

**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](#) )

**NOTE**

In this subclass, the following term is used with the meaning indicated :

- "thermometer" includes thermally-sensitive elements not provided for in other subclasses.

Attention is drawn to the Notes following the title of class [G01](#).

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
- 
- G01K 7/00**                 **Measuring temperature based on the use of electric or magnetic elements directly sensitive to heat ( giving results other than momentary value of temperature [G01K 3/00](#);**

measuring electric or magnetic variables [G01R](#) ); { Power supply, e.g. by thermoelectric elements }

- G01K 7/003 . { using pyroelectric elements ( radiation pyrometers [G01J 5/00](#) ) }
- G01K 7/006 . { using superconductive elements }
- G01K 7/01 . using semiconducting elements having PN junctions ( [G01K 7/02](#), [G01K 7/16](#), [G01K 7/30](#) take precedence )
- G01K 7/015 . . { using microstructures, e.g. made of silicon }
- G01K 7/02 . using thermoelectric elements, e.g. thermocouples ( { cooling arrangements in electronic devices using the Peltier effect [H01L 23/38](#); } thermo-electric or thermo-magnetic devices per se [H01L 35/00](#), [H01L 37/00](#) )
- G01K 7/021 . . { Particular circuit arrangements ( [G01K 7/026](#), [G01K 7/12](#), [G01K 7/14](#) take precedence ) }
- G01K 7/023 . . { provided with specially adapted connectors ( connectors per se [H01R](#) ) }
- G01K 7/025 . . { expendable thermocouples }
- G01K 7/026 . . { Arrangements for signalling rupture or disconnection of the thermocouple }
- G01K 7/028 . . { using microstructures, e.g. made of silicon }
- G01K 7/04 . . the object to be measured not forming one of the thermo-electric materials
- G01K 7/06 . . . the thermo-electric materials being arranged one within the other with the junction at one end exposed to the object, e.g. sheathed type
- G01K 7/08 . . the object to be measured forming one of the thermo-electric materials, e.g. pointed type
- G01K 7/10 . . Arrangements for compensating for auxiliary variables, e.g. length of lead
- G01K 7/12 . . . Arrangements with respect to the cold junction, e.g. preventing influence of temperature of surrounding air
- G01K 7/13 . . . . Circuits for cold-junction compensation
- G01K 7/14 . . Arrangements for modifying the output characteristic, e.g. linearising
- G01K 7/16 . using resistive elements ( resistive elements per se [H01C](#), [H01L](#) )
- G01K 2007/163 . . provided with specially adapted connectors
- G01K 2007/166 . . Electrical time domain reflectometry
- G01K 7/18 . . the element being a linear resistance, e.g. platinum resistance thermometer ( [G01K 7/26](#) takes precedence )
- G01K 7/183 . . . { characterised by the use of the resistive element }
- G01K 7/186 . . . { using microstructures }
- G01K 7/20 . . in a specially-adapted circuit, e.g. bridge circuit
- G01K 7/203 . . . { in an oscillator circuit }
- G01K 7/206 . . . { in a potentiometer circuit }
- G01K 7/21 . . . for modifying the output characteristic, e.g. linearising
- G01K 7/22 . . the element being a non-linear resistance, e.g. thermistor ( [G01K 7/26](#) takes precedence )
- G01K 7/223 . . . { characterised by the shape of the resistive element }
- G01K 7/226 . . . { using microstructures, e.g. silicon spreading resistance }

