

SECTION G –PHYSICS

Notes

- (1) In this section, the following term is used with the meaning indicated:
 - “variable” (as a noun) means a feature or property (e.g., a dimension, a physical condition such as temperature, a quality such as density or colour) which, in respect of a particular entity (e.g., an object, a quantity of a substance, a beam of light) and at a particular instant, is capable of being measured; the variable may change, so that its numerical expression may assume different values at different times, in different conditions or in individual cases, but may be constant in respect of a particular entity in certain conditions or for practical purposes (e.g., the length of a bar may be regarded as constant for many purposes).
- (2) Attention is drawn to the definitions of terms or expressions used, appearing in the notes of several of the classes in this section, in particular those of “measuring” in class G01 and “control” and “regulation” in class G05.
- (3) Classification in this section may present more difficulty than in other sections, because the distinction between different fields of use rests to a considerable extent on differences in the intention of the user rather than on any constructional differences or differences in the manner of use, and because the subjects dealt with are often in effect systems or combinations, which have features or parts in common, rather than “things”, which are readily distinguishable as a whole. For example, information (e.g., a set of figures) may be displayed for the purpose of education or advertising (G09), for enabling the result of a measurement to be known (G01), for signalling the information to a distant point or for giving information which has been signalled from a distant point (G08). The words used to describe the purpose depend on features that may be irrelevant to the form of the apparatus concerned, for example, such features as the desired effect on the person who sees the display, or whether the display is controlled from a remote point. Again, a device which responds to some change in a condition, e.g., in the pressure of a fluid, may be used, without modification of the device itself, to give information about the pressure (G01L) or about some other condition linked to the pressure (another subclass of class G01, e.g., G01K for temperature), to make a record of the pressure or of its occurrence (G07C), to give an alarm (G08B), or to control another apparatus (G05).
 The classification scheme is intended to enable things of a similar nature (as indicated above) to be classified together. It is therefore particularly necessary for the real nature of any technical subject to be decided before it can be properly classified.

INSTRUMENTS

G01 MEASURING (counting G06M); TESTING

Notes

- (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”. [7]
- (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. [6]
- 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. [6]
- 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]
- (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 (measuring human body, see the relevant places, where such exist, e.g. A41H 1/00, A43D 1/02, A61B 5/103; measuring appliances combined with walking-sticks A45B 3/08; sorting according to dimensions B07; methods or devices for measuring, specially adapted for metal-rolling mills B21B 38/00; tool-setting or drawing instruments not specially modified for measuring B23B 49/00, B23Q 15/00 to B23Q 17/00, B43L; measuring or gauging equipment specially adapted for grinding or polishing operations B24B 49/00; combinations of measuring devices with writing-implements B43K 29/08; geodetical, nautical or aeronautical measuring, surveying, rangefinding G01C; photogrammetry or videogrammetry G01C 11/00; measuring force or stress, in general G01L 1/00; investigating or analysing surface structures in atomic ranges using scanning-probe techniques G01N 13/00; investigating or analysing particle size, investigating or analysing surface area of porous material G01N 15/00; radio direction-finding, determining distance or velocity by use of propagation effects, e.g. Doppler effect, propagation time, of radio waves, analogous arrangements using other waves G01S; geophysical measuring G01V; measuring length or roll diameter of film in cameras or projectors G03B 1/60; combinations of measuring devices with means for controlling or regulating G05; methods or arrangements for converting the position of a manually-operated writing or tracing member into an electrical signal G06K 11/00; measuring elapsed travel of recording medium in recording or playback equipment, sensing diameter of record in autochange gramophones G11B; details of scanning-probe apparatus, in general G12B 21/00; means structurally associated with electric rotary current collectors for indicating brush wear H01R 39/58; indicating consumption of electrodes in arc lamps H05B 31/34)

Notes

- (1) This subclass covers measuring of position or displacement in terms of linear or angular dimensions. [4]
- (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 to G01B 17/00 are classified in group G01B 21/00 if no single other group can be selected as being predominantly applicable.

Subclass Index

MEASURING DEVICES CHARACTERISED BY THE MATERIAL	1/00	By fluids	13/00
PREDOMINANT METHODS USED IN MEASURING DEVICES		By light waves; by other electro-magnetic waves or radiation	9/00, 11/00; 15/00
Mechanical	3/00, 5/00	By sonic waves	17/00
Electric or magnetic	7/00	OTHER MEASURING ARRANGEMENTS	21/00

1/00	Measuring instruments characterised by the selection of material therefor	5/00	Measuring arrangements characterised by the use of mechanical means (instruments of the types covered by group G01B 3/00 <i>per se</i> G01B 3/00) [2]
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]	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]
3/02	. Rulers or tapes with scales or marks for direct reading	5/04	. . specially adapted for measuring length or width of objects while moving
3/04	. . rigid	5/06	. . for measuring thickness
3/06	. . . folding	5/08	. for measuring diameters
3/08	. . . extensible	5/10	. . of objects while moving
3/10	. . flexible	5/12	. . internal diameters
3/11	. Chains for measuring length	5/14	. for measuring distance or clearance between spaced objects or spaced apertures (G01B 5/24 takes precedence)
3/12	. Measuring wheels	5/16	. . between a succession of regularly spaced objects or regularly spaced apertures
3/14	. Templates for checking contours	5/18	. for measuring depth
3/16	. Compasses, i.e. with a pair of pivoted arms	5/20	. for measuring contours or curvatures
3/18	. Micrometers	5/207	. . using a plurality of fixed, simultaneously operating transducers (G01B 5/213 to G01B 5/22 take precedence) [6]
3/20	. Slide gauges	5/213	. . for measuring radius of curvature [6]
3/22	. Feeler-pin gauges, e.g. dial gauges (for measuring contours or curvatures G01B 5/20)	5/22	. . Spherometers
3/24	. . with open yoke, i.e. calipers	5/24	. for measuring angles or tapers; for testing the alignment of axes
3/26	. . Plug gauges	5/245	. . for testing perpendicularity [6]
3/28	. . Depth gauges	5/25	. . for testing the alignment of axes
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	5/252	. . . for measuring eccentricity, i.e. lateral shift between two parallel axes [6]
3/32	. . Holders therefor	5/255	. . for testing wheel alignment
3/34	. Ring or other apertured gauges, e.g. "go/no-go" gauge	5/26	. for measuring areas, e.g. planimeter (integrators in general G06G)
3/36	. . for external screw threads	5/28	. for measuring roughness or irregularity of surfaces
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	5/30	. for measuring the deformation in a solid, e.g. mechanical strain gauge
3/40	. . for external screw threads	7/00	Measuring arrangements characterised by the use of electric or magnetic means
3/42	. . of limit-gauge type, i.e. "go/no-go" (G01B 3/40 takes precedence)	7/004	. for measuring coordinates of points [6]
3/44	. . . preadjustable for wear or tolerance	7/008	. . using coordinate measuring machines [6]
3/46	. Plug gauges for internal dimensions with engaging surfaces which are at a fixed distance, although they may be preadjustable	7/012	. . . Contact-making feeler heads therefor [6]
3/48	. . for internal screw threads	7/016	. . . . Constructional details of contacts [6]
3/50	. . of limit-gauge type, i.e. "go/no-go" (G01B 3/48 takes precedence)	7/02	. for measuring length, width, or thickness (G01B 7/004, G01B 7/12 takes precedence) [6]
3/52	. . . preadjustable for wear or tolerance	7/04	. . specially adapted for measuring length or width of objects while moving
3/56	. Gauges for measuring angles or tapers, e.g. conical calipers	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 to 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 (microscopes in general G02B 21/00)
- 9/06 . Measuring telescopes (telescopes in general G02B 23/00)
- 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)
- 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]	21/26	. . for testing wheel alignment [3]
21/20	. for measuring contours or curvatures, e.g. determining profile [3]	21/28	. for measuring areas (integrators in general G06G) [3]
21/22	. for measuring angles or tapers; for testing the alignment of axes [3]	21/30	. for measuring roughness or irregularity of surfaces [3]
21/24	. . for testing the alignment of axes [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 dimensions or angles of objects G01B; measuring liquid level G01F; measuring intensity or direction of magnetic fields, other than the earth's field, in general G01R; 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; optical systems therefor G02B; maps, globes G09B)

