

**CPC****COOPERATIVE PATENT CLASSIFICATION****G01K****MEASURING TEMPERATURE; MEASURING QUANTITY OF HEAT; THERMALLY-SENSITIVE ELEMENTS NOT OTHERWISE PROVIDED FOR**

(sensing temperature changes for compensating measurements of other variables for compensating readings of instruments for variation in temperature, see [G01D](#) or relevant subclasses for variable measured; radiation pyrometry [G01J](#); investigating or analysing materials by use of thermal means [G01N 25/00](#); compound sensitive elements, e.g. bimetallic, [G12B 1/02](#))

**NOTES**

1. In this subclass, the following term is used with the meaning indicated :
  - "thermometer" includes thermally-sensitive elements not provided for in other subclasses.
2. Attention is drawn to the Notes following the title of class [G01](#).
3. Attention is drawn to the Notes following the titles of class [B81](#) and subclass [B81B](#) relating to "micro-structural devices" and "micro-structural systems".

**G01K 1/00**

**Details of thermometers not specially adapted for particular types of thermometer** (circuits for reducing thermal inertia [G01K 7/42](#))

[G01K 1/02](#)

- Special applications of indicating or recording means, e.g. for remote indications

[G01K 1/022](#)

- . {recording means}

[G01K 1/024](#)

- . {for remote indication (remote indication per se [G08C](#))}

[G01K 1/026](#)

- . {arrangements for monitoring a plurality of temperatures, e.g. by multiplexing}

[G01K 1/028](#)

- . {arrangements for numerical indication}

[G01K 1/04](#)

- . Scales

[G01K 1/045](#)

- . . {temperature indication combined with the indication of another variable (indicating of human comfort [G01W 1/17](#))}

[G01K 1/06](#)

- . . Arrangements for facilitating reading, e.g. illumination, magnifying glass

[G01K 1/065](#)

- . . . {of liquid column thermometers}

[G01K 1/08](#)

- Protective devices, e.g. casings

[G01K 1/083](#)

- . {for clinical thermometers, e.g. contamination preventing sleeves}

[G01K 1/086](#)

- . . {for tympanic thermometers}

[G01K 1/10](#)

- . for preventing chemical attack

[G01K 1/105](#)

- . . {for siderurgical use}

[G01K 1/12](#)

- . for preventing damage due to heat overloading

[G01K 1/125](#)

- . . {for siderurgical use}

[G01K 1/14](#)

- Supports; Fastening devices; Mounting thermometers in particular locations

[G01K 1/143](#)

- . {for measuring surface temperatures, e.g. of pipe walls}

[G01K 1/146](#)

- . {arrangements for moving thermometers to or from a measuring position}

[G01K 1/16](#)

- Special arrangements for conducting heat from the object to the sensitive element



- G01K 1/165 . . {for application in zero heat flux sensors}
- G01K 1/18 . . for reducing thermal inertia
- G01K 1/20 . Compensating for effects of temperature changes other than those to be measured, e.g. changes in ambient temperature
- G01K 1/22 . . by means of fluid contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the fluid
- G01K 1/24 . . by means of compounded strips or plates, e.g. by bimetallic strips
- G01K 1/26 . Compensating for effects of pressure changes
  
- G01K 3/00** **Thermometers giving results other than momentary value of temperature**  
(G01K 7/42 takes precedence)
- G01K 3/005 . {Circuits arrangements for indicating a predetermined temperature (fire detection G08B 17/00)}
- G01K 3/02 . giving means values; giving integrated values
- G01K 3/04 . . in respect of time
- G01K 3/06 . . in respect of space
- G01K 3/08 . giving differences of values (using thermoelectric elements G01K 7/02); giving differentiated values
- G01K 3/10 . . in respect of time, e.g. reacting only to a quick change of temperature
- G01K 3/12 . . . based upon expansion or contraction of materials
- G01K 3/14 . . in respect of space
- G01K 2003/145 . . . {Hotspot localization}
  