- 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

- |                                   |   |
|-----------------------------------|---|
|                                   | <ul style="list-style-type: none"> <li>.. sheets for use in thermography <a href="#">B41M 5/00</a>; { tenebrescent compositions <a href="#">C09K 9/00</a> }</li> </ul>  |
| <a href="#">G01K 11/125</a>       | <ul style="list-style-type: none"> <li>.. { using change in reflectance }</li> </ul>  |
| <a href="#">G01K 11/14</a>        | <ul style="list-style-type: none"> <li>.. of inorganic materials</li> </ul>   |
| <a href="#">G01K 11/16</a>        | <ul style="list-style-type: none"> <li>.. of organic materials</li> </ul>   |
| <a href="#">G01K 11/165</a>       | <ul style="list-style-type: none"> <li>... { liquid crystals ( liquid crystal compositions <a href="#">C09K 19/00</a>; electro-optic liquid crystals <a href="#">G02F 1/13</a> ) }</li> </ul>   |
| <a href="#">G01K 11/18</a>        | <ul style="list-style-type: none"> <li>.. of materials which change translucency</li> </ul>   |
| <a href="#">G01K 11/20</a>        | <ul style="list-style-type: none"> <li>.. using thermoluminescent materials ( <a href="#">G01K 11/32</a> takes precedence )</li> </ul>  |
| <a href="#">G01K 11/22</a>        | <ul style="list-style-type: none"> <li>.. using measurement of acoustic effects</li> </ul>  |
| <a href="#">G01K 11/24</a>        | <ul style="list-style-type: none"> <li>.. of the velocity of propagation of sound</li> </ul>  |
| <a href="#">G01K 11/26</a>        | <ul style="list-style-type: none"> <li>.. of resonant frequencies</li> </ul>  |
| <a href="#">G01K 11/265</a>       | <ul style="list-style-type: none"> <li>... { using surface acoustic wave (SAW) }</li> </ul>   |
| <a href="#">G01K 11/28</a>        | <ul style="list-style-type: none"> <li>.. using measurements of density ( measuring density in general <a href="#">G01N 9/00</a> )</li> </ul>   |
| <a href="#">G01K 11/30</a>        | <ul style="list-style-type: none"> <li>.. using measurement of the effect of a material on X-radiation, gamma radiation or particle radiation</li> </ul>  |
| <a href="#">G01K 11/32</a>        | <ul style="list-style-type: none"> <li>.. using changes in transmission, scattering or fluorescence in optical fibres {( in general <a href="#">G01D 5/268</a> ) }</li> </ul>   |
| <a href="#">G01K 11/3206</a>      | <ul style="list-style-type: none"> <li>.. { at discrete locations in the fibre, e.g. by means of Bragg gratings }</li> </ul>  |
| <a href="#">G01K 11/3213</a>      | <ul style="list-style-type: none"> <li>... { using changes in fluorescence, e.g. at the distal end of the fibre }</li> </ul>  |
| <a href="#">G01K 2011/322</a>     | <ul style="list-style-type: none"> <li>.. using Brillouin scattering</li> </ul>   |
| <a href="#">G01K 2011/324</a>     | <ul style="list-style-type: none"> <li>.. using Raman scattering</li> </ul>   |
| <b><a href="#">G01K 13/00</a></b> | <b>Adaptations of thermometers for specific purposes</b>  |
| <a href="#">G01K 13/002</a>       | <ul style="list-style-type: none"> <li>.. { for measuring body temperature ( <a href="#">G01K 5/22</a> takes precedence; for prediction aspects <a href="#">G01K 7/42</a>; diagnostic temperature sensing <a href="#">A61M 39/0247</a> ) }</li> </ul> |
| <a href="#">G01K 13/004</a>       | <ul style="list-style-type: none"> <li>.. { Infrared clinical thermometers, e.g. tympanic }</li> </ul>  |
| <a href="#">G01K 13/006</a>       | <ul style="list-style-type: none"> <li>.. { for cryogenic purposes }</li> </ul>   |
| <a href="#">G01K 13/008</a>       | <ul style="list-style-type: none"> <li>.. { using microstructures, e.g. made of silicon }</li> </ul>  |
| <a href="#">G01K 13/02</a>        | <ul style="list-style-type: none"> <li>.. for measuring temperature of moving fluids or granular materials capable of flow</li> </ul>   |
| <a href="#">G01K 13/022</a>       | <ul style="list-style-type: none"> <li>.. { Suction thermometers }</li> </ul>   |
| <a href="#">G01K 2013/024</a>     | <ul style="list-style-type: none"> <li>.. Moving gas</li> </ul>   |
| <a href="#">G01K 2013/026</a>     | <ul style="list-style-type: none"> <li>.. Moving liquid</li> </ul>  |
| <a href="#">G01K 13/028</a>       | <ul style="list-style-type: none"> <li>.. { for use in total air temperature [TAT] probes }</li> </ul>  |
| <a href="#">G01K 13/04</a>        | <ul style="list-style-type: none"> <li>.. for measuring temperature of moving solid bodies</li> </ul>   |
| <a href="#">G01K 13/06</a>        | <ul style="list-style-type: none"> <li>.. in linear movement</li> </ul>   |
| <a href="#">G01K 13/08</a>        | <ul style="list-style-type: none"> <li>.. in rotary movement</li> </ul>   |
| <a href="#">G01K 13/10</a>        | <ul style="list-style-type: none"> <li>.. for measuring temperature within piled or stacked materials ( by special arrangements</li> </ul>  |