Notes

- (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

MEASURING INSTRUMENTS

For measuring angles; inclinations.....	1/00; 9/00
For measuring distances; heights or levels	3/00, 22/00; 5/00
Compasses; gyroscopes; other navigation instruments.....	17/00; 19/00; 21/00

Other surveying instruments	15/00
Combined instruments	23/00
Manufacture, calibrating	25/00
TRACING PROFILES	7/00
PHOTOGRAMMETRY OR VIDEOGRAMMETRY	11/00
SURVEYING OPEN WATER.....	13/00

1/00	Measuring angles (in compasses G01C 17/00)	3/14	. . with binocular observation at a single point, e.g. stereoscopic type (G01C 3/20 takes precedence)
1/02	. Theodolites	3/16	. . . Measuring marks
1/04	. . combined with cameras	3/18	. . with one observation point at each end of the base (G01C 3/20 takes precedence)
1/06	. . Arrangements for reading scales	3/20	. . with adaptation to the measurement of the height of an object
1/08	. Sextants	3/22	. using a parallax triangle with variable angles and a base of fixed length at, near, or formed by, the object (active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves, G01S 17/48) [1,8]
1/10	. . including an artificial horizon (G01C 1/14 takes precedence; artificial horizons <i>per se</i> G01C 15/14)	3/24	. using a parallax triangle with fixed angles and a base of variable length in the observation station, e.g. in the instrument (active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves, G01S 17/48) [1,8]
1/12	. . . with a stabilised mirror (tilt compensation in general G12B)	3/26	. using a parallax triangle with fixed angles and a base of variable length at, near, or formed by, the object (active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves, G01S 17/48) [1,8]
1/14	. . Periscopic sextants (periscopes in general G02B 23/08)	3/28	. . with provision for reduction of the distance into the horizontal plane
3/00	Measuring distances in line of sight; Optical rangefinders (tapes, chains, or wheels for measuring length G01B; active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves, G01S 17/48; coupling rangefinders with operating parts of photographic apparatus G03B) [1,8]	3/30	. . . with adaptation to the measurement of the height of an object, e.g. tacheometers
3/02	. Details	3/32	. by focusing the object, e.g. on a ground glass screen
3/04	. . Adaptation of rangefinders for combination with telescopes or binoculars (rangefinders coupled with focusing arrangements of cameras G03B 13/20)		
3/06	. . Use of electric means to obtain final indication		
3/08	. . . Use of electric radiation detectors		
3/10	. using a parallax triangle with variable angles and a base of fixed length in the observation station, e.g. in the instrument [1,8]		
3/12	. . with monocular observation at a single point, e.g. coincidence type (G01C 3/20 takes precedence)		

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; tracing profiles G01C 7/00; levels indicating inclination at a single point G01C 9/00)	11/12	. . . the pictures being supported in the same relative position as when they were taken
5/02	. involving automatic stabilisation of the line of sight (regulation of direction in general G05D 3/00; tilt compensation in general G12B)	11/14	. . . . with optical projection (G01C 11/26 takes precedence)
5/04	. Hydrostatic levelling, i.e. by flexibly interconnected liquid containers at separated points	11/16	. . . . . in a common plane
5/06	. by using barometric means (barometers <i>per se</i> G01L)	11/18	. . . . . involving scanning means
7/00	Tracing profiles (by photogrammetry or videogrammetry G01C 11/00; survey of wells E21B 47/00)	11/20	. . . . . in separate planes
7/02	. of land surfaces	11/22	. . . . . with mechanical projection (G01C 11/26 takes precedence)
7/04	. . involving a vehicle which moves along the profile to be traced	11/24	. . . . . with optical-mechanical projection (G01C 11/26 takes precedence)
7/06	. of cavities, e.g. tunnels	11/26	. . . . . using computers to control the position of the pictures (computers <i>per se</i> G06)
9/00	Measuring inclination, e.g. by clinometers, by levels	11/28	. . . . Special adaptation for recording picture point data, e.g. for profiles
9/02	. Details	11/30	. . by triangulation
9/04	. . Transmission means between sensing element and final indicator for giving an enlarged reading	11/32	. . . Radial triangulation
9/06	. . Electric or photoelectric indication or reading means	11/34	. . . Aerial triangulation
9/08	. . Means for compensating acceleration forces due to movement of instrument	11/36	. <i>Videogrammetry, i.e. electronic processing of video signals from different sources to give parallax or range information</i> [8]
9/10	. by using rolling bodies	13/00	Surveying specially adapted to open water, e.g. sea, lake, river, canal (liquid level metering G01F; measuring liquid velocity G01P; determining existence or flow of underground water G01V)
9/12	. by using a single pendulum (plumb lines G01C 15/10)	15/00	Surveying instruments or accessories not provided for in groups G01C 1/00 to G01C 13/00
9/14	. . movable in more than one direction	15/02	. Means for marking measuring points
9/16	. by using more than one pendulum	15/04	. . Permanent marks; Boundary markers
9/18	. by using liquids	15/06	. . Surveyors' staffs; Movable markers
9/20	. . the indication being based on the inclination of the surface of a liquid relative to its container	15/08	. . . Plumbing or registering staffs or markers over ground marks
9/22	. . . with interconnected containers in fixed relation to each other	15/10	. Plumb lines
9/24	. . in closed containers partially filled with liquid so as to leave a gas bubble	15/12	. Instruments for setting out fixed angles, e.g. right angles
9/26	. . . Details	15/14	. Artificial horizons (tilt compensation in general G12B 5/00)
9/28	. . . . Mountings	17/00	Compasses; Devices for ascertaining true or magnetic north for navigation or surveying purposes (using gyroscopic effect G01C 19/00; for geophysical or prospecting purposes G01V 3/00)
9/30	. . . . Means for adjusting dimensions of bubble	17/02	. Magnetic compasses
9/32	. . . . Means for facilitating the observation of the position of the bubble, e.g. illuminating means	17/04	. . with north-seeking magnetic elements, e.g. needles
9/34	. . . of the tubular type, i.e. for indicating the level in one direction only	17/06	. . . Suspending magnetic elements
9/36	. . . of the spherical type, i.e. for indicating the level in all directions	17/08	. . . . by flotation
11/00	Photogrammetry or videogrammetry, e.g. stereogrammetry; Photographic surveying (cameras combined with surveying instruments, e.g. with theodolites, G01C 1/00, G01C 3/00, G01C 5/00, G01C 9/00; surveying cameras G03B 37/00) [1,8]	17/10	. . . Comparing observed direction with north indication
11/02	. Picture-taking arrangements specially adapted for photogrammetry or photographic surveying, e.g. controlling overlapping of pictures	17/12	. . . . by sighting means, e.g. for surveyors' compasses
11/04	. Interpretation of pictures	17/14	. . . . by reference marks, e.g. for ships' compasses
11/06	. . by comparison of two or more pictures of the same area	17/16	. . . . by clinometers, e.g. for determining dip or strike of geological strata
11/08	. . . the pictures not being supported in the same relative position as when they were taken	17/18	. . . Supporting or suspending compasses, e.g. by gimbal, by flotation
11/10	. . . . using computers to control the position of the pictures (computers <i>per se</i> G06)	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 with vibrating masses; Turn-sensitive devices without moving masses**
 - 19/02 . Rotary gyroscopes
 - 19/04 . . Details
 - 19/06 . . . Rotors
 - 19/08 electrically driven (G01C 19/14 takes precedence; dynamo-electric machines H02K)
 - 19/10 Power supply
 - 19/12 fluid driven (G01C 19/14 takes precedence)
 - 19/14 Fluid rotors
 - 19/16 . . . Suspensions; Bearings (bearings in general F16C; balancing rotors G01M)
 - 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 (applicable to instruments in general G01D 11/20)
 - 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 (in general G01D)
 - 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 with vibrating masses, e.g. tuning fork
 - 19/58 . Turn-sensitive devices without moving masses [3]
 - 19/60 . . Electronic or nuclear magnetic resonance gyroscopes (magnetic resonance arrangements in general G01R 33/20) [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 gyroscopes (ring lasers in general H01S 3/083) [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 gyroscopes [5]
- 21/00 Navigation; Navigational instruments not provided for in groups G01C 1/00 to G01C 19/00** (measuring distance traversed on the ground by a vehicle G01C 22/00; measuring linear or angular speed or acceleration G01P; control of position, course, altitude or attitude of vehicles G05D 1/00; traffic control systems G08G)
 - 21/02 . by astronomical means (G01C 21/24, G01C 21/26 take precedence; measuring time by using position of the sun, moon, or stars G04B 49/00) [1,7]
 - 21/04 . by terrestrial means (G01C 21/24, G01C 21/26 take precedence; marking of navigation route for ships B63B 51/00) [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; adaptations of digital computers to a specific function or application G06F 17/00, G06F 19/00) [1,7]
 - 21/22 . . Plotting boards (in general B43L)
 - 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, using pedometers** (counting mechanisms *per se* G06M)
 - 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; MEASURING OR TESTING NOT OTHERWISE PROVIDED FOR (means structurally associated with lightning or other overvoltage discharging apparatus for recording the operation thereof G01R; displaying information in general G09F; recording in a way which requires playback through a transducer G11B)

