensors of separable sub-assemblies shall be equal.

The length of the signal lead as supplied by the manufacturer shall not be changed.

The length shall be within the values given in table 2.

Table 2: Maximum lengths of leads for Pt 100 temperature sensors

Lead cross section mm^2	Max. length for Pt 100 m
0,22	2,5
0,50	5,0
0,75	7,5
1,50	15,0

For sensors of higher resistances the limiting value can be extended proportionally.

NOTE: The values given in Table 2 have been obtained in the following manner:

It is assumed, that the difference in temperature of the leads does not exceed one third of the temperature difference between flow and return pipes.

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The maximum permissible length of lead for each lead cross section was then calculated, having decided that the error created may not be allowed to exceed 0,2 times the maximum permissible error of the temperature probe pair and using the knowledge of the different resistances created by the temperature differences between the flow and return leads.

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The influence of the length of a signal lead can be neglected, if the total resistance of a lead for a Pt 100 temperature sensor does not exceed two times 0,2 Ω.

3.3.5 Temperature sensors for the 4-wire method

If the cable length requirements in 3.3.4 cannot be fulfilled, the 4-wire method shall be used.

The connections shall be clearly identifiable so that they cannot be confused.

A cross-section of 0,5 mm^2 is recommended for head sensors and a minimum cross-section of 0,14 mm^2 for cable sensors.