- G01K 5/00** **Measuring temperature based on the expansion or contraction of a material**  
(G01K 9/00 takes precedence; giving other than momentary value of temperature G01K 3/00; of vapour arising from a liquid G01K 11/02; thermally-actuated switches H01H)
- G01K 5/02 . the material being a liquid (contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the material G01K 5/32)
- G01K 5/025 . . {Manufacturing of this particular type of thermometer}
- G01K 5/04 . . Details
- G01K 5/06 . . . Arrangements for driving back the liquid column
- G01K 5/08 . . . Capillary tubes
- G01K 5/10 . . . Containers for the liquid
- G01K 5/12 . . . Selection of liquid compositions
- G01K 5/14 . . the liquid displacing a further liquid column or a solid body (for maximum or minimum indication G01K 5/20)
- G01K 5/16 . . with electric contacts
- G01K 5/18 . . with electric conversion means for final indication
- G01K 5/20 . . with means for indicating a maximum or a minimum or both (G01K 5/22 takes precedence)
- G01K 5/22 . . with provision for expansion indicating over not more than a few degrees, e.g. clinical thermometer



- G01K 5/225 . . . {with means for indicating a maximum, e.g. a constriction in the capillary tube}
- G01K 5/24 . . with provision for measuring the difference between two temperatures
- G01K 5/26 . . with provision for adjusting zero point of scale, e.g. Beckmann thermometer
- G01K 5/28 . the material being a gas (contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the material [G01K 5/32](#))
- G01K 5/30 . . the gas displacing a liquid column
- G01K 5/32 . the material being a fluid contained in a hollow body having parts which are deformable or displaceable (under pressure developed by evaporation [G01K 11/04](#); pressure measuring devices in general [G01L](#))
- G01K 5/323 . . {Selection of fluid compositions}
- G01K 5/326 . . {using a fluid container connected to the deformable body by means of a capillary tube}
- G01K 5/34 . . the body being a capsule ([G01K 5/36](#), [G01K 5/42](#) take precedence)
- G01K 5/36 . . the body being a tubular spring, e.g. Bourdon tube
- G01K 5/38 . . . of spiral formation
- G01K 5/40 . . . of helical formation
- G01K 5/42 . . the body being a bellows
- G01K 5/44 . . the body being a cylinder and piston
- G01K 5/46 . . with electric conversion means for final indication
- G01K 5/465 . . . {using electrical contact making or breaking devices}
- G01K 5/48 . the material being a solid
- G01K 5/483 . . {using materials with a configuration memory e.g. Ni-Ti alloys}
- G01K 5/486 . . {using microstructures, e.g. made of silicon ([G01K 7/015](#), [G01K 7/028](#), [G01K 7/226](#), [G01K 17/006](#) take precedence)}
- G01K 5/50 . . arranged for free expansion or contraction
- G01K 5/52 . . . with electrical conversion means for final indication
- G01K 5/54 . . consisting of pivotally-connected elements
- G01K 5/56 . . constrained so that expansion or contraction causes a deformation of the solid
- G01K 5/58 . . . the solid body being constrained at more than one point, e.g. rod, plate, diaphragm ([G01K 5/62](#) takes precedence)
- G01K 5/60 . . . . the body being a flexible wire or ribbon
- G01K 5/62 . . . the solid body being formed of compounded strips or plates, e.g. bimetallic strip
- G01K 5/64 . . . . Details of the compounds system
- G01K 5/66 . . . . Selection of composition of the components of the system
- G01K 5/68 . . . . Shape of the system
- G01K 5/70 . . . . specially adapted for indicating or recording
- G01K 5/72 . . . . with electric transmission means for final indication