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 . { Calibration }
- G01K 15/007 . { Testing }

## **G01K 17/00 Measuring quantity of heat ( measuring temperature by calorimetry [G01K 3/00](#) to [G01K 11/00](#); specially adapted for measuring thermal properties of materials, e.g. specific heat, heat of combustion [G01N](#) )**

- G01K 17/003 . { for measuring the power of light beams, e.g. laser beams }
- G01K 17/006 . { Microcalorimeters, e.g. using silicon microstructures }
- G01K 17/02 . Calorimeters using transport of an indicating substances, e.g. evaporation calorimeters
- G01K 17/025 . . { where evaporation, sublimation or condensation caused by heating or cooling, is measured }
- G01K 17/04 . 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 }
- G01K 17/06 . Measuring quantity of heat conveyed by flowing mediums, e.g. in heating systems ( [G01K 17/02](#), [G01K 17/04](#) take precedence ) { e.g. the quantity of heat in a transporting medium, delivered to or consumed in an expenditure device }
- G01K 17/08 . . based upon measurement of temperature difference { or of a temperature }
- G01K 17/10 . . . 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 }
- G01K 17/12 . . . . Indicating product of flow and temperature difference directly { or temperature }
- G01K 17/14 . . . . . using mechanical means for both measurements
- G01K 17/16 . . . . . using electrical { or magnetic } means for both measurements
- G01K 17/18 . . . . . using electrical { or magnetic } means for one measurement and mechanical means for the other
- G01K 17/185 . . . . . { where the indicating-instrument is driven electrically or magnetically by the temperature-measurement device and mechanically by the flow-measurement device }
- G01K 17/20 . . . across a radiating surface, combined with ascertainment of the heat transmission coefficient { ( materials therefor [G01K 17/08](#) ) }

## **G01K 19/00 Testing or calibrating calorimeters**

**G01K 2201/00**      **Application of thermometers in air-conditioning systems**

G01K 2201/02      .    in vehicles

**G01K 2203/00**      **Application of thermometers in cryogenics****G01K 2205/00**      **Application of thermometers in motors, e.g. of a vehicle**

G01K 2205/02      .    for measuring inlet gas temperature

G01K 2205/04      .    for measuring exhaust gas temperature

**G01K 2207/00**      **Application of thermometers in household appliances**

G01K 2207/02      .    for measuring food temperature

G01K 2207/04      . .    for conservation purposes

G01K 2207/06      . .    for preparation purposes

G01K 2207/08      . .    with food recipients having temperature sensing capability

**G01K 2211/00**      **Thermometers based on nanotechnology****G01K 2213/00**      **Temperature mapping****G01K 2215/00**      **Details concerning sensor power supply****G01K 2217/00**      **Temperature measurement using electric or magnetic components already present in the system to be measured****G01K 2219/00**      **Thermometers with dedicated analog to digital converters**