SECTION G — PHYSICS

G01 MEASURING; TESTING

Note(s)

1. This class covers, in addition to "true" measuring instruments, other indicating or recording devices of analogous construction, and also signalling or control devices insofar as they are concerned with measurement (as defined in Note 2 below) and are not specially adapted to the particular purpose of signalling or control.
2. In this class, the following term is used with the meaning indicated:
   - "measuring" is used to cover considerably more than its primary or basic meaning. In this primary sense, it means finding a numerical expression of the value of a variable in relation to a unit or datum or to another variable of the same nature, e.g. expressing a length in terms of another length as in measuring a length with a scale; the value may be obtained directly (as just suggested) or by measuring some other variable of which the value can be related to the value of the required variable, as in measuring a change in temperature by measuring a resultant change in the length of a column of mercury. However, since the same device or instrument may, instead of giving an immediate indication, be used to produce a record or to initiate a signal to produce an indication or control effect, or may be used in combination with other devices or instruments to give a conjoint result from measurement of two or more variables of the same or different kinds, it is necessary to interpret "measuring" as including also any operation that would make it possible to obtain such a numerical expression by the additional use of some way of converting a value into figures. Thus the expression in figures may be actually made by a digital presentation or by reading a scale, or an indication of it may be given without the use of figures, e.g. by some perceptible feature (variable) of the entity (e.g. object, substance, beam of light) of which the variable being measured is a property or condition or by an analogue of such a feature (e.g. the corresponding position of a member without any scale, a corresponding voltage generated in some way). In many cases there is no such value indication but only an indication of difference or equality in relation to a standard or datum (of which the value may or may not be known in figures); the standard or datum may be the value of another variable of the same nature but of a different entity (e.g. a standard measure) or of the same entity at a different time.
     In its simplest form, measurement may give merely an indication of presence or absence of a certain condition or quality, e.g. movement (in any direction or in a particular direction), or whether a variable exceeds a predetermined value.
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" and the Notes following the title of subclass B82B relating to "nano-structures".
4. Attention is drawn to the Notes following the title of section G, especially as regards the definition of the term "variable".
5. In many measuring arrangements, a first variable to be measured is transformed into a second, or further, variables. The second, or further, variables may be (a) a condition related to the first variable and produced in a member, or (b) a displacement of a member. Further transformation may be needed.
   When classifying such an arrangement, (i) the transformation step, or each transformation step, that is of interest is classified, or (ii) if interest lies only in the system as a whole, the first variable is classified in the appropriate place.
   This is particularly important where two or more conversions take place, for instance where a first variable, for example pressure, is transformed into a second variable, for example an optical property of a sensing body, and that second variable is expressed by means of a third variable, for example an electric effect. In such a case, the following classification places should be considered: the place for the transformation of the first variable, that for sensing the condition caused by that variable, subclass G01D for expression of the measurement, and finally the place for the overall system, if any.
6. The measurement of change in the value of a physical property is classified in the same subclass as the measurement of that physical property, e.g. measurement of expansion of length is classified in subclass G01B.

G01B MEASURING LENGTH, THICKNESS OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS

Note(s)

1. This subclass covers measuring of position or displacement in terms of linear or angular dimensions.
2. In this subclass, the groups are distinguished by the means of measurement which is of major importance. Thus the mere application of other means for giving a final indication does not affect the classification.
3. Attention is drawn to the Notes following the title of class G01.
4. Machines operated on similar principles to the hand-held devices specified in this subclass are classified with these devices.
5. Measuring arrangements or details thereof covered by two or more of groups G01B 3/00-G01B 17/00 are classified in group G01B 21/00 if no single other group can be selected as being predominantly applicable.

Subclass index

1/00 Measuring instruments characterised by the selection of material therefor

3/00 Instruments as specified in the subgroups and characterised by the use of mechanical measuring means (arrangements for measuring particular parameters G01B 5/00; devices of general interest specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H 75/34) **[2]**

- 3/02 • Rulers or tapes with scales or marks for direct reading
- 3/04 • • rigid
- 3/06 • • • folding
- 3/08 • • • extensible
- 3/10 • • flexible
- 3/11 • Chains for measuring length
- 3/12 • Measuring wheels
- 3/14 • Templates for checking contours
- 3/16 • Compasses, i.e. with a pair of pivoted arms
- 3/18 • Micrometers
- 3/20 • Slide gauges
- 3/22 • Feeler-pin gauges, e.g. dial gauges (for measuring contours or curvatures G01B 5/20)
- 3/24 • • with open yoke, i.e. calipers
- 3/26 • • Plug gauges
- 3/28 • • Depth gauges
- 3/30 • Bars, blocks, or strips in which the distance between a pair of faces is fixed, although it may be preadjustable, e.g. end measure, feeler strip
- 3/32 • • Holders therefor
- 3/34 • Ring or other apertured gauges, e.g. "go/no-go" gauge
- 3/36 • • for external screw threads
- 3/38 • Gauges with an open yoke and opposed faces, i.e. calipers, in which the internal distance between the faces is fixed, although it may be preadjustable
- 3/40 • • for external screw threads
- 3/42 • • of limit-gauge type, i.e. "go/no-go" (G01B 3/40 takes precedence)
- 3/44 • • • preadjustable for wear or tolerance
- 3/46 • Plug gauges for internal dimensions with engaging surfaces which are at a fixed distance, although they may be preadjustable
- 3/48 • • for internal screw threads
- 3/50 • • of limit-gauge type, i.e. "go/no-go" (G01B 3/48 takes precedence)
- 3/52 • • • preadjustable for wear or tolerance
- 3/56 • Gauges for measuring angles or tapers, e.g. conical calipers

5/00 Measuring arrangements characterised by the use of mechanical means (instruments of the types covered by group G01B 3/00 per se G01B 3/00) **[2]**

- 5/004 • for measuring coordinates of points **[6]**
- 5/008 • • using coordinate measuring machines **[6]**
- 5/012 • • • Contact-making feeler heads therefor **[6]**
- 5/016 • • • • Constructional details of contacts **[6]**
- 5/02 • for measuring length, width, or thickness (G01B 5/004, G01B 5/08 take precedence) **[6]**
- 5/04 • • specially adapted for measuring length or width of objects while moving
- 5/06 • • for measuring thickness
- 5/08 • for measuring diameters
- 5/10 • • of objects while moving
- 5/12 • • internal diameters
- 5/14 • for measuring distance or clearance between spaced objects or spaced apertures (G01B 5/24 takes precedence)
- 5/16 • • between a succession of regularly spaced objects or regularly spaced apertures
- 5/18 • for measuring depth
- 5/20 • for measuring contours or curvatures
- 5/207 • • using a plurality of fixed, simultaneously operating transducers (G01B 5/213-G01B 5/22 take precedence) **[6]**
- 5/213 • • for measuring radius of curvature **[6]**
- 5/22 • • Spherometers
- 5/24 • for measuring angles or tapers; for testing the alignment of axes
- 5/245 • • for testing perpendicularity **[6]**
- 5/25 • • for testing the alignment of axes
- 5/252 • • • for measuring eccentricity, i.e. lateral shift between two parallel axes **[6]**
- 5/255 • • for testing wheel alignment
- 5/26 • for measuring areas, e.g. planimeter (integrators in general G06G)
- 5/28 • for measuring roughness or irregularity of surfaces
- 5/30 • for measuring the deformation in a solid, e.g. mechanical strain gauge

7/00 Measuring arrangements characterised by the use of electric or magnetic means

- 7/004 • for measuring coordinates of points **[6]**
- 7/008 • • using coordinate measuring machines **[6]**
- 7/012 • • • Contact-making feeler heads therefor **[6]**
- 7/016 • • • • Constructional details of contacts **[6]**
- 7/02 • for measuring length, width, or thickness (G01B 7/004, G01B 7/12 takes precedence) **[6]**
- 7/04 • • specially adapted for measuring length or width of objects while moving
- 7/06 • • for measuring thickness
- 7/12 • for measuring diameters
- 7/13 • • Internal diameters **[6]**
- 7/14 • for measuring distance or clearance between spaced objects or spaced apertures (G01B 7/30 takes precedence)
- 7/15 • • being regularly spaced **[6]**
- 7/16 • for measuring the deformation in a solid, e.g. by resistance strain gauge
- 7/24 • • using change in magnetic properties
- 7/26 • for measuring depth
- 7/28 • for measuring contours or curvatures
- 7/287 • • using a plurality of fixed, simultaneously operating transducers (G01B 7/293 takes precedence) **[6]**

7/293 • • for measuring radius of curvature **[6]**
7/30 • for measuring angles or tapers; for testing the alignment of axes
7/305 • • for testing perpendicularity **[6]**
7/31 • • for testing the alignment of axes
7/312 • • • for measuring eccentricity, i.e. lateral shift between two parallel axes **[6]**
7/315 • • for testing wheel alignment
7/32 • for measuring areas (integrators in general G06G)
7/34 • for measuring roughness or irregularity of surfaces

9/00 Instruments as specified in the subgroups and characterised by the use of optical measuring means (arrangements for measuring particular parameters G01B 11/00) **[2]**
9/02 • Interferometers
9/021 • • using holographic techniques **[2]**
9/023 • • • for contour producing (G01B 9/025-G01B 9/029 take precedence) **[2]**
9/025 • • • Double-exposure technique **[2]**
9/027 • • • in real time **[2]**
9/029 • • • by time averaging **[2]**
9/04 • Measuring microscopes
9/06 • Measuring telescopes
9/08 • Optical projection comparators
9/10 • Goniometers for measuring angles between surfaces

11/00 Measuring arrangements characterised by the use of optical means (instruments of the types covered by group G01B 9/00 per se G01B 9/00) **[2]**
11/02 • for measuring length, width, or thickness (G01B 11/08 takes precedence)
11/03 • • by measuring coordinates of points **[3]**
11/04 • • specially adapted for measuring length or width of objects while moving
11/06 • • for measuring thickness
11/08 • for measuring diameters
11/10 • • of objects while moving
11/12 • • internal diameters
11/14 • for measuring distance or clearance between spaced objects or spaced apertures (G01B 11/26 takes precedence; rangefinders G01C 3/00)
11/16 • for measuring the deformation in a solid, e.g. optical strain gauge
11/22 • for measuring depth
11/24 • for measuring contours or curvatures
11/245 • • using a plurality of fixed, simultaneously operating transducers (G01B 11/255 takes precedence) **[7]**
11/25 • • by projecting a pattern, e.g. moiré fringes, on the object (G01B 11/255 takes precedence) **[7]**
11/255 • • for measuring radius of curvature **[7]**
11/26 • for measuring angles or tapers; for testing the alignment of axes
11/27 • • for testing the alignment of axes
11/275 • • for testing wheel alignment
11/28 • for measuring areas (integrators in general G06G)
11/30 • for measuring roughness or irregularity of surfaces

13/00 Measuring arrangements characterised by the use of fluids
13/02 • for measuring length, width, or thickness (G01B 13/08 takes precedence)
13/03 • • by measuring coordinates of points **[3]**
13/04 • • specially adapted for measuring length or width of objects while moving
13/06 • • for measuring thickness
13/08 • for measuring diameters
13/10 • • internal diameters
13/12 • for measuring distance or clearance between spaced objects or spaced apertures (G01B 13/18 takes precedence)
13/14 • for measuring depth
13/16 • for measuring contours or curvatures
13/18 • for measuring angles or tapers; for testing the alignment of axes
13/19 • • for testing the alignment of axes
13/195 • • for testing wheel alignment
13/20 • for measuring areas, e.g. pneumatic planimeter (integrators in general G06G)
13/22 • for measuring roughness or irregularity of surfaces
13/24 • for measuring the deformation in a solid **[3]**

15/00 Measuring arrangements characterised by the use of wave or particle radiation (G01B 9/00, G01B 11/00 take precedence) **[4]**
15/02 • for measuring thickness
15/04 • for measuring contours or curvatures
15/06 • for measuring the deformation in a solid
15/08 • for measuring roughness or irregularity of surfaces **[6]**

17/00 Measuring arrangements characterised by the use of infrasonic, sonic, or ultrasonic vibrations [4]
17/02 • for measuring thickness
17/04 • for measuring the deformation in a solid, e.g. by vibrating string
17/06 • for measuring contours or curvatures **[6]**
17/08 • for measuring roughness or irregularity of surfaces **[6]**

21/00 Measuring arrangements or details thereof in so far as they are not adapted to particular types of measuring means of the other groups of this subclass [3]
21/02 • for measuring length, width, or thickness (G01B 21/10 takes precedence) **[3]**
21/04 • • by measuring coordinates of points **[3]**
21/06 • • specially adapted for measuring length or width of objects while moving **[3]**
21/08 • • for measuring thickness **[3]**
21/10 • for measuring diameters **[3]**
21/12 • • of objects while moving **[3]**
21/14 • • internal diameters **[3]**
21/16 • for measuring distance or clearance between spaced objects **[3]**
21/18 • for measuring depth **[3]**
21/20 • for measuring contours or curvatures, e.g. determining profile **[3]**
21/22 • for measuring angles or tapers; for testing the alignment of axes **[3]**
21/24 • • for testing the alignment of axes **[3]**
21/26 • • for testing wheel alignment **[3]**
21/28 • for measuring areas (integrators in general G06G) **[3]**
21/30 • for measuring roughness or irregularity of surfaces **[3]**
21/32 • for measuring the deformation in a solid **[3]**

G01C MEASURING DISTANCES, LEVELS OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY OR VIDEOGRAMMETRY (measuring liquid level G01F; radio navigation, determining distance or velocity by use of propagation effects, e.g. Doppler effect, propagation time, of radio waves, analogous arrangements using other waves G01S)

Note(s)

1. In this subclass, the following term is used with the meaning indicated:
   - "navigation" means determining the position and course of land vehicles, ships, aircraft, and space vehicles.
2. Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Measuring angles

1/02 • Theodolites
1/04 • • combined with cameras
1/06 • • Arrangements for reading scales
1/08 • Sextants
1/10 • • including an artificial horizon (G01C 1/14 takes precedence)
1/12 • • • with a stabilised mirror
1/14 • • Periscopic sextants

3/00 Measuring distances in line of sight; Optical rangefinders (tapes, chains, or wheels for measuring length G01B 3/00; active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves, G01S 17/48) **[1, 2006.01]**

3/02 • Details
3/04 • • Adaptation of rangefinders for combination with telescopes or binoculars
3/06 • • Use of electric means to obtain final indication
3/08 • • • Use of electric radiation detectors
3/10 • using a parallactic triangle with variable angles and a base of fixed length in the observation station, e.g. in the instrument **[1, 2006.01]**
3/12 • • with monocular observation at a single point, e.g. coincidence type (G01C 3/20 takes precedence)
3/14 • • with binocular observation at a single point, e.g. stereoscopic type (G01C 3/20 takes precedence)
3/16 • • • Measuring marks
3/18 • • with one observation point at each end of the base (G01C 3/20 takes precedence)
3/20 • • with adaptation to the measurement of the height of an object
3/22 • using a parallactic triangle with variable angles and a base of fixed length at, near, or formed by, the object **[1, 2006.01]**
3/24 • using a parallactic triangle with fixed angles and a base of variable length in the observation station, e.g. in the instrument **[1, 2006.01]**
3/26 • using a parallactic triangle with fixed angles and a base of variable length at, near, or formed by, the object **[1, 2006.01]**
3/28 • • with provision for reduction of the distance into the horizontal plane
3/30 • • • with adaptation to the measurement of the height of an object, e.g. tacheometers
3/32 • by focusing the object, e.g. on a ground glass screen

5/00 Measuring height; Measuring distances transverse to line of sight; Levelling between separated points; Surveyors' levels (G01C 3/20, G01C 3/30 take precedence)

5/02 • involving automatic stabilisation of the line of sight
5/04 • Hydrostatic levelling, i.e. by flexibly interconnected liquid containers at separated points
5/06 • by using barometric means

7/00 Tracing profiles (by photogrammetry or videogrammetry G01C 11/00)

7/02 • of land surfaces
7/04 • • involving a vehicle which moves along the profile to be traced
7/06 • of cavities, e.g. tunnels

9/00 Measuring inclination, e.g. by clinometers, by levels

9/02 • Details
9/04 • • Transmission means between sensing element and final indicator for giving an enlarged reading
9/06 • • Electric or photoelectric indication or reading means
9/08 • • Means for compensating acceleration forces due to movement of instrument
9/10 • by using rolling bodies
9/12 • by using a single pendulum (plumb lines G01C 15/10)
9/14 • • movable in more than one direction
9/16 • by using more than one pendulum
9/18 • by using liquids
9/20 • • the indication being based on the inclination of the surface of a liquid relative to its container
9/22 • • • with interconnected containers in fixed relation to each other

9/24 • • in closed containers partially filled with liquid so as to leave a gas bubble
9/26 • • • Details
9/28 • • • • Mountings
9/30 • • • • Means for adjusting dimensions of bubble
9/32 • • • • Means for facilitating the observation of the position of the bubble, e.g. illuminating means
9/34 • • • of the tubular type, i.e. for indicating the level in one direction only
9/36 • • • of the spherical type, i.e. for indicating the level in all directions

11/00 Photogrammetry or videogrammetry, e.g. stereogrammetry; Photographic surveying [1, 2006.01]

11/02 • Picture-taking arrangements specially adapted for photogrammetry or photographic surveying, e.g. controlling overlapping of pictures
11/04 • Interpretation of pictures
11/06 • • by comparison of two or more pictures of the same area
11/08 • • • the pictures not being supported in the same relative position as when they were taken
11/10 • • • • using computers to control the position of the pictures
11/12 • • • the pictures being supported in the same relative position as when they were taken
11/14 • • • • with optical projection (G01C 11/26 takes precedence)
11/16 • • • • • in a common plane
11/18 • • • • • • involving scanning means
11/20 • • • • • in separate planes
11/22 • • • • with mechanical projection (G01C 11/26 takes precedence)
11/24 • • • • with optical-mechanical projection (G01C 11/26 takes precedence)
11/26 • • • • using computers to control the position of the pictures
11/28 • • • Special adaptation for recording picture point data, e.g. for profiles
11/30 • • by triangulation
11/32 • • • Radial triangulation
11/34 • • • Aerial triangulation
11/36 • Videogrammetry, i.e. electronic processing of video signals from different sources to give parallax or range information **[2006.01]**

13/00 Surveying specially adapted to open water, e.g. sea, lake, river or canal (liquid level metering G01F)

15/00 Surveying instruments or accessories not provided for in groups G01C 1/00-G01C 13/00

15/02 • Means for marking measuring points
15/04 • • Permanent marks; Boundary markers
15/06 • • Surveyors' staffs; Movable markers
15/08 • • • Plumbing or registering staffs or markers over ground marks
15/10 • Plumb lines
15/12 • Instruments for setting out fixed angles, e.g. right angles
15/14 • Artificial horizons

17/00 Compasses; Devices for ascertaining true or magnetic north for navigation or surveying purposes (using gyroscopic effect G01C 19/00)

17/02 • Magnetic compasses
17/04 • • with north-seeking magnetic elements, e.g. needles
17/06 • • • Suspending magnetic elements
17/08 • • • • by flotation
17/10 • • • Comparing observed direction with north indication
17/12 • • • • by sighting means, e.g. for surveyors' compasses
17/14 • • • • by reference marks, e.g. for ships' compasses
17/16 • • • • by clinometers, e.g. for determining dip or strike of geological strata
17/18 • • • Supporting or suspending compasses, e.g. by gimbal, by flotation
17/20 • • • Observing the compass card or needle
17/22 • • • • by projection
17/24 • • • • Illumination
17/26 • • • • using electric pick-offs for transmission to final indicator, e.g. photocell
17/28 • • Electromagnetic compasses (with north-seeking magnetic elements and having electric pick-offs G01C 17/26)
17/30 • • • Earth-inductor compasses
17/32 • • • Electron compasses
17/34 • Sun- or astro-compasses
17/36 • Repeaters for remote indication of readings of a master compass
17/38 • Testing, calibrating, or compensating of compasses

19/00 Gyroscopes; Turn-sensitive devices using vibrating masses; Turn-sensitive devices without moving masses; Measuring angular rate using gyroscopic effects [1, 2013.01]

19/02 • Rotary gyroscopes
19/04 • • Details
19/06 • • • Rotors
19/08 • • • • electrically driven (G01C 19/14 takes precedence)
19/10 • • • • • Power supply
19/12 • • • • fluid driven (G01C 19/14 takes precedence)
19/14 • • • • Fluid rotors
19/16 • • • Suspensions; Bearings
19/18 • • • • providing movement of rotor with respect to its rotational axes (G01C 19/20, G01C 19/24 take precedence)
19/20 • • • • in fluid
19/22 • • • • torsional
19/24 • • • • using magnetic or electrostatic fields
19/26 • • • Caging, i.e. immobilising moving parts, e.g. for transport
19/28 • • • Pick-offs, i.e. devices for taking off an indication of the displacement of the rotor axis
19/30 • • • Erection devices, i.e. devices for restoring rotor axis to a desired position (for instrument indicating the vertical G01C 19/46)
19/32 • • • Indicating or recording means specially adapted for rotary gyroscopes
19/34 • • for indicating a direction in the horizontal plane, e.g. directional gyroscopes
19/36 • • • with north-seeking action by magnetic means, e.g. gyromagnetic compasses
19/38 • • • with north-seeking action by other than magnetic means, e.g. gyrocompasses using earth's rotation
19/40 • • for control by signals from a master compass, i.e. repeater compasses

19/42 • • for indicating rate of turn; for integrating rate of turn
19/44 • • for indicating the vertical
19/46 • • • Erection devices for restoring rotor axis to a desired position
19/48 • • • • operating by electrical means (G01C 19/54 takes precedence)
19/50 • • • • operating by mechanical means (G01C 19/54 takes precedence)
19/52 • • • • operating by fluid means (G01C 19/54 takes precedence)
19/54 • • • • with correction for acceleration forces due to movement of instrument
19/56 • Turn-sensitive devices using vibrating masses, e.g. vibratory angular rate sensors based on Coriolis forces **[1, 2012.01]**
19/5607 • • using vibrating tuning forks (double-ended tuning forks using planar vibrating masses suspended at opposite ends G01C 19/5719) **[2012.01]**
19/5614 • • • Signal processing **[2012.01]**
19/5621 • • • the devices involving a micro-mechanical structure **[2012.01]**
19/5628 • • • Manufacturing; Trimming; Mounting; Housings **[2012.01]**
19/5635 • • using vibrating wires or strings **[2012.01]**
19/5642 • • using vibrating bars or beams **[2012.01]**
19/5649 • • • Signal processing **[2012.01]**
19/5656 • • • the devices involving a micro-mechanical structure **[2012.01]**
19/5663 • • • Manufacturing; Trimming; Mounting; Housings **[2012.01]**
19/567 • • using the phase shift of a vibration node or antinode **[2012.01]**
19/5677 • • • of essentially two-dimensional vibrators, e.g. ring-shaped vibrators **[2012.01]**
19/5684 • • • • the devices involving a micro-mechanical structure **[2012.01]**
19/5691 • • • of essentially three-dimensional vibrators, e.g. wine glass-type vibrators **[2012.01]**
19/5698 • • using acoustic waves, e.g. surface acoustic wave gyros **[2012.01]**
19/5705 • • using masses driven in reciprocating rotary motion about an axis **[2012.01]**
19/5712 • • • the devices involving a micro-mechanical structure **[2012.01]**
19/5719 • • using planar vibrating masses driven in a translation vibration along an axis **[2012.01]**
19/5726 • • • Signal processing **[2012.01]**
19/5733 • • • Structural details or topology **[2012.01]**
19/574 • • • • the devices having two sensing masses in anti-phase motion **[2012.01]**
19/5747 • • • • • each sensing mass being connected to a driving mass, e.g. driving frames **[2012.01]**
19/5755 • • • • the devices having a single sensing mass **[2012.01]**
19/5762 • • • • • the sensing mass being connected to a driving mass, e.g. driving frames **[2012.01]**
19/5769 • • • Manufacturing; Mounting; Housings **[2012.01]**
19/5776 • • Signal processing not specific to any of the devices covered by groups G01C 19/5607-G01C 19/5719 **[2012.01]**
19/5783 • • Mountings or housings not specific to any of the devices covered by groups G01C 19/5607-G01C 19/5719 **[2012.01]**
19/58 • Turn-sensitive devices without moving masses **[3]**
19/60 • • Electronic or nuclear magnetic resonance gyrometers **[3, 4]**
19/62 • • • with optical pumping **[3]**
19/64 • • Gyrometers using the Sagnac effect, i.e. rotation-induced shifts between counter-rotating electromagnetic beams **[3]**
19/66 • • • Ring laser gyrometers **[5]**
19/68 • • • • Lock-in prevention **[5]**
19/70 • • • • • by mechanical means **[5]**
19/72 • • • with counter-rotating light beams in a passive ring, e.g. fibre laser gyrometers **[5]**

21/00 Navigation; Navigational instruments not provided for in groups G01C 1/00-G01C 19/00 (measuring distance traversed on the ground by a vehicle G01C 22/00; control of position, course, altitude or attitude of vehicles G05D 1/00; traffic control systems for road vehicles involving transmission of navigation instructions to the vehicle G08G 1/0968)
21/02 • by astronomical means (G01C 21/24, G01C 21/26 take precedence) **[1, 7]**
21/04 • by terrestrial means (G01C 21/24, G01C 21/26 take precedence) **[1, 7]**
21/06 • • involving measuring of drift angle; involving correction for drift
21/08 • • involving use of the magnetic field of the earth
21/10 • by using measurement of speed or acceleration (G01C 21/24, G01C 21/26 take precedence) **[1, 7]**
21/12 • • executed aboard the object being navigated; Dead reckoning
21/14 • • • by recording the course traversed by the object (G01C 21/16 takes precedence)
21/16 • • • by integrating acceleration or speed, i.e. inertial navigation
21/18 • • • • Stabilised platforms, e.g. by gyroscope
21/20 • Instruments for performing navigational calculations (G01C 21/24, G01C 21/26 take precedence) **[1, 7]**
21/22 • • Plotting boards
21/24 • specially adapted for cosmonautical navigation
21/26 • specially adapted for navigation in a road network **[7]**
21/28 • • with correlation of data from several navigational instruments **[7]**
21/30 • • • Map- or contour-matching **[7]**
21/32 • • • • Structuring or formatting of map data **[7]**
21/34 • • Route searching; Route guidance **[7]**
21/36 • • • Input/output arrangements for on-board computers **[7]**

22/00 Measuring distance traversed on the ground by vehicles, persons, animals or other moving solid bodies, e.g. using odometers or using pedometers
22/02 • by conversion into electric waveforms and subsequent integration, e.g. using tachometer generator

23/00 Combined instruments indicating more than one navigational value, e.g. for aircraft; Combined measuring devices for measuring two or more variables of movement, e.g. distance, speed, acceleration

25/00 Manufacturing, calibrating, cleaning, or repairing instruments or devices referred to in the other groups of this subclass (testing, calibrating, or compensating compasses G01C 17/38)

G01D MEASURING NOT SPECIALLY ADAPTED FOR A SPECIFIC VARIABLE; ARRANGEMENTS FOR MEASURING TWO OR MORE VARIABLES NOT COVERED BY A SINGLE OTHER SUBCLASS; TARIFF METERING APPARATUS; TRANSFERRING OR TRANSDUCING ARRANGEMENTS NOT SPECIALLY ADAPTED FOR A SPECIFIC VARIABLE; MEASURING OR TESTING NOT OTHERWISE PROVIDED FOR

Note(s)

1. This subclass covers:
   - devices for indicating or recording the results of measurements, not peculiar to variables covered by a single other subclass;
   - analogous arrangements but in which the input is not a variable to be measured, e.g. a hand operation;
   - details of measuring instruments, which are of general interest;
   - measurement transducers not adapted solely for the measurement of a single specified variable and not provided for elsewhere, i.e. means for converting the output of a sensing member to another variable where the form or nature of the sensing member does not constrain the means for converting;
   - measuring or testing not otherwise provided for.
2. Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Measuring arrangements giving results other than momentary value of variable, of general application (G01D 3/00 takes precedence; in tariff metering apparatus G01D 4/00; transducers not specially adapted for a specific variable G01D 5/00)

1/02 • giving mean values, e.g. root mean square values (measuring root mean square values of currents or voltages G01R 19/02)

1/04 • giving integrated values (giving mean values G01D 1/02)

1/06 • • by intermittent summation

1/08 • • • over fixed periods of time

1/10 • giving differentiated values

1/12 • giving a maximum or minimum of a value

1/14 • giving a distribution function of a value, i.e. number of times the value comes within specified ranges of amplitude

1/16 • giving a value which is a function of two or more values, e.g. product, ratio

1/18 • with arrangements for signalling that a predetermined value of an unspecified parameter has been exceeded (G01D 1/14 takes precedence) **[3]**

3/00 Measuring arrangements with provision for the special purposes referred to in the subgroups of this group

3/02 • with provision for altering or correcting the transfer function

3/024 • • for range change; Arrangements for substituting one sensing member by another **[6]**

3/028 • mitigating undesired influences, e.g. temperature, pressure **[6]**

3/032 • • affecting incoming signal, e.g. by averaging; gating undesired signals **[6]**

3/036 • • on measuring arrangements themselves **[6]**

3/06 • with provision for operation by a null method

3/08 • with provision for safeguarding the apparatus, e.g. against abnormal operation, against breakdown

3/10 • with provision for switching-in of additional or auxiliary indicators or recorders

4/00 Tariff metering apparatus (in taximeters G07B 13/00; apparatus actuated by coins, cards or the like with meter-controlled dispensing of liquid, gas, or electricity G07F 15/00)

4/02 • Details

4/04 • • Resetting-mechanisms, e.g. for indicating members

4/06 • • Arrangement of clutches between driving and indicating member, e.g. of hysteresis clutch (G01D 4/04 takes precedence)

4/08 • • Transfer of indication from a counter into a summing counter

4/10 • Maximum indicating or recording apparatus, i.e. where the tariff for a period is based on a maximum demand within that period

4/12 • • Apparatus for indicating or recording progressive maximum

4/14 • • Fixed-demand indicating or recording apparatus, i.e. where indication is made when a predetermined quantity has been consumed during a time interval greater or less than a predetermined time interval

4/16 • Apparatus for indicating or recording maximum or minimum load hours

4/18 • Apparatus for indicating or recording overconsumption with opposing torque which comes into effect when a predetermined level is exceeded, e.g. subtraction meters

5/00 Mechanical means for transferring the output of a sensing member; Means for converting the output of a sensing member to another variable where the form or nature of the sensing member does not constrain the means for converting; Transducers not specially adapted for a specific variable
(G01D 3/00 takes precedence; specially adapted for apparatus giving results other than momentary value of variable G01D 1/00) **[6]**

Note(s)

Groups G01D 5/02-G01D 5/54 are distinguished by the means which is of major importance. Thus the mere application of other means for giving a final indication does not affect the classification.