<b>G01K 7/00</b>	<b>Measuring temperature based on the use of electric or magnetic elements directly sensitive to heat</b> (giving results other than momentary value of temperature <a href="#">G01K 3/00</a> ; measuring electric or magnetic variables <a href="#">G01R</a> ); <b>{Power supply, e.g. by thermoelectric elements}</b>
<a href="#">G01K 7/003</a>	<ul style="list-style-type: none"> <li>• {using pyroelectric elements (radiation pyrometers <a href="#">G01J 5/00</a>)}</li> </ul>
<a href="#">G01K 7/006</a>	<ul style="list-style-type: none"> <li>• {using superconductive elements}</li> </ul>
<a href="#">G01K 7/01</a>	<ul style="list-style-type: none"> <li>• using semiconducting elements having PN junctions (<a href="#">G01K 7/02</a>, <a href="#">G01K 7/16</a>, <a href="#">G01K 7/30</a> take precedence)</li> </ul>
<a href="#">G01K 7/015</a>	<ul style="list-style-type: none"> <li>• • {using microstructures, e.g. made of silicon}</li> </ul>
<a href="#">G01K 7/02</a>	<ul style="list-style-type: none"> <li>• using thermoelectric elements, e.g. thermocouples ({cooling arrangements in electronic devices using the Peltier effect <a href="#">H01L 23/38</a>;} thermo-electric or thermo-magnetic devices per se <a href="#">H01L 35/00</a>, <a href="#">H01L 37/00</a>)</li> </ul>
<a href="#">G01K 7/021</a>	<ul style="list-style-type: none"> <li>• • {Particular circuit arrangements (<a href="#">G01K 7/026</a>, <a href="#">G01K 7/12</a>, <a href="#">G01K 7/14</a> take precedence)}</li> </ul>
<a href="#">G01K 7/023</a>	<ul style="list-style-type: none"> <li>• • {provided with specially adapted connectors (connectors per se <a href="#">H01R</a>)}</li> </ul>
<a href="#">G01K 7/025</a>	<ul style="list-style-type: none"> <li>• • {expendable thermocouples}</li> </ul>
<a href="#">G01K 7/026</a>	<ul style="list-style-type: none"> <li>• • {Arrangements for signalling rupture or disconnection of the thermocouple}</li> </ul>
<a href="#">G01K 7/028</a>	<ul style="list-style-type: none"> <li>• • {using microstructures, e.g. made of silicon}</li> </ul>
<a href="#">G01K 7/04</a>	<ul style="list-style-type: none"> <li>• • the object to be measured not forming one of the thermo-electric materials</li> </ul>
<a href="#">G01K 7/06</a>	<ul style="list-style-type: none"> <li>• • • the thermo-electric materials being arranged one within the other with the junction at one end exposed to the object, e.g. sheathed type</li> </ul>
<a href="#">G01K 7/08</a>	<ul style="list-style-type: none"> <li>• • the object to be measured forming one of the thermo-electric materials, e.g. pointed type</li> </ul>
<a href="#">G01K 7/10</a>	<ul style="list-style-type: none"> <li>• • Arrangements for compensating for auxiliary variables, e.g. length of lead</li> </ul>
<a href="#">G01K 7/12</a>	<ul style="list-style-type: none"> <li>• • • Arrangements with respect to the cold junction, e.g. preventing influence of temperature of surrounding air</li> </ul>
<a href="#">G01K 7/13</a>	<ul style="list-style-type: none"> <li>• • • • Circuits for cold-junction compensation</li> </ul>
<a href="#">G01K 7/14</a>	<ul style="list-style-type: none"> <li>• • Arrangements for modifying the output characteristic, e.g. linearising</li> </ul>
<a href="#">G01K 7/16</a>	<ul style="list-style-type: none"> <li>• using resistive elements (resistive elements per se <a href="#">H01C</a>, <a href="#">H01L</a>)</li> </ul>
<a href="#">G01K 2007/163</a>	<ul style="list-style-type: none"> <li>• • {provided with specially adapted connectors}</li> </ul>
<a href="#">G01K 2007/166</a>	<ul style="list-style-type: none"> <li>• • {Electrical time domain reflectometry}</li> </ul>
<a href="#">G01K 7/18</a>	<ul style="list-style-type: none"> <li>• • the element being a linear resistance, e.g. platinum resistance thermometer (<a href="#">G01K 7/26</a> takes precedence)</li> </ul>
<a href="#">G01K 7/183</a>	<ul style="list-style-type: none"> <li>• • • {characterised by the use of the resistive element}</li> </ul>
<a href="#">G01K 7/186</a>	<ul style="list-style-type: none"> <li>• • • {using microstructures}</li> </ul>
<a href="#">G01K 7/20</a>	<ul style="list-style-type: none"> <li>• • • in a specially-adapted circuit, e.g. bridge circuit</li> </ul>
<a href="#">G01K 7/203</a>	<ul style="list-style-type: none"> <li>• • • • {in an oscillator circuit}</li> </ul>
<a href="#">G01K 7/206</a>	<ul style="list-style-type: none"> <li>• • • • {in a potentiometer circuit}</li> </ul>
<a href="#">G01K 7/21</a>	<ul style="list-style-type: none"> <li>• • • • for modifying the output characteristic, e.g. linearising</li> </ul>
<a href="#">G01K 7/22</a>	<ul style="list-style-type: none"> <li>• • the element being a non-linear resistance, e.g. thermistor (<a href="#">G01K 7/26</a> takes precedence)</li> </ul>
<a href="#">G01K 7/223</a>	<ul style="list-style-type: none"> <li>• • • {characterised by the shape of the resistive element}</li> </ul>
<a href="#">G01K 7/226</a>	<ul style="list-style-type: none"> <li>• • • {using microstructures, e.g. silicon spreading resistance}</li> </ul>