Notes

- (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

MEASURING ARRANGEMENTS IN GENERAL

With data restitution in other form than their instantaneous value 1/00
 With provision for special purposes..... 3/00
 Transferring and converting arrangements, prevailing means used..... 5/00
 Component parts..... 11/00

INDICATING; COMPONENT PARTS OF

INDICATORS 7/00, 13/00
 RECORDING; COMPONENT PARTS OF RECORDERS..... 9/00, 15/00
 TESTING OR CALIBRATING..... 18/00
 MEASURING OR TESTING NOT OTHERWISE PROVIDED FOR..... 21/00
 TARIFF METERING 4/00

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; computing G06)

- 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; for a specified parameter, see the subclass relevant to this parameter, e.g. level of a liquid exceeded G01F, temperature exceeded G01K) [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 (tariff meters for measuring the time integral of electric power or current G01R 11/56; in taximeters G07B 13/00; coin-freed mechanisms therefor G07F)

4/02 . Details

4/04 . . Resetting-mechanisms, e.g. for indicating members (for mechanical counters G06M 1/28)

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 (mechanical counters G06M)

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; sensing members, see the relevant subclasses, e.g. of G01, H01; for converting a single current or a single voltage into a mechanical displacement G01R 5/00; specially adapted for high-voltage or high-current measuring arrangements G01R 15/04, G01R 15/14; measuring currents or voltages using digital measurement techniques G01R 19/25; transmission systems for measured values, control or similar signals G08C, e.g. electrical signals G08C 19/00) [6]
- Note**
- Groups G01D 5/02 to 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 (gearing in general F16)
 - 5/06 . . acting through a wall or enclosure, e.g. by bellows, by magnetic coupling (in general F16)
 - 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

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

Note

For a combination of two or more of the means specified, the first applicable one of subgroups G01D 5/56 to 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	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)
9/04	with provision for multiple or alternative recording	11/18	Springs (G01D 11/06 takes precedence)
9/06	Multiple recording, e.g. duplicating	11/20	Caging devices for moving parts when not in use
9/08	giving both graphical and numerical recording	11/22	automatically actuated
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	11/24	Housings
9/12	recording occurring continuously	11/26	Windows; Cover glasses; Sealings therefor
9/14	with provision for altering speed of recording medium in accordance with the magnitude of the variable to be recorded	11/28	Structurally-combined illuminating devices
9/16	recording occurring at separated intervals, e.g. by chopper bar	11/30	Supports specially adapted for an instrument; Supports specially adapted for a set of instruments (in general F16M; specially adapted for aircraft or vehicles, <u>see</u> the relevant subclasses)
9/18	recording element actuated only upon change in value of variable	13/00	Component parts of indicators for measuring arrangements not specially adapted for a specific 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	13/02	Scales; Dials
9/22	recording occurring continuously	13/04	Construction
9/24	recording occurring at separated intervals, e.g. by chopper bar	13/06	Moving bands (G01D 13/10 takes precedence)
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	13/08	Rotating drums (G01D 13/10 takes precedence)
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)	13/10	with adjustable scales; with auxiliary scales, e.g. vernier
9/30	there being a separate recording element for each variable, e.g. multiple-pen recorder	13/12	Graduation
9/32	there being a common recording element for two or more variables	13/14	for rotations of more than 360°
9/34	the variables being recorded in predetermined sequence	13/16	with staggered markings
9/36	in separate columns	13/18	with raised or recessed markings
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	13/20	with luminescent markings
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	13/22	Pointers, e.g. settable pointer
9/42	Recording indications of measuring instruments by photographic means, e.g. of counters	13/24	for indicating a maximum or minimum
11/00	Component parts of measuring arrangements not specially adapted for a specific variable (G01D 13/00, G01D 15/00 take precedence)	13/26	adapted to perform a further operation, e.g. making electrical contact
11/02	Bearings or suspensions for moving parts (bearings in general F16C)	13/28	with luminescent markings
11/04	Knife-edge bearings	15/00	Component parts of recorders for measuring arrangements not specially adapted for a specific variable
11/06	Strip or thread suspensions, e.g. in tension	15/02	Styli or other recording elements acting to mechanically deform or perforate the recording surface (printing recording elements G01D 15/20)
11/08	Elements for balancing moving parts	15/04	acting to punch holes in the recording surface
11/10	Elements for damping the movement of parts	15/06	Electric recording elements, e.g. electrolytic
11/12	using fluid damping	15/08	for spark erosion
11/14	using magnetic induction damping	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; implements for writing or drawing in general B43K)
		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 (clockworks <u>per se</u> G04B, G04C)
		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 of apparatus or arrangements provided for in groups G01D 1/00 to 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 (milk flow sensing devices in milking machines or devices A01J 5/01; measuring or recording blood flow A61B 5/02, A61B 8/06; metering media to the human body A61M 5/168; burettes or pipettes B01L 3/02; arrangements of liquid volume meters or volume-flow meters in liquid-delivering apparatus, e.g. for retail sale purposes, B67D 5/16; pumps, fluid motors, details common to measuring or metering devices and pumps or fluid motors F01 to F04; locating, determining distance or velocity using reflection or reradiation of radio waves, analogous arrangements using other waves G01S; systems for ratio control G05D 11/00) [2,5]