5/02 • using mechanical means
5/04 • • using levers; using cams; using gearing
5/06 • • acting through a wall or enclosure, e.g. by bellows, by magnetic coupling
5/08 • • Reducing the effects of friction, e.g. by applying vibrations
5/10 • • Applying external forces to increase force available for operation of indicating or recording part
5/12 • using electric or magnetic means (G01D 5/06 takes precedence) **[3]**
5/14 • • influencing the magnitude of a current or voltage
5/16 • • • by varying resistance
5/165 • • • • by relative movement of a point of contact and a resistive track **[6]**
5/18 • • • by varying effective impedance of discharge tubes or semiconductor devices
5/20 • • • by varying inductance, e.g. by a movable armature
5/22 • • • • differentially influencing two coils
5/24 • • • by varying capacitance
5/241 • • • • by relative movement of capacitor electrodes **[6]**
5/242 • • • by varying output of an electrodynamic device, e.g. of a tachodynamo
5/243 • • influencing the phase or frequency of ac
5/244 • • influencing characteristics of pulses or pulse trains; generating pulses or pulse trains **[6]**
5/245 • • • using a variable number of pulses in a train
5/246 • • • by varying the duration of individual pulses
5/247 • • • using time shifts of pulses
5/248 • • • by varying pulse repetition frequency
5/249 • • • using pulse code
5/25 • • Selecting one or more conductors or channels from a plurality of conductors or channels, e.g. by closing contacts
5/251 • • • one conductor or channel
5/252 • • • a combination of conductors or channels
5/26 • using optical means, i.e. using infra-red, visible or ultra-violet light
5/28 • • with deflection of beams of light, e.g. for direct optical indication (G01D 5/40 takes precedence)
5/30 • • • the beams of light being detected by photocells
5/32 • • with attenuation or whole or partial obturation of beams of light (G01D 5/40 takes precedence)
5/34 • • • the beams of light being detected by photocells
5/347 • • • • using displacement encoding scales **[6]**
5/353 • • • • influencing the transmission properties of an optical fibre **[6]**
5/36 • • • • Forming the light into pulses
5/38 • • • • • by diffraction gratings
5/39 • • Scanning a visible indication of the measured value and reproducing this indication at a remote place, e.g. on the screen of a cathode-ray tube
5/40 • • specially adapted for use with infra-red light
5/42 • using fluid means
5/44 • • using jets of fluid
5/46 • • • by deflecting or throttling the flow
5/48 • using wave or particle radiation means (G01D 5/26 takes precedence)
5/50 • • derived from a radioactive source
5/52 • • • detected by a counter tube
5/54 • using means specified in two or more of groups G01D 5/02, G01D 5/12, G01D 5/26, G01D 5/42, and G01D 5/48

Note(s)

Classification is made in this group only if no other group can be selected as being predominantly applicable.

Note(s)

For a combination of two or more of the means specified, the first applicable one of subgroups G01D 5/56-G01D 5/62 takes precedence over any others of these groups.

5/56 • • using electric or magnetic means
5/58 • • using optical means, i.e. using infra-red, visible or ultra-violet light
5/60 • • using fluid means
5/62 • • using wave or particle radiation means not covered by group G01D 5/58

7/00 Indicating measured values
7/02 • Indicating value of two or more variables simultaneously
7/04 • • using a separate indicating element for each variable
7/06 • • • Luminous indications projected on a common screen
7/08 • • using a common indicating element for two or more variables
7/10 • • • giving indication in co-ordinate form
7/12 • Audible indication of meter readings, e.g. for the blind **[2]**

9/00 Recording measured values
9/02 • Producing one or more recordings of the values of a single variable
9/04 • • with provision for multiple or alternative recording
9/06 • • • Multiple recording, e.g. duplicating
9/08 • • • • giving both graphical and numerical recording
9/10 • • the recording element, e.g. stylus, being controlled in accordance with the variable, and the recording medium, e.g. paper roll, being controlled in accordance with time
9/12 • • • recording occurring continuously
9/14 • • • • with provision for altering speed of recording medium in accordance with the magnitude of the variable to be recorded
9/16 • • • recording occurring at separated intervals, e.g. by chopper bar
9/18 • • • • recording element actuated only upon change in value of variable

9/20 • • the recording element, e.g. stylus, being controlled in accordance with time and the recording medium, e.g. paper roll, being controlled in accordance with the variable
9/22 • • • recording occurring continuously
9/24 • • • recording occurring at separated intervals, e.g. by chopper bar
9/26 • • either the recording element, e.g. stylus, or the recording medium, e.g. paper roll, being controlled in accordance with both time and the variable
9/28 • Producing one or more recordings, each recording being of the values of two or more different variables (G01D 9/38, G01D 9/40 take precedence)
9/30 • • there being a separate recording element for each variable, e.g. multiple-pen recorder
9/32 • • there being a common recording element for two or more variables
9/34 • • • the variables being recorded in predetermined sequence
9/36 • • • • in separate columns
9/38 • Producing one or more recordings, each recording being produced by controlling the recording element, e.g. stylus, in accordance with one variable and controlling the recording medium, e.g. paper roll, in accordance with another variable
9/40 • Producing one or more recordings, each recording being produced by controlling either the recording element, e.g. stylus, or the recording medium, e.g. paper roll, in accordance with two or more variables
9/42 • Recording indications of measuring instruments by photographic means, e.g. of counters

11/00 Component parts of measuring arrangements not specially adapted for a specific variable (G01D 13/00, G01D 15/00 take precedence)
11/02 • Bearings or suspensions for moving parts
11/04 • • Knive-edge bearings
11/06 • • Strip or thread suspensions, e.g. in tension
11/08 • Elements for balancing moving parts
11/10 • Elements for damping the movement of parts
11/12 • • using fluid damping
11/14 • • using magnetic induction damping
11/16 • Elements for restraining or preventing the movement of parts, e.g. for zeroising (caging of moving parts when not in use G01D 11/20)
11/18 • • Springs (G01D 11/06 takes precedence)
11/20 • Caging devices for moving parts when not in use
11/22 • • automatically actuated
11/24 • Housings
11/26 • • Windows; Cover glasses; Sealings therefor
11/28 • Structurally-combined illuminating devices
11/30 • Supports specially adapted for an instrument; Supports specially adapted for a set of instruments

13/00 Component parts of indicators for measuring arrangements not specially adapted for a specific variable
13/02 • Scales; Dials
13/04 • • Construction
13/06 • • • Moving bands (G01D 13/10 takes precedence)
13/08 • • • Rotating drums (G01D 13/10 takes precedence)
13/10 • • • with adjustable scales; with auxiliary scales, e.g. vernier
13/12 • • Graduation
13/14 • • • for rotations of more than 360°
13/16 • • • with staggered markings
13/18 • • • with raised or recessed markings
13/20 • • • with luminescent markings
13/22 • Pointers, e.g. settable pointer
13/24 • • for indicating a maximum or minimum
13/26 • • adapted to perform a further operation, e.g. making electrical contact
13/28 • • with luminescent markings

15/00 Component parts of recorders for measuring arrangements not specially adapted for a specific variable
15/02 • Styli or other recording elements acting to mechanically deform or perforate the recording surface (printing recording elements G01D 15/20)
15/04 • • acting to punch holes in the recording surface
15/06 • Electric recording elements, e.g. electrolytic
15/08 • • for spark erosion
15/10 • Heated recording elements acting on heat-sensitive layers
15/12 • Magnetic recording elements
15/14 • Optical recording elements; Recording elements using X- or nuclear radiation
15/16 • Recording elements transferring recording material, e.g. ink, to the recording surface (printing recording elements G01D 15/20)
15/18 • • Nozzles emitting recording material
15/20 • Recording elements for printing with ink or for printing by deformation or perforation of the recording surface, e.g. embossing
15/22 • Chopper bars for bringing recording element into contact with recording surface
15/24 • Drives for recording elements or surfaces, not covered by group G01D 5/00
15/26 • • operating by clockwork
15/28 • Holding means for recording surfaces; Guiding means for recording surfaces; Exchanging means for recording surfaces
15/30 • • for foldable strip charts
15/32 • • for circular charts
15/34 • Recording surfaces

18/00 Testing or calibrating apparatus or arrangements provided for in groups G01D 1/00-G01D 15/00

21/00 Measuring or testing not otherwise provided for
21/02 • Measuring two or more variables by means not covered by a single other subclass

G01F MEASURING VOLUME, VOLUME FLOW, MASS FLOW, OR LIQUID LEVEL; METERING BY VOLUME [2, 5]

Note(s)

Attention is drawn to the Notes following the title of class G01.

Subclass index

Measuring volume flow

1/00 **Measuring the volume flow or mass flow of fluid or fluent solid material wherein the fluid passes through the meter in a continuous flow** (measuring a proportion of the volume flow G01F 5/00) **[2]**

Note(s)

Groups G01F 1/704-G01F 1/76 take precedence over groups G01F 1/05-G01F 1/68.

1/05 • by using mechanical effects **[2]**
1/06 • • using rotating vanes with tangential admission **[2]**
1/07 • • • with mechanical coupling to the indicating device **[2]**
1/075 • • • with magnetic or electromagnetic coupling to the indicating device **[2]**
1/08 • • • Adjusting, correcting, or compensating means therefor **[2]**
1/10 • • using rotating vanes with axial admission **[2]**
1/11 • • • with mechanical coupling to the indicating device **[2]**
1/115 • • • with magnetic or electromagnetic coupling to the indicating device **[2]**
1/12 • • • Adjusting, correcting, or compensating means therefor
1/20 • • by detection of dynamic effects of the fluid flow **[2]**
1/22 • • • by variable-area meters **[2]**
1/24 • • • • with magnetic or electric coupling to the indicating device **[2]**
1/26 • • • • of the valve type **[2]**
1/28 • • • by drag-force, e.g. vane type or impact flowmeter **[2]**
1/30 • • • • for fluent solid material **[2]**
1/32 • • • by swirl flowmeter, e.g. using Karman vortices **[2]**
1/34 • • by measuring pressure or differential pressure **[2]**
1/36 • • • the pressure or differential pressure being created by the use of flow constriction **[2]**
1/37 • • • • the pressure or differential pressure being measured by means of communicating tubes or reservoirs with movable fluid levels, e.g. by U-tubes **[2]**
1/38 • • • • the pressure or differential pressure being measured by means of a movable element, e.g. diaphragm, piston, Bourdon tube or flexible capsule **[2]**
1/40 • • • • Details of construction of the flow constriction devices **[2]**
1/42 • • • • • Orifices or nozzles **[2]**
1/44 • • • • • Venturi tubes **[2]**
1/46 • • • • • Pitot tubes **[2]**
1/48 • • • the pressure or differential pressure being created by a capillary element **[2]**
1/50 • • • Correcting or compensating means **[2]**
1/52 • • by measuring the height of the fluid level due to the lifting power of the fluid flow **[2]**
1/54 • • by means of chains, flexible bands, or wires introduced into, and moved by, the flow **[2]**
1/56 • by using electric or magnetic effects (G01F 1/66 takes precedence) **[2]**
1/58 • • by electromagnetic flowmeters **[2]**
1/60 • • • Circuits therefor **[2]**
1/64 • • by measuring electrical currents passing through the fluid flow; by measuring electrical potential generated by the fluid flow, e.g. by electrochemical, contact, or friction effects (G01F 1/58 takes precedence) **[2]**
1/66 • by measuring frequency, phase shift, or propagation time of electromagnetic or other waves, e.g. ultrasonic flowmeters **[2]**
1/68 • by using thermal effects **[2]**
1/684 • • Structural arrangements; Mounting of elements, e.g. in relation to fluid flow **[6]**
1/688 • • • using a particular type of heating, cooling or sensing element **[6]**
1/69 • • • • of resistive type **[6]**
1/692 • • • • • Thin-film arrangements **[6]**
1/696 • • Circuits therefor, e.g. constant-current flow meters **[6]**
1/698 • • • Feedback or rebalancing circuits, e.g. self heated constant temperature flowmeters **[6]**
1/699 • • • • by control of a separate heating or cooling element **[6]**
1/704 • using marked regions or existing inhomogeneities within the fluid stream, e.g. statistically occurring variations in a fluid parameter (G01F 1/76, G01F 25/00 take precedence) **[4]**
1/708 • • Measuring the time taken to traverse a fixed distance **[4]**
1/712 • • • using auto-correlation or cross-correlation detection means **[4]**
1/716 • • • using electron paramagnetic resonance (EPR) or nuclear magnetic resonance (NMR) **[4]**
1/72 • Devices for measuring pulsing fluid flows **[2]**
1/74 • Devices for measuring flow of a fluid or flow of a fluent solid material in suspension in another fluid **[2]**
1/76 • Devices for measuring mass flow of a fluid or a fluent solid material **[2]**
1/78 • • Direct mass flowmeters **[2]**
1/80 • • • operating by measuring pressure, force, momentum, or frequency of a fluid flow to which a rotational movement has been imparted **[2]**

1/82 • • • • using a driven wheel as impeller and one or more other wheels or moving elements which are angularly restrained by a resilient member, e.g. spring member, as the measuring device **[2]**
1/84 • • • • Coriolis or gyroscopic mass flowmeters **[2]**
1/86 • • Indirect mass flowmeters, e.g. measuring volume flow and density, temperature, or pressure **[2]**
1/88 • • • with differential-pressure measurement to determine the volume flow **[2]**
1/90 • • • with positive-displacement meter or turbine meter to determine the volume flow **[2]**

3/00 Measuring the volume flow of fluids or fluent solid material wherein the fluid passes through the meter in successive and more or less isolated quantities, the meter being driven by the flow (measuring a proportion of the volume flow G01F 5/00)

3/02 • with measuring chambers which expand or contract during measurement
3/04 • • having rigid movable walls
3/06 • • • comprising members rotating in a fluid-tight or substantially fluid-tight manner in a housing
3/08 • • • • Rotary-piston or ring-piston meters
3/10 • • • • Geared or lobed impeller meters
3/12 • • • • Meters with nutating members, e.g. discs
3/14 • • • comprising reciprocating pistons, e.g. reciprocating in a rotating body
3/16 • • • • in stationary cylinders
3/18 • • • • • involving two or more cylinders
3/20 • • having flexible movable walls, e.g. diaphragms, bellows
3/22 • • • for gases
3/24 • with measuring chambers moved during operation (wet gas-meters G01F 3/30)
3/26 • • Tilting-trap meters
3/28 • • on carriers rotated by the weight of the liquid in the measuring chambers
3/30 • Wet gas-meters
3/32 • • comprising partitioned drums rotating or nutating in a liquid
3/34 • • comprising bells reciprocating in a liquid
3/36 • with stationary measuring chambers having constant volume during measurement (with measuring chambers which expand or contract during measurement G01F 3/02)
3/38 • • having only one measuring chamber

5/00 Measuring a proportion of the volume flow

7/00 Volume-flow measuring devices with two or more measuring ranges; Compound meters

9/00 Measuring volume flow relative to another variable, e.g. of liquid fuel for an engine

9/02 • wherein the other variable is the speed of a vehicle

Metering by volume

11/00 Apparatus requiring external operation adapted at each repeated and identical operation to measure and separate a predetermined volume of fluid or fluent solid material from a supply or container, without regard to weight, and to deliver it

11/02 • with measuring chambers which expand or contract during measurement
11/04 • • of the free-piston type
11/06 • • • with provision for varying the stroke of the piston
11/08 • • of the diaphragm or bellows type
11/10 • with measuring chambers moved during operation
11/12 • • of the valve type, i.e. the separating being effected by fluid-tight or powder-tight movements (involving the tilting or inverting of the supply vessel G01F 11/26)
11/14 • • • wherein the measuring chamber reciprocates
11/16 • • • • for liquid or semiliquid
11/18 • • • • for fluent solid material
11/20 • • • wherein the measuring chamber rotates or oscillates
11/22 • • • • for liquid or semiliquid
11/24 • • • • for fluent solid material
11/26 • • wherein the measuring chamber is filled and emptied by tilting or inverting the supply vessel, e.g. bottle-emptying apparatus
11/28 • with stationary measuring chambers having constant volume during measurement
11/30 • • with supply and discharge valves of the lift or plug-lift type
11/32 • • • for liquid or semiliquid
11/34 • • • for fluent solid material
11/36 • • with supply or discharge valves of the rectilinearly-moved slide type
11/38 • • • for liquid or semiliquid
11/40 • • • for fluent or solid material
11/42 • • with supply or discharge valves of the rotary or oscillatory type
11/44 • • • for liquid or semiliquid
11/46 • • • for fluent solid material

13/00 Apparatus for measuring by volume and delivering fluids or fluent solid materials, not provided for in the preceding groups

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15/00 Details of, or accessories for, apparatus of groups G01F 1/00-G01F 13/00 insofar as such details or appliances are not adapted to particular types of such apparatus

15/02 • Compensating or correcting for variations in pressure, density, or temperature
15/04 • • of gases to be measured
15/06 • Indicating or recording devices, e.g. for remote indication
15/07 • Integration to give total flow, e.g. using mechanically-operated integrating mechanism **[2]**
15/075 • • using electrically-operated integrating means **[2]**
15/08 • Air or gas separators in combination with liquid meters; Liquid separators in combination with gas-meters
15/10 • Preventing damage by freezing or excess pressure or insufficient pressure
15/12 • Cleaning arrangements; Filters
15/14 • Casings, e.g. of special material
15/16 • Diaphragms; Bellows; Mountings therefor
15/18 • Supports or connecting means for meters

Measuring volume

17/00 Methods or apparatus for determining the capacity of containers or cavities, or the volume of solid bodies (measuring linear dimensions to determine volume G01B)

19/00 Calibrated capacity measures for fluids or fluent solid material, e.g. measuring cups

22/00 Methods or apparatus for measuring volume of fluids or fluent solid material, not otherwise provided for [5]

22/02 • involving measurement of pressure **[5]**

Level indicators

23/00 Indicating or measuring liquid level, or level of fluent solid material, e.g. indicating in terms of volume, indicating by means of an alarm

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23/02 • by gauge glasses or other apparatus involving a window or transparent tube for directly observing the level to be measured or the level of a liquid column in free communication with the main body of the liquid

23/04 • by dip members, e.g. dip-sticks

23/14 • by measurement of pressure

23/16 • • Indicating, recording, or alarm devices being actuated by mechanical or fluid means, e.g. using gas, mercury, or a diaphragm as transmitting element, or by a column of liquid

23/18 • • Indicating, recording, or alarm devices actuated electrically

23/20 • by measurement of weight, e.g. to determine the level of stored liquefied gas

23/22 • by measurement of physical variables, other than linear dimensions, pressure, or weight, dependent on the level to be measured, e.g. by difference of heat transfer of steam or water (involving the use of floats G01F 23/30)

23/24 • • by measuring variations of resistance of resistors due to contact with conductor fluid

23/26 • • by measuring variations of capacity or inductance of capacitors or inductors arising from the presence of liquid or fluent solid material in the electric or electromagnetic fields

23/28 • • by measuring the variations of parameters of electromagnetic or acoustic waves applied directly to the liquid or fluent solid material **[6]**

23/284 • • • Electromagnetic waves **[6]**

23/288 • • • • X-rays; Gamma rays **[6]**

23/292 • • • • Light **[6]**

23/296 • • • Acoustic waves **[6]**

23/30 • by floats **[4]**

23/32 • • using rotatable arms or other pivotable transmission elements **[4]**

23/34 • • • using mechanically actuated indicating means **[4]**

23/36 • • • using electrically actuated indicating means **[4]**

23/38 • • • using magnetically actuated indicating means **[4]**

23/40 • • using bands or wires as transmission elements **[4]**

23/42 • • • using mechanically actuated indicating means **[4]**

23/44 • • • using electrically actuated indicating means **[4]**

23/46 • • • using magnetically actuated indicating means **[4]**

23/48 • • using twisted spindles as transmission elements **[4]**

23/50 • • • using mechanically actuated indicating means **[4]**

23/52 • • • using electrically actuated indicating means **[4]**

23/54 • • • using magnetically actuated indicating means **[4]**

23/56 • • using elements rigidly fixed to, and rectilinearly moving with, the floats as transmission elements **[4]**

23/58 • • • using mechanically actuated indicating means **[4]**

23/60 • • • using electrically actuated indicating means **[4]**

23/62 • • • using magnetically actuated indicating means **[4]**

23/64 • • of the free float type **[4]**

23/66 • • • using mechanically actuated indicating means **[4]**

23/68 • • • using electrically actuated indicating means **[4]**

23/70 • • • • for sensing changes in level only at discrete points **[4]**

23/72 • • • using magnetically actuated indicating means **[4]**

23/74 • • • • for sensing changes in level only at discrete points **[4]**

23/76 • • characterised by the construction of the float **[4]**

25/00 Testing or calibrating of apparatus for measuring volume, volume flow, or liquid level, or for metering by volume

G01G WEIGHING

Note(s)

Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Weighing apparatus involving the use of a counterweight or other counterbalancing mass

1/02 • Pendulum-weight apparatus
1/04 • • the pendulum having a fixed pivot axis
1/06 • • • with a plurality of pendulums
1/08 • • the pendulum having a moving pivot axis, e.g. a floating pendulum
1/10 • • • with a plurality of pendulums
1/12 • • Constructional arrangements for obtaining equal indicative divisions
1/14 • • Temperature-compensating arrangements
1/16 • • Means for correcting for obliquity of mounting
1/18 • Balances involving the use of a pivoted beam, i.e. beam balances
1/20 • • Beam balances having the pans carried below the beam, and for use with separate counterweights
1/22 • • • for precision weighing
1/24 • • Platform-type scales, i.e. having the pans carried above the beam
1/26 • • with associated counterweight or set of counterweights
1/28 • • • involving means for automatically lifting counterweights corresponding to the load
1/29 • • • • with electrical or electromechanical control means **[3]**
1/30 • • • wherein the counterweight is in the form of a chain
1/32 • • • wherein the counterweights are in the form of rider-weights
1/34 • • • involving a fixed counterweight, with poise-weights selectively added to the load side
1/36 • • • wherein the counterweights are slidable along the beam, e.g. steelyards
1/38 • • • • with automatically-driven counterweight
1/40 • • specially adapted for weighing by substitution
1/42 • • Temperature-compensating arrangements

3/00 Weighing apparatus characterised by the use of elastically-deformable members, e.g. spring balances

3/02 • wherein the weighing element is in the form of a helical spring
3/04 • • using a plurality of springs
3/06 • wherein the weighing element is in the form of a spiral spring
3/08 • wherein the weighing element is in the form of a leaf spring
3/10 • wherein the torsional deformation of a weighing element is measured
3/12 • wherein the weighing element is in the form of a solid body stressed by pressure or tension during weighing
3/13 • • having piezo-electric or piezo-resistive properties **[3]**
3/14 • • measuring variations of electrical resistance (G01G 3/13 takes precedence) **[3]**
3/142 • • • Circuits specially adapted therefor **[3]**
3/145 • • • • involving comparison with a reference value (G01G 3/147 takes precedence) **[3]**
3/147 • • • • involving digital counting **[3]**
3/15 • • measuring variations of magnetic properties
3/16 • • measuring variations of frequency of oscillations of the body
3/18 • Temperature-compensating arrangements

5/00 Weighing apparatus wherein the balancing is effected by fluid action

5/02 • with a float or other member variably immersed in liquid
5/04 • with means for measuring the pressure imposed by the load on a liquid
5/06 • • using electrical indicating means **[3]**

7/00 Weighing apparatus wherein the balancing is effected by magnetic, electromagnetic, or electrostatic action, or by means not provided for in groups G01G 1/00-G01G 5/00

7/02 • by electromagnetic action
7/04 • • with means for regulating the current to solenoids
7/06 • by electrostatic action

9/00 Methods of, or apparatus for, the determination of weight, not provided for in groups G01G 1/00-G01G 7/00

11/00 Apparatus for weighing a continuous stream of material during flow; Conveyor-belt weighers

11/02 • having mechanical weight-sensitive devices
11/04 • having electrical weight-sensitive devices
11/06 • having fluid weight-sensitive devices
11/08 • having means for controlling the rate of feed or discharge
11/10 • • by controlling the height of the material on the belt
11/12 • • by controlling the speed of the belt
11/14 • using totalising or integrating devices
11/16 • • being electric or electronic devices **[3]**
11/18 • • • using digital counting **[3]**
11/20 • • being mechanical devices **[3]**

13/00 Weighing apparatus with automatic feed or discharge for weighing-out batches of material (for weighing a continuous stream G01G 11/00; check-weighing G01G 15/00; for fluids G01G 17/04; apportioning by weight materials to be mixed G01G 19/22; combinatorial weighing G01G 19/387) **[5]**

13/02 • Means for automatically loading weigh-pans or other receptacles, e.g. disposable containers, under control of the weighing mechanism
13/04 • • involving dribble-feed means controlled by the weighing mechanism to top up the receptacle to the target weight
13/06 • • • wherein the main feed is effected by gravity from a hopper or chute
13/08 • • • wherein the main feed is effected by mechanical conveying means, e.g. by belt conveyors or by vibratory conveyors
13/10 • • • wherein the main feed is effected by pneumatic conveying means, e.g. by fluidised feed of granular material
13/12 • • Arrangements for compensating for material suspended at cut-off, i.e. for material which is still falling from the feeder when the weigher stops the feeder