- G01K 7/24 . . . in a specially-adapted circuit, e.g. bridge circuit
- G01K 7/245 . . . . {in an oscillator circuit}
- G01K 7/25 . . . . for modifying the output characteristic, e.g. linearising
- G01K 7/26 . . the element being an electrolyte
- G01K 7/28 . . . in a specially-adapted circuit, e.g. bridge circuit
- G01K 7/30 . using thermal noise of resistances or conductors
- G01K 7/32 . using change of resonant frequency of a crystal
- G01K 7/34 . using capacitive elements (capacitors per se [H01G](#))
- G01K 7/343 . . {the dielectric constant of which is temperature dependant}
- G01K 7/346 . . {for measuring temperature based on the time delay of a signal through a series of logical ports}
- G01K 7/36 . using magnetic elements, e.g. magnets, coils (magnetic elements per se [H01F](#))
- G01K 7/38 . . the variations of temperature influencing the magnetic permeability
- G01K 7/40 . using ionisation of gases
- G01K 7/42 . Circuits for reducing thermal inertia; Circuits for predicting the stationary value of temperature
- G01K 2007/422 . . {Dummy objects used for estimating temperature of real objects}
- G01K 7/425 . . {Thermal management of integrated systems}
- G01K 7/427 . . {Temperature calculation based on spatial modeling, e.g. spatial inter- or extrapolation}
  
- G01K 9/00** **Measuring temperature based on movements caused by redistribution of weight, e.g. tilting thermometer** (not giving momentary value of temperature [G01K 3/00](#))
  
- G01K 11/00** **Measuring temperature based upon physical or chemical changes not covered by groups [G01K 3/00](#), [G01K 5/00](#), [G01K 7/00](#) or [G01K 9/00](#)**
- G01K 11/003 . {using absorption or generation of gas, e.g. hydrogen}
- G01K 11/006 . {using measurement of the effect of a material on microwaves or longer electromagnetic waves, e.g. measuring temperature via microwaves emitted by the object ([G01K 17/003](#), [G01J 5/00](#) take precedence; measuring the effect of a material on X-, gamma- or particle radiation [G01K 11/30](#))}
- G01K 11/02 . using evaporation or sublimation, e.g. by observing boiling
- G01K 11/04 . . from material contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the vapour
- G01K 11/06 . using melting, freezing, or softening
- G01K 11/08 . . of disposable test bodies, e.g. cone
- G01K 11/10 . using sintering
- G01K 11/12 . using change of colour or translucency ([G01K 11/32](#) takes precedence; heat-sensitive sheets for use in thermography [B41M 5/00](#); {tenebrescent compositions [C09K 9/00](#)})
- G01K 11/125 . . {using change in reflectance}
- G01K 11/14 . . of inorganic materials
- G01K 11/16 . . of organic materials