Note

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

Subclass Index

MEASURING VOLUME.....	17/00, 19/00, 22/00	With multiple measuring ranges	7/00
		By comparison with another value	9/00
MEASURING VOLUME FLOW		LEVEL INDICATORS	23/00
In continuous flow; in		METERING BY VOLUME	11/00, 13/00
discontinuous flow; by proportion		DETAILS, ACCESSORIES	15/00
of flow	1/00; 3/00; 5/00	TESTING, CALIBRATING	25/00

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; measuring speed of flow G01P 5/00; indicating presence or absence of flow G01P 13/00; regulating quantity or ratio G05D) [2]

Note

Groups G01F 1/704 to G01F 1/76 take precedence over groups G01F 1/05 to G01F 1/68. [2]

1/05	. by using mechanical effects [2]	1/28	. . . by drag-force, e.g. vane type or impact flowmeter [2]
1/06	. . using rotating vanes with tangential admission [2]	1/30	. . . . for fluent solid material [2]
1/07	. . . with mechanical coupling to the indicating device [2]	1/32	. . . by swirl flowmeter, e.g. using Karman vortices [2]
1/075	. . . with magnetic or electromagnetic coupling to the indicating device [2]	1/34	. . by measuring pressure or differential pressure [2]
1/08	. . . Adjusting, correcting, or compensating means therefor [2]	1/36	. . . the pressure or differential pressure being created by the use of flow constriction [2]
1/10	. . using rotating vanes with axial admission [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]
1/11	. . . with mechanical coupling to the indicating device [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]
1/115	. . . with magnetic or electromagnetic coupling to the indicating device [2]	1/40	. . . . Details of construction of the flow constriction devices [2]
1/12	. . . Adjusting, correcting, or compensating means therefor	1/42	. . . . . Orifices or nozzles [2]
1/20	. . by detection of dynamic effects of the fluid flow [2]	1/44	. . . . . Venturi tubes [2]
1/22	. . . by variable-area meters [2]	1/46	. . . . . Pitot tubes (specially adapted for measuring speed of fluids G01P 5/165) [2]
1/24	. . . . with magnetic or electric coupling to the indicating device [2]	1/48	. . . the pressure or differential pressure being created by a capillary element [2]
1/26	. . . . of the valve type [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 (measuring speed by using correlation detection means in general G01P 3/80, G01P 5/22) [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 (weighing a continuous stream of material during flow G01G 11/00) [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 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 (diaphragms or bellows therefor G01F 15/16)
- 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 (diaphragms or bellows therefor G01F 15/16)
- 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 (with measuring chambers which expand or contract during measurement G01F 11/02)

11/30	. . . with supply and discharge valves of the lift or plug-lift type	23/04	. . . by dip members, e.g. dip-sticks
11/32	. . . . for liquid or semiliquid	23/14	. . . by measurement of pressure (measuring pressure in general G01L)
11/34	. . . . for fluent solid material	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
11/36	. . . with supply or discharge valves of the rectilinearly-moved slide type	23/18	. . . Indicating, recording, or alarm devices actuated electrically
11/38	. . . . for liquid or semiliquid	23/20	. . . by measurement of weight, e.g. to determine the level of stored liquefied gas (weighing in general G01G)
11/40	. . . . for fluent or solid material	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)
11/42	. . . with supply or discharge valves of the rotary or oscillatory type	23/24	. . . by measuring variations of resistance of resistors due to contact with conductor fluid
11/44	. . . . for liquid or semiliquid	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
11/46	. . . . for fluent solid material	23/28	. . . by measuring the variations of parameters of electromagnetic or acoustic waves applied directly to the liquid or fluent solid material [6]
13/00	Apparatus for measuring by volume and delivering fluids or fluent solid materials, not provided for in the preceding groups	23/284	. . . . Electromagnetic waves [6]
<hr/>		23/288	. . . . X-rays; Gamma rays [6]
15/00	Details of, or accessories for, apparatus of groups G01F 1/00 to G01F 13/00 insofar as such details or appliances are not adapted to particular types of such apparatus	23/292	. . . . Light [6]
15/02	. . . Compensating or correcting for variations in pressure, density, or temperature	23/296	. . . . Acoustic waves [6]
15/04	. . . of gases to be measured	23/30	. . . by floats (switches operated by floats H01H 35/18) [4]
15/06	. . . Indicating or recording devices, e.g. for remote indication	23/32	. . . using rotatable arms or other pivotable transmission elements [4]
15/07	. . . Integration to give total flow, e.g. using mechanically-operated integrating mechanism [2]	23/34	. . . . using mechanically actuated indicating means [4]
15/075	. . . using electrically-operated integrating means [2]	23/36	. . . . using electrically actuated indicating means [4]
15/08	. . . Air or gas separators in combination with liquid meters; Liquid separators in combination with gas-meters	23/38	. . . . using magnetically actuated indicating means [4]
15/10	. . . Preventing damage by freezing or excess pressure or insufficient pressure	23/40	. . . . using bands or wires as transmission elements [4]
15/12	. . . Cleaning arrangements; Filters (filters in general B01D)	23/42	. . . . using mechanically actuated indicating means [4]
15/14	. . . Casings, e.g. of special material	23/44	. . . . using electrically actuated indicating means [4]
15/16	. . . Diaphragms; Bellows; Mountings therefor	23/46	. . . . using magnetically actuated indicating means [4]
15/18	. . . Supports or connecting means for meters	23/48	. . . using twisted spindles as transmission elements [4]
Measuring volume		23/50	. . . . using mechanically actuated indicating means [4]
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)	23/52	. . . . using electrically actuated indicating means [4]
19/00	Calibrated capacity measures for fluids or fluent solid material, e.g. measuring cups	23/54	. . . . using magnetically actuated indicating means [4]
22/00	Methods or apparatus for measuring volume of fluids or fluent solid material, not otherwise provided for [5]	23/56	. . . using elements rigidly fixed to, and rectilinearly moving with, the floats as transmission elements [4]
22/02	. . . involving measurement of pressure [5]	23/58	. . . . using mechanically actuated indicating means [4]
Level indicators		23/60	. . . . using electrically actuated indicating means [4]
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 (in wells E21B 47/04; adaptation to, or mounting on, steam boilers F22B 37/78; level regulation G05D; alarm devices G08B)	23/62	. . . . using magnetically actuated indicating means [4]
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	23/64	. . . 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 (sorting by weighing B07C 5/16)