13/14 • • Arrangements for determination of, or compensation for, the tare weight of an unloaded container, e.g. of a disposable container
13/16 • Means for automatically discharging weigh receptacles under control of the weighing mechanism
13/18 • • by valves or flaps in the container bottom
13/20 • • by screw conveyors in the weigh receptacle
13/22 • • by tilting or rotating the receptacle
13/24 • Weighing mechanism control arrangements for automatic feed or discharge
13/26 • • involving fluid-pressure systems
13/28 • • involving variation of an electrical variable which is used to control loading or discharge of the receptacle
13/285 • • • involving comparison with a reference value (G01G 13/29 takes precedence) **[3]**
13/29 • • • involving digital counting **[3]**
13/295 • • • for controlling automatic loading of the receptacle **[3]**
13/30 • • involving limit switches or position-sensing switches
13/32 • • • involving photoelectric devices
13/34 • • involving mechanical linkage motivated by the weighing mechanism

15/00 Arrangements for check-weighing of materials dispensed into removable containers

15/02 • with provision for adding or removing a make-up quantity of material to obtain the desired net weight (dribble-feed means for automatic batch-weighers G01G 13/04)
15/04 • with provision for adding or removing a make-up quantity of material to obtain the desired gross weight (dribble-feed means for automatic batch-weighers G01G 13/04)

17/00 Apparatus for, or methods of, weighing material of special form or property (determining weight by measuring volume G01F)

17/02 • for weighing material of filamentary or sheet form
17/04 • for weighing fluids, e.g. gases, pastes
17/06 • • having means for controlling the supply or discharge
17/08 • for weighing livestock

19/00 Weighing apparatus or methods adapted for special purposes not provided for in groups G01G 11/00-G01G 17/00

19/02 • for weighing wheeled or rolling bodies, e.g. vehicles
19/03 • • for weighing during motion (G01G 19/04, G01G 19/07 take precedence) **[3]**
19/04 • • for weighing railway vehicles
19/06 • • • on overhead rails
19/07 • • for weighing aircraft
19/08 • for incorporation in vehicles
19/10 • • having fluid weight-sensitive devices
19/12 • • having electrical weight-sensitive devices
19/14 • for weighing suspended loads (G01G 3/00 takes precedence)
19/16 • • having fluid weight-sensitive devices
19/18 • • having electrical weight-sensitive devices
19/20 • • for weighing unbalanced loads
19/22 • for apportioning materials by weighing prior to mixing them
19/24 • • using a single weighing apparatus
19/26 • • • associated with two or more counterweighted beams
19/28 • • • having fluid weight-sensitive devices
19/30 • • • having electrical weight-sensitive devices
19/32 • • using two or more weighing apparatus
19/34 • • with electrical control means
19/36 • • with mechanical control means
19/38 • • programme controlled, e.g. by perforated tape
19/387 • for combinatorial weighing, i.e. selecting a combination of articles whose total weight or number is closest to a desired value **[5]**
19/393 • • using two or more weighing units **[5]**
19/40 • with provisions for indicating, recording, or computing price or other quantities dependent on the weight (indicating means for weighing apparatus G01G 23/18; recording means for weighing apparatus G01G 23/18)
19/41 • • using mechanical computing means
19/413 • • using electromechanical or electronic computing means
19/414 • • • using electronic computing means only **[5]**
19/415 • • • • combined with recording means **[5]**
19/417 • • with provision for checking computing part of balance
19/42 • • for counting by weighing (G01G 19/387 takes precedence) **[5]**
19/44 • for weighing persons
19/46 • • Spring balances specially adapted for this purpose
19/48 • • Pendulum balances specially adapted for this purpose
19/50 • • having additional measuring devices, e.g. for height
19/52 • Weighing apparatus combined with other objects, e.g. with furniture (with walking-sticks A45B 3/08)
19/54 • • combined with writing implements or paper-knives
19/56 • • combined with handles of tools or of household implements
19/58 • • combined with handles of suit-cases or trunks
19/60 • • combined with fishing equipment, e.g. with fishing rods
19/62 • Over or under weighing apparatus **[3]**
19/64 • Percentage-indicating weighing apparatus, i.e. for expressing the weight as a percentage of a predetermined or initial weight **[3]**

21/00 Details of weighing apparatus

21/02 • Arrangements of bearings
21/04 • • of knife-edge bearings
21/06 • • of ball or roller bearings
21/07 • • of flexure-plate bearings **[3]**
21/08 • • Bearing mountings or adjusting means therefor
21/10 • • Floating suspensions; Arrangements of shock-absorbers
21/12 • • Devices for preventing derangement
21/14 • Beams
21/16 • • of composite construction; Connections between different beams
21/18 • Link connections between the beam and the weigh pan
21/20 • • for precision weighing apparatus
21/22 • Weigh-pans or other weighing receptacles; Weighing platforms
21/23 • Support or suspension of weighing platforms (G01G 21/24 takes precedence) **[3]**
21/24 • Guides or linkages for ensuring parallel motion of the weigh-pans

21/26 • Counterweights; Poise-weights; Sets of weights; Holders for the reception of weights
21/28 • Frames; Housings
21/30 • Means for preventing contamination by dust

23/00 Auxiliary devices for weighing apparatus
23/01 • Testing or calibrating of weighing apparatus **[3]**
23/02 • Relieving mechanisms; Arrestment mechanisms
23/04 • • for precision weighing apparatus
23/06 • Means for damping oscillations, e.g. of weigh-beams
23/08 • • by fluid means
23/10 • • by electric or magnetic means
23/12 • • specially adapted for preventing oscillations due to movement of the load
23/14 • Devices for determining tare weight or for cancelling out the tare by zeroising, e.g. mechanically operated (in connection with automatic loading G01G 13/14)
23/16 • • electrically or magnetically operated
23/18 • Indicating devices, e.g. for remote indication; Recording devices; Scales, e.g. graduated
23/20 • • Indicating the weight by mechanical means
23/22 • • • combined with price indicators
23/24 • • • involving logarithmic scales
23/26 • • • Drive for the indicating member, e.g. mechanical amplifiers
23/28 • • • involving auxiliary or memory marks
23/30 • • • with means for illuminating the scale
23/32 • • Indicating the weight by optical projection means
23/34 • • • combined with price indicators
23/35 • • Indicating the weight by photographic recording
23/36 • • Indicating the weight by electrical means, e.g. using photoelectric cells
23/365 • • • involving comparison with a reference value (G01G 23/37 takes precedence) **[3]**
23/37 • • • involving digital counting
23/375 • • • • during the movement of a coded element **[3]**
23/38 • • Recording or coding devices specially adapted for weighing apparatus
23/40 • • • mechanically operated
23/42 • • • electrically operated
23/44 • • • • Coding devices therefor **[3]**
23/46 • • • Devices preventing recording until the weighing mechanism has come to rest **[3]**
23/48 • Temperature-compensating arrangements (G01G 1/14, G01G 1/42, G01G 3/18 take precedence) **[3]**

G01H MEASUREMENT OF MECHANICAL VIBRATIONS OR ULTRASONIC, SONIC OR INFRASONIC WAVES [4]

Note(s)

1. This subclass covers the combination of generation and measurement of mechanical vibrations.
2. Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Measuring vibrations in solids by using direct conduction to the detector (G01H 9/00, G01H 11/00 take precedence)
1/04 • of vibrations which are transverse to direction of propagation
1/06 • • Frequency
1/08 • • Amplitude
1/10 • of torsional vibrations
1/12 • of longitudinal or not specified vibrations **[4]**
1/14 • • Frequency **[4]**
1/16 • • Amplitude **[4]**

3/00 Measuring vibrations by using a detector in a fluid (G01H 7/00, G01H 9/00, G01H 11/00 take precedence)
3/04 • Frequency
3/06 • • by electric means
3/08 • • Analysing frequencies present in complex vibrations, e.g. comparing harmonics present
3/10 • Amplitude; Power
3/12 • • by electric means (G01H 3/14 takes precedence) **[2]**
3/14 • • Measuring mean amplitude; Measuring mean power; Measuring time integral of power **[2]**

5/00 Measuring propagation velocity of ultrasonic, sonic or infrasonic waves

7/00 Measuring reverberation time

9/00 Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves by using radiation-sensitive means, e.g. optical means

11/00 Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves by detecting changes in electric or magnetic properties
11/02 • by magnetic means, e.g. reluctance **[4]**
11/04 • • using magnetostrictive devices **[4]**
11/06 • by electric means **[4]**
11/08 • • using piezo-electric devices **[4]**

13/00 Measuring resonant frequency

15/00 Measuring mechanical or acoustic impedance [3]

17/00 Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves, not provided for in the other groups of this subclass [4]

G01J MEASUREMENT OF INTENSITY, VELOCITY, SPECTRAL CONTENT, POLARISATION, PHASE OR PULSE CHARACTERISTICS OF INFRA-RED, VISIBLE OR ULTRA-VIOLET LIGHT; COLORIMETRY; RADIATION PYROMETRY [2]

Note(s)

1. This subclass covers the detection of the presence or absence of infra-red, visible, or ultra-violet light, not otherwise provided for.
2. Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Photometry, e.g. photographic exposure meter (spectrophotometry G01J 3/00; specially adapted for radiation pyrometry G01J 5/00)

1/02 • Details
1/04 • • Optical or mechanical part
1/06 • • • Restricting the angle of incident light
1/08 • • Arrangements of light sources specially adapted for photometry
1/10 • by comparison with reference light or electric value
1/12 • • using wholly visual means (G01J 1/20 takes precedence)
1/14 • • • using comparison with a surface of graded brightness
1/16 • • using electric radiation detectors (G01J 1/20 takes precedence)
1/18 • • • using comparison with a reference electric value
1/20 • • intensity of the measured or reference value being varied to equalise their effects at the detector, e.g. by varying incidence angle
1/22 • • • using a variable element in the light-path, e.g. filter, polarising means (G01J 1/34 takes precedence)
1/24 • • • • using electric radiation detectors
1/26 • • • • • adapted for automatic variation of the measured or reference value
1/28 • • • using variation of intensity or distance of source (G01J 1/34 takes precedence)
1/30 • • • • using electric radiation detectors
1/32 • • • • • adapted for automatic variation of the measured or reference value
1/34 • • • using separate light-paths used alternately or sequentially, e.g. flicker
1/36 • • • • using electric radiation detectors
1/38 • using wholly visual means (G01J 1/10 takes precedence)
1/40 • • using limit of visibility or extinction effect
1/42 • using electric radiation detectors (optical or mechanical part G01J 1/04; by comparison with a reference light or electric value G01J 1/10)
1/44 • • Electric circuits
1/46 • • • using a capacitor
1/48 • using chemical effects
1/50 • • using change in colour of an indicator, e.g. actinometer
1/52 • • using photographic effects
1/54 • • by observing photo-reactions between gases
1/56 • using radiation pressure or radiometer effect
1/58 • using luminescence generated by light
1/60 • by measuring the pupil of the eye

3/00 Spectrometry; Spectrophotometry; Monochromators; Measuring colours [4]

3/02 • Details
3/04 • • Slit arrangements
3/06 • • Scanning arrangements
3/08 • • Beam-switching arrangements
3/10 • • Arrangements of light sources specially adapted for spectrometry or colorimetry
3/12 • Generating the spectrum; Monochromators
3/14 • • using refracting elements, e.g. prism (G01J 3/18, G01J 3/26 take precedence)
3/16 • • • with autocollimation
3/18 • • using diffraction elements, e.g. grating
3/20 • • • Rowland circle spectrometers
3/22 • • • Littrow mirror spectrometers
3/24 • • • using gratings profiled to favour a specific order
3/26 • • using multiple reflection, e.g. Fabry-Perot interferometer, variable interference filter
3/28 • Investigating the spectrum (using colour filters G01J 3/51) **[4]**
3/30 • • Measuring the intensity of spectral lines directly on the spectrum itself (G01J 3/42, G01J 3/44 take precedence)
3/32 • • • Investigating bands of a spectrum in sequence by a single detector
3/36 • • • Investigating two or more bands of a spectrum by separate detectors
3/40 • • Measuring the intensity of spectral lines by determining density of a photograph of the spectrum; Spectrography (G01J 3/42, G01J 3/44 take precedence) **[4]**
3/42 • • Absorption spectrometry; Double-beam spectrometry; Flicker spectrometry; Reflection spectrometry (beam-switching arrangements G01J 3/08) **[4]**
3/427 • • • Dual wavelength spectrometry **[4]**
3/433 • • • Modulation spectrometry; Derivative spectrometry **[4]**
3/44 • • Raman spectrometry; Scattering spectrometry **[4]**
3/443 • • Emission spectrometry **[4]**
3/447 • • Polarisation spectrometry **[4]**
3/45 • • Interferometric spectrometry **[4]**
3/453 • • • by correlation of the amplitudes **[4]**
3/457 • • Correlation spectrometry, e.g. of the intensity (G01J 3/453 takes precedence) **[4]**

3/46 • Measurement of colour; Colour measuring devices, e.g. colorimeters (measuring colour temperature G01J 5/60) **[4]**
3/50 • • using electric radiation detectors **[4]**
3/51 • • • using colour filters **[4]**
3/52 • • using colour charts

4/00 Measuring polarisation of light [2]
4/02 • Polarimeters of separated-field type; Polarimeters of half-shadow type **[2]**
4/04 • Polarimeters using electric detection means (G01J 4/02 takes precedence) **[2]**

5/00 Radiation pyrometry
5/02 • Details
5/04 • • Casings
5/06 • • Arrangements for eliminating effects of disturbing radiation
5/08 • • Optical features
5/10 • using electric radiation detectors
5/12 • • using thermoelectric elements, e.g. thermocouples
5/14 • • • Electrical features
5/16 • • • • Arrangements with respect to the cold junction; Compensating influence of ambient temperature or other variables
5/18 • • • • Special adaptation for indicating or recording
5/20 • • using resistors, thermistors, or semiconductors sensitive to radiation
5/22 • • • Electrical features
5/24 • • • • Use of a specially-adapted circuit, e.g. bridge circuit
5/26 • • • • Special adaptation for indicating or recording
5/28 • • using photo-emissive, photo-conductive, or photo-voltaic cells
5/30 • • • Electrical features
5/32 • • • • Special adaptation for indicating or recording
5/34 • • using capacitors
5/36 • • using ionisation of gases
5/38 • using extension or expansion of solids or fluids
5/40 • • using bimetallic elements
5/42 • • using Golay cells
5/44 • • using change of resonant frequency, e.g. of piezo-electric crystal
5/46 • using radiation pressure or radiometer effect
5/48 • using wholly visual means
5/50 • using techniques specified in the subgroups below
5/52 • • using comparison with reference sources, e.g. disappearing-filament pyrometer
5/54 • • • Optical features
5/56 • • • Electrical features
5/58 • • using absorption; using polarisation; using extinction effect
5/60 • • using determination of colour temperature
5/62 • • using means for chopping the light

7/00 Measuring velocity of light

9/00 Measuring optical phase difference; Determining degree of coherence; Measuring optical wavelength (spectrometry G01J 3/00) **[3]**
9/02 • by interferometric methods **[3]**
9/04 • by beating two waves of the same source but of different frequency and measuring the phase shift of the lower frequency obtained **[3]**

11/00 Measuring the characteristics of individual optical pulses or of optical pulse trains [5]

G01K MEASURING TEMPERATURE; MEASURING QUANTITY OF HEAT; THERMALLY-SENSITIVE ELEMENTS NOT OTHERWISE PROVIDED FOR (radiation pyrometry G01J 5/00)

Note(s)

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.

Subclass index

1/00 Details of thermometers not specially adapted for particular types of thermometer (circuits for reducing thermal inertia G01K 7/42) **[6]**
1/02 • Special applications of indicating or recording means, e.g. for remote indications
1/04 • • Scales
1/06 • • • Arrangements for facilitating reading, e.g. illumination, magnifying glass
1/08 • Protective devices, e.g. casings
1/10 • • for preventing chemical attack
1/12 • • for preventing damage due to heat overloading
1/14 • Supports; Fastening devices; Mounting thermometers in particular locations
1/16 • Special arrangements for conducting heat from the object to the sensitive element
1/18 • • for reducing thermal inertia

1/20 • Compensating for effects of temperature changes other than those to be measured, e.g. changes in ambient temperature
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
1/24 • • by means of compounded strips or plates, e.g. bimetallic strips
1/26 • Compensating for effects of pressure changes

3/00 Thermometers giving results other than momentary value of temperature (G01K 7/42 takes precedence) **[6]**
3/02 • giving mean values; giving integrated values
3/04 • • in respect of time
3/06 • • in respect of space
3/08 • giving differences of values; giving differentiated values
3/10 • • in respect of time, e.g. reacting only to a quick change of temperature
3/12 • • • based upon expansion or contraction of materials
3/14 • • in respect of space

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)
5/02 • the material being a liquid (G01K 5/32 takes precedence)
5/04 • • Details
5/06 • • • Arrangements for driving back the liquid column
5/08 • • • Capillary tubes
5/10 • • • Containers for the liquid
5/12 • • • Selection of liquid compositions
5/14 • • the liquid displacing a further liquid column or a solid body (for maximum or minimum indication G01K 5/20)
5/16 • • with electric contacts
5/18 • • with electric conversion means for final indication
5/20 • • with means for indicating a maximum or a minimum or both (G01K 5/22 takes precedence)
5/22 • • with provision for expansion indicating over not more than a few degrees, e.g. clinical thermometer
5/24 • • with provision for measuring the difference between two temperatures
5/26 • • with provision for adjusting zero point of scale, e.g. Beckmann thermometer
5/28 • the material being a gas (G01K 5/32 takes precedence)
5/30 • • the gas displacing a liquid column
5/32 • the material being a fluid contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the material (under pressure developed by evaporation G01K 11/04)
5/34 • • the body being a capsule (G01K 5/36, G01K 5/42 take precedence)
5/36 • • the body being a tubular spring, e.g. Bourdon tube
5/38 • • • of spiral formation
5/40 • • • of helical formation
5/42 • • the body being a bellows
5/44 • • the body being a cylinder and piston
5/46 • • with electric conversion means for final indication
5/48 • the material being a solid
5/50 • • arranged for free expansion or contraction
5/52 • • • with electrical conversion means for final indication
5/54 • • consisting of pivotally-connected elements
5/56 • • constrained so that expansion or contraction causes a deformation of the solid
5/58 • • • the solid body being constrained at more than one point, e.g. rod, plate, diaphragm (G01K 5/62 takes precedence)
5/60 • • • • the body being a flexible wire or ribbon
5/62 • • • the solid body being formed of compounded strips or plates, e.g. bimetallic strip
5/64 • • • • Details of the compound system
5/66 • • • • • Selection of composition of the components of the system
5/68 • • • • • Shape of the system
5/70 • • • • specially adapted for indicating or recording
5/72 • • • • • with electric transmission means for final indication

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)
7/01 • using semiconducting elements having PN junctions (G01K 7/02, G01K 7/16, G01K 7/30 take precedence) **[6]**
7/02 • using thermo-electric elements, e.g. thermo-couples
7/04 • • the object to be measured not forming one of the thermo-electric materials
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
7/08 • • the object to be measured forming one of the thermo-electric materials, e.g. pointed type
7/10 • • Arrangements for compensating for auxiliary variables, e.g. length of lead
7/12 • • • Arrangements with respect to the cold junction, e.g. preventing influence of temperature of surrounding air
7/13 • • • • Circuits for cold-junction compensation **[6]**
7/14 • • Arrangements for modifying the output characteristic, e.g. linearising
7/16 • using resistive elements
7/18 • • the element being a linear resistance, e.g. platinum resistance thermometer (G01K 7/26 takes precedence)
7/20 • • • in a specially-adapted circuit, e.g. bridge circuit
7/21 • • • • for modifying the output characteristic, e.g. linearising **[6]**
7/22 • • the element being a non-linear resistance, e.g. thermistor (G01K 7/26 takes precedence)
7/24 • • • in a specially-adapted circuit, e.g. bridge circuit
7/25 • • • • for modifying the output characteristic, e.g. linearising **[6]**
7/26 • • the element being an electrolyte
7/28 • • • in a specially-adapted circuit, e.g. bridge circuit
7/30 • using thermal noise of resistances or conductors
7/32 • using change of resonant frequency of a crystal
7/34 • using capacitative elements
7/36 • using magnetic elements, e.g. magnets, coils
7/38 • • the variations of temperature influencing the magnetic permeability
7/40 • using ionisation of gases
7/42 • Circuits for reducing thermal inertia; Circuits for predicting the stationary value of temperature **[6]**

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)

11/00 **Measuring temperature based on physical or chemical changes not covered by group G01K 3/00, G01K 5/00, G01K 7/00, or G01K 9/00**

11/02 • using evaporation or sublimation, e.g. by observing boiling

11/04 • • from material contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the vapour

11/06 • using melting, freezing, or softening

11/08 • • of disposable test bodies, e.g. cone

11/10 • using sintering

11/12 • using change of colour or translucency (G01K 11/32 takes precedence) **[6]**

11/14 • • of inorganic materials

11/16 • • of organic materials

11/18 • • of materials which change translucency

11/20 • using thermoluminescent materials (G01K 11/32 takes precedence) **[6]**

11/22 • using measurement of acoustic effects

11/24 • • of the velocity of propagation of sound

11/26 • • of resonant frequencies

11/28 • using measurements of density

11/30 • using measurement of the effect of a material on X-radiation, gamma radiation or particle radiation **[5]**

11/32 • using changes in transmission, scattering or fluorescence in optical fibres **[6]**

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

13/02 • for measuring temperature of moving fluids or granular materials capable of flow

13/04 • for measuring temperature of moving solid bodies

13/06 • • in linear movement

13/08 • • in rotary movement

13/10 • for measuring temperature within piled or stacked materials (by special arrangements for conducting heat from the object to the sensitive element G01K 1/16)

13/12 • combined with sampling devices for measuring temperatures of samples of material

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

17/00 **Measuring quantity of heat**

17/02 • Calorimeters using transport of an indicating substance, e.g. evaporation calorimeters

17/04 • Calorimeters using compensation methods

17/06 • Measuring quantity of heat conveyed by flowing media, e.g. in heating systems (G01K 17/02, G01K 17/04 take precedence)

17/08 • • based upon measurement of temperature difference

17/10 • • • between an inlet and an outlet point, combined with measurement of rate of flow of the medium

17/12 • • • • Indicating product of flow and temperature difference directly

17/14 • • • • • using mechanical means for both measurements

17/16 • • • • • using electrical means for both measurements

17/18 • • • • • using electrical means for one measurement and mechanical means for the other

17/20 • • • across a radiating surface, combined with ascertainment of the heat-transmission coefficient

19/00 **Testing or calibrating calorimeters**

G01L **MEASURING FORCE, STRESS, TORQUE, WORK, MECHANICAL POWER, MECHANICAL EFFICIENCY, OR FLUID PRESSURE** (weighing G01G) **[4]**

Note(s)

Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 **Measuring force or stress, in general** (measuring force due to impact G01L 5/00) **[4]**

1/02 • by hydraulic or pneumatic means

1/04 • by measuring elastic deformation of gauges, e.g. of springs

1/06 • by measuring the permanent deformation of gauges, e.g. of compressed bodies

1/08 • by the use of counterbalancing forces
1/10 • by measuring variations of frequency of stressed vibrating elements, e.g. of stressed strings (using resistance strain gauges G01L 1/22)
1/12 • by measuring variations in the magnetic properties of materials resulting from the application of stress
1/14 • by measuring variations in capacitance or inductance of electrical elements, e.g. by measuring variations of frequency of electrical oscillators
1/16 • using properties of piezo-electric devices
1/18 • using properties of piezo-resistive materials, i.e. materials of which the ohmic resistance varies according to changes in magnitude or direction of force applied to the material
1/20 • by measuring variations in ohmic resistance of solid materials or of electrically-conductive fluids (of piezo-resistive materials G01L 1/18); by making use of electrokinetic cells, i.e. liquid-containing cells wherein an electrical potential is produced or varied upon the application of stress
1/22 • • using resistance strain gauges
1/24 • by measuring variations of optical properties of material when it is stressed, e.g. by photoelastic stress analysis
1/25 • using wave or particle radiation, e.g. X-rays, neutrons (G01L 1/24 takes precedence) **[4]**
1/26 • Auxiliary measures taken, or devices used, in connection with the measurement of force, e.g. for preventing influence of transverse components of force, for preventing overload

3/00 Measuring torque, work, mechanical power, or mechanical efficiency, in general
3/02 • Rotary-transmission dynamometers
3/04 • • wherein the torque-transmitting element comprises a torsionally-flexible shaft
3/06 • • • involving mechanical means for indicating
3/08 • • • involving optical means for indicating
3/10 • • • involving electric or magnetic means for indicating
3/12 • • • • involving photoelectric means
3/14 • • wherein the torque-transmitting element is other than a torsionally-flexible shaft
3/16 • Rotary-absorption dynamometers, e.g. of brake type
3/18 • • mechanically actuated
3/20 • • fluid actuated
3/22 • • electrically or magnetically actuated
3/24 • Devices for determining the value of power, e.g. by measuring and simultaneously multiplying the values of torque and revolutions per unit of time, by multiplying the values of tractive or propulsive force and velocity
3/26 • Devices for measuring efficiency, i.e. the ratio of power output to power input

5/00 Apparatus for, or methods of, measuring force, e.g. due to impact, work, mechanical power, or torque, adapted for special purposes
5/03 • for measuring release force of ski safety bindings
5/04 • for measuring tension in ropes, cables, wires, threads, belts, bands, or like flexible members
5/06 • • using mechanical means
5/08 • • using fluid means
5/10 • • using electric means
5/12 • for measuring axial thrust in a rotary shaft, e.g. of propulsion plants
5/13 • for measuring the tractive or propulsive power of vehicles
5/14 • for measuring the force of explosions; for measuring the energy of projectiles
5/16 • for measuring several components of force
5/18 • for measuring ratios of force
5/20 • for measuring wheel side-thrust
5/22 • for measuring the force applied to control members, e.g. control members of vehicles, triggers
5/24 • for determining value of torque or twisting moment for tightening a nut or other member which is similarly stressed
5/26 • for determining the characteristic of torque in relation to revolutions per unit of time
5/28 • for testing brakes

Measuring fluid pressure

7/00 Measuring the steady or quasi-steady pressure of a fluid or a fluent solid material by mechanical or fluid pressure-sensitive elements (transmitting or indicating the displacement of mechanical pressure-sensitive elements by electric or magnetic means G01L 9/00; measuring differences of two or more pressure values G01L 13/00; measuring two or more pressure values simultaneously G01L 15/00)
7/02 • in the form of elastically-deformable gauges
7/04 • • in the form of flexible, deformable tubes, e.g. Bourdon gauges
7/06 • • of the bellows type
7/08 • • of the flexible-diaphragm type
7/10 • • of the capsule type
7/12 • • • with exhausted chamber; Aneroid barometers
7/14 • • • • with zero-setting means
7/16 • in the form of pistons
7/18 • using liquid as the pressure-sensitive medium, e.g. liquid-column gauges
7/20 • • involving a closed chamber above the liquid level, the chamber being exhausted or housing low-pressure gas; Liquid barometers
7/22 • • involving floats, e.g. floating bells
7/24 • • involving balances in the form of rings partly filled with liquid

9/00 Measuring steady or quasi-steady pressure of a fluid or a fluent solid material by electric or magnetic pressure-sensitive elements; Transmitting or indicating the displacement of mechanical pressure-sensitive elements, used to measure the steady or quasi-steady pressure of a fluid or fluent solid material, by electric or magnetic means (measuring differences of two or more pressure values G01L 13/00; measuring two or more pressure values simultaneously G01L 15/00)
9/02 • by making use of variations in ohmic resistance, e.g. of potentiometers
9/04 • • of resistance strain gauges
9/06 • • of piezo-resistive devices
9/08 • by making use of piezo-electric devices
9/10 • by making use of variations in inductance
9/12 • by making use of variations in capacitance
9/14 • involving the displacement of magnets, e.g. electromagnets
9/16 • by making use of variations in the magnetic properties of material resulting from the application of stress

