

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".

Guidance heading:**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 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 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 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 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 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 . { 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**

Guidance heading:

- G01K 2003/00** **Thermometers giving results other than momentary value of temperature** ([G01K 7/42](#) takes precedence)

- G01K 2003/08 . giving differences of values (using thermoelectric elements [G01K 7/02](#)) ; giving differentiated values
- G01K 2003/14 . . in respect of space
- [G01K 2003/145](#) . . . Hotspot localization

- G01K 2007/00 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 2007/16 . 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 2007/42 . 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 2011/00 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 2011/32 . using changes in transmission, scattering or fluorescence in optical fibres { (in general [G01D 5/268](#)) }
- [G01K 2011/322](#) . . using Brillouin scattering
- [G01K 2011/324](#) . . using Raman scattering

- G01K 2013/00 Adaptations of thermometers for specific purposes**

- G01K 2013/02 . for measuring temperature of moving fluids or granular materials capable of flow
- [G01K 2013/024](#) . . Moving gas
- [G01K 2013/026](#) . . Moving liquid

- Guidance heading:**

- [G01K 2201/00](#) Application of thermometers in air-conditioning systems**

- [G01K 2201/02](#) . in vehicles

- Guidance heading:**

- [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