Note

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

Subclass Index

WEIGHING APPARATUS

CHARACTERISED BY THE MEANS USED

Mechanical 1/00, 3/00
 Fluidic 5/00
 Electric, magnetic 7/00
 Other 9/00

WEIGHING APPARATUS

CHARACTERISED BY, OR ADAPTED FOR, THE WEIGHING OF LOADS HAVING SPECIAL CHARACTERISTICS

..... 11/00 to 19/00
 DETAILS 21/00
 AUXILIARY DEVICES 23/00

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 (pressure gauges *per se* G01L)

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 to 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 to 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 (regulation of flow of fluent material G05D)
- 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 (totalising or integrating devices *per se* G06)
- 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 conveyers, by vibratory conveyers
- 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 conveyers 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 (packaging aspects B65B)

- 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 to 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 (arrangements on vehicles B60P 5/00)
- 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; incorporation of weighing devices in cranes B66C 1/40, B66C 13/16)
- 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 (ratio regulation G05D 11/00)
- 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; computers in general G06)
- 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]	21/28	. Frames; Housings
19/44	. for weighing persons	21/30	. Means for preventing contamination by dust
19/46	. . Spring balances specially adapted for this purpose	23/00	Auxiliary devices for weighing apparatus
19/48	. . Pendulum balances specially adapted for this purpose	23/01	. Testing or calibrating of weighing apparatus [3]
19/50	. . having additional measuring devices, e.g. for height	23/02	. Relieving mechanisms; Arrestment mechanisms
19/52	. Weighing apparatus combined with other objects, e.g. with furniture (with walking-sticks A45B 3/08)	23/04	. . for precision weighing apparatus
19/54	. . combined with writing implements or paper-knives	23/06	. Means for damping oscillations, e.g. of weigh-beams
19/56	. . combined with handles of tools or of household implements	23/08	. . by fluid means
19/58	. . combined with handles of suit-cases or trunks	23/10	. . by electric or magnetic means
19/60	. . combined with fishing equipment, e.g. with fishing rods	23/12	. . specially adapted for preventing oscillations due to movement of the load
19/62	. Over or under weighing apparatus [3]	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)
19/64	. Percentage-indicating weighing apparatus, i.e. for expressing the weight as a percentage of a predetermined or initial weight [3]	23/16	. . electrically or magnetically operated
21/00	Details of weighing apparatus	23/18	. Indicating devices, e.g. for remote indication; Recording devices; Scales, e.g. graduated
21/02	. Arrangements of bearings (bearings <u>per se</u> F16C)	23/20	. . Indicating the weight by mechanical means
21/04	. . of knife-edge bearings	23/22	. . . combined with price indicators
21/06	. . of ball or roller bearings	23/24	. . . involving logarithmic scales
21/07	. . of flexure-plate bearings [3]	23/26	. . . Drive for the indicating member, e.g. mechanical amplifiers
21/08	. . Bearing mountings or adjusting means therefor	23/28	. . . involving auxiliary or memory marks
21/10	. . Floating suspensions; Arrangements of shock-absorbers (shock-absorbers <u>per se</u> F16F)	23/30	. . . with means for illuminating the scale
21/12	. . Devices for preventing derangement	23/32	. . Indicating the weight by optical projection means
21/14	. Beams	23/34	. . . combined with price indicators
21/16	. . of composite construction; Connections between different beams	23/35	. . Indicating the weight by photographic recording
21/18	. Link connections between the beam and the weigh pan	23/36	. . Indicating the weight by electrical means, e.g. using photoelectric cells
21/20	. . for precision weighing apparatus	23/365	. . . involving comparison with a reference value (G01G 23/37 takes precedence) [3]
21/22	. Weigh-pans or other weighing receptacles; Weighing platforms	23/37	. . . involving digital counting
21/23	. Support or suspension of weighing platforms (G01G 21/24 takes precedence) [3]	23/375	. . . . during the movement of a coded element [3]
21/24	. Guides or linkages for ensuring parallel motion of the weigh-pans	23/38	. . Recording or coding devices specially adapted for weighing apparatus (computers <u>per se</u> G06; disc converters in general G08C)
21/26	. Counterweights; Poise-weights; Sets of weights; Holders for the reception of weights	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 (generation of mechanical vibrations without measurement B06B, G10K; measuring position, direction or velocity of an object G01C, G01S; measuring quasi-steady pressure of a fluid G01L 7/00; determining unbalance G01M 1/14; determining properties of material by sonic or ultrasonic waves transmitted therethrough G01N; systems using the reflection or reradiation of acoustic waves, e.g. acoustic imaging, G01S 15/00; seismology, seismic prospecting, acoustic prospecting G01V 1/00; acousto-optical devices per se G02F; obtaining records by techniques analogous to photography using ultrasonic, sonic or infrasonic waves G03B 42/06; speech analysis or synthesis, speech recognition G10L; information storage based on relative movement between record carrier and transducer G11B; piezo-electric, electrostrictive or magnetostrictive elements in general H01L; manufacture of electromechanical resonators by processes which include measurement of frequency with consequential modification of the resonator H03H 3/00) [4]

Notes

- (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**PRINCIPLE OF THE MEASURING**

By direct conduction; by detection
in a fluid; by sensitivity to
radiation; by detection of changes
in electric or magnetic properties 1/00; 3/00;
9/00; 11/00

SPECIAL CHARACTERISTICS MEASURED

Propagation velocity; reverberation
time; resonant frequency;
mechanical or acoustic impedance 5/00; 7/00;
13/00; 15/00

1/00	Measuring vibrations in solids by using direct conduction to the detector (G01H 9/00, G01H 11/00 take precedence)	5/00	Measuring propagation velocity of ultrasonic, sonic or infrasonic waves
1/04	. of vibrations which are transverse to direction of propagation	7/00	Measuring reverberation time (measuring absorption of vibrations in a material G01N; arrangements for producing a reverberation G10K 15/08)
1/06	. . Frequency	9/00	Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves by using radiation-sensitive means, e.g. optical means
1/08	. . Amplitude	11/00	Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves by detecting changes in electric or magnetic properties
1/10	. of torsional vibrations	11/02	. by magnetic means, e.g. reluctance [4]
1/12	. of longitudinal or not specified vibrations [4]	11/04	. . using magnetostrictive devices [4]
1/14	. . Frequency [4]	11/06	. by electric means [4]
1/16	. . Amplitude [4]	11/08	. . using piezo-electric devices [4]
3/00	Measuring vibrations by using a detector in a fluid (G01H 7/00, G01H 9/00, G01H 11/00 take precedence)	13/00	Measuring resonant frequency
3/04	. Frequency	15/00	Measuring mechanical or acoustic impedance [3]
3/06	. . by electric means	17/00	Measuring mechanical vibrations or ultrasonic, sonic or infrasonic waves, not provided for in the other groups of this subclass [4]
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]		