9/18 • by making use of electrokinetic cells, i.e. liquid-containing cells wherein an electric potential is produced or varied upon the application of stress

11/00 Measuring steady or quasi-steady pressure of a fluid or a fluent solid material by means not provided for in group G01L 7/00 or G01L 9/00

11/02 • by optical means **[6]**
11/04 • by acoustic means **[6]**
11/06 • • Ultrasonic means **[6]**

13/00 Devices or apparatus for measuring differences of two or more fluid pressure values

13/02 • using elastically-deformable members or pistons as sensing elements
13/04 • using floats or liquids as sensing elements
13/06 • using electric or magnetic pressure-sensitive elements

15/00 Devices or apparatus for measuring two or more fluid pressure values simultaneously

17/00 Devices or apparatus for measuring tyre pressure or the pressure in other inflated bodies

19/00 Details of, or accessories for, apparatus for measuring steady or quasi-steady pressure of a fluent medium insofar as such details or accessories are not special to particular types of pressure gauges

19/02 • Arrangements for preventing, or for compensating for, effects of inclination or acceleration of the measuring device; Zero-setting means (for aneroid barometers G01L 7/14)
19/04 • Means for compensating for effects of changes of temperature
19/06 • Means for preventing overload or deleterious influence of the measured medium on the measuring device or vice versa
19/08 • Means for indicating or recording, e.g. for remote indication
19/10 • • mechanical
19/12 • • Alarms or signals
19/14 • Housings
19/16 • Dials; Mounting of dials

21/00 Vacuum gauges

21/02 • having a compression chamber in which gas, whose pressure is to be measured, is compressed
21/04 • • wherein the chamber is closed by liquid; Vacuum gauges of the McLeod type
21/06 • • • actuated by rotating or inverting the measuring device
21/08 • by measuring variations in the transmission of acoustic waves through the medium, the pressure of which is to be measured
21/10 • by measuring variations in the heat conductivity of the medium, the pressure of which is to be measured
21/12 • • measuring changes in electric resistance of measuring members, e.g. of filaments; Vacuum gauges of the Pirani type
21/14 • • using thermocouples
21/16 • by measuring variation of frictional resistance of gases
21/18 • • using a pendulum
21/20 • • using members oscillating about a vertical axis
21/22 • • using resonance effects of a vibrating body; Vacuum gauges of the Klumb type
21/24 • • using rotating members; Vacuum gauges of the Langmuir type
21/26 • by making use of radiometer action, i.e. of the pressure caused by the momentum of molecules passing from a hotter to a cooler member; Vacuum gauges of the Knudsen type
21/28 • • using torsional rotary measuring members
21/30 • by making use of ionisation effects
21/32 • • using electric discharge tubes with thermionic cathodes
21/34 • • using electric discharge tubes with cold cathodes
21/36 • • using radioactive substances

23/00 Devices or apparatus for measuring or indicating or recording rapid changes, such as oscillations, in the pressure of steam, gas, or liquid; Indicators for determining work or energy of steam, internal-combustion, or other fluid-pressure engines from the condition of the working fluid

23/02 • mechanically indicating or recording and involving loaded or return springs
23/04 • involving means subjected to known counteracting pressure
23/06 • Indicating or recording by optical means
23/08 • operated electrically
23/10 • • by pressure-sensitive members of the piezo-electric type
23/12 • • by changing capacitance or inductance
23/14 • • by electromagnetic elements
23/16 • • by photoelectric means
23/18 • • by resistance strain gauges
23/20 • combined with planimeters or integrators
23/22 • for detecting or indicating knocks in internal-combustion engines; Units comprising pressure-sensitive members combined with ignitors for firing internal-combustion engines
23/24 • for measuring pressure in inlet or exhaust ducts of internal-combustion engines
23/26 • Details or accessories
23/28 • • Cooling means
23/30 • • Means for indicating consecutively positions of pistons or cranks of internal-combustion engines in combination with pressure indicators
23/32 • • Apparatus specially adapted for recording pressure changes measured by indicators

25/00 Testing or calibrating of apparatus for measuring force, torque, work, mechanical power, or mechanical efficiency [2]

27/00 Testing or calibrating of apparatus for measuring fluid pressure [2]

27/02 • of indicators

G01M TESTING STATIC OR DYNAMIC BALANCE OF MACHINES OR STRUCTURES; TESTING OF STRUCTURES OR APPARATUS, NOT OTHERWISE PROVIDED FOR

Note(s)

Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Testing static or dynamic balance of machines or structures

1/02 • Details of balancing machines or devices
1/04 • • Adaptation of bearing support assemblies for receiving the body to be tested
1/06 • • Adaptation of drive assemblies for receiving the body to be tested
1/08 • • Instruments for indicating directly the magnitude and phase of the unbalance
1/10 • Determining the moment of inertia
1/12 • Static balancing; Determining position of centre of gravity (by determining unbalance G01M 1/14)
1/14 • Determining unbalance (G01M 1/30, G01M 1/38 take precedence)
1/16 • • by oscillating or rotating the body to be tested
1/18 • • • and running the body down from a speed greater than normal
1/20 • • • and applying external forces compensating forces due to unbalance
1/22 • • • and converting vibrations due to unbalance into electric variables
1/24 • • • Performing balancing on elastic shafts, e.g. for crankshafts
1/26 • • • with special adaptations for marking, e.g. by drilling
1/28 • • • with special adaptations for determining unbalance of the body in situ, e.g. of vehicle wheels
1/30 • Compensating unbalance (G01M 1/38 takes precedence)
1/32 • • by adding material to the body to be tested, e.g. by correcting-weights
1/34 • • by removing material from the body to be tested, e.g. from the tread of tyres
1/36 • • by adjusting position of masses built-in the body to be tested
1/38 • Combined machines or devices for both determining and correcting unbalance

3/00 Investigating fluid tightness of structures

3/02 • by using fluid or vacuum
3/04 • • by detecting the presence of fluid at the leakage point
3/06 • • • by observing bubbles in a liquid pool
3/08 • • • • for pipes, cables, or tubes; for pipe joints or seals; for valves
3/10 • • • • for containers, e.g. radiators
3/12 • • • by observing elastic covers or coatings, e.g. soapy water
3/14 • • • • for pipes, cables, or tubes; for pipe joints or seals; for valves
3/16 • • • using electric detection means (G01M 3/06, G01M 3/12, G01M 3/20, G01M 3/24, G01M 3/26 take precedence)
3/18 • • • • for pipes, cables, or tubes; for pipe joints or seals; for valves
3/20 • • • using special tracer materials, e.g. dye, fluorescent material, radioactive material
3/22 • • • • for pipes, cables, or tubes; for pipe joints or seals; for valves
3/24 • • • using infrasonic, sonic, or ultrasonic vibrations
3/26 • • by measuring rate of loss or gain of fluid, e.g. by pressure-responsive devices, by flow detectors **[2]**
3/28 • • • for pipes, cables, or tubes; for pipe joints or seals; for valves **[2]**
3/30 • • • • using progressive displacement of one fluid by another **[2]**
3/32 • • • for containers, e.g. radiators **[2]**
3/34 • • • • by testing the possibility of maintaining the vacuum in containers, e.g. in can-testing machines **[2]**
3/36 • • by detecting change in dimensions of the structure being tested
3/38 • by using light (G01M 3/02 takes precedence)
3/40 • by using electric means, e.g. by observing electric discharges

5/00 Investigating the elasticity of structures, e.g. deflection of bridges or aircraft wings (G01M 9/00 takes precedence)

7/00 Vibration-testing of structures; Shock-testing of structures (G01M 9/00 takes precedence)

7/02 • Vibration-testing **[5]**
7/04 • • Monodirectional test stands **[5]**
7/06 • • Multidirectional test stands **[5]**
7/08 • Shock-testing **[5]**

9/00 Aerodynamic testing; Arrangements in or on wind tunnels

9/02 • Wind tunnels **[5]**
9/04 • • Details **[5]**

9/06 • Measuring arrangements specially adapted for aerodynamic testing **[5]**
9/08 • Aerodynamic models **[5]**

10/00 Hydrodynamic testing; Arrangements in or on ship-testing tanks or water tunnels

11/00 Testing of optical apparatus; Testing structures by optical methods not otherwise provided for
11/02 • Testing of optical properties
11/04 • • Optical benches
11/06 • • Testing of alignment of vehicle head-light devices
11/08 • Testing of mechanical properties

13/00 Testing of machine parts
13/02 • Testing of gearing or of transmission mechanisms
13/04 • Testing of bearings

15/00 Testing of engines [4]
15/02 • Details or accessories of testing apparatus **[2006.01]**
15/04 • Testing of internal-combustion engines, e.g. diagnostic testing of piston engines **[2006.01]**
15/05 • • by combined monitoring of two or more different engine parameters **[2006.01]**

Note(s) [2006.01]

Group G01M 15/05 takes precedence over groups G01M 15/06-G01M 15/12.

15/06 • • by monitoring positions of pistons or cranks **[2006.01]**
15/08 • • by monitoring pressure in cylinders **[2006.01]**
15/09 • • by monitoring pressure in fluid ducts, e.g. in lubrication or cooling parts **[2006.01]**
15/10 • • by monitoring exhaust gases **[2006.01]**
15/11 • • by detecting misfire **[2006.01]**
15/12 • • by monitoring vibrations **[2006.01]**
15/14 • Testing of gas-turbine plants or jet-propulsion plants **[2006.01]**

17/00 Testing of vehicles (G01M 15/00 takes precedence; testing fluid tightness G01M 3/00; testing elastic properties of bodies or chassis, e.g. torsion-testing, G01M 5/00; testing alignment of vehicle head-lighting devices G01M 11/06)
17/007 • of wheeled or endless-tracked vehicles (G01M 17/08 takes precedence) **[6]**
17/013 • • of wheels **[6]**
17/02 • • of tyres **[6]**
17/03 • • of endless-tracks **[6]**
17/04 • • of suspension or of damping **[6]**
17/06 • • of steering behaviour; of rolling behaviour **[6]**
17/08 • of railway vehicles **[6]**
17/10 • • of suspensions, axles or wheels **[6]**

99/00 Subject matter not provided for in other groups of this subclass [2011.01]

G01N INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (measuring or testing processes other than immunoassay, involving enzymes or micro-organisms C12M, C12Q)

Note(s)

1. In this subclass, the following terms are used with the meanings indicated:
   - "investigating" means testing or determining;
   - "materials" includes solid, liquid or gaseous media, e.g. the atmosphere.
2. Attention is drawn to the Notes following the title of class G01.
3. Investigating the properties of materials, specially adapted for use in processes covered by subclass B23K, is classified in group B23K 31/12.

Subclass index

1/00 Sampling; Preparing specimens for investigation (handling materials for automatic analysis G01N 35/00)
1/02 • Devices for withdrawing samples
1/04 • • in the solid state, e.g. by cutting
1/06 • • • providing a thin slice, e.g. microtome
1/08 • • • involving an extracting tool, e.g. core bit
1/10 • • in the liquid or fluent state
1/12 • • • Dippers; Dredgers **[5]**
1/14 • • • Suction devices, e.g. pumps; Ejector devices

1/16 • • • with provision for intake at several levels (G01N 1/12, G01N 1/14 take precedence)
1/18 • • • with provision for splitting samples into portions (G01N 1/12, G01N 1/14 take precedence; fraction-collection apparatus for chromatography B01D 15/08)
1/20 • • • for flowing or falling materials (G01N 1/12, G01N 1/14 take precedence)
1/22 • • in the gaseous state
1/24 • • • Suction devices
1/26 • • • with provision for intake from several spaces
1/28 • Preparing specimens for investigation (mounting specimens on microscopic slides G02B 21/34; means for supporting the objects or the materials to be analysed in electron microscopes H01J 37/20)
1/30 • • Staining; Impregnating
1/31 • • • Apparatus therefor **[6]**
1/32 • • Polishing; Etching
1/34 • • Purifying; Cleaning
1/36 • • Embedding or analogous mounting of samples **[6]**
1/38 • • Diluting, dispersing or mixing samples **[6]**
1/40 • • Concentrating samples **[6]**
1/42 • • Low-temperature sample treatment, e.g. cryofixation **[6]**
1/44 • • Sample treatment involving radiation, e.g. heat **[6]**

3/00 Investigating strength properties of solid materials by application of mechanical stress

Note(s)

This group covers the stressing of materials not only below but also beyond the elastic limit, e.g. until breaking occurs.

3/02 • Details
3/04 • • Chucks
3/06 • • Special adaptations of indicating or recording means
3/08 • by applying steady tensile or compressive forces (G01N 3/28 takes precedence)
3/10 • • generated by pneumatic or hydraulic pressure (G01N 3/18 takes precedence)
3/12 • • • Pressure-testing
3/14 • • generated by dead weight, e.g. pendulum; generated by spring tension (G01N 3/18 takes precedence)
3/16 • • applied through gearing (G01N 3/18 takes precedence)
3/18 • • Performing tests at high or low temperatures
3/20 • by applying steady bending forces (G01N 3/26, G01N 3/28 take precedence)
3/22 • by applying steady torsional forces (G01N 3/26, G01N 3/28 take precedence)
3/24 • by applying steady shearing forces (G01N 3/26, G01N 3/28 take precedence)
3/26 • Investigating twisting or coiling properties
3/28 • Investigating ductility, e.g. suitability of sheet metal for deep-drawing or spinning
3/30 • by applying a single impulsive force (investigating hardness by performing impressions under impulsive load G01N 3/48)
3/303 • • generated only by free-falling weight **[7]**
3/307 • • generated by a compressed or tensile-stressed spring; generated by pneumatic or hydraulic means **[7]**
3/31 • • generated by a rotating fly-wheel **[7]**
3/313 • • generated by explosives **[7]**
3/317 • • generated by electromagnetic means **[7]**
3/32 • by applying repeated or pulsating forces
3/34 • • generated by mechanical means, e.g. hammer blows
3/36 • • generated by pneumatic or hydraulic means
3/38 • • generated by electromagnetic means
3/40 • Investigating hardness or rebound hardness
3/42 • • by performing impressions under a steady load by indentors, e.g. sphere, pyramid (G01N 3/54 takes precedence)
3/44 • • • the indentors being put under a minor load and a subsequent major load, i.e. Rockwell system
3/46 • • • the indentors performing a scratching movement
3/48 • • by performing impressions under impulsive load by indentors, e.g. falling ball (G01N 3/54 takes precedence)
3/50 • • by measuring rolling friction, e.g. by rocking pendulum (G01N 3/54 takes precedence)
3/52 • • by measuring extent of rebound of a striking body (G01N 3/54 takes precedence)
3/54 • • Performing tests at high or low temperatures
3/56 • Investigating resistance to wear or abrasion
3/58 • Investigating machinability by cutting tools; Investigating the cutting ability of tools
3/60 • Investigating resistance of materials, e.g. refractory materials, to rapid heat changes
3/62 • Manufacturing, calibrating, or repairing devices used in investigations covered by the preceding subgroups

5/00 Analysing materials by weighing, e.g. weighing small particles separated from a gas or liquid (G01N 9/00 takes precedence)

5/02 • by absorbing or adsorbing components of a material and determining change of weight of the adsorbent, e.g. determining moisture content
5/04 • by removing a component, e.g. by evaporation, and weighing the remainder

7/00 Analysing materials by measuring the pressure or volume of a gas or vapour

7/02 • by absorption, adsorption, or combustion of components and measurement of the change in pressure or volume of the remainder
7/04 • • by absorption or adsorption alone
7/06 • • by combustion alone
7/08 • • by combustion followed by absorption or adsorption of the combustion products
7/10 • by allowing diffusion of components through a porous wall and measuring a pressure or volume difference
7/12 • • the diffusion being followed by combustion or catalytic oxidation
7/14 • by allowing the material to emit a gas or vapour, e.g. water vapour, and measuring a pressure or volume difference
7/16 • • by heating the material
7/18 • • by allowing the material to react
7/20 • • • the reaction being fermentation
7/22 • • • • of dough

9/00 Investigating density or specific gravity of materials; Analysing materials by determining density or specific gravity

9/02 • by measuring weight of a known volume
9/04 • • of fluids

9/06 • • • with continuous circulation through a pivotally-supported member
9/08 • by measuring buoyant force of solid materials by weighing both in air and in a liquid
9/10 • by observing bodies wholly or partially immersed in fluid materials
9/12 • • by observing the depth of immersion of the bodies, e.g. hydrometers
9/14 • • • the body being built into a container
9/16 • • • the body being pivoted
9/18 • • • Special adaptations for indicating, recording, or control
9/20 • • by balancing the weight of the bodies
9/22 • • • with continuous circulation of the fluid
9/24 • by observing the transmission of wave or particle radiation through the material
9/26 • by measuring pressure differences
9/28 • • by measuring the blowing pressure of gas bubbles escaping from nozzles at different depths in a liquid
9/30 • by using centrifugal effects
9/32 • by using flow properties of fluids, e.g. flow through tubes or apertures
9/34 • • by using elements moving through the fluid, e.g. vane
9/36 • Analysing materials by measuring the density or specific gravity, e.g. determining quantity of moisture (methods of measurement G01N 9/02-G01N 9/32)

11/00 Investigating flow properties of materials, e.g. viscosity, plasticity; Analysing materials by determining flow properties
11/02 • by measuring flow of the material
11/04 • • through a restricted passage, e.g. tube, aperture
11/06 • • • by timing the outflow of a known quantity
11/08 • • • by measuring pressure required to produce a known flow
11/10 • by moving a body within the material
11/12 • • by measuring rising or falling speed of the body; by measuring penetration of wedged gauges (G01N 11/16 takes precedence)
11/14 • • by using rotary bodies, e.g. vane (G01N 11/16 takes precedence)
11/16 • • by measuring damping effect upon oscillatory body

13/00 Investigating surface or boundary effects, e.g. wetting power; Investigating diffusion effects; Analysing materials by determining surface, boundary, or diffusion effects (scanning-probe techniques or apparatus G01Q) **[1, 7]**
13/02 • Investigating surface tension of liquids
13/04 • Investigating osmotic effects

15/00 Investigating characteristics of particles; Investigating permeability, pore-volume or surface-area of porous materials (identification of micro-organisms C12Q) **[4]**
15/02 • Investigating particle size or size distribution (G01N 15/04, G01N 15/10 take precedence; by measuring osmotic pressure G01N 7/10) **[4]**
15/04 • Investigating sedimentation of particle suspensions
15/05 • • in blood **[4]**
15/06 • Investigating concentration of particle suspensions (G01N 15/04, G01N 15/10 take precedence; by weighing G01N 5/00) **[3]**
15/08 • Investigating permeability, pore volume, or surface area of porous materials
15/10 • Investigating individual particles **[4]**
15/12 • • Coulter-counters **[4]**
15/14 • • Electro-optical investigation **[4]**

17/00 Investigating resistance of materials to the weather, to corrosion, or to light
17/02 • Electrochemical measuring systems for weathering, corrosion or corrosion-protection measurement (G01N 17/04 takes precedence) **[5]**
17/04 • Corrosion probes **[5]**

19/00 Investigating materials by mechanical methods (G01N 3/00-G01N 17/00 take precedence)
19/02 • Measuring coefficient of friction between materials
19/04 • Measuring adhesive force between materials, e.g. of sealing tape, of coating
19/06 • Investigating by removing material, e.g. spark-testing
19/08 • Detecting presence of flaws or irregularities
19/10 • Measuring moisture content, e.g. by measuring change in length of hygroscopic filament; Hygrometers

21/00 Investigating or analysing materials by the use of optical means, i.e. using infra-red, visible or ultra-violet light (G01N 3/00-G01N 19/00 take precedence)

Note(s)

This group does not cover the investigation of spectral properties of light per se, or measurements of the properties of materials where spectral properties of light are sensed and primary emphasis is placed on creating, detecting or analysing the spectrum providing that the properties of the materials to be investigated are of minor importance (see also Note (4) after the title of class G01). Those subjects are covered by group G01J 3/00.

21/01 • Arrangements or apparatus for facilitating the optical investigation **[3]**
21/03 • • Cuvette constructions **[3]**
21/05 • • • Flow-through cuvettes (G01N 21/09 takes precedence) **[3]**
21/07 • • • Centrifugal type cuvettes (G01N 21/09 takes precedence) **[3]**
21/09 • • • adapted to resist hostile environments or corrosive or abrasive materials **[3]**
21/11 • • Filling or emptying of cuvettes **[3]**
21/13 • • Moving of cuvettes or solid samples to or from the investigating station **[3]**
21/15 • • Preventing contamination of the components of the optical system or obstruction of the light path **[3]**
21/17 • Systems in which incident light is modified in accordance with the properties of the material investigated (where the material investigated is optically excited causing a change in wavelength of the incident light G01N 21/63) **[3]**
21/19 • • Dichroism **[3]**
21/21 • • Polarisation-affecting properties (G01N 21/19 takes precedence) **[3]**
21/23 • • • Bi-refringence **[3]**
21/25 • • Colour; Spectral properties, i.e. comparison of effect of material on the light at two or more different wavelengths or wavelength bands **[3]**
21/27 • • • using photo-electric detection (G01N 21/31 takes precedence) **[3]**

21/29 • • • using visual detection (G01N 21/31 takes precedence) **[3]**
21/31 • • • Investigating relative effect of material at wavelengths characteristic of specific elements or molecules, e.g. atomic absorption spectrometry **[3]**
21/33 • • • • using ultra-violet light (G01N 21/39 takes precedence) **[3]**
21/35 • • • • *using infra-red light (G01N 21/39 takes precedence)* ***[3, 2014.01]***
21/3504 • • • • • *for analysing gases, e.g. multi-gas analysis* ***[2014.01]***
21/3518 • • • • • • *Devices using gas filter correlation techniques; Devices using gas pressure modulation techniques* ***[2014.01]***

Note(s) [2014.01]

This group also covers devices without instrumental sources, e.g. radiometric-type devices using ambient infra-red light.

21/3554 • • • • • *for determining moisture content* ***[2014.01]***
21/3559 • • • • • • *in sheets, e.g. in paper* ***[2014.01]***
21/3563 • • • • • *for analysing solids; Preparation of samples therefor* ***[2014.01]***
21/3577 • • • • • *for analysing liquids, e.g. polluted water* ***[2014.01]***
21/3581 • • • • • *using far infra-red light; using Terahertz radiation* ***[2014.01]***
21/3586 • • • • • • *by Terahertz time domain spectroscopy [THz-TDS]* ***[2014.01]***
21/359 • • • • • *using near infra-red light* ***[2014.01]***
21/37 • • • • • using pneumatic detection **[3]**
21/39 • • • • using tunable lasers **[3]**
21/41 • • Refractivity; Phase-affecting properties, e.g. optical path length (G01N 21/21 takes precedence) **[3]**
21/43 • • • by measuring critical angle **[3]**
21/45 • • • using interferometric methods; using Schlieren methods **[3]**
21/47 • • Scattering, i.e. diffuse reflection (G01N 21/25, G01N 21/41 take precedence) **[3]**
21/49 • • • within a body or fluid **[3]**
21/51 • • • • inside a container, e.g. in an ampoule (G01N 21/53 takes precedence) **[3]**
21/53 • • • • within a flowing fluid, e.g. smoke **[3]**
21/55 • • *Specular reflectivity* ***[3, 2014.01]***
21/552 • • • *Attenuated total reflection* ***[2014.01]***
21/57 • • • Measuring gloss **[3]**
21/59 • • Transmissivity (G01N 21/25 takes precedence) **[3]**
21/61 • • • Non-dispersive gas analysers **[3]**
21/62 • Systems in which the material investigated is excited whereby it emits light or causes a change in wavelength of the incident light **[3]**
21/63 • • optically excited **[3]**
21/64 • • • Fluorescence; Phosphorescence **[3]**
21/65 • • • Raman scattering **[3]**
21/66 • • electrically excited, e.g. electroluminescence **[3]**
21/67 • • • using electric arcs or discharges **[3]**
21/68 • • • using high frequency electric fields **[3]**
21/69 • • • specially adapted for fluids **[3]**
21/70 • • mechanically excited, e.g. triboluminescence **[3]**
21/71 • • thermally excited **[3]**
21/72 • • • using flame burners **[3]**
21/73 • • • using plasma burners or torches **[3]**
21/74 • • • using flameless atomising, e.g. graphite furnaces **[3]**
21/75 • Systems in which material is subjected to a chemical reaction, the progress or the result of the reaction being investigated (systems in which material is burnt in a flame or plasma G01N 21/72, G01N 21/73) **[3]**
21/76 • • Chemiluminescence; Bioluminescence **[3]**
21/77 • • by observing the effect on a chemical indicator **[3]**
21/78 • • • producing a change of colour **[3]**
21/79 • • • • Photometric titration **[3]**
21/80 • • • • Indicating pH value **[3]**
21/81 • • • • Indicating humidity **[3]**
21/82 • • • producing a precipitate or turbidity **[3]**
21/83 • • • • Turbidimetric titration **[3]**
21/84 • Systems specially adapted for particular applications **[3]**
21/85 • • Investigating moving fluids or granular solids **[3]**
21/86 • • Investigating moving sheets (G01N 21/89 takes precedence) **[3]**
21/87 • • Investigating jewels (G01N 21/88 takes precedence) **[3]**
21/88 • • Investigating the presence of flaws, defects or contamination **[3]**
21/89 • • • in moving material, e.g. paper, textiles (G01N 21/90, G01N 21/91, G01N 21/94 take precedence) **[3, 7]**
21/892 • • • • characterised by the flaw, defect or object feature examined **[7]**
21/894 • • • • • Pinholes **[7]**
21/896 • • • • • Optical defects in or on transparent materials, e.g. distortion, surface flaws **[7]**
21/898 • • • • • Irregularities in textured or patterned surfaces, e.g. textiles, wood **[7]**
21/90 • • • in a container or its contents (G01N 21/91 takes precedence) **[3]**
21/91 • • • using penetration of dyes, e.g. fluorescent ink **[3]**
21/93 • • • Detection standards; Calibrating **[7]**
21/94 • • • Investigating contamination, e.g. dust (G01N 21/85 takes precedence) **[7]**
21/95 • • • characterised by the material or shape of the object to be examined (G01N 21/89-G01N 21/91, G01N 21/94 take precedence) **[7]**
21/952 • • • • Inspecting the exterior surface of cylindrical bodies or wires (G01N 21/956 takes precedence) **[7]**
21/954 • • • • Inspecting the inner surface of hollow bodies, e.g. bores **[7]**
21/956 • • • • Inspecting patterns on the surface of objects **[7]**
21/958 • • • • Inspecting transparent materials **[7]**

22/00 **Investigating or analysing materials by the use of microwaves** (G01N 3/00-G01N 17/00, G01N 24/00 take precedence) **[3]**
22/02 • Investigating the presence of flaws **[3]**
22/04 • Investigating moisture content **[3]**

23/00 **Investigating or analysing materials by the use of wave or particle radiation not covered by group G01N 21/00 or G01N 22/00, e.g. X-rays, neutrons** (G01N 3/00-G01N 17/00 take precedence)
23/02 • by transmitting the radiation through the material
23/04 • • and forming a picture
23/05 • • • using neutrons **[3]**
23/06 • • and measuring the absorption

23/08 • • • using electric detection means
23/083 • • • • the radiation being X-rays (G01N 23/10-G01N 23/18 take precedence) **[5]**
23/087 • • • • • using polyenergetic X-rays **[5]**
23/09 • • • • the radiation being neutrons **[3]**
23/10 • • • • the material being confined in a container (G01N 23/09 takes precedence) **[3]**
23/12 • • • • the material being a flowing fluid or a flowing granular solid (G01N 23/09 takes precedence) **[3]**
23/14 • • • • • specially adapted for controlling or monitoring operations or for signalling
23/16 • • • • the material being a moving sheet (G01N 23/09, G01N 23/18 take precedence) **[3]**
23/18 • • • • Investigating the presence of flaws or inclusions (G01N 23/09 takes precedence) **[3, 5]**
23/20 • by using diffraction of the radiation, e.g. for investigating crystal structure; by using reflection of the radiation
23/201 • • by measuring small-angle scattering **[2]**
23/202 • • • using neutrons **[3]**
23/203 • • by measuring back scattering **[2]**
23/204 • • • using neutrons **[3]**
23/205 • • by means of diffraction cameras (G01N 23/201 takes precedence) **[2]**
23/206 • • • the radiation being neutrons **[3]**
23/207 • • by means of diffractometry using detectors, e.g. using an analysing crystal or a crystal to be analysed in a central position and one or more displaceable detectors in circumferential positions (G01N 23/201 takes precedence) **[2]**
23/22 • by measuring secondary emission **[2]**
23/221 • • by activation analysis **[2]**
23/222 • • • using neutrons **[3]**
23/223 • • by irradiating the sample with X-rays and by measuring X-ray fluorescence **[2]**
23/225 • • using electron or ion microprobe **[2]**
23/227 • • by measuring photoelectric effect, e.g. Auger electrons **[2]**