- G01K 11/165 . . . {liquid crystals (liquid crystal compositions [C09K 19/00](#); electro-optic liquid crystals [G02F 1/13](#))}
- G01K 11/18 . . of materials which change translucency
- G01K 11/20 . using thermoluminescent materials ([G01K 11/32](#) takes precedence)
- G01K 11/22 . using measurement of acoustic effects
- G01K 11/24 . . of the velocity of propagation of sound
- G01K 11/26 . . of resonant frequencies
- G01K 11/265 . . . {using surface acoustic wave [SAW]}
- G01K 11/28 . using measurements of density {(measuring density in general [G01N 9/00](#))}
- G01K 11/30 . using measurement of the effect of a material on X-radiation, gamma radiation or particle radiation
- G01K 11/32 . using changes in transmission, scattering or fluorescence in optical fibres {(in general [G01D 5/268](#))}
- G01K 11/3206 . . {at discrete locations in the fibre, e.g. by means of Bragg gratings}
- G01K 11/3213 . . . {using changes in fluorescence, e.g. at the distal end of the fibre}
- G01K 2011/322 . . {using Brillouin scattering}
- G01K 2011/324 . . {using Raman scattering}

**G01K 13/00****Adaptations of thermometers for specific purposes**

- G01K 13/002 . {for measuring body temperature ([G01K 5/22](#) takes precedence; for prediction aspects [G01K 7/42](#); diagnostic temperature sensing [A61M 39/0247](#))}
- G01K 13/004 . . {Infrared clinical thermometers, e.g. tympanic}
- G01K 13/006 . {for cryogenic purposes}
- G01K 13/008 . . {using microstructures, e.g. made of silicon}
- G01K 13/02 . for measuring temperature of moving fluids or granular materials capable of flow
- G01K 13/022 . . {Suction thermometers}
- G01K 2013/024 . . {Moving gas}
- G01K 2013/026 . . {Moving liquid}
- G01K 13/028 . . {for use in total air temperature [TAT] probes}
- G01K 13/04 . for measuring temperature of moving solid bodies
- G01K 13/06 . . in linear movement
- G01K 13/08 . . in rotary movement
- G01K 13/10 . for measuring temperature within piled or stacked materials (by special arrangements for conducting heat from the object to the sensitive heat element [G01K 1/16](#))
- G01K 13/12 . combined with sampling devices for measuring temperatures of samples of materials
- G01K 13/125 . . {for siderurgical purposes}

**G01K 15/00****Testing or calibrating of thermometers**

- G01K 15/002 . {Calibrated temperature sources, temperature standards therefor (arrangements with respect to the cold junction of thermo-electric elements [G01K 7/12](#))}