G01J MEASUREMENT OF INTENSITY, VELOCITY, SPECTRAL CONTENT, POLARISATION, PHASE OR PULSE CHARACTERISTICS OF INFRA-RED, VISIBLE OR ULTRA-VIOLET LIGHT; COLORIMETRY; RADIATION PYROMETRY (light sources F21, H01J, H01K, H05B; investigating properties of materials by optical means G01N) [2]

Notes

- (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

PHOTOMETRY; PYROMETRY 1/00; 5/00
SPECTROMETRY; MEASURING:
POLARISATION; VELOCITY; PHASE;
PULSES..... 3/00; 4/00;
7/00; 9/00; 11/00

1/00	Photometry, e.g. photographic exposure meter (spectrophotometry G01J 3/00; specially adapted for radiation pyrometry G01J 5/00)	1/16	. . using electric radiation detectors (G01J 1/20 takes precedence)
1/02	. Details	1/18	. . . using comparison with a reference electric value
1/04	. . Optical or mechanical part	1/20	. . intensity of the measured or reference value being varied to equalise their effects at the detector, e.g. by varying incidence angle
1/06	. . . Restricting the angle of incident light	1/22	. . . using a variable element in the light-path, e.g. filter, polarising means (G01J 1/34 takes precedence)
1/08	. . Arrangements of light sources specially adapted for photometry	1/24	. . . . using electric radiation detectors
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		

- 1/26 adapted for automatic variation of the measured or reference value (regulation of light intensity G05D 25/00)
- 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 (regulation of light intensity G05D 25/00)
- 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 (gratings per se G02B)
- 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** (investigating or analysing materials by measuring rotation of plane of polarised light G01N 21/21) [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** (photometry in general G01J 1/00; spectrometry in general G01J 3/00)
- 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 (thermoelectric elements per se H01L 35/00, H01L 37/00)
- 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 (indicating or recording measured values in general G01D)
- 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 (devices or arrangements for controlling the phase of light beams G02F 1/01); Determining degree of coherence; Measuring optical wavelength (spectrometry G01J 3/00) [3]
		9/02	. by interferometric methods (using interferometers for measuring optically the linear dimensions of objects G01B 9/02) [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 (sensing temperature changes for compensating measurements of other variables or for compensating readings of instruments for variations in temperature, see G01D or relevant subclass for variable measured; radiation pyrometry G01J; investigating or analysing materials by use of thermal means G01N 25/00; compound sensitive elements, e.g. bimetallic, G12B 1/02)

Notes

- (1) In this subclass, the following term is used with the meaning indicated:
 - “thermometer” includes thermally-sensitive elements not provided for in other subclasses.
- (2) Attention is drawn to the Notes following the title of class G01.

Subclass Index

MEASURING TEMPERATURE

characterised by principle of operation	5/00, 7/00, 9/00, 11/00
Thermometers giving an indication other than the instantaneous value	3/00
Details of thermometers not specially adapted for particular types of thermometers	1/00

Adaptations of thermometers for specific purposes	13/00
Testing and calibrating of thermometers	15/00

MEASURING QUANTITY OF HEAT; TESTING AND CALIBRATING OF CALORIMETERS.....	17/00; 19/00
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1/00	Details of thermometers not specially adapted for particular types of thermometer (circuits for reducing thermal inertia G01K 7/42) [6]	3/00	Thermometers giving results other than momentary value of temperature (G01K 7/42 takes precedence; using thermo-electric elements G01K 7/02) [6]
1/02	. Special applications of indicating or recording means, e.g. for remote indications	3/02	. giving mean values; giving integrated values
1/04	. . Scales	3/04	. . in respect of time
1/06	. . . Arrangements for facilitating reading, e.g. illumination, magnifying glass	3/06	. . in respect of space
1/08	. Protective devices, e.g. casings	3/08	. giving differences of values; giving differentiated values
1/10	. . for preventing chemical attack	3/10	. . in respect of time, e.g. reacting only to a quick change of temperature
1/12	. . for preventing damage due to heat overloading	3/12	. . . based upon expansion or contraction of materials
1/14	. Supports; Fastening devices; Mounting thermometers in particular locations	3/14	. . in respect of space
1/16	. Special arrangements for conducting heat from the object to the sensitive element	5/00	Measuring temperature based on the expansion or contraction of a material (G01K 9/00 takes precedence; giving other than momentary value of temperature G01K 3/00; of vapour arising from a liquid G01K 11/02; thermally-actuated switches H01H)
1/18	. . for reducing thermal inertia	5/02	. the material being a liquid (contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the fluid material G01K 5/32)
1/20	. Compensating for effects of temperature changes other than those to be measured, e.g. changes in ambient temperature	5/04	. . Details
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	5/06	. . . Arrangements for driving back the liquid column
1/24	. . by means of compounded strips or plates, e.g. bimetallic strips		
1/26	. Compensating for effects of pressure changes		

G01K

- 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 (contained in a hollow body having parts which are deformable or displaceable under the pressure developed by the material G01K 5/32)
- 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; pressure-measuring devices in general G01L)
- 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; measuring electric or magnetic variables G01R)
- 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 (thermo-electric or thermo-magnetic devices per se H01L 35/00, H01L 37/00)
- 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 (resistive elements per se H01C, H01L)
- 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 capacitive elements (capacitors per se H01G)
- 7/36 . using magnetic elements, e.g. magnets, coils (magnetic elements per se H01F)
- 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; heat-sensitive sheets for use in thermography B41M 5/00) [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	17/04	. Calorimeters using compensation methods
11/28	. using measurements of density (measuring density in general G01N)	17/06	. Measuring quantity of heat conveyed by flowing media, e.g. in heating systems (G01K 17/02, G01K 17/04 take precedence)
11/30	. using measurement of the effect of a material on X-radiation, gamma radiation or particle radiation [5]	17/08	. . . based upon measurement of temperature difference
11/32	. using changes in transmission, scattering or fluorescence in optical fibres [6]	17/10	. . . between an inlet and an outlet point, combined with measurement of rate of flow of the medium
13/00	Adaptations of thermometers for specific purposes	17/12	. . . . Indicating product of flow and temperature difference directly
13/02	. for measuring temperature of moving fluids or granular materials capable of flow	17/14	. . . . . using mechanical means for both measurements
13/04	. for measuring temperature of moving solid bodies	17/16	. . . . . using electrical means for both measurements
13/06	. . . in linear movement	17/18	. . . . . using electrical means for one measurement and mechanical means for the other
13/08	. . . in rotary movement	17/20	. . . across a radiating surface, combined with ascertainment of the heat-transmission coefficient
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	19/00	Testing or calibrating calorimeters
17/00	Measuring quantity of heat (measuring temperature by calorimetry G01K 3/00 to G01K 11/00; specially adapted for measuring thermal properties of materials, e.g. specific heat, heat of combustion, G01N)		
17/02	. Calorimeters using transport of an indicating substance, e.g. evaporation calorimeters		

G01L MEASURING FORCE, STRESS, TORQUE, WORK, MECHANICAL POWER, MECHANICAL EFFICIENCY, OR FLUID PRESSURE (methods or devices for measuring specially adapted for metal-rolling mills B21B 38/00; sensing pressure changes for compensating measurements of other variables or for compensating readings of instruments for variations in pressure, see G01D or other relevant subclasses for the variable measured; weighing G01G; scanning-probe techniques using atomic force microscopy G01N 13/16; converting a pattern of forces into electrical signals G06K 11/00) [4]