24/00 Investigating or analysing materials by the use of nuclear magnetic resonance, electron paramagnetic resonance or other spin effects [3, 4, 5]

24/08 • by using nuclear magnetic resonance (G01N 24/12 takes precedence) **[3]**
24/10 • by using electron paramagnetic resonance (G01N 24/12 takes precedence) **[3]**
24/12 • by using double resonance **[3]**
24/14 • by using cyclotron resonance **[3]**

25/00 Investigating or analysing materials by the use of thermal means (G01N 3/00-G01N 23/00 take precedence)

25/02 • by investigating changes of state or changes of phase; by investigating sintering
25/04 • • of melting point; of freezing point; of softening point
25/06 • • • Analysis by measuring change of freezing point
25/08 • • of boiling point
25/10 • • • Analysis by measuring change of boiling point
25/12 • • of critical point; of other phase change
25/14 • by using distillation, extraction, sublimation, condensation, freezing, or crystallisation (G01N 25/02 takes precedence)
25/16 • by investigating thermal coefficient of expansion
25/18 • by investigating thermal conductivity (by calorimetry G01N 25/20; by measuring change of resistance of an electrically-heated body G01N 27/18)
25/20 • by investigating the development of heat, i.e. calorimetry, e.g. by measuring specific heat, by measuring thermal conductivity
25/22 • • on combustion or catalytic oxidation, e.g. of components of gas mixtures
25/24 • • • using combustion tubes, e.g. for micro-analysis
25/26 • • • using combustion with oxygen under pressure, e.g. in bomb calorimeter
25/28 • • • the rise in temperature of the gases resulting from combustion being measured directly
25/30 • • • • using electric temperature-responsive elements
25/32 • • • • • using thermoelectric elements
25/34 • • • • using mechanical temperature-responsive elements, e.g. bimetallic
25/36 • • • • • for investigating the composition of gas mixtures
25/38 • • • • using the melting or combustion of a solid
25/40 • • • the heat developed being transferred to a flowing fluid
25/42 • • • • continuously
25/44 • • • the heat developed being transferred to a fixed quantity of fluid
25/46 • • • • for investigating the composition of gas mixtures
25/48 • • on solution, sorption, or a chemical reaction not involving combustion or catalytic oxidation
25/50 • by investigating flash-point; by investigating explosibility
25/52 • • by determining flash-point of liquids
25/54 • • by determining explosibility
25/56 • by investigating moisture content
25/58 • • by measuring changes of properties of the material due to heat, cold, or expansion
25/60 • • • for determining the wetness of steam
25/62 • • by psychrometric means, e.g. wet-and-dry-bulb thermometers
25/64 • • • using electric temperature-responsive elements
25/66 • • by investigating dew-point
25/68 • • • by varying the temperature of a condensing surface
25/70 • • • by varying the temperature of the material, e.g. by compression, by expansion
25/72 • Investigating presence of flaws

27/00 Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means (G01N 3/00-G01N 25/00 take precedence; measurement or testing of electric or magnetic variables or of electric or magnetic properties of materials G01R)

27/02 • by investigating impedance
27/04 • • by investigating resistance
27/06 • • • of a liquid (involving electrolysis G01N 27/26)
27/07 • • • • Construction of measuring vessels; Electrodes therefor **[2]**
27/08 • • • • which is flowing continuously
27/10 • • • • • Investigation or analysis specially adapted for controlling or monitoring operations or for signalling
27/12 • • • of a solid body in dependence upon absorption of a fluid; of a solid body in dependence upon reaction with a fluid

27/14 • • • of an electrically-heated body in dependence upon change of temperature
27/16 • • • • caused by burning or catalytic oxidation of surrounding material to be tested, e.g. of gas
27/18 • • • • caused by changes in the thermal conductivity of a surrounding material to be tested (G01N 27/20 takes precedence)
27/20 • • • Investigating the presence of flaws
27/22 • • by investigating capacitance
27/24 • • • Investigating the presence of flaws
27/26 • by investigating electrochemical variables; by using electrolysis or electrophoresis **[5]**
27/27 • • Association of two or more measuring systems or cells, each measuring a different parameter, where the measurement results may be either used independently, the systems or cells being physically associated, or combined to produce a value for a further parameter **[5]**
27/28 • • Electrolytic cell components
27/30 • • • Electrodes, e.g. test electrodes; Half-cells (G01N 27/414 takes precedence) **[5]**
27/31 • • • • Half-cells with permeable membranes, e.g. semi-porous or perm-selective membranes **[5]**
27/32 • • • • Calomel electrodes
27/327 • • • • Biochemical electrodes **[5]**
27/333 • • • • Ion-selective electrodes or membranes (glass electrodes G01N 27/36) **[5]**
27/34 • • • • Dropping-mercury electrodes
27/36 • • • • Glass electrodes
27/38 • • • • Cleaning of electrodes
27/40 • • • Semi-permeable membranes or partitions
27/401 • • • Salt-bridge leaks; Liquid junctions **[5]**
27/403 • • Cells and electrode assemblies **[5]**
27/404 • • • Cells with anode, cathode and cell electrolyte on the same side of a permeable membrane which separates them from the sample fluid **[5]**
27/406 • • • Cells and probes with solid electrolytes **[5]**
27/407 • • • • for investigating or analysing gases **[5]**
27/409 • • • • • Oxygen concentration cells **[5]**
27/41 • • • • • Oxygen pumping cells **[5]**
27/411 • • • • for investigating or analysing of liquid metals **[5]**
27/413 • • • Concentration cells using liquid electrolytes **[5]**
27/414 • • • Ion-sensitive or chemical field-effect transistors, i.e. ISFETS or CHEMFETS **[5]**
27/416 • • Systems (G01N 27/27 takes precedence) **[5]**
27/417 • • • using cells and probes with solid electrolytes **[5]**
27/419 • • • • Measuring voltages or currents with a combination of oxygen pumping cells and oxygen concentration cells **[5]**
27/42 • • • Measuring deposition or liberation of materials from an electrolyte; Coulometry, i.e. measuring coulomb-equivalent of material in an electrolyte **[5]**
27/44 • • • • using electrolysis to generate a reagent, e.g. for titration **[5]**
27/447 • • • using electrophoresis **[5]**
27/453 • • • • Cells therefor **[5]**
27/48 • • • using polarography, i.e. measuring changes in current under a slowly-varying voltage
27/49 • • • Systems involving the determination of the current at a single specific value, or small range of values, of applied voltage for producing selective measurement of one or more particular ionic species **[5]**
27/60 • by investigating electrostatic variables
27/61 • • Investigating the presence of flaws **[3]**
27/62 • by investigating the ionisation of gases; by investigating electric discharges, e.g. emission of cathode
27/64 • • using wave or particle radiation to ionise a gas, e.g. in an ionisation chamber
27/66 • • • and measuring current or voltage
27/68 • • using electric discharge to ionise a gas
27/70 • • • and measuring current or voltage
27/72 • by investigating magnetic variables
27/74 • • of fluids (G01N 24/00 takes precedence)
27/76 • • • by investigating susceptibility
27/80 • • for investigating mechanical hardness, e.g. by investigating saturation or remanence of ferromagnetic material
27/82 • • for investigating the presence of flaws
27/83 • • • by investigating stray magnetic fields **[3]**
27/84 • • • • by applying magnetic powder or magnetic ink **[3]**
27/85 • • • • using magnetographic methods **[3]**
27/87 • • • • using probes **[3]**
27/90 • • • using eddy currents **[3]**
27/92 • by investigating breakdown voltage (G01N 27/60, G01N 27/62 take precedence) **[3]**

29/00 Investigating or analysing materials by the use of ultrasonic, sonic or infrasonic waves; Visualisation of the interior of objects by transmitting ultrasonic or sonic waves through the object (G01N 3/00-G01N 27/00 take precedence) **[4]**

29/02 • Analysing fluids (using acoustic emission techniques G01N 29/14) **[5, 2006.01]**
29/024 • • by measuring propagation velocity or propagation time of acoustic waves **[2006.01]**
29/028 • • by measuring mechanical or acoustic impedance **[2006.01]**
29/032 • • by measuring attenuation of acoustic waves **[2006.01]**
29/036 • • by measuring frequency or resonance of acoustic waves **[2006.01]**
29/04 • Analysing solids (using acoustic emission techniques G01N 29/14) **[4, 5, 2006.01]**
29/06 • • Visualisation of the interior, e.g. acoustic microscopy **[4, 2006.01]**
29/07 • • by measuring propagation velocity or propagation time of acoustic waves **[2006.01]**
29/09 • • by measuring mechanical or acoustic impedance **[2006.01]**
29/11 • • by measuring attenuation of acoustic waves **[2006.01]**
29/12 • • by measuring frequency or resonance of acoustic waves **[5, 2006.01]**
29/14 • using acoustic emission techniques **[5, 2006.01]**
29/22 • Details **[5]**
29/24 • • Probes **[5]**
29/26 • • Arrangements for orientation or scanning **[5]**
29/265 • • • by moving the sensor relative to a stationary material **[2006.01]**
29/27 • • • by moving the material relative to a stationary sensor **[2006.01]**

29/275 • • • by moving both the sensor and the material **[2006.01]**
29/28 • • providing acoustic coupling **[5]**
29/30 • • Arrangements for calibrating or comparing, e.g. with standard objects **[2006.01]**
29/32 • • Arrangements for suppressing undesired influences, e.g. temperature or pressure variations **[2006.01]**
29/34 • Generating the ultrasonic, sonic or infrasonic waves **[2006.01]**
29/36 • Detecting the response signal **[2006.01]**
29/38 • • by time filtering, e.g. using time gates **[2006.01]**
29/40 • • by amplitude filtering, e.g. by applying a threshold **[2006.01]**
29/42 • • by frequency filtering **[2006.01]**
29/44 • Processing the detected response signal **[2006.01]**
29/46 • • by spectral analysis, e.g. Fourier analysis **[2006.01]**
29/48 • • by amplitude comparison **[2006.01]**
29/50 • • using auto-correlation techniques or cross-correlation techniques **[2006.01]**
29/52 • • using inversion methods other than spectral analysis, e.g. conjugated gradient inversion **[2006.01]**

30/00 Investigating or analysing materials by separation into components using adsorption, absorption or similar phenomena or using ion-exchange, e.g. chromatography (G01N 3/00-G01N 29/00 take precedence) **[4]**

30/02 • Column chromatography **[4]**

Note(s)

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

- "conditioning" means the adjustment or control of environmental parameters, e.g. temperature or pressure.

30/04 • • Preparation or injection of sample to be analysed **[4]**
30/06 • • • Preparation **[4]**
30/08 • • • • using an enricher **[4]**
30/10 • • • • using a splitter **[4]**
30/12 • • • • by evaporation **[4]**
30/14 • • • • by elimination of some components **[4]**
30/16 • • • Injection (G01N 30/24 takes precedence) **[4]**
30/18 • • • • using a septum or microsyringe **[4]**
30/20 • • • • using a sampling valve **[4]**
30/22 • • • • in high pressure liquid systems **[4]**
30/24 • • • Automatic injection systems **[4]**
30/26 • • Conditioning of the fluid carrier; Flow patterns **[4]**
30/28 • • • Control of physical parameters of the fluid carrier **[4]**
30/30 • • • • of temperature **[4]**
30/32 • • • • of pressure or speed (G01N 30/36 takes precedence) **[4]**
30/34 • • • • of fluid composition, e.g. gradient (G01N 30/36 takes precedence) **[4]**
30/36 • • • • in high pressure liquid systems **[4]**
30/38 • • • Flow patterns **[4]**
30/40 • • • • using back flushing **[4]**
30/42 • • • • using counter-current **[4]**
30/44 • • • • using recycling of the fraction to be distributed **[4]**
30/46 • • • • using more than one column **[4]**
30/50 • • Conditioning of the sorbent material or stationary liquid **[4]**
30/52 • • • Physical parameters **[4]**
30/54 • • • • Temperature **[4]**
30/56 • • • Packing methods or coating methods **[4]**
30/58 • • • the sorbent moving as a whole **[4]**
30/60 • • Construction of the column **[4]**
30/62 • • Detectors specially adapted therefor **[4]**
30/64 • • • Electrical detectors **[4]**
30/66 • • • • Thermal conductivity detectors **[4]**
30/68 • • • • Flame ionisation detectors **[4]**
30/70 • • • • Electron capture detectors (G01N 30/68 takes precedence) **[4]**
30/72 • • • Mass spectrometers **[4]**
30/74 • • • Optical detectors **[4]**
30/76 • • • Acoustical detectors **[4]**
30/78 • • • using more than one detector **[4]**
30/80 • • Fraction collectors **[4]**
30/82 • • • Automatic means therefor **[4]**
30/84 • • Preparation of the fraction to be distributed **[4]**
30/86 • • Signal analysis **[4]**
30/88 • • Integrated analysis systems specially adapted therefor, not covered by a single one of groups G01N 30/04-G01N 30/86 **[4]**
30/89 • Inverse chromatography, i.e. with the analyte in stationary phase **[2006.01]**
30/90 • Plate chromatography, e.g. thin layer or paper chromatography **[4]**
30/91 • • Application of the sample **[4]**
30/92 • • Construction of the plate **[4]**
30/93 • • • Application of the sorbent layer **[4]**
30/94 • • Development **[4]**
30/95 • • Detectors specially adapted therefor; Signal analysis **[4]**
30/96 • using ion-exchange (G01N 30/02, G01N 30/90 take precedence) **[4]**

31/00 Investigating or analysing non-biological materials by the use of the chemical methods specified in the subgroups; Apparatus specially adapted for such methods [4]

Note(s)

The observation of the progress of the reactions covered by groups G01N 31/02-G01N 31/22 by any of the methods specified in groups G01N 3/00-G01N 29/00, if this observation is of major importance, is classified in the relevant group covering the method.

31/02 • using precipitation
31/10 • using catalysis
31/12 • using combustion (G01N 25/20 takes precedence)
31/16 • using titration
31/18 • • Burettes specially adapted for titration
31/20 • using micro-analysis, e.g. drop reaction
31/22 • using chemical indicators (G01N 31/02 takes precedence)

33/00 Investigating or analysing materials by specific methods not covered by groups G01N 1/00-G01N 31/00

33/02 • Food
33/03 • • Edible oils or edible fats **[4]**
33/04 • • Dairy products
33/06 • • • Determining fat content, e.g. by butyrometer
33/08 • • Eggs, e.g. by candling
33/10 • • Starch-containing substances, e.g. dough

33/12 • • Meat; fish
33/14 • • Beverages
33/15 • Medicinal preparations **[3]**
33/18 • Water
33/20 • Metals
33/22 • Fuels; explosives
33/24 • Earth materials (G01N 33/42 takes precedence)
33/26 • Oils; viscous liquids; paints; inks (G01N 33/22 takes precedence)
33/28 • • Oils (edible oils or edible fats G01N 33/03) **[4]**
33/30 • • • for lubricating properties
33/32 • • Paints; inks
33/34 • Paper
33/36 • Textiles
33/38 • Concrete; lime; mortar; gypsum; bricks; ceramics; glass
33/40 • Grinding-materials
33/42 • Road-making materials (G01N 33/38 takes precedence)
33/44 • Resins; plastics; rubber; leather
33/46 • Wood
33/48 • Biological material, e.g. blood, urine (G01N 33/02, G01N 33/26, G01N 33/44, G01N 33/46 take precedence); Haemocytometers (counting blood corpuscules distributed over a surface by scanning the surface G06M 11/02) **[3, 4]**
33/483 • • Physical analysis of biological material **[4]**
33/487 • • • of liquid biological material **[4]**
33/49 • • • • blood **[4]**
33/493 • • • • urine **[4]**
33/497 • • • of gaseous biological material, e.g. breath **[4]**
33/50 • • Chemical analysis of biological material, e.g. blood, urine; Testing involving biospecific ligand binding methods; Immunological testing (measuring or testing processes other than immunological involving enzymes or micro-organisms, compositions or test papers therefor; processes of forming such compositions, condition responsive control in microbiological or enzymological processes C12Q) **[3]**

Note(s)

In this group, the following expression is used with the meaning indicated:

- "involving", when used in relation to a material, includes the testing for the material as well as employing the material as a determinant or reactant in a test for a different material.

Note(s)

In groups G01N 33/52-G01N 33/98, in the absence of an indication to the contrary, classification is made in the last appropriate place.

33/52 • • • Use of compounds or compositions for colorimetric, spectrophotometric or fluorometric investigation, e.g. use of reagent paper **[3]**
33/53 • • • Immunoassay; Biospecific binding assay; Materials therefor **[4]**
33/531 • • • • Production of immunochemical test materials **[4]**
33/532 • • • • • Production of labelled immunochemicals **[4]**
33/533 • • • • • • with fluorescent label **[4]**
33/534 • • • • • • with radioactive label **[4]**
33/535 • • • • • • with enzyme label **[4]**
33/536 • • • • with immune complex formed in liquid phase **[4]**
33/537 • • • • • with separation of immune complex from unbound antigen or antibody **[4]**
33/538 • • • • • • by sorbent column, particles or resin strip **[4]**
33/539 • • • • • • involving precipitating reagent **[4]**
33/541 • • • • • • • Double or second antibody **[4]**
33/542 • • • • with steric inhibition or signal modification, e.g. fluorescent quenching **[4]**
33/543 • • • with an insoluble carrier for immobilising immunochemicals **[4]**
33/544 • • • • the carrier being organic **[4]**
33/545 • • • • • Synthetic resin **[4]**
33/546 • • • • • • as water suspendable particles **[4]**
33/547 • • • • • • with antigen or antibody attached to the carrier via a bridging agent **[4]**
33/548 • • • • • Carbohydrates, e.g. dextran **[4]**
33/549 • • • • • with antigen or antibody entrapped within the carrier **[4]**
33/551 • • • • the carrier being inorganic **[4]**
33/552 • • • • • Glass or silica **[4]**
33/553 • • • • • Metal or metal coated **[4]**
33/554 • • • • the carrier being a biological cell or cell fragment, e.g. bacteria, yeast cells **[4]**
33/555 • • • • • Red blood cell **[4]**
33/556 • • • • • • Fixed or stabilised red blood cell **[4]**
33/557 • • • using kinetic measurement, i.e. time rate of progress of an antigen-antibody interaction **[4]**
33/558 • • • using diffusion or migration of antigen or antibody **[4]**
33/559 • • • • through a gel, e.g. Ouchterlony technique **[4]**
33/561 • • • • Immunoelectrophoresis **[4]**
33/563 • • • involving antibody fragments **[4]**
33/564 • • • for pre-existing immune complex or autoimmune disease **[4]**
33/566 • • • using specific carrier or receptor proteins as ligand binding reagent **[4]**
33/567 • • • • utilising isolate of tissue or organ as binding agent **[4]**
33/569 • • • for micro-organisms, e.g. protozoa, bacteria, viruses **[4]**
33/571 • • • • for venereal disease, e.g. syphilis, gonorrhoea, herpes **[4]**
33/573 • • • for enzymes or isoenzymes **[4]**
33/574 • • • for cancer **[4]**
33/576 • • • for hepatitis **[4]**
33/577 • • • involving monoclonal antibodies **[4]**
33/579 • • involving limulus lysate **[4]**
33/58 • • involving labelled substances (G01N 33/53 takes precedence) **[3]**
33/60 • • • involving radioactive labelled substances **[3]**
33/62 • • involving urea **[3]**
33/64 • • involving ketones **[3]**
33/66 • • involving blood sugars, e.g. galactose **[3]**
33/68 • • involving proteins, peptides or amino acids **[3]**
33/70 • • involving creatine or creatinine **[3]**
33/72 • • involving blood pigments, e.g. hemoglobin, bilirubin **[3]**
33/74 • • involving hormones **[3]**
33/76 • • • Human chorionic gonadotropin **[3]**
33/78 • • • Thyroid gland hormones **[3]**

33/80 • • • involving blood groups or blood types **[3]**
33/82 • • • involving vitamins **[3]**
33/84 • • • involving inorganic compounds or pH **[3]**
33/86 • • • involving blood coagulating time **[3]**
33/88 • • • involving prostaglandins **[3]**
33/90 • • • involving iron binding capacity of blood **[3]**
33/92 • • • involving lipids, e.g. cholesterol **[3]**
33/94 • • • involving narcotics **[3]**
33/96 • • • involving blood or serum control standard **[3]**
33/98 • • • involving alcohol, e.g. ethanol in breath **[4]**

35/00 Automatic analysis not limited to methods or materials provided for in any single one of groups G01N 1/00-G01N 33/00; Handling materials therefor [3]

35/02 • using a plurality of sample containers moved by a conveyor system past one or more treatment or analysis stations **[3]**
35/04 • • Details of the conveyor system **[3]**
35/08 • using a stream of discrete samples flowing along a tube system, e.g. flow injection analysis **[3]**
35/10 • Devices for transferring samples to, in, or from, the analysis apparatus, e.g. suction devices, injection devices **[6]**

37/00 Details not covered by any other group of this subclass [3]

G01P MEASURING LINEAR OR ANGULAR SPEED, ACCELERATION, DECELERATION OR SHOCK; INDICATING PRESENCE OR ABSENCE OF MOVEMENT; INDICATING DIRECTION OF MOVEMENT (measuring angular rate using gyroscopic effects G01C 19/00; combined measuring devices for measuring two or more variables of movement G01C 23/00; measuring velocity of sound G01H 5/00; measuring velocity of light G01J 7/00; determining direction or velocity of solid objects by reflection or reradiation of radio or other waves and based on propagation effects, e.g. Doppler effect, propagation time or direction of propagation, G01S; measuring speed of nuclear radiation G01T)

Note(s)

1. This subclass covers measuring direction or velocity of flowing fluids using propagation effects of radiowaves or other waves caused in the fluid itself, e.g. by laser anemometer, by ultrasonic flowmeter with "sing-around-system".
2. Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Details of instruments
1/02 • Housings
1/04 • Special adaptations of driving means
1/07 • Indicating devices, e.g. for remote indication **[3]**
1/08 • • Arrangements of scales, pointers, lamps, or acoustic indicators, e.g. in automobile speedometers
1/10 • • • for indicating predetermined speeds
1/11 • • • • by the detection of the position of the indicator needle **[3]**
1/12 • Recording devices **[3]**
1/14 • • for permanent recording **[3]**
1/16 • • for erasable recording, e.g. magnetic recording **[3]**

3/00 Measuring linear or angular speed; Measuring differences of linear or angular speeds (G01P 5/00-G01P 11/00 take precedence; measuring angular rate using gyroscopic effects G01C 19/00)

Note(s)

Groups G01P 3/02-G01P 3/64 are distinguished by the method of measurement which is of major importance. Thus the mere application of other methods for giving a final indication does not affect the classification.

3/02 • Devices characterised by the use of mechanical means
3/04 • • by comparing two speeds
3/06 • • • using a friction gear
3/08 • • • using differential gearing
3/10 • • by actuating an indicating element, e.g. pointer, for a fixed time
3/12 • • by making use of a system excited by impact
3/14 • • by exciting one or more mechanical resonance systems
3/16 • • by using centrifugal forces of solid masses
3/18 • • • transferred to the indicator by mechanical means
3/20 • • • transferred to the indicator by fluid means
3/22 • • • transferred to the indicator by electric or magnetic means
3/24 • • by using friction effects (G01P 3/06 takes precedence)

3/26 • Devices characterised by the use of fluids
3/28 • • by using pumps
3/30 • • by using centrifugal forces of fluids
3/32 • • • in a rotary container communicating with a fixed container
3/34 • • by using friction effects
3/36 • Devices characterised by the use of optical means, e.g. using infra-red, visible, or ultra-violet light (G01P 3/68 takes precedence)
3/38 • • using photographic means
3/40 • • using stroboscopic means
3/42 • Devices characterised by the use of electric or magnetic means (G01P 3/66 takes precedence)
3/44 • • for measuring angular speed (G01P 3/56 takes precedence)
3/46 • • • by measuring amplitude of generated current or voltage
3/48 • • • by measuring frequency of generated current or voltage
3/481 • • • • of pulse signals **[3]**
3/482 • • • • • delivered by nuclear radiation detectors **[3]**
3/483 • • • • • delivered by variable capacitance detectors **[3]**
3/484 • • • • • delivered by contact-making switches **[3]**
3/486 • • • • • delivered by photo-electric detectors **[3]**
3/487 • • • • • delivered by rotating magnets **[3]**
3/488 • • • • • delivered by variable reluctance detectors **[3]**
3/489 • • • • • Digital circuits therefor **[3]**
3/49 • • • using eddy currents
3/495 • • • • where the indicating means responds to forces produced by the eddy currents and the generating magnetic field **[3]**
3/50 • • for measuring linear speed (G01P 3/56 takes precedence)
3/52 • • • by measuring amplitude of generated current or voltage
3/54 • • • by measuring frequency of generated current or voltage
3/56 • • for comparing two speeds
3/58 • • • by measuring or comparing amplitudes of generated currents or voltages
3/60 • • • by measuring or comparing frequency of generated currents or voltages
3/62 • Devices characterised by the determination of the variation of atmospheric pressure with height to measure the vertical components of speed
3/64 • Devices characterised by the determination of the time taken to traverse a fixed distance
3/66 • • using electric or magnetic means (G01P 3/80 takes precedence) **[4]**
3/68 • • using optical means, i.e. using infra-red, visible, or ultra-violet light (G01P 3/80 takes precedence) **[4]**
3/80 • • using auto-correlation or cross-correlation detection means **[4]**

5/00 Measuring speed of fluids, e.g. of air stream; Measuring speed of bodies relative to fluids, e.g. of ship, of aircraft (application of speed-measuring devices for measuring volume of fluids G01F)

5/01 • by using swirlflowmeter **[3]**
5/02 • by measuring forces exerted by the fluid on solid bodies, e.g. anemometer
5/04 • • using deflection of baffle-plates
5/06 • • using rotation of vanes
5/07 • • • with electrical coupling to the indicating device **[3]**
5/08 • by measuring variation of an electric variable directly affected by the flow, e.g. by using dynamo-electric effect
5/10 • by measuring thermal variables
5/12 • • using variation of resistance of a heated conductor
5/14 • by measuring differences of pressure in the fluid
5/16 • • using Pitot tubes
5/165 • • • Arrangements or constructions of Pitot tubes **[3]**
5/17 • • • Coupling arrangements to the indicating device **[3]**
5/175 • • • • with the determination of Mach number **[3]**
5/18 • by measuring the time taken by the fluid to traverse a fixed distance **[1, 7]**
5/20 • • using particles entrained by a fluid stream (G01P 5/22 takes precedence) **[4]**
5/22 • • using auto-correlation or cross-correlation detection means **[4]**
5/24 • by measuring the direct influence of the streaming fluid on the properties of a detecting acoustical wave **[7]**
5/26 • by measuring the direct influence of the streaming fluid on the properties of a detecting optical wave **[7]**

7/00 Measuring speed by integrating acceleration (inertial navigation, i.e. calculating position or speed aboard the object being navigated, by integration of speed or acceleration G01C 21/16)

11/00 Measuring average value of speed (by determining time taken to traverse a fixed distance G01P 3/64, G01P 5/18)

11/02 • Measuring average speed of a number of bodies, e.g. of vehicles for traffic control

13/00 Indicating or recording presence or absence of movement; Indicating or recording of direction of movement

13/02 • Indicating direction only, e.g. by weather vane
13/04 • • Indicating positive or negative direction of a linear movement or clockwise or anti-clockwise direction of a rotational movement **[3]**

15/00 Measuring acceleration; Measuring deceleration; Measuring shock, i.e. sudden change of acceleration

15/02 • by making use of inertia forces (G01P 15/14 takes precedence) **[1, 7, 2013.01]**
15/03 • • by using non-electrical means **[3]**
15/04 • • for indicating maximum value
15/06 • • • using members subjected to a permanent deformation
15/08 • • with conversion into electric or magnetic values
15/09 • • • by piezo-electric pick-up **[3]**
15/093 • • • by photoelectric pick-up **[7]**
15/097 • • • by vibratory elements **[7]**
15/10 • • • • by vibratory strings
15/105 • • • by magnetically sensitive devices **[7]**
15/11 • • • • by inductive pick-up **[3]**
15/12 • • • by alteration of electrical resistance
15/125 • • • by capacitive pick-up **[3]**
15/13 • • • by measuring the force required to restore a proofmass subjected to inertial forces to a null position **[3]**
15/135 • • • by making use of contacts which are actuated by a movable inertial mass **[3]**

15/14 • by making use of gyroscopes **[1, 7, 2013.01]**
15/16 • by evaluating the time-derivative of a measured speed signal **[3, 7, 2013.01]**
15/18 • in two or more dimensions **[7, 2013.01]**

21/00 Testing or calibrating of apparatus or devices covered by the other groups of this subclass
21/02 • of speedometers

G01Q SCANNING-PROBE TECHNIQUES OR APPARATUS; APPLICATIONS OF SCANNING-PROBE TECHNIQUES, e.g. SCANNING-PROBE MICROSCOPY [SPM] [2010.01]

Note(s) [2010.01]

In this subclass, the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place.