G01K 15/005	<ul style="list-style-type: none"> <li>• {Calibration}</li> </ul>
G01K 15/007	<ul style="list-style-type: none"> <li>• {Testing}</li> </ul>
<b>G01K 17/00</b>	<b>Measuring quantity of heat</b> (measuring temperature by calorimetry <a href="#">G01K 3/00 - G01K 11/00</a> ; specially adapted for measuring thermal properties of materials, e.g. specific heat, heat of combustion <a href="#">G01N</a> )
G01K 17/003	<ul style="list-style-type: none"> <li>• {for measuring the power of light beams, e.g. laser beams}</li> </ul>
G01K 17/006	<ul style="list-style-type: none"> <li>• {Microcalorimeters, e.g. using silicon microstructures}</li> </ul>
G01K 17/02	<ul style="list-style-type: none"> <li>• Calorimeters using transport of an indicating substances, e.g. evaporation calorimeters</li> </ul>
G01K 17/025	<ul style="list-style-type: none"> <li>• . {where evaporation, sublimation or condensation caused by heating or cooling, is measured}</li> </ul>
G01K 17/04	<ul style="list-style-type: none"> <li>• Calorimeters using compensation methods {i.e. where the absorbed or released quantity of heat to be measured is compensated by a measured quantity of heating or cooling}</li> </ul>
G01K 17/06	<ul style="list-style-type: none"> <li>• Measuring quantity of heat conveyed by flowing mediums, e.g. in heating systems (<a href="#">G01K 17/02</a>, <a href="#">G01K 17/04</a> take precedence) {e.g. the quantity of heat in a transporting medium, delivered to or consumed in an expenditure device}</li> </ul>
G01K 17/08	<ul style="list-style-type: none"> <li>• . based upon measurement of temperature difference {or of a temperature}</li> </ul>
G01K 17/10	<ul style="list-style-type: none"> <li>• . . between an inlet and an outlet point, combined with measurement of rate of flow of the medium {if such, by integration during a certain time-interval}</li> </ul>
G01K 17/12	<ul style="list-style-type: none"> <li>• . . . Indicating product of flow and temperature difference directly {or temperature}</li> </ul>
G01K 17/14	<ul style="list-style-type: none"> <li>• . . . . using mechanical means for both measurements</li> </ul>
G01K 17/16	<ul style="list-style-type: none"> <li>• . . . . using electrical {or magnetic} means for both measurements</li> </ul>
G01K 17/18	<ul style="list-style-type: none"> <li>• . . . . using electrical {or magnetic} means for one measurement and mechanical means for the other</li> </ul>
G01K 17/185	<ul style="list-style-type: none"> <li>• . . . . . {where the indicating-instrument is driven electrically or magnetically by the temperature-measurement device and mechanically by the flow-measurement device}</li> </ul>
G01K 17/20	<ul style="list-style-type: none"> <li>• . . . across a radiating surface, combined with ascertainment of the heat transmission coefficient {(materials therefor <a href="#">G01K 17/08</a>)}</li> </ul>
<b>G01K 19/00</b>	<b>Testing or calibrating calorimeters</b>
<b>G01K 2201/00</b>	<b>Application of thermometers in air-conditioning systems</b>
G01K 2201/02	<ul style="list-style-type: none"> <li>• in vehicles</li> </ul>
<b>G01K 2203/00</b>	<b>Application of thermometers in cryogenics</b>
<b>G01K 2205/00</b>	<b>Application of thermometers in motors, e.g. of a vehicle</b>
G01K 2205/02	<ul style="list-style-type: none"> <li>• for measuring inlet gas temperature</li> </ul>
G01K 2205/04	<ul style="list-style-type: none"> <li>• for measuring exhaust gas temperature</li> </ul>
<b>G01K 2207/00</b>	<b>Application of thermometers in household appliances</b>
G01K 2207/02	<ul style="list-style-type: none"> <li>• for measuring food temperature</li> </ul>



G01K 2207/04	• • for conservation purposes
G01K 2207/06	• • for preparation purposes
G01K 2207/08	• • with food recipients having temperature sensing capability
<b>G01K 2211/00</b>	<b>Thermometers based on nanotechnology</b>
<b>G01K 2213/00</b>	<b>Temperature mapping</b>
<b>G01K 2215/00</b>	<b>Details concerning sensor power supply</b>
<b>G01K 2217/00</b>	<b>Temperature measurement using electric or magnetic components already present in the system to be measured</b>
<b>G01K 2219/00</b>	<b>Thermometers with dedicated analog to digital converters</b>