Note

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

Subclass Index

MEASURING FORCE, STRESS, TORQUE,
WORK, MECHANICAL POWER,
MECHANICAL EFFICIENCY

General methods; apparatus adapted
to special purposes 1/00, 3/00;
5/00

MEASURING FLUID PRESSURE

Methods of measuring 7/00, 9/00,
11/00

Measurements of differential or
multiple pressure values 13/00, 15/00

Details of apparatus or accessories 19/00
SPECIAL ADAPTATIONS OF MEASURING
APPARATUS

Measurements of pressure of
inflated bodies 17/00
Vacuum gauges 21/00

INDICATORS OF FAST CHANGES,
PARTICULARLY IN THE OPERATION OF
FLUID-PRESSURE ENGINES 23/00
TESTING OR CALIBRATING 25/00, 27/00

1/00 Measuring force or stress, in general (measuring force due to impact G01L 5/00; measuring fluid pressure G01L 7/00 to G01L 27/00; measuring deformation of bodies as a result of stress by using gauges G01B) [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 (resistance strain gauges for measuring linear expansion or contraction G01B)
- 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 (resistance strain gauges for measuring linear expansion or contraction G01B)
- 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 (measuring velocity per se G01P)
- 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** (measuring pressure of a fluent medium G01L 7/00 to G01L 21/00; measuring rapid changes of pressure in steam, gas, or liquid G01L 23/00)
 - 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 (in balancing G01M)
 - 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 (arrangements in wrenches or screwdrivers B25B 23/14)
 - 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; measuring tyre pressure or the pressure of other inflated bodies G01L 17/00; vacuum gauges G01L 21/00; hollow bodies deformable or displaceable under internal pressure per se G12B 1/04)

- 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; vacuum gauges G01L 21/00)

- 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 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 pressure values simultaneously**
- 17/00 Devices or apparatus for measuring tyre pressure or the pressure in other inflated bodies** (specially adapted for mounting on vehicles or tyres B60C 23/00; connection of valves to inflatable elastic bodies B60C 29/00)
- 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 (tubes therefor H01J 41/02)
 - 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 (apparatus for recording steady or quasi-steady pressure G01L 19/08)
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- 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 STRUCTURES OR APPARATUS NOT OTHERWISE PROVIDED FOR

Note

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

Subclass Index

TESTING STATIC OR DYNAMIC BALANCE OF MACHINES OR STRUCTURES	1/00	Optical testing	11/00
INVESTIGATING FLUID-TIGHTNESS; ELASTICITY	3/00; 5/00	Mechanical or engine testing	13/00, 15/00, 17/00
VIBRATION- OR SHOCK-TESTING	7/00	OTHER TESTING OF STRUCTURES OR OF APPARATUS NOT PROVIDED FOR ELSEWHERE	19/00
SPECIAL APPLICATIONS Aerodynamic; hydrodynamic testing	9/00; 10/00		

1/00	Testing static or dynamic balance of machines or structures (balancing rotary bowls of centrifuges B04B 9/14; apparatus characterised by the means for holding wheels or parts thereof B60B 30/00; determining stability factors of ships B63B; stabilising of aircraft B64C 17/00; control systems for balancing automatically in operation G05; balancing rotors of dynamo-electric machines H02K 15/16)	1/36	. . . by adjusting position of masses built-in the body to be tested
1/02	. Details of balancing machines or devices	1/38	. Combined machines or devices for both determining and correcting unbalance
1/04	. . . Adaptation of bearing support assemblies for receiving the body to be tested	3/00	Investigating fluid tightness of structures (investigating permeability of porous material, investigating the presence of flaws in general G01N)
1/06	. . . Adaptation of drive assemblies for receiving the body to be tested	3/02	. by using fluid or vacuum
1/08	. . . Instruments for indicating directly the magnitude and phase of the unbalance (measuring electrical variables in general G01R)	3/04	. . . by detecting the presence of fluid at the leakage point
1/10	. Determining the moment of inertia	3/06	. . . . by observing bubbles in a liquid pool
1/12	. Static balancing; Determining position of centre of gravity (by determining unbalance G01M 1/14)	3/08	. . . . for pipes, cables, or tubes; for pipe joints or seals; for valves
1/14	. Determining unbalance (G01M 1/30, G01M 1/38 take precedence)	3/10	. . . . for containers, e.g. radiators
1/16	. . . by oscillating or rotating the body to be tested	3/12	. . . . by observing elastic covers or coatings, e.g. soapy water
1/18	. . . and running the body down from a speed greater than normal	3/14	. . . . for pipes, cables, or tubes; for pipe joints or seals; for valves
1/20	. . . and applying external forces compensating forces due to unbalance	3/16	. . . . using electric detection means (G01M 3/06, G01M 3/12, G01M 3/20, G01M 3/24, G01M 3/26 take precedence)
1/22	. . . and converting vibrations due to unbalance into electric variables (measuring vibrations in general G01H; microphones or like acoustic electromechanical transducers H04R)	3/18	. . . . for pipes, cables, or tubes; for pipe joints or seals; for valves
1/24	. . . . Performing balancing on elastic shafts, e.g. for crankshafts	3/20	. . . . using special tracer materials, e.g. dye, fluorescent material, radioactive material
1/26	. . . . with special adaptations for marking, e.g. by drilling	3/22	. . . . for pipes, cables, or tubes; for pipe joints or seals; for valves
1/28	. . . . with special adaptations for determining unbalance of the body <u>in situ</u> , e.g. of vehicle wheels	3/24	. . . . using infrasonic, sonic, or ultrasonic vibrations
1/30	. Compensating unbalance (G01M 1/38 takes precedence; counterweights F16F 15/28)	3/26	. . . by measuring rate of loss or gain of fluid, e.g. by pressure-responsive devices, by flow detectors [2]
1/32	. . . by adding material to the body to be tested, e.g. by correcting-weights (correcting-weights <u>per se</u> F16F 15/32)	3/28	. . . . for pipes, cables, or tubes; for pipe joints or seals; for valves [2]
1/34	. . . by removing material from the body to be tested, e.g. from the tread of tyres	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, aircraft wings (G01M 9/00 takes precedence; strain gauges G01B)	15/05	. . by combined monitoring of two or more different engine parameters [8]
7/00	Vibration-testing of structures; Shock-testing of structures (G01M 9/00 takes precedence)	Note Group G01M 15/05 takes precedence over groups G01M 15/06 to G01M 15/12. [8]	
7/02	. Vibration-testing [5]	15/06	. . by monitoring positions of pistons or cranks [8]
7/04	. . Monodirectional test stands [5]	15/08	. . by monitoring pressure in cylinders [8]
7/06	. . Multidirectional test stands [5]	15/09	. . by monitoring pressure in fluid ducts, e.g. in lubrication or cooling parts [8]
7/08	. Shock-testing [5]	15/10	. . by monitoring exhaust gases [8]
9/00	Aerodynamic testing; Arrangements in or on wind tunnels (building aspects section E; investigating properties of materials in general G01N)	15/11	. . by detecting misfire [8]
9/02	. Wind tunnels [5]	15/12	. . by monitoring vibrations [8]
9/04	. . Details [5]	15/14	. Testing of gas-turbine plants or jet-propulsion plants [8]
9/06	. Measuring arrangements specially adapted for aerodynamic testing [5]	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)
9/08	. Aerodynamic models [5]	17/007	. of wheeled or endless-tracked vehicles (G01M 17/08 takes precedence) [6]
10/00	Hydrodynamic testing; Arrangements in or on ship-testing tanks or water tunnels (building aspects section E; investigating properties of materials in general G01N)	17/013	. . of wheels [6]
11/00	Testing of optical apparatus; Testing structures by optical methods not otherwise provided for	17/02	. . of tyres [6]
11/02	. Testing of optical properties	17/03	. . of endless-tracks [6]
11/04	. . Optical benches	17/04	. . of suspension or of damping [6]
11/06	. . Testing of alignment of vehicle head-light devices	17/06	. . of steering behaviour; of rolling behaviour (measuring steering angles G01B; measuring steering forces G01L) [6]
11/08	. Testing of mechanical properties	17/08	. of railway vehicles [6]
13/00	Testing of machine parts (investigating the cutting power of tools G01N, e.g. G01N 3/58)	17/10	. . of suspensions, axles or wheels [6]
13/02	. Testing of gearing or of transmission mechanisms (measuring efficiency G01L)	19/00	Testing of structures or of apparatus, not provided for in the other groups of this subclass
13/04	. Testing of bearings	19/02	. Testing of sparking plugs (testing characteristics of the spark in internal-combustion engine ignition F02P 17/12; testing electric properties G01R 31/00)
15/00	Testing of engines [4]		
15/02	. Details or accessories of testing apparatus [8]		
15/04	. Testing of internal-combustion engines, e.g. diagnostic testing of piston engines [8]		