10/00 Scanning or positioning arrangements, i.e. arrangements for actively controlling the movement or position of the probe [2010.01]
10/02 • Coarse scanning or positioning **[2010.01]**
10/04 • Fine scanning or positioning **[2010.01]**
10/06 • • Circuits or algorithms therefor **[2010.01]**

20/00 Monitoring the movement or position of the probe [2010.01]
20/02 • by optical means **[2010.01]**
20/04 • Self-detecting probes, i.e. wherein the probe itself generates a signal representative of its position, e.g. piezo-electric gauge **[2010.01]**

30/00 Auxiliary means serving to assist or improve the scanning probe techniques or apparatus, e.g. display or data processing devices [2010.01]
30/02 • Non-SPM analysing devices, e.g. SEM [Scanning Electron Microscope], spectrometer or optical microscope **[2010.01]**
30/04 • Display or data processing devices **[2010.01]**
30/06 • • for error compensation **[2010.01]**
30/08 • Means for establishing or regulating a desired environmental condition within a sample chamber **[2010.01]**
30/10 • • Thermal environment **[2010.01]**
30/12 • • Fluid environment **[2010.01]**
30/14 • • • Liquid environment **[2010.01]**
30/16 • • Vacuum environment **[2010.01]**
30/18 • Means for protecting or isolating the interior of a sample chamber from external environmental conditions or influences, e.g. vibrations or electromagnetic fields **[2010.01]**
30/20 • Sample handling devices or methods **[2010.01]**

40/00 Calibration, e.g. of probes [2010.01]
40/02 • Calibration standards or methods of fabrication thereof **[2010.01]**

60/00 Particular types of SPM [Scanning-Probe Microscopy] or apparatus therefor; Essential components thereof [2010.01]
60/02 • Multiple-type SPM, i.e. involving two or more SPM techniques **[2010.01]**
60/04 • • STM [Scanning Tunnelling Microscopy] combined with AFM [Atomic Force Microscopy] **[2010.01]**
60/06 • • SNOM [Scanning Near-field Optical Microscopy] combined with AFM [Atomic Force Microscopy] **[2010.01]**
60/08 • • MFM [Magnetic Force Microscopy] combined with AFM [Atomic Force Microscopy] **[2010.01]**
60/10 • STM [Scanning Tunnelling Microscopy] or apparatus therefor, e.g. STM probes **[2010.01]**
60/12 • • STS [Scanning Tunnelling Spectroscopy] **[2010.01]**
60/14 • • STP [Scanning Tunnelling Potentiometry] **[2010.01]**
60/16 • • Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**
60/18 • SNOM [Scanning Near-Field Optical Microscopy] or apparatus therefor, e.g. SNOM probes **[2010.01]**
60/20 • • Fluorescence **[2010.01]**
60/22 • • Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**
60/24 • AFM [Atomic Force Microscopy] or apparatus therefor, e.g. AFM probes **[2010.01]**
60/26 • • Friction force microscopy **[2010.01]**
60/28 • • Adhesion force microscopy **[2010.01]**
60/30 • • Scanning potential microscopy **[2010.01]**
60/32 • • AC mode **[2010.01]**
60/34 • • • Tapping mode **[2010.01]**
60/36 • • DC mode **[2010.01]**
60/38 • • Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**
60/40 • • • Conductive probes **[2010.01]**
60/42 • • • Functionalisation **[2010.01]**
60/44 • SICM [Scanning Ion-Conductance Microscopy] or apparatus therefor, e.g. SICM probes **[2010.01]**
60/46 • SCM [Scanning Capacitance Microscopy] or apparatus therefor, e.g. SCM probes **[2010.01]**
60/48 • • Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**
60/50 • MFM [Magnetic Force Microscopy] or apparatus therefor, e.g. MFM probes **[2010.01]**
60/52 • • Resonance **[2010.01]**
60/54 • • Probes, their manufacture or their related instrumentation, e.g. holders **[2010.01]**
60/56 • • • Probes with magnetic coating **[2010.01]**
60/58 • SThM [Scanning Thermal Microscopy] or apparatus therefor, e.g. SThM probes **[2010.01]**
60/60 • SECM [Scanning Electro-Chemical Microscopy] or apparatus therefor, e.g. SECM probes **[2010.01]**

70/00 General aspects of SPM probes, their manufacture or their related instrumentation, insofar as they are not specially adapted to a single SPM technique covered by group G01Q 60/00 [2010.01]
70/02 • Probe holders **[2010.01]**
70/04 • • with compensation for temperature or vibration induced errors **[2010.01]**
70/06 • Probe tip arrays **[2010.01]**
70/08 • Probe characteristics **[2010.01]**
70/10 • • Shape or taper **[2010.01]**
70/12 • • • Nano-tube tips **[2010.01]**
70/14 • • Particular materials **[2010.01]**

70/16 • Probe manufacture **[2010.01]**
70/18 • • Functionalisation **[2010.01]**

80/00 Applications, other than SPM, of scanning-probe techniques (manufacture or treatment of micro-structures B81C; manufacture or treatment of nano-structures B82B 3/00; recording or reproducing information using near-field interaction G11B 9/12, G11B 11/24 or G11B 13/08) **[2010.01]**

90/00 Scanning-probe techniques or apparatus not otherwise provided for [2010.01]

G01R MEASURING ELECTRIC VARIABLES; MEASURING MAGNETIC VARIABLES (indicating correct tuning of resonant circuits H03J 3/12)

Note(s)

1. This subclass covers:
   - measuring all kinds of electric or magnetic variables directly or by derivation from other electric or magnetic variables;
   - measuring all kinds of electric or magnetic properties of materials;
   - testing electric or magnetic devices, apparatus or networks (e.g. discharge tubes, amplifiers) or measuring their characteristics;
   - indicating presence or sign of current or voltage;
   - NMR, EPR or other spin-effect apparatus, not specially adapted for a particular application;
   - equipment for generating signals to be used for carrying out such tests and measurements.
2. In this subclass, the following terms or expressions are used with the meanings indicated:
   - "measuring" includes investigating;
   - "instruments" or "measuring instruments" means electro-mechanical measuring mechanisms;
   - "arrangements for measuring" means apparatus, circuits, or methods for measuring;
3. Attention is drawn to the Notes following the title of class G01.
4. In this subclass, instruments or arrangements for measuring electric variables are classified in the following way:
   - Electromechanical instruments where the measured electric variables direcly effect the indication of the measured value, including combined effects of two or more values, are classified in groups G01R 5/00-G01R 11/00.
   - Details common to different types of the instruments covered by groups G01R 5/00-G01R 11/00 are classified in group G01R 1/00.
   - Arrangements involving circuitry to obtain an indication of a measured value by deriving, calculating or otherwise processing electric variables, e.g. by comparison with another value, are classified in groups G01R 17/00-G01R 29/00.
   - Details common to different types of arrangements covered by groups G01R 17/00-G01R 29/00 are classified in group G01R 15/00.
5. In this subclass, group G01R 17/00 takes precedence over groups G01R 19/00-G01R 31/00.

Subclass index

1/00 Details of instruments or arrangements of the types covered by groups G01R 5/00-G01R 13/00 or G01R 31/00 (constructional details particular to electromechanical arrangements for measuring the electric consumption G01R 11/02) **[3, 2006.01]**

1/02 • General constructional details
1/04 • • Housings; Supporting members; Arrangements of terminals
1/06 • • Measuring leads; Measuring probes (G01R 19/145, G01R 19/165 take precedence) **[3]**
1/067 • • • Measuring probes **[3]**
1/07 • • • • Non contact-making probes **[6]**
1/073 • • • • Multiple probes **[3]**
1/08 • • Pointers; Scales, Scale illumination
1/10 • • Arrangements of bearings
1/12 • • • of strip or wire bearings
1/14 • • Braking arrangements; Damping arrangements
1/16 • • Magnets
1/18 • • Screening arrangements against electric or magnetic fields, e.g. against earth's field
1/20 • Modifications of basic electric elements for use in electric measuring instruments; Structural combinations of such elements with such instruments
1/22 • • Tong testers acting as secondary windings of current transformers

1/24 • • Transmission-line, e.g. waveguide, measuring sections, e.g. slotted section
1/26 • • • with linear movement of probe
1/28 • Provision in measuring instruments for reference values, e.g. standard voltage, standard waveform
1/30 • Structural combination of electric measuring instruments with basic electronic circuits, e.g. with amplifier
1/36 • Overload-protection arrangements or circuits for electric measuring instruments
1/38 • Arrangements for altering the indicating characteristic, e.g. by modifying the air gap
1/40 • Modifications of instruments to indicate the maximum or the minimum value reached in a time interval, e.g. by maximum indicator pointer **[3]**
1/42 • • thermally operated
1/44 • Modifications of instruments for temperature compensation **[2]**

3/00 Apparatus or processes specially adapted for the manufacture of measuring instruments

5/00 Instruments for converting a single current or a single voltage into a mechanical displacement

5/02 • Moving-coil instruments
5/04 • • with magnet external to the coil
5/06 • • with core magnet
5/08 • • specially adapted for wide angle deflection; with eccentrically-pivoted moving coil
5/10 • String galvanometers
5/12 • Loop galvanometers
5/14 • Moving-iron instruments
5/16 • • with pivoting magnet
5/18 • • with pivoting soft iron, e.g. needle galvanometer
5/20 • Induction instruments e.g. Ferraris instruments
5/22 • Thermoelectric instruments
5/24 • • operated by elongation of a strip or wire or by expansion of a gas or fluid
5/26 • • operated by deformation of a bimetallic element
5/28 • Electrostatic instruments
5/30 • • Leaf electrometers
5/32 • • Wire electrometers; Needle electrometers
5/34 • • Quadrant electrometers

7/00 Instruments capable of converting two or more currents or voltages into a single mechanical displacement (G01R 9/00 takes precedence)

7/02 • for forming a sum or a difference
7/04 • for forming a quotient (for measuring resistance G01R 27/08)
7/06 • • moving-iron type
7/08 • • moving-coil type, e.g. crossed-coil type
7/10 • • • having more than two moving coils
7/12 • for forming product
7/14 • • moving-iron type
7/16 • • having both fixed and moving coils, i.e. dynamometers
7/18 • • • with iron core magnetically coupling fixed and moving coils

9/00 Instruments employing mechanical resonance

9/02 • Vibration galvanometers, e.g. for measuring current
9/04 • using vibrating reeds, e.g. for measuring frequency
9/06 • • magnetically driven
9/08 • • piezo-electrically driven

11/00 Electromechanical arrangements for measuring time integral of electric power or current, e.g. of consumption (monitoring electric consumption of electrically-propelled vehicles B60L 3/00)

11/02 • Constructional details
11/04 • • Housings; Supporting racks; Arrangements of terminals
11/06 • • Magnetic circuits of induction meters **[2]**
11/067 • • • Coils therefor **[2]**
11/073 • • • Armatures therefor **[2]**
11/09 • • • • Disc armatures **[2]**
11/10 • • Braking magnets; Damping arrangements
11/12 • • Arrangements of bearings
11/14 • • • with magnetic relief
11/16 • • Adaptations of counters to electricity meters
11/17 • • Compensating for errors; Adjusting or regulating means therefor **[2]**
11/18 • • • Compensating for variations in ambient conditions **[2]**
11/185 • • • • Temperature compensation **[2]**
11/19 • • • Compensating for errors caused by disturbing torque, e.g. rotating-field errors of polyphase meters **[2]**
11/20 • • • Compensating for phase errors in induction meters **[2]**
11/21 • • • Compensating for errors caused by damping effects of the current, e.g. adjustment in the overload range **[2]**
11/22 • • • Adjusting torque, e.g. adjusting starting torque, adjusting of polyphase meters for obtaining equal torques **[2]**
11/23 • • • Compensating for errors caused by friction, e.g. adjustment in the light-load range **[2]**
11/24 • • Arrangements for avoiding or indicating fraudulent use **[4]**
11/25 • • Arrangements for indicating or signalling faults **[2, 4]**

Note(s)

Groups G01R 11/48-G01R 11/56 take precedence over groups G01R 11/30-G01R 11/46.

11/30 • Dynamo-electric motor meters
11/32 • • Watt-hour meters
11/34 • • Ampère-hour meters
11/36 • Induction meters, e.g. Ferraris meters
11/38 • • for single-phase operation
11/40 • • for polyphase operation
11/42 • • • Circuitry therefor
11/46 • Electrically-operated clockwork meters; Oscillatory meters; Pendulum meters
11/48 • Meters specially adapted for measuring real or reactive components; Meters specially adapted for measuring apparent energy
11/50 • • for measuring real component
11/52 • • for measuring reactive component
11/54 • • for measuring simultaneously at least two of the following three variables: real component, reactive component, apparent energy
11/56 • Special tariff meters
11/57 • • Multi-rate meters (G01R 11/63 takes precedence) **[2]**
11/58 • • • Tariff-switching devices therefor **[2]**
11/60 • • Subtraction meters; Meters measuring maximum or minimum-load hours

11/63 • • Over-consumption meters, e.g. measuring consumption while a predetermined level of power is exceeded **[2]**

11/64 • • Maximum meters, e.g. tariff for a period is based on maximum demand within that period

11/66 • • • Circuitry

13/00 Arrangements for displaying electric variables or waveforms [4]

13/02 • for displaying measured electric variables in digital form **[4]**

13/04 • for producing permanent records **[4]**

13/06 • • Modifications for recording transient disturbances, e.g. by starting or accelerating a recording medium

13/08 • • Electromechanical recording system using a mechanical direct-writing method

13/10 • • • with intermittent recording by representing the variable by the length of a stroke or by the position of a dot

13/12 • • Chemical recording, e.g. clydonographs (G01R 13/14 takes precedence)

13/14 • • Recording on a light-sensitive material

13/16 • • Recording on a magnetic medium

13/18 • • • using boundary displacement

13/20 • Cathode-ray oscilloscopes

13/22 • • Circuits therefor

13/24 • • • Time-base deflection circuits

13/26 • • • Circuits for controlling the intensity of the electron beam

13/28 • • • Circuits for simultaneous or sequential presentation of more than one variable

13/30 • • • Circuits for inserting reference markers, e.g. for timing, for calibrating, for frequency marking

13/32 • • • Circuits for displaying non-recurrent functions such as transients; Circuits for triggering; Circuits for synchronisation; Circuits for time-base expansion

13/34 • • • Circuits for representing a single waveform by sampling, e.g. for very high frequencies **[2]**

13/36 • using length of glow discharge, e.g. glowlight oscilloscopes **[4]**

13/38 • using the steady or oscillatory displacement of a light beam by an electromechanical measuring system **[4]**

13/40 • using modulation of a light beam otherwise than by mechanical displacement, e.g. by Kerr effect **[4]**

13/42 • Instruments using length of spark discharge, e.g. by measuring maximum separation of electrodes to produce spark

15/00 Details of measuring arrangements of the types provided for in groups G01R 17/00-G01R 29/00, G01R 33/00-G01R 33/26 or G01R 35/00 [1, 2006.01]

15/04 • Voltage dividers **[6]**

15/06 • • having reactive components, e.g. capacitive transformer **[6]**

15/08 • Circuits for altering the measuring range

15/09 • • Autoranging circuits **[6]**

15/12 • Circuits for multi-testers, e.g. for measuring voltage, current, or impedance at will

15/14 • Adaptations providing voltage or current isolation, e.g. for high-voltage or high-current networks **[6]**

15/16 • • using capacitive devices **[6]**

15/18 • • using inductive devices, e.g. transformers **[6]**

15/20 • • using galvano-magnetic devices, e.g. Hall-effect devices **[6]**

15/22 • • using light-emitting devices, e.g. LED, optocouplers **[6]**

15/24 • • using light-modulating devices **[6]**

15/26 • • using modulation of waves other than light, e.g. radio or acoustic waves **[6]**

17/00 Measuring arrangements involving comparison with a reference value, e.g. bridge

17/02 • Arrangements in which the value to be measured is automatically compared with a reference value

17/04 • • in which the reference value is continuously or periodically swept over the range of values to be measured

17/06 • • Automatic balancing arrangements

17/08 • • • in which a force or torque representing the measured value is balanced by a force or torque representing the reference value

17/10 • ac or dc measuring bridges

17/12 • • using comparison of currents, e.g. bridges with differential current output

17/14 • • with indication of measured value by calibrated null indicator, e.g. percent bridge, tolerance bridge (G01R 17/12, G01R 17/16 take precedence)

17/16 • • with discharge tubes or semiconductor devices in one or more arms of the bridge, e.g. voltmeter using a difference amplifier

17/18 • • with more than four branches

17/20 • ac or dc potentiometric measuring arrangements

17/22 • • with indication of measured value by calibrated null indicator

19/00 Arrangements for measuring currents or voltages or for indicating presence or sign thereof (G01R 5/00 takes precedence; for measuring bioelectric currents or voltages A61B 5/04) **[4]**

Note(s)

Within groups G01R 19/02-G01R 19/32, group G01R 19/28 takes precedence. Groups G01R 19/18-G01R 19/25 take precedence over groups G01R 19/02-G01R 19/165 and G01R 19/30.

19/02 • Measuring effective values, i.e. root-mean-square values

19/03 • • using thermoconverters **[4]**

19/04 • Measuring peak values of ac or of pulses **[2]**

19/06 • Measuring real component; Measuring reactive component

19/08 • Measuring current density

19/10 • Measuring sum, difference, or ratio

19/12 • Measuring rate of change

19/14 • Indicating direction of current; Indicating polarity of voltage

19/145 • Indicating the presence of current or voltage **[3]**

19/15 • • Indicating the presence of current **[3]**

19/155 • • Indicating the presence of voltage **[3]**

19/165 • Indicating that current or voltage is either above or below a predetermined value or within or outside a predetermined range of values **[3]**

19/17 • • giving an indication of the number of times this occurs **[3]**

19/175 • Indicating the instants of passage of current or voltage through a given value, e.g. passage through zero **[3]**

19/18 • using conversion of dc into ac, e.g. with choppers

19/20 • • using transductors

19/22 • using conversion of ac into dc

19/25 • using digital measurement techniques **[3]**

19/252 • • using analogue/digital converters of the type with conversion of voltage or current into frequency and measuring of this frequency **[4]**

19/255 • • using analogue/digital converters of the type with counting of pulses during a period of time proportional to voltage or current, delivered by a pulse generator with fixed frequency **[4]**

19/257 • • using analogue/digital converters of the type with comparison of different reference values with the value of voltage or current, e.g. using step-by-step method **[4]**

19/28 • adapted for measuring in circuits having distributed constants

19/30 • Measuring the maximum or the minimum value of current or voltage reached in a time interval (G01R 19/04 takes precedence) **[2, 3]**

19/32 • Compensating for temperature change **[2]**

21/00 Arrangements for measuring electric power or power factor (G01R 7/12 takes precedence) **[4]**

21/01 • in circuits having distributed constants (G01R 21/04, G01R 21/07, G01R 21/09, G01R 21/12 take precedence) **[2]**

21/02 • by thermal methods **[2]**

21/04 • • in circuits having distributed constants

21/06 • by measuring current and voltage (G01R 21/08-G01R 21/133 take precedence) **[4]**

21/07 • • in circuits having distributed constants (G01R 21/09 takes precedence) **[2]**

21/08 • by using galvanomagnetic-effect devices, e.g. Hall-effect devices **[2]**

21/09 • • in circuits having distributed constants **[2]**

21/10 • by using square-law characteristics of circuit elements, e.g. diodes, to measure power absorbed by loads of known impedance (G01R 21/02 takes precedence) **[2]**

21/12 • • in circuits having distributed constants

21/127 • by using pulse modulation (G01R 21/133 takes precedence) **[4]**

21/133 • by using digital technique **[4]**

21/14 • Compensating for temperature change **[2]**

22/00 Arrangements for measuring time integral of electric power or current, e.g. electricity meters [4, 2006.01]

Note(s)

An arrangement for measuring time integral of electric power is classified in group G01R 21/00 if the essential characteristic is the measuring of electric power.

22/02 • by electrolytic methods **[4]**

22/04 • by calorimetric methods **[4]**

22/06 • by electronic methods **[2006.01]**

22/08 • • using analogue techniques **[2006.01]**

22/10 • • using digital techniques **[2006.01]**

23/00 Arrangements for measuring frequencies; Arrangements for analysing frequency spectra

23/02 • Arrangements for measuring frequency, e.g. pulse repetition rate; Arrangements for measuring period of current or voltage

23/04 • • adapted for measuring in circuits having distributed constants

23/06 • • by converting frequency into an amplitude of current or voltage

23/07 • • • using response of circuits tuned on resonance, e.g. grid-drip meter **[2]**

23/08 • • • using response of circuits tuned off resonance

23/09 • • • using analogue integrators, e.g. capacitors establishing a mean value by balance of input signals and defined discharge signals or leakage **[2]**

23/10 • • by converting frequency into a train of pulses, which are then counted

23/12 • • by converting frequency into phase shift

23/14 • • by heterodyning; by beat-frequency comparison **[2]**

23/15 • • Indicating that frequency of pulses is either above or below a predetermined value or within or outside a predetermined range of values, by making use of non-linear or digital elements **[3]**

23/16 • Spectrum analysis; Fourier analysis

23/163 • • adapted for measuring in circuits having distributed constants **[3]**

23/165 • • using filters **[3]**

23/167 • • • with digital filters **[3]**

23/17 • • with optical auxiliary devices **[3]**

23/173 • • Wobbulating devices similar to swept panoramic receivers **[3]**

23/175 • • by delay means, e.g. tapped delay lines **[3]**

23/177 • • Analysis of very low frequencies **[3]**

23/18 • • with provision for recording frequency spectrum

23/20 • • Measurement of non-linear distortion

25/00 Arrangements for measuring phase angle between a voltage and a current or between voltages or currents [2]

25/02 • in circuits having distributed constants

25/04 • involving adjustment of a phase shifter to produce a predetermined phase difference, e.g. zero difference

25/06 • employing quotient instrument

25/08 • by counting of standard pulses **[2]**

27/00 Arrangements for measuring resistance, reactance, impedance, or electric characteristics derived therefrom

27/02 • Measuring real or complex resistance, reactance, impedance, or other two-pole characteristics derived therefrom, e.g. time constant (by measuring phase angle only G01R 25/00)

27/04 • • in circuits having distributed constants

27/06 • • • Measuring reflection coefficients; Measuring standing-wave ratio

27/08 • • Measuring resistance by measuring both voltage and current

27/10 • • • using two-coil or crossed-coil instruments forming quotient

27/12 • • • • using hand generators, e.g. meggers

27/14 • • Measuring resistance by measuring current or voltage obtained from a reference source (G01R 27/16, G01R 27/20, G01R 27/22 take precedence)

27/16 • • Measuring impedance of element or network through which a current is passing from another source, e.g. cable, power line

27/18 • • • Measuring resistance to earth

27/20 • • Measuring earth resistance; Measuring contact resistance of earth connections, e.g. plates

27/22 • • Measuring resistance of fluids

27/26 • • Measuring inductance or capacitance; Measuring quality factor, e.g. by using the resonance method; Measuring loss factor; Measuring dielectric constants

27/28 • Measuring attenuation, gain, phase shift, or derived characteristics of electric four-pole networks, i.e. two-port networks; Measuring transient response (in line transmission systems H04B 3/46)

27/30 • • with provision for recording characteristics, e.g. by plotting Nyquist diagram

27/32 • • in circuits having distributed constants **[2]**

29/00 Arrangements for measuring or indicating electric quantities not covered by groups G01R 19/00-G01R 27/00

29/02 • Measuring characteristics of individual pulses, e.g. deviation from pulse flatness, rise time or duration **[3]**

29/027 • • Indicating that a pulse characteristic is either above or below a predetermined value or within or beyond a predetermined range of values **[3]**

29/033 • • • giving an indication of the number of times this occurs **[3]**

29/04 • Measuring form factor, i.e. quotient of root-mean-square value and arithmetic mean of instantaneous value; Measuring peak factor, i.e. quotient of maximum value and root-mean-square value

29/06 • Measuring depth of modulation

29/08 • Measuring electromagnetic field characteristics

29/10 • • Radiation diagrams of aerials

29/12 • Measuring electrostatic fields

29/14 • • Measuring field distribution

29/16 • Measuring asymmetry of polyphase networks

29/18 • Indicating phase sequence; Indicating synchronism

29/20 • Measuring number of turns; Measuring transformation ratio or coupling factor of windings

29/22 • Measuring piezo-electric properties

29/24 • Arrangements for measuring quantities of charge **[2]**

29/26 • Measuring noise figure; Measuring signal-to-noise ratio **[2]**

31/00 Arrangements for testing electric properties; Arrangements for locating electric faults; Arrangements for electrical testing characterised by what is being tested not provided for elsewhere (testing or measuring semiconductors or solid state devices during manufacture H01L 21/66; testing line transmission systems H04B 3/46)

31/01 • Subjecting similar articles in turn to test, e.g. "go/no-go" tests in mass production; Testing objects at points as they pass through a testing station (G01R 31/18 takes precedence) **[6]**

31/02 • Testing of electric apparatus, lines, or components for short-circuits, discontinuities, leakage, or incorrect line connection

31/04 • • Testing connections, e.g. of plugs, of non-disconnectable joints

31/06 • • Testing of electric windings, e.g. for polarity

31/07 • • Testing of fuses **[6]**

31/08 • Locating faults in cables, transmission lines, or networks

31/10 • • by increasing destruction at fault, e.g. burning-in by using a pulse generator operating a special programme

31/11 • • using pulse-reflection methods

31/12 • Testing dielectric strength or breakdown voltage

31/14 • • Circuits therefor

31/16 • • Construction of testing vessels; Electrodes therefor

31/18 • • Subjecting similar articles in turn to test, e.g. "go/no-go" tests in mass production

31/20 • • Preparation of articles or specimens to facilitate testing

31/24 • Testing of discharge tubes (during manufacture H01J 9/42) **[2]**

31/25 • • Testing of vacuum tubes **[2]**

31/26 • *Testing of individual semiconductor devices (testing or measuring during manufacture or treatment H01L 21/66; testing of photovoltaic devices H02S 50/10)* ***[2, 2014.01]***

31/265 • • Contactless testing **[6]**

31/27 • • Testing of devices without physical removal from the circuit of which they form part, e.g. compensating for effects due to surrounding elements **[6]**

31/28 • Testing of electronic circuits, e.g. by signal tracer (testing computers during standby operation or idle time G06F 11/22)

31/30 • • Marginal testing, e.g. by varying supply voltage (testing computers during standby operation or idle time G06F 11/22) **[2]**

31/302 • • Contactless testing **[5]**

31/303 • • • of integrated circuits (G01R 31/305-G01R 31/315 take precedence) **[6]**

31/304 • • • of printed or hybrid circuits (G01R 31/305-G01R 31/315 take precedence) **[6]**

31/305 • • • using electron beams **[5]**

31/306 • • • • of printed or hybrid circuits **[6]**

31/307 • • • • of integrated circuits **[6]**

31/308 • • • using non-ionising electromagnetic radiation, e.g. optical radiation **[5]**

31/309 • • • • of printed or hybrid circuits **[6]**

31/311 • • • • of integrated circuits **[6]**

31/312 • • • by capacitive methods **[5]**

31/315 • • • by inductive methods **[5]**

31/316 • • Testing of analog circuits **[6]**

31/3161 • • • Marginal testing **[6]**

31/3163 • • • Functional testing **[6]**

31/3167 • • Testing of combined analog and digital circuits **[6]**

31/317 • • Testing of digital circuits **[6]**

31/3173 • • • Marginal testing **[6]**

31/3177 • • • Testing of logic operation, e.g. by logic analysers **[6]**

31/3181 • • • Functional testing (G01R 31/3177 takes precedence) **[6]**

31/3183 • • • • Generation of test inputs, e.g. test vectors, patterns or sequences **[6]**

31/3185 • • • • Reconfiguring for testing, e.g. LSSD, partitioning **[6]**

31/3187 • • • • Built-in tests **[6]**

31/319 • • • • Tester hardware, i.e. output processing circuits **[6]**

31/3193 • • • • • with comparison between actual response and known fault-free response **[6]**

31/327 • Testing of circuit interrupters, switches or circuit-breakers **[6]**

31/333 • • Testing of the switching capacity of high-voltage circuit-breakers **[6]**

31/34 • Testing dynamo-electric machines **[3]**

31/36 • Apparatus for testing electrical condition of accumulators or electric batteries, e.g. capacity or charge condition (accumulators combined with arrangements for measuring, testing or indicating condition H01M 10/48) **[3]**

31/40 • *Testing power supplies (testing photovoltaic devices H02S 50/10)* ***[6, 2014.01]***

31/42 • • AC power supplies **[6]**

31/44 • Testing lamps **[6]**

33/00 Arrangements or instruments for measuring magnetic variables

33/02 • Measuring direction or magnitude of magnetic fields or magnetic flux (G01R 33/20 takes precedence) **[4]**

33/022 • • Measuring gradient **[3]**

Note(s)

Group G01R 33/022 or group G01R 33/10 takes precedence over groups G01R 33/025-G01R 33/06.

33/025 • • Compensating stray fields **[3]**

33/028 • • Electrodynamic magnetometers **[3]**

33/032 • • using magneto-optic devices, e.g. Faraday **[3]**

33/035 • • using superconductive devices **[3]**

33/038 • • using permanent magnets, e.g. balances, torsion devices **[3]**

33/04 • • using the flux-gate principle

33/05 • • • in thin-film element **[3]**

33/06 • • using galvano-magnetic devices

33/07 • • • Hall-effect devices **[6]**

33/09 • • • Magneto-resistive devices **[6]**

33/10 • • Plotting field distribution

33/12 • Measuring magnetic properties of articles or specimens of solids or fluids (involving magnetic resonance G01R 33/20) **[4]**

33/14 • • Measuring or plotting hysteresis curves

33/16 • • Measuring susceptibility

33/18 • • Measuring magnetostrictive properties

33/20 • involving magnetic resonance (medical aspects A61B 5/055; magnetic resonance gyrometers G01C 19/60) **[4, 5]**

33/24 • • for measuring direction or magnitude of magnetic fields or magnetic flux **[4]**

33/26 • • • using optical pumping **[4]**

33/28 • • Details of apparatus provided for in groups G01R 33/44-G01R 33/64 **[5]**

33/30 • • • Sample handling arrangements, e.g. sample cells, spinning mechanisms **[5]**

33/31 • • • • Temperature control thereof **[6]**

33/32 • • • Excitation or detection systems, e.g. using radiofrequency signals **[5]**

33/34 • • • • Constructional details, e.g. resonators **[5]**

33/341 • • • • • comprising surface coils **[6]**

33/3415 • • • • • • comprising arrays of sub-coils **[6]**

33/343 • • • • • of slotted-tube or loop-gap type **[6]**

33/345 • • • • • of waveguide type (G01R 33/343 takes precedence) **[6]**

33/36 • • • • Electrical details, e.g. matching or coupling of the coil to the receiver **[5]**

33/38 • • • Systems for generation, homogenisation or stabilisation of the main or gradient magnetic field **[5]**

Note(s)

Groups G01R 33/385-G01R 33/389 take precedence over groups G01R 33/381-G01R 33/383.

33/381 • • • • using electromagnets **[6]**

33/3815 • • • • • with superconducting coils, e.g. power supply therefor **[6]**

33/383 • • • • using permanent magnets **[6]**

33/385 • • • • using gradient magnetic field coils **[6]**

33/387 • • • • Compensation of inhomogeneities **[6]**

33/3873 • • • • • using ferromagnetic bodies **[6]**

33/3875 • • • • • using correction coil assemblies, e.g. active shimming **[6]**

33/389 • • • • Field stabilisation **[6]**

33/42 • • • Screening **[5, 6]**

33/421 • • • • of main or gradient magnetic field **[6]**

33/422 • • • • of the radiofrequency field **[6]**

33/44 • • using nuclear magnetic resonance (NMR) (G01R 33/24, G01R 33/62 take precedence) **[5]**

33/46 • • • NMR spectroscopy **[5]**

33/465 • • • • applied to biological material, e.g. in vitro testing **[6]**

33/48 • • • NMR imaging systems **[5]**

33/483 • • • • with selection of signal or spectra from particular regions of the volume, e.g. in vivo spectroscopy **[6]**

33/485 • • • • • based on chemical shift information **[6]**

33/50 • • • • based on the determination of relaxation times **[5]**

33/54 • • • • Signal processing systems, e.g. using pulse sequences **[5]**

33/56 • • • • • Image enhancement or correction, e.g. subtraction or averaging techniques **[5]**

33/561 • • • • • • by reduction of the scanning time, i.e. fast acquiring systems, e.g. using echo-planar pulse sequences **[6]**

33/563 • • • • • • of moving material, e.g. flow-contrast angiography **[6]**

33/565 • • • • • • Correction of image distortions, e.g. due to magnetic field inhomogeneities **[6]**

33/567 • • • • • • gated by physiological signals **[6]**

33/58 • • • • Calibration of imaging systems, e.g. using test probes **[5]**

33/60 • • using electron paramagnetic resonance (G01R 33/24, G01R 33/62 take precedence) **[5]**

33/62 • • using double resonance (G01R 33/24 takes precedence) **[5]**

33/64 • • using cyclotron resonance (G01R 33/24 takes precedence) **[5]**

35/00 Testing or calibrating of apparatus covered by the other groups of this subclass [2]

35/02 • of auxiliary devices, e.g. of instrument transformers according to prescribed transformation ratio, phase angle, or wattage rating

35/04 • of instruments for measuring time integral of power or current

35/06 • • by stroboscopic methods

G01R

G01S RADIO DIRECTION-FINDING; RADIO NAVIGATION; DETERMINING DISTANCE OR VELOCITY BY USE OF RADIO WAVES; LOCATING OR PRESENCE-DETECTING BY USE OF THE REFLECTION OR RERADIATION OF RADIO WAVES; ANALOGOUS ARRANGEMENTS USING OTHER WAVES

Note(s)

1. In this subclass, the following term is used with the meaning indicated:
   - "transponder" means an arrangement which reacts to an incoming interrogating or detecting wave by emitting a specific answering or identifying wave.
2. Attention is drawn to the Notes following the title of class G01 and to Note (1) following the title of subclass G09B.

Subclass index

1/00 Beacons or beacon systems transmitting signals having a characteristic or characteristics capable of being detected by non-directional receivers and defining directions, positions, or position lines fixed relatively to the beacon transmitters; Receivers co-operating therewith (position-fixing by co-ordinating a plurality of determinations of direction or position lines G01S 5/00) **[2]**

1/02 • using radio waves (G01S 19/00 takes precedence) **[1, 2010.01]**

1/04 • • Details

1/06 • • • Means for providing multiple indication, e.g. coarse and fine indications

1/08 • • Systems for determining direction or position line

1/10 • • • using amplitude comparison of signals transmitted sequentially from aerials or aerial systems having differently-oriented overlapping directivity-characteristics, e.g. equi-signal A-N type

1/12 • • • • the signals being transmitted sequentially from an aerial or aerial system having the orientation of its directivity characteristic periodically varied, e.g. by means of sequentially effective reflectors

1/14 • • • using amplitude comparison of signals transmitted simultaneously from aerials or aerial systems having differently-oriented overlapping directivity-characteristics

1/16 • • • • Azimuthal guidance systems, e.g. system for defining aircraft approach path, localiser system

1/18 • • • • Elevational guidance systems, e.g. system for defining aircraft glide path

1/20 • • • using a comparison of transit time of synchronised signals transmitted from non-directional aerials or aerial systems spaced apart, i.e. path-difference systems

1/22 • • • • the synchronised signals being frequency modulations on carrier waves and the transit times being compared by measuring difference of instantaneous frequencies of received carrier waves

1/24 • • • • the synchronised signals being pulses or equivalent modulations on carrier waves and the transit times being compared by measuring the difference in arrival time of a significant part of the modulations

1/26 • • • • • Systems in which pulses or time-base signals are generated locally at the receiver and brought into predetermined time-relationship with received signals, e.g. pulse duration coincides with time interval between arrival of significant part of modulation of signals received from first and second aerials or aerial systems

1/28 • • • • • • wherein the predetermined time-relationship is maintained automatically

1/30 • • • • the synchronised signals being continuous waves or intermittent trains of continuous waves, the intermittency not being for the purpose of determining direction or position line and the transit times being compared by measuring the phase difference

1/32 • • • • • Systems in which the signals received, with or without amplification, or signals derived therefrom, are compared in phase directly

1/34 • • • • • Systems in which first and second synchronised signals are transmitted from both aerials or aerial systems and a beat frequency, obtained by heterodyning the first signals with each other is compared in phase with a beat frequency obtained by heterodyning the second signals with each other

1/36 • • • • • Systems in which a beat frequency, obtained by heterodyning the synchronised signals, is compared in phase with a reference signal having a phase substantially independent of direction

1/38 • • • using comparison of (1) the phase of the envelope of the change of frequency, due to Doppler effect, of the signal transmitted by an aerial moving, or appearing to move, in a cyclic path with (2) the phase of a reference signal, the frequency of this reference signal being synchronised with that of the cyclic movement, or apparent cyclic movement, of the aerial

1/40 • • • • the apparent movement of the aerial being produced by cyclic sequential energisation of fixed aerials

1/42 • • • Conical-scan beam beacons transmitting signals which indicate at a mobile receiver any displacement of the receiver from the conical-scan axis, e.g. for "beam-riding" missile control **[5]**

1/44 • • • Rotating or oscillating beam beacons defining directions in the plane of rotation or oscillation **[5]**

1/46 • • • • Broad-beam systems producing at a receiver a substantially continuous sinusoidal envelope signal of the carrier wave of the beam, the phase angle of which is dependent upon the angle between the direction of the receiver from the beacon and a reference direction from the beacon, e.g. cardioid system **[5]**

1/48 • • • • • wherein the phase angle of the direction-dependent envelope signal is a multiple of the direction angle, e.g. for "fine" bearing indication **[5]**

1/50 • • • • • wherein the phase angle of the direction-dependent envelope signal is compared with a non-direction- dependent reference signal **[5]**

1/52 • • • • • wherein the phase angles of a plurality of direction-dependent envelope signals produced by a plurality of beams rotating at different speeds or in different directions are compared **[5]**

1/54 • • • • Narrow-beam systems producing at a receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the receiver from the beacon and a reference direction from the beacon; Overlapping broad beam systems defining a narrow zone and producing at a receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the receiver from the beacon and a reference direction from the beacon **[5]**

1/56 • • • • • Timing the pulse-type envelope signals derived by reception of beam **[5]**

1/58 • • • • • wherein a characteristic of the beam transmitted or of an auxiliary signal is varied in time synchronously with rotation or oscillation of the beam **[5]**

1/60 • • • • • • Varying frequency of beam signal or of auxiliary signal **[5]**

1/62 • • • • • • Varying phase-relationship between beam and auxiliary signal **[5]**

1/64 • • • • • • Varying pulse timing, e.g. varying interval between pulses radiated in pairs **[5]**

1/66 • • • • • • Superimposing direction-indicating intelligence signals, e.g. speech, Morse **[5]**

1/68 • • Marker, boundary, call-sign, or like beacons transmitting signals not carrying directional information

1/70 • using electromagnetic waves other than radio waves

1/72 • using ultrasonic, sonic, or infrasonic waves

1/74 • • Details **[5]**

1/76 • • Systems for determining direction or position line **[5]**

1/78 • • • using amplitude comparison of signals transmitted from transducers or transducer systems having differently-oriented characteristics **[5]**

1/80 • • • using a comparison of transit time of synchronised signals transmitted from non-directional transducers or transducer systems spaced apart, i.e. path-difference systems **[5]**

1/82 • • • Rotating or oscillating beam beacons defining directions in the plane of rotation or oscillation **[5]**

3/00 Direction-finders for determining the direction from which infrasonic, sonic, ultrasonic, or electromagnetic waves, or particle emission, not having a directional significance, are being received (position-fixing by co-ordinating a plurality of determinations of direction or position lines G01S 5/00)

3/02 • using radio waves

3/04 • • Details

3/06 • • • Means for increasing effective directivity, e.g. by combining signals having differently-oriented directivity characteristics or by sharpening the envelope waveform of the signal derived from a rotating or oscillating beam aerial (comparing amplitude of signals having differently-oriented directivity characteristics to determine direction G01S 3/16, G01S 3/28)

3/08 • • • Means for reducing polarisation errors, e.g. by use of Adcock or spaced loop aerial systems

3/10 • • • Means for reducing or compensating for quadrantal, site, or like errors

3/12 • • • Means for determining sense of direction, e.g. by combining signals from directional aerial or goniometer search coil with those from non-directional aerial (determining direction by amplitude comparison of signals derived by combining directional and non-directional signals G01S 3/24, G01S 3/34)

3/14 • • Systems for determining direction or deviation from predetermined direction

3/16 • • • using amplitude comparison of signals derived sequentially from receiving aerials or aerial systems having differently-oriented directivity characteristics or from an aerial system having periodically-varied orientation of directivity characteristic

3/18 • • • • derived directly from separate directional aerials

3/20 • • • • derived by sampling signal received by an aerial system having periodically-varied orientation of directivity characteristic

3/22 • • • • derived from different combinations of signals from separate aerials, e.g. comparing sum with difference

3/24 • • • • • the separate aerials comprising one directional aerial and one non-directional aerial, e.g. combination of loop and open aerials producing a reversed cardioid directivity characteristic

3/26 • • • • • the separate aerials having differently-oriented directivity characteristics
3/28 • • • using amplitude comparison of signals derived simultaneously from receiving aerials or aerial systems having differently-oriented directivity characteristics
3/30 • • • • derived directly from separate directional systems
3/32 • • • • derived from different combinations of signals from separate aerials, e.g. comparing sum with difference
3/34 • • • • • the separate aerials comprising one directional aerial and one non-directional aerial, e.g. combination of loop and open aerials producing a reversed cardioid directivity characteristic
3/36 • • • • • the separate aerials having differently-oriented directivity characteristics
3/38 • • • using adjustment of real or effective orientation of directivity characteristic of an aerial or an aerial system to give a desired condition of signal derived from that aerial or aerial system, e.g. to give a maximum or minimum signal (G01S 3/16, G01S 3/28 take precedence)
3/40 • • • • adjusting orientation of a single directivity characteristic to produce maximum or minimum signal, e.g. rotatable loop aerial, equivalent goniometer system
3/42 • • • • the desired condition being maintained automatically
3/44 • • • • the adjustment being varied periodically or continuously until it is halted automatically when the desired condition is attained
3/46 • • • using aerials spaced apart and measuring phase or time difference between signals therefrom, i.e. path-difference systems
3/48 • • • • the waves arriving at the aerials being continuous or intermittent and the phase difference of signals derived therefrom being measured
3/50 • • • • the waves arriving at the aerials being pulse modulated and the time difference of their arrival being measured
3/52 • • • using a receiving aerial moving, or appearing to move, in a cyclic path to produce a Doppler variation of frequency of the received signal
3/54 • • • • the apparent movement of the aerial being produced by coupling the receiver cyclically and sequentially to each of several fixed spaced aerials
3/56 • • • Conical-scan beam systems using signals indicative of the deviation of the direction of reception from the scan axis
3/58 • • • Rotating or oscillating beam systems using continuous analysis of received signal for determining direction in the plane of rotation or oscillation or for determining deviation from a predetermined direction in such a plane (G01S 3/16 takes precedence)
3/60 • • • • Broad-beam systems producing in the receiver a substantially-sinusoidal envelope signal of the carrier wave of the beam, the phase angle of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver, e.g. cardioid system
3/62 • • • • • wherein the phase angle of the signal is indicated by a cathode-ray tube
3/64 • • • • • wherein the phase angle of the signal is determined by phase comparison with a reference alternating signal varying in synchronism with the directivity variation
3/66 • • • • Narrow-beam systems producing in the receiver a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver; Overlapping broad-beam systems defining in the receiver a narrow zone and producing a pulse-type envelope signal of the carrier wave of the beam, the timing of which is dependent upon the angle between the direction of the transmitter from the receiver and a reference direction from the receiver
3/68 • • • • • wherein the timing of the pulse-type envelope signal is indicated by cathode-ray tube
3/70 • • • • • wherein the timing of the pulse-type envelope signal is determined by bringing a locally-generated pulse-type signal into coincidence or other predetermined time-relationship with the envelope signal
3/72 • • Diversity systems specially adapted for direction-finding
3/74 • • Multi-channel systems specially adapted for direction-finding, i.e. having a single aerial system capable of giving simultaneous indications of the directions of different signals (systems in which the directions of different signals are determined sequentially and displayed simultaneously G01S 3/04, G01S 3/14)
3/78 • using electromagnetic waves other than radio waves
3/781 • • Details **[5]**
3/782 • • Systems for determining direction or deviation from predetermined direction **[5]**
3/783 • • • using amplitude comparison of signals derived from static detectors or detector systems **[5]**
3/784 • • • • using a mosaic of detectors **[5]**
3/785 • • • using adjustment of orientation of directivity characteristics of a detector or detector system to give a desired condition of signal derived from that detector or detector system **[5]**
3/786 • • • • the desired condition being maintained automatically **[5]**
3/787 • • • using rotating reticles producing a direction-dependent modulation characteristic **[5]**
3/788 • • • • producing a frequency modulation characteristic **[5]**
3/789 • • • using rotating or oscillating beam systems, e.g. using mirrors, prisms **[5]**
3/80 • using ultrasonic, sonic, or infrasonic waves
3/801 • • Details **[5]**
3/802 • • Systems for determining direction or deviation from predetermined direction **[5]**
3/803 • • • using amplitude comparison of signals derived from receiving transducers or transducer systems having differently-oriented directivity characteristics **[5]**
3/805 • • • using adjustment of real or effective orientation of directivity characteristics of a transducer or transducer system to give a desired condition of signal derived from that transducer or transducer system, e.g. to give a maximum or minimum signal **[5]**

3/807 • • • • the desired condition being maintained automatically **[5]**
3/808 • • • using transducers spaced apart and measuring phase or time difference between signals therefrom, i.e. path-difference systems **[5]**
3/809 • • • Rotating or oscillating beam systems using continuous analysis of received signal for determining direction in the plane of rotation or oscillation or for determining deviation from a predetermined direction in such a plane **[5]**
3/82 • • with means for adjusting phase or compensating for time-lag errors
3/84 • • with indication presented on cathode-ray tubes
3/86 • • with means for eliminating undesired waves, e.g. disturbing noises

5/00 Position-fixing by co-ordinating two or more direction or position-line determinations; Position-fixing by co-ordinating two or more distance determinations [2]

5/02 • using radio waves (G01S 19/00 takes precedence) **[1, 2010.01]**
5/04 • • Position of source determined by a plurality of spaced direction-finders
5/06 • • Position of source determined by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/12 takes precedence) **[3]**
5/08 • • Position of single direction-finder fixed by determining direction of a plurality of spaced sources of known location
5/10 • • Position of receiver fixed by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/12 takes precedence) **[3]**
5/12 • • by co-ordinating position lines of different shape, e.g. hyperbolic, circular, elliptical or radial
5/14 • • Determining absolute distances from a plurality of spaced points of known location
5/16 • using electromagnetic waves other than radio waves
5/18 • using ultrasonic, sonic, or infrasonic waves
5/20 • • Position of source determined by a plurality of spaced direction-finders **[5]**
5/22 • • Position of source determined by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/28 takes precedence) **[5]**
5/24 • • Position of single direction-finder fixed by determining direction of a plurality of spaced sources of known location **[5]**
5/26 • • Position of receiver fixed by co-ordinating a plurality of position lines defined by path-difference measurements (G01S 5/28 takes precedence) **[5]**
5/28 • • by co-ordinating position lines of different shape, e.g. hyperbolic, circular, elliptical or radial **[5]**
5/30 • • Determining absolute distances from a plurality of spaced points of known location **[5]**

7/00 Details of systems according to groups G01S 13/00, G01S 15/00, G01S 17/00

7/02 • of systems according to group G01S 13/00
7/03 • • Details of HF subsystems specially adapted therefor, e.g. common to transmitter and receiver **[5]**
7/04 • • Display arrangements
7/06 • • • Cathode-ray tube displays
7/08 • • • • with vernier indication of distance, e.g. using two cathode-ray tubes
7/10 • • • • Providing two-dimensional co-ordinated display of distance and direction
7/12 • • • • • Plan-position indicators, i.e. P. P. I.
7/14 • • • • • • • Sector, off-centre, or expanded- angle display
7/16 • • • • • Signals displayed as intensity modulation with rectangular co-ordinates representing distance and bearing, e.g. type B
7/18 • • • • • Distance-height displays; Distance-elevation displays, e.g. type RHI, type E
7/20 • • • • Stereoscopic displays; Three-dimensional displays; Pseudo-three-dimensional displays
7/22 • • • • Producing cursor lines and indicia by electronic means
7/24 • • • • the display being orientated or displaced in accordance with movement of object carrying the transmitting and receiving apparatus, e.g. true-motion radar
7/26 • • • Displays using electroluminescent panels
7/28 • • Details of pulse systems
7/282 • • • Transmitters **[5]**
7/285 • • • Receivers **[5]**
7/288 • • • • Coherent receivers **[5]**
7/292 • • • • Extracting wanted echo-signals **[5]**
7/295 • • • • Means for transforming co-ordinates or for evaluating data, e.g. using computers **[5]**
7/298 • • • • • Scan converters **[5]**
7/32 • • • • Shaping echo pulse signals; Deriving non-pulse signals from echo pulse signals **[5]**
7/34 • • • • Gain of receiver varied automatically during pulse-recurrence period, e.g. anti-clutter gain control **[5]**
7/35 • • Details of non-pulse systems **[5]**
7/36 • • Means for anti-jamming
7/38 • • Jamming means, e.g. producing false echoes **[2]**
7/40 • • Means for monitoring or calibrating
7/41 • • using analysis of echo signal for target characterisation; Target signature; Target cross-section **[6]**
7/42 • • Diversity systems specially adapted for radar
7/48 • of systems according to group G01S 17/00
7/481 • • Constructional features, e.g. arrangements of optical elements **[6]**
7/483 • • Details of pulse systems **[6]**
7/484 • • • Transmitters **[6]**
7/486 • • • Receivers **[6]**
7/487 • • • • Extracting wanted echo signals **[6]**
7/489 • • • • Gain of receiver varied automatically during pulse-recurrence period **[6]**
7/491 • • Details of non-pulse systems **[6]**
7/493 • • • Extracting wanted echo signals **[6]**
7/495 • • Counter-measures or counter-counter-measures **[6]**
7/497 • • Means for monitoring or calibrating **[6]**
7/499 • • using polarisation effects **[6]**
7/51 • • Display arrangements **[6]**
7/52 • of systems according to group G01S 15/00
7/521 • • Constructional features **[6]**
7/523 • • Details of pulse systems **[6]**
7/524 • • • Transmitters **[6]**
7/526 • • • Receivers **[6]**
7/527 • • • • Extracting wanted echo signals **[6]**
7/529 • • • • Gain of receiver varied automatically during pulse-recurrence period **[6]**

7/53 • • • • Means for transforming co-ordinates or for evaluating data, e.g. using computers **[6]**
7/531 • • • • • Scan converters **[6]**
7/533 • • • • • Data rate converters **[6]**
7/534 • • Details of non-pulse systems **[6]**
7/536 • • • Extracting wanted echo signals **[6]**
7/537 • • Counter measures or counter-counter-measures, e.g. jamming, anti-jamming **[6]**
7/539 • • using analysis of echo signal for target characterisation; Target signature; Target cross-section **[6]**
7/54 • • with receivers spaced apart
7/56 • • Display arrangements
7/58 • • • for providing variable ranges
7/60 • • • for providing a permanent recording
7/62 • • • Cathode-ray tube displays
7/64 • • Luminous indications (G01S 7/62 takes precedence) **[5]**

11/00 Systems for determining distance or velocity not using reflection or reradiation (position-fixing by co-ordinating two or more distance determinations G01S 5/00) **[2]**

11/02 • using radio waves (G01S 19/00 takes precedence) **[5, 2010.01]**
11/04 • • using angle measurements **[5]**
11/06 • • using intensity measurements **[5]**
11/08 • • using synchronised clocks **[5]**
11/10 • • using Doppler effect **[5]**
11/12 • using electromagnetic waves other than radio waves **[5]**
11/14 • using ultrasonic, sonic or infrasonic waves **[5]**
11/16 • using difference in transit time between electromagnetic and sonic waves **[5]**

Note(s)

1. Groups G01S 13/00-G01S 17/00cover:
   - systems for detecting the presence of an object, e.g. by reflection or reradiation from the object itself, or from a transponder associated with the object, for determining the distance or relative velocity of an object, for providing a co-ordinated display of the distance and direction of an object or for obtaining an image thereof;
   - systems arranged for mounting on a moving craft or vehicle and using the reflection of waves from an extended surface external to the craft, e.g. the surface of the earth, to determine the velocity and direction of motion of the craft relative to the surface.
2. Groups G01S 13/00-G01S 17/00 do not cover:
   - systems for determining the direction of an object by means not employing reflection or reradiation, which are covered by groups G01S 1/00 or G01S 3/00;
   - systems for determining distance or velocity of an object by means not employing reflection or reradiation, which are covered by group G01S 11/00.

13/00 Systems using the reflection or reradiation of radio waves, e.g. radar systems; Analogous systems using reflection or reradiation of waves whose nature or wavelength is irrelevant or unspecified [3]

13/02 • Systems using reflection of radio waves, e.g. primary radar systems; Analogous systems **[3]**
13/04 • • Systems determining presence of a target (based on relative movement of target G01S 13/56) **[3]**
13/06 • • Systems determining position data of a target **[3]**
13/08 • • • Systems for measuring distance only (indirect measurement G01S 13/46) **[3]**
13/10 • • • • using transmission of interrupted pulse modulated waves (determination of distance by phase measurement G01S 13/32) **[3]**
13/12 • • • • • wherein the pulse-recurrence frequency is varied to provide a desired time relationship between the transmission of a pulse and the receipt of the echo of a preceding pulse **[3]**
13/14 • • • • • wherein a voltage or current pulse is initiated and terminated in accordance respectively with the pulse transmission and echo reception **[3]**
13/16 • • • • • • using counters **[3]**
13/18 • • • • • wherein range gates are used **[3]**
13/20 • • • • • whereby multiple time-around echos are used or eliminated **[3]**
13/22 • • • • • using irregular pulse repetition frequency **[3]**
13/24 • • • • • using frequency agility of carrier wave **[3]**
13/26 • • • • • wherein the transmitted pulses use a frequency- or phase-modulated carrier wave **[3]**
13/28 • • • • • • with time compression of received pulses **[3]**
13/30 • • • • • using more than one pulse per radar period **[3]**
13/32 • • • • using transmission of continuous unmodulated waves, amplitude-, frequency- or phase-modulated waves **[3]**
13/34 • • • • • using transmission of frequency-modulated waves and the received signal, or a signal derived therefrom, being heterodyned with a locally-generated signal related to the contemporaneous transmitted signal to give a beat-frequency signal **[3]**
13/36 • • • • • with phase comparison between the received signal and the contemporaneously transmitted signal **[3]**
13/38 • • • • • • wherein more than one modulation frequency is used **[3]**
13/40 • • • • • • wherein the frequency of transmitted signal is adjusted to give a predetermined phase relationship **[3]**
13/42 • • • Simultaneous measurement of distance and other coordinates (indirect measurement G01S 13/46) **[3]**
13/44 • • • • Monopulse radar, i.e. simultaneous lobing **[3]**
13/46 • • • Indirect determination of position data **[3]**
13/48 • • • • using multiple beams at emission or reception **[3]**
13/50 • • Systems of measurement based on relative movement of target **[3]**
13/52 • • • Discriminating between fixed and moving objects or between objects moving at different speeds **[3]**
13/522 • • • • using transmissions of interrupted pulse modulated waves **[5]**

13/524 • • • • • based upon the phase or frequency shift resulting from movement of objects, with reference to the transmitted signals, e.g. coherent MTi **[5]**

13/526 • • • • • • performing filtering on the whole spectrum without loss of range information, e.g. using delay line cancellers or comb filters **[5]**

13/528 • • • • • • • with elimination of blind speeds **[5]**

13/53 • • • • • • performing filtering on a single spectral line and associated with one or more range gates with a phase detector or a frequency mixer to extract the Doppler information, e.g. pulse Doppler radar **[5]**

13/532 • • • • • • • using a bank of range gates or a memory matrix **[5]**

13/534 • • • • • • based upon amplitude or phase shift resulting from movement of objects, with reference to the surrounding clutter echo signal, e.g. non-coherent MTi, clutter referenced MTi, externally coherent MTi **[5]**

13/536 • • • • using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves **[5]**

13/538 • • • • eliminating objects that have not moved between successive antenna scans, e.g. area MTi **[5]**

13/56 • • • • for presence detection **[3]**

13/58 • • • Velocity or trajectory determination systems; Sense-of-movement determination systems **[3]**

13/60 • • • • wherein the transmitter and receiver are mounted on the moving object, e.g. for determining ground speed, drift angle, ground track (G01S 13/64 takes precedence) **[3]**

13/62 • • • • Sense-of-movement determination **[3]**

13/64 • • • • Velocity measuring systems using range gates **[3]**

13/66 • Radar-tracking systems; Analogous systems **[3]**

13/68 • • for angle tracking only **[3]**

13/70 • • for range tracking only **[3]**

13/72 • • for two-dimensional tracking, e.g. combination of angle and range tracking, track-while-scan radar **[3]**

13/74 • Systems using reradiation of radio waves, e.g. secondary radar systems; Analogous systems **[3, 6]**

13/75 • • using transponders powered from received waves, e.g. using passive transponders **[6]**

13/76 • • wherein pulse-type signals are transmitted **[3]**

13/78 • • • discriminating between different kinds of targets, e.g. IFF-radar, i.e. identification of friend or foe (G01S 13/75, G01S 13/79 takes precedence) **[3]**

13/79 • • Systems using random coded signals or random pulse repetition frequencies **[6]**

13/82 • • wherein continuous-type signals are transmitted **[3]**

13/84 • • • for distance determination by phase measurement **[3]**

13/86 • Combinations of radar systems with non-radar systems, e.g. sonar, direction finder **[3]**

13/87 • Combinations of radar systems, e.g. primary radar and secondary radar **[3]**

13/88 • Radar or analogous systems, specially adapted for specific applications (electromagnetic prospecting or detecting of objects, e.g. near-field detection, G01V 3/00) **[3, 6]**

13/89 • • for mapping or imaging **[3]**

13/90 • • • using synthetic aperture techniques **[3, 6]**

13/91 • • for traffic control (G01S 13/93 takes precedence) **[3]**

13/92 • • • for velocity measurement **[3]**

13/93 • • for anti-collision purposes **[3]**

13/94 • • for terrain-avoidance **[3]**

13/95 • • for meteorological use **[3]**

15/00 Systems using the reflection or reradiation of acoustic waves, e.g. sonar systems [3]

15/02 • using reflection of acoustic waves (G01S 15/66 takes precedence) **[3]**

15/04 • • Systems determining presence of a target **[3]**

15/06 • • Systems determining position data of a target **[3]**

15/08 • • • Systems for measuring distance only (indirect measurement G01S 15/46) **[3]**

15/10 • • • • using transmission of interrupted pulse-modulated waves (determination of distance by phase measurement G01S 15/32) **[3]**

15/12 • • • • • wherein the pulse-recurrence frequency is varied to provide a desired time relationship between the transmission of a pulse and the receipt of the echo of a preceding pulse **[3]**

15/14 • • • • • wherein a voltage or current pulse is initiated and terminated in accordance respectively with the pulse transmission and echo reception **[3]**

15/18 • • • • • wherein range gates are used **[3]**

15/32 • • • • using transmission of continuous unmodulated waves, amplitude-, frequency- or phase-modulated waves **[3]**

15/34 • • • • • using transmission of frequency-modulated waves and the received signal, or a signal derived therefrom, being heterodyned with a locally-generated signal related to the contemporaneous transmitted signal to give a beat-frequency signal **[3]**

15/36 • • • • • with phase comparison between the received signal and the contemporaneously transmitted signal **[3]**

15/42 • • • Simultaneous measurement of distance and other coordinates (indirect measurement G01S 15/46) **[3]**

15/46 • • • Indirect determination of position data **[3]**

15/50 • • Systems of measurement based on relative movement of target **[3]**

15/52 • • • Discriminating between fixed and moving objects or between objects moving at different speeds **[3]**

15/58 • • • Velocity or trajectory determination systems; Sense-of-movement determination systems **[3]**

15/60 • • • • wherein the transmitter and receiver are mounted on the moving object, e.g. for determining ground speed, drift angle, ground track **[3]**

15/62 • • • • Sense-of-movement determination **[3]**

15/66 • Sonar tracking systems **[3]**

15/74 • Systems using reradiation of acoustic waves, e.g. IFF, i.e. identification of friend or foe **[3]**

15/87 • Combinations of sonar systems **[3]**

15/88 • Sonar systems, specially adapted for specific applications (seismic or acoustic prospecting or detecting G01V 1/00) **[3, 6]**
15/89 • • for mapping or imaging **[3]**
15/93 • • for anti-collision purposes **[3]**
15/96 • • for locating fish **[3]**

17/00 Systems using the reflection or reradiation of electromagnetic waves other than radio waves, e.g. lidar systems [3]

17/02 • Systems using the reflection of electromagnetic waves other than radio waves (G01S 17/66 takes precedence) **[3]**
17/06 • • Systems determining position data of a target **[3]**
17/08 • • • for measuring distance only (indirect measurement G01S 17/46; active triangulation systems G01S 17/48) **[3, 2006.01]**
17/10 • • • • using transmission of interrupted pulse-modulated waves (determination of distance by phase measurements G01S 17/32) **[3]**
17/32 • • • • using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves **[3]**
17/36 • • • • • with phase comparison between the received signal and the contemporaneously transmitted signal **[3]**
17/42 • • • Simultaneous measurement of distance and other coordinates (indirect measurement G01S 17/46) **[3]**
17/46 • • • Indirect determination of position data **[3]**
17/48 • • • • Active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves **[2006.01]**
17/50 • • Systems of measurement based on relative movement of target **[3]**
17/58 • • • Velocity or trajectory determination systems; Sense-of-movement determination systems **[3]**
17/66 • Tracking systems using electromagnetic waves other than radio waves **[3]**
17/74 • Systems using reradiation of electromagnetic waves other than radio waves, e.g. IFF, i.e. identification of friend or foe **[3]**
17/87 • Combinations of systems using electromagnetic waves other than radio waves **[3]**
17/88 • Lidar systems, specially adapted for specific applications **[3]**
17/89 • • for mapping or imaging **[6, 2006.01]**
17/93 • • for anti-collision purposes **[6, 2006.01]**
17/95 • • for meteorological use **[6, 2006.01]**

19/00 Satellite radio beacon positioning systems; Determining position, velocity or attitude using signals transmitted by such systems [2010.01]

19/01 • Satellite radio beacon positioning systems transmitting time-stamped messages, e.g. GPS [Global Positioning System], GLONASS [Global Orbiting Navigation Satellite System] or GALILEO **[2010.01]**
19/02 • • Details of the space or ground control segments **[2010.01]**
19/03 • • Cooperating elements; Interaction or communication between different cooperating elements or between cooperating elements and receivers **[2010.01]**

Note(s) [2010.01]

The term "cooperating elements" designates additional elements or subsystems, including receivers of other users, which interact or communicate with the receiver or the satellite positioning system.

19/04 • • • providing carrier phase data **[2010.01]**
19/05 • • • providing aiding data **[2010.01]**
19/06 • • • • employing an initial estimate of the location of the receiver as aiding data or in generating aiding data **[2010.01]**
19/07 • • • providing data for correcting measured positioning data, e.g. DGPS [differential GPS] or ionosphere corrections **[2010.01]**
19/08 • • • providing integrity information, e.g. health of satellites or quality of ephemeris data **[2010.01]**
19/09 • • • providing processing capability normally carried out by the receiver **[2010.01]**
19/10 • • • providing dedicated supplementary positioning signals **[2010.01]**
19/11 • • • • wherein the cooperating elements are pseudolites or satellite radio beacon positioning system signal repeaters **[2010.01]**
19/12 • • • • wherein the cooperating elements are telecommunication base stations **[2010.01]**
19/13 • • Receivers **[2010.01]**
19/14 • • • specially adapted for specific applications **[2010.01]**
19/15 • • • • Aircraft landing systems **[2010.01]**
19/16 • • • • Anti-theft; Abduction **[2010.01]**
19/17 • • • • Emergency applications **[2010.01]**
19/18 • • • • Military applications **[2010.01]**
19/19 • • • • Sporting applications **[2010.01]**
19/20 • • • Integrity monitoring, fault detection or fault isolation of space segment **[2010.01]**
19/21 • • • Interference related issues **[2010.01]**
19/22 • • • Multipath-related issues **[2010.01]**
19/23 • • • Testing, monitoring, correcting or calibrating of a receiver element **[2010.01]**
19/24 • • • Acquisition or tracking of signals transmitted by the system **[2010.01]**
19/25 • • • • involving aiding data received from a cooperating element, e.g. assisted GPS **[2010.01]**
19/26 • • • • involving a sensor measurement for aiding acquisition or tracking **[2010.01]**
19/27 • • • • creating, predicting or correcting ephemeris or almanac data within the receiver **[2010.01]**
19/28 • • • • Satellite selection **[2010.01]**
19/29 • • • • carrier related **[2010.01]**
19/30 • • • • code related **[2010.01]**
19/31 • • • Acquisition or tracking of other signals for positioning **[2010.01]**
19/32 • • • Multimode operation in a single same satellite system, e.g. GPS L1/L2 **[2010.01]**
19/33 • • • Multimode operation in different systems which transmit time stamped messages, e.g. GPS/GLONASS **[2010.01]**
19/34 • • • Power consumption **[2010.01]**
19/35 • • • Constructional details or hardware or software details of the signal processing chain **[2010.01]**
19/36 • • • • relating to the receiver frond end **[2010.01]**
19/37 • • • • Hardware or software details of the signal processing chain **[2010.01]**

19/38 • Determining a navigation solution using signals transmitted by a satellite radio beacon positioning system **[2010.01]**

19/39 • • the satellite radio beacon positioning system transmitting time-stamped messages, e.g. GPS [Global Positioning System], GLONASS [Global Orbiting Navigation Satellite System] or GALILEO **[2010.01]**

19/40 • • • Correcting position, velocity or attitude **[2010.01]**

19/41 • • • • Differential correction, e.g. DGPS [differential GPS] **[2010.01]**

19/42 • • • Determining position **[2010.01]**

19/43 • • • • using carrier phase measurements, e.g. kinematic positioning; using long or short baseline interferometry **[2010.01]**

19/44 • • • • • Carrier phase ambiguity resolution; Floating ambiguity; LAMBDA [Least-squares AMBiguity Decorrelation Adjustment] method **[2010.01]**

19/45 • • • • by combining measurements of signals from the satellite radio beacon positioning system with a supplementary measurement **[2010.01]**

19/46 • • • • • the supplementary measurement being of a radio-wave signal type **[2010.01]**

19/47 • • • • • the supplementary measurement being an inertial measurement, e.g. tightly coupled inertial **[2010.01]**

19/48 • • • • by combining or switching between position solutions derived from the satellite radio beacon positioning system and position solutions derived from a further system **[2010.01]**

19/49 • • • • • whereby the further system is an inertial position system, e.g. loosely-coupled **[2010.01]**

19/50 • • • • whereby the position solution is constrained to lie upon a particular curve or surface, e.g. for locomotives on railway tracks **[2010.01]**

19/51 • • • • Relative positioning **[2010.01]**

19/52 • • • Determining velocity **[2010.01]**

19/53 • • • Determining attitude **[2010.01]**

19/54 • • • • using carrier phase measurements; using long or short baseline interferometry **[2010.01]**

19/55 • • • • • Carrier phase ambiguity resolution; Floating ambiguity; LAMBDA [Least-squares AMBiguity Decorrelation Adjustment] method **[2010.01]**

G01T MEASUREMENT OF NUCLEAR OR X-RADIATION (radiation analysis of materials, mass spectrometry G01N 23/00; tubes for determining the presence, intensity, density or energy of radiation or particles H01J 47/00)

Note(s)

1. This subclass covers the measurement of X-radiation, gamma radiation, corpuscular radiation, cosmic radiation, or neutron radiation.
2. Attention is drawn to the Notes following the title of class G01.

1/00 Measuring X-radiation, gamma radiation, corpuscular radiation, or cosmic radiation (G01T 3/00, G01T 5/00 take precedence) **[2]**

1/02 • Dosimeters (G01T 1/15 takes precedence) **[2]**

1/04 • • Chemical dosimeters (G01T 1/06, G01T 1/08 take precedence)

1/06 • • Glass dosimeters

1/08 • • Photographic dosimeters

1/10 • • Luminescent dosimeters

1/105 • • • Read-out devices (G01T 1/115 takes precedence) **[2]**

1/11 • • • Thermo-luminescent dosimeters

1/115 • • • • Read-out devices **[2]**

1/12 • • Calorimetric dosimeters

1/14 • • Electrostatic dosimeters (construction of ionisation chambers H01J 47/02)

1/142 • • • Charging devices; Read-out devices **[2]**

1/15 • Instruments in which pulses generated by a radiation detector are integrated, e.g. by a diode pump circuit

1/16 • Measuring radiation intensity (G01T 1/29 takes precedence) **[2]**

1/161 • • Applications in the field of nuclear medicine, e.g. in vivo counting **[2]**

1/163 • • • Whole-body counters **[2]**

1/164 • • • Scintigraphy **[2]**

1/166 • • • • involving relative movement between detector and subject **[2]**

1/167 • • Measuring radioactive content of objects, e.g. contamination (whole-body counters G01T 1/163) **[2]**

1/169 • • Exploration, location of contaminated surface areas **[2]**

1/17 • • Circuit arrangements not adapted to a particular type of detector

1/172 • • • with coincidence circuit arrangements (G01T 1/178 takes precedence) **[2]**

1/175 • • • Power supply circuits **[2]**

1/178 • • • for measuring specific activity in the presence of other radioactive substances, e.g. natural, in the air or in liquids such as rain-water **[2]**

1/18 • • with counting-tube arrangements, e.g. with Geiger counters (tubes H01J 47/00)

1/185 • • with ionisation-chamber arrangements **[2]**

1/20 • • with scintillation detectors

1/202 • • • the detector being a crystal

1/203 • • • the detector being made of plastics

1/204 • • • the detector being a liquid

1/205 • • • the detector being a gas

1/208 • • • Circuits specially adapted for scintillation detectors, e.g. for the photo-multiplier section **[2]**

1/22 • • with Cerenkov detectors

1/24 • • with semiconductor detectors

1/26 • • with resistance detectors

1/28 • • with secondary-emission detectors

1/29 • Measurement performed on radiation beams, e.g. position or section of the beam; Measurement of spatial distribution of radiation **[2]**

1/30 • Measuring half-life of a radioactive substance

1/32 • Measuring polarisation of particles

1/34 • Measuring cross-section, e.g. absorption cross-section of particles
1/36 • Measuring spectral distribution of X-rays or of nuclear radiation
1/38 • • Particle discrimination and measurement of relative mass, e.g. by measurement of loss of energy with distance (dE/dx) **[2]**
1/40 • • Stabilisation of spectrometers **[2]**

3/00 Measuring neutron radiation (G01T 5/00 takes precedence) **[2]**
3/02 • by shielding other radiation
3/04 • using calorimetric devices
3/06 • with scintillation detectors **[2]**
3/08 • with semiconductor detectors **[2]**

5/00 Recording of movements or tracks of particles (spark chambers H01J 47/14)**; Processing or analysis of such tracks [2]**
5/02 • Processing of tracks; Analysis of tracks
5/04 • Cloud chambers, e.g. Wilson chamber
5/06 • Bubble chambers
5/08 • Scintillation chambers (discharge tubes H01J 40/00, H01J 47/00)
5/10 • Plates or blocks in which tracks of nuclear particles are made visible by after-treatment, e.g. using photographic emulsion, using mica
5/12 • Circuit arrangements with multi-wire or parallel-plate chambers, e.g. spark chambers (tubes per se H01J 47/00) **[2]**

7/00 Details of radiation-measuring instruments
7/02 • Collecting-means for receiving or storing samples to be investigated
7/04 • • by filtration
7/06 • • by electrostatic precipitation (G01T 7/04 takes precedence)
7/08 • Means for conveying samples received
7/10 • • using turntables
7/12 • Provision for actuation of an alarm

G01V GEOPHYSICS; GRAVITATIONAL MEASUREMENTS; DETECTING MASSES OR OBJECTS; TAGS (means for indicating the location of accidentally buried, e.g. snow-buried, persons A63B 29/02) **[4, 6]**

Note(s)

1. This subclass covers radar, sonar, lidar or analogous systems specifically designed for geophysical use. Radar, sonar, lidar or analogous systems, or details of such systems, if of a general interest, are also classified in subclass G01S.
2. In this subclass, the following term is used with the meaning indicated:
   • "tags" means arrangements cooperating with a detecting field, e.g. near field, and designed to produce a specific detectable effect; "tags" also means active markers capable of generating a detectable field.
3. In this subclass, the geophysical methods apply both to the earth and to other celestial objects, e.g. planets.
4. Attention is drawn to the Notes following the title of class G01.

Subclass index

1/00 Seismology; Seismic or acoustic prospecting or detecting
1/02 • Generating seismic energy
1/04 • • Details
1/047 • • • Arrangements for coupling the generator to the ground **[3]**
1/053 • • • • for generating transverse waves **[3]**
1/06 • • • Ignition devices (G01V 1/393 takes precedence) **[3]**
1/08 • • • • involving time-delay devices
1/09 • • • Transporting arrangements, e.g. on vehicles (G01V 1/38 takes precedence) **[3]**
1/104 • • using explosive charges (G01V 1/157 takes precedence) **[3]**
1/108 • • • by deforming or displacing surfaces of enclosures **[3]**
1/112 • • • • for use on the surface of the earth **[3]**
1/116 • • • where pressurised combustion gases escape from the generator in a pulsating manner, e.g. for generating bursts **[3]**
1/13 • • • Arrangements or disposition of charges to produce a desired pattern in space or time
1/133 • • using fluidic driving means, e.g. using highly pressurised fluids (G01V 1/104 takes precedence) **[3]**
1/135 • • • by deforming or displacing surfaces of enclosures **[3]**
1/137 • • • which fluids escape from the generator in a pulsating manner, e.g. for generating bursts **[3]**
1/143 • • using mechanical driving means (G01V 1/104, G01V 1/133 takes precedence) **[3]**
1/145 • • • by deforming or displacing surfaces **[3]**
1/147 • • • using impact of dropping masses **[3]**
1/153 • • • using rotary unbalanced masses **[3]**
1/155 • • • using reciprocating masses **[3]**
1/157 • • using spark discharges; using exploding wires **[3]**

1/16 • Receiving elements for seismic signals; Arrangements or adaptations of receiving elements
1/18 • • Receiving elements, e.g. seismometer, geophone **[2]**
1/20 • • Arrangements of receiving elements, e.g. geophone pattern
1/22 • Transmitting seismic signals to recording or processing apparatus
1/24 • Recording seismic data
1/26 • • Reference-signal-transmitting devices, e.g. indicating moment of firing of shot
1/28 • Processing seismic data, e.g. analysis, for interpretation, for correction (G01V 1/48 takes precedence) **[6]**
1/30 • • Analysis (G01V 1/50 takes precedence) **[6]**
1/32 • • Transforming one recording into another
1/34 • • Displaying seismic recordings
1/36 • • Effecting static or dynamic corrections on records, e.g. correcting spread; Correlating seismic signals; Eliminating effects of unwanted energy
1/37 • • • specially adapted for seismic systems using continuous agitation of the ground **[3]**
1/38 • specially adapted for water-covered areas (G01V 1/28 takes precedence)
1/387 • • Reducing secondary bubble pulse, i.e. reducing the detected signals resulting from the generation and release of gas bubbles after the primary explosion **[3]**
1/393 • • Means for loading explosive underwater charges, e.g. combined with ignition devices **[3]**
1/40 • specially adapted for well-logging
1/42 • • using generators in one well and receivers elsewhere or vice-versa (G01V 1/52 takes precedence) **[6]**
1/44 • • using generators and receivers in the same well (G01V 1/52 takes precedence) **[6]**
1/46 • • • Data acquisition **[6]**
1/48 • • • Processing data **[6]**
1/50 • • • • Analysing data **[6]**
1/52 • • Structural details **[6]**

3/00 Electric or magnetic prospecting or detecting; Measuring magnetic field characteristics of the earth, e.g. declination or deviation [2, 4]

Note(s)

Groups G01V 3/15-G01V 3/18 take precedence over groups G01V 3/02-G01V 3/14.

3/02 • operating with propagation of electric current
3/04 • • using dc
3/06 • • using ac
3/08 • operating with magnetic or electric fields produced or modified by objects or geological structures or by detecting devices (with electromagnetic waves G01V 3/12)
3/10 • • using induction coils
3/11 • • • for detecting conductive objects, e.g. firearms, cables or pipes **[3]**
3/12 • operating with electromagnetic waves
3/14 • operating with electron or nuclear magnetic resonance
3/15 • specially adapted for use during transport, e.g. by a person, vehicle or boat **[3]**
3/16 • • specially adapted for use from aircraft (G01V 3/165-G01V 3/175 take precedence) **[3]**
3/165 • • operating with magnetic or electric fields produced or modified by the object or by the detecting device (with electromagnetic waves G01V 3/17) **[3]**
3/17 • • operating with electromagnetic waves **[3]**
3/175 • • operating with electron or nuclear magnetic resonance **[3]**
3/18 • specially adapted for well-logging
3/20 • • operating with propagation of electric current **[3]**
3/22 • • • using dc **[3]**
3/24 • • • using ac **[3]**
3/26 • • operating with magnetic or electric fields produced or modified either by the surrounding earth formation or by the detecting device (with electromagnetic waves G01V 3/30) **[3]**
3/28 • • • using induction coils **[3]**
3/30 • • operating with electromagnetic waves **[3]**
3/32 • • operating with electron or nuclear magnetic resonance **[3]**
3/34 • • Transmitting data to recording or processing apparatus; Recording data **[3]**
3/36 • Recording data (G01V 3/34 takes precedence) **[3]**
3/38 • Processing data, e.g. for analysis, for interpretation or for correction **[3]**
3/40 • specially adapted for measuring magnetic field characteristics of the earth **[3]**

5/00 Prospecting or detecting by the use of nuclear radiation, e.g. of natural or induced radioactivity

5/02 • specially adapted for surface logging, e.g. from aircraft **[3]**
5/04 • specially adapted for well-logging **[3]**
5/06 • • for detecting naturally radioactive minerals **[3]**
5/08 • • using primary nuclear radiation sources or X-rays **[3]**
5/10 • • • using neutron sources **[3]**
5/12 • • • using gamma- or X-ray sources **[3]**
5/14 • • • using a combination of several sources, e.g. a neutron and a gamma source **[3]**

7/00 Measuring gravitational fields or waves; Gravimetric prospecting or detecting

7/02 • Details
7/04 • • Electric, photoelectric, or magnetic indicating or recording means
7/06 • • Analysis or interpretation of gravimetric records
7/08 • using balances
7/10 • • using torsion balances, e.g. Eötvös balance
7/12 • using pendulums
7/14 • using free-fall time
7/16 • specially adapted for use on moving platforms, e.g. ship, aircraft

8/00 Prospecting or detecting by optical means [6]

Note(s)

This group covers the use of infra-red, visible or ultra-violet light.

8/02 • Prospecting **[6]**
8/10 • Detecting, e.g. by using light barriers (by reflection from the object G01S 17/00) **[6]**
8/12 • • using one transmitter and one receiver **[6]**
8/14 • • • using reflectors **[6]**
8/16 • • • using optical fibres **[6]**
8/18 • • • using mechanical scanning systems **[6]**
8/20 • • using multiple transmitters or receivers **[6]**

8/22 • • • using reflectors **[6]**
8/24 • • • using optical fibres **[6]**
8/26 • • • using mechanical scanning systems **[6]**

9/00 Prospecting or detecting by methods not provided for in groups G01V 1/00-G01V 8/00 [6]

9/02 • Determining existence or flow of underground water

11/00 Prospecting or detecting by methods combining techniques covered by two or more of main groups G01V 1/00-G01V 9/00

13/00 Manufacturing, calibrating, cleaning, or repairing instruments or devices covered by groups G01V 1/00-G01V 11/00

15/00 Tags attached to, or associated with, an object, in order to enable detection of the object (record carriers for use with machines having a detectable tag or marker G06K 19/00) **[6]**

Note(s)

This group does not cover detectors or detection methods, e.g. methods in which the object to be detected produces or modifies magnetic or electric fields, which are covered elsewhere, e.g. in group G01V 3/00.

99/00 Subject matter not provided for in other groups of this subclass [2009.01]

G01W METEOROLOGY (radar, sonar, lidar or analogous systems, designed for meteorological use G01S 13/95, G01S 15/88, G01S 17/95)

Note(s)

1. In this subclass, the following term is used with the meaning indicated:
   • "meteorology" includes measurement of certain ambient atmospheric conditions.
2. Attention is drawn to the Notes following the title of class G01.

1/00 Meteorology

1/02 • Instruments for indicating weather conditions by measuring two or more variables, e.g. humidity, pressure, temperature, cloud cover, wind speed (G01W 1/10 takes precedence)
1/04 • • giving only separate indications of the variables measured
1/06 • • giving a combined indication of weather conditions (catathermometers for measuring "cooling value" related either to weather conditions or to comfort of other human environment G01W 1/17)
1/08 • Adaptations of balloons, missiles, or aircraft for meteorological purposes; Radiosondes
1/10 • Devices for predicting weather conditions
1/11 • Devices for indicating atmospheric humidity
1/12 • Sunshine-duration recorders
1/14 • Rainfall or precipitation gauges
1/16 • Measuring atmospheric potential differences, e.g. due to electrical charges in clouds
1/17 • Catathermometers for measuring "cooling value" related either to weather conditions or to comfort of other human environment
1/18 • Testing or calibrating meteorological apparatus