G01N INVESTIGATING OR ANALYSING MATERIALS BY DETERMINING THEIR CHEMICAL OR PHYSICAL PROPERTIES (separating components of materials in general B01D, B01J, B03, B07; apparatus fully provided for in a single other subclass, *see* the relevant subclass, e.g. B01L; measuring or testing processes other than immunoassay, involving enzymes or micro-organisms C12M, C12Q; investigation of foundation soil *in situ* E02D 1/00; monitoring or diagnostic devices for exhaust-gas treatment apparatus F01N 11/00; sensing humidity changes for compensating measurements of other variables or for compensating readings of instruments for variations in humidity, *see* G01D or the relevant subclass for the variable measured; testing or determining the properties of structures G01M; measuring or investigating electric or magnetic properties of materials G01R; systems in general for determining distance, velocity or presence by use of propagation effects, e.g. Doppler effect, propagation time, of reflected or reradiated radio waves, analogous arrangements using other waves G01S; determining sensitivity, graininess, or density of photographic materials G03C 5/02; testing component parts of nuclear reactors G21C 17/00)

Notes

- (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. [5]

Subclass Index

SAMPLING, PREPARING.....	1/00
INVESTIGATING OR ANALYSING CHARACTERISED BY THE PROPERTY INVESTIGATED	
Mechanical strength; density; flow	3/00; 9/00; 11/00
Surface or boundary effects; characteristics of particles, permeability; friction, adhesive force	13/00; 15/00; 19/00
Resistance to atmospheric agents.....	17/00
INVESTIGATING OR ANALYSING CHARACTERISED BY THE METHOD USED	
Weighing; measuring pressure or volume of gas; mechanical.....	5/00; 7/00; 19/00

Optical; by microwaves; by radiation	21/00; 22/00; 23/00
Magnetic resonance or other spin effects	24/00
Thermal; electric, electrochemical, magnetic; sonic	25/00; 27/00; 29/00
By separation into components; by the use of the chemical methods.....	30/00; 31/00
OTHER INVESTIGATING OR ANALYSING CHARACTERISED BY THE MATERIAL INVESTIGATED	33/00
Immunoassay	33/53
AUTOMATIC ANALYSIS	35/00
DETAILS NOT COVERED BY THE PRECEDING GROUPS.....	37/00

1/00 Sampling; Preparing specimens for investigation
(handling materials for automatic analysis G01N 35/00)

- 1/02 . Devices for withdrawing samples (for medical or veterinary purposes A61; obtaining samples of soil or well fluids E21B 49/00)
- 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 (suction dredgers E02F 3/88) [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 (strain gauges G01B; measuring stress in general G01L 1/00)

Note

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 (testing fluid-tightness G01M 3/00)
- 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 (generation of such forces in general, see the relevant classes or subclasses, e.g. B06, G10)

- 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** (weighing apparatus G01G)
- 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 in general G01N 9/02 to 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; Investigating or analysing surface structures in atomic ranges [1,7]**
- 13/02 . Investigating surface tension of liquids
- 13/04 . Investigating osmotic effects
- 13/10 . Investigating or analysing surface structures in atomic ranges using scanning-probe techniques (by measuring secondary emission G01N 23/22; dimensional measurement using scanning-probe techniques G01B; details of scanning-probe apparatus, in general G12B 21/00) [7]
- 13/12 . . . using scanning tunnelling microscopy (STM) [7]
- 13/14 . . . using scanning near-field optical microscopy (SNOM) [7]
- 13/16 . . . using atomic force microscopy (AFM) [7]
- 13/18 . . . using scanning ion-conductance microscopy (SICM) [7]
- 13/20 . . . using scanning capacitance microscopy (SCM) [7]
- 13/22 . . . using magnetic force microscopy (MFM) [7]
- 13/24 . . . using scanning electrochemical microscopy [7]

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; by filtering B01D; by sifting B07B) [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 to 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 (measuring roughness or irregularity of surfaces G01B 5/28)
- 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 to G01N 19/00 take precedence; measuring stress in general G01L 1/00; optical elements of measuring instruments G02B; image analysis by data processing G06T)

Note

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. [7]

- 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; handling fluid samples G01N 1/10) [3]
- 21/07 . . . Centrifugal type cuvettes (G01N 21/09 takes precedence; centrifuges B04B) [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]
- 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; checking containers for cleanliness B08B 9/46) [3]
- 21/53 within a flowing fluid, e.g. smoke (alarm devices actuated by smoke G08B 17/10) [3]
- 21/55 . . Specular reflectivity [3]
- 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 (spark gaps H01T) [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 to 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 (contactless testing of electronic circuits G01R 31/308; testing currency G07D) [7]
- 21/958 Inspecting transparent materials [7]
- 22/00 Investigating or analysing materials by the use of microwaves** (G01N 3/00 to 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 to G01N 17/00 take precedence; measuring stress in general G01L 1/00; measurement of nuclear or X-radiation G01T; introducing objects or materials into nuclear reactors, or removing them therefrom, or storing them after treatment therein G21C; construction or operation of X-ray apparatus or circuits therefor H05G)
- 23/02 . by transmitting the radiation through the material
- 23/04 . . and forming a picture (electron microscopes H01J)
- 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 to 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; spectrometry of detected or measured radiation intensity G01T 1/36) [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 (electron or ion-beam tubes for microprobe analysis H01J 37/00) [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** (arrangements or instruments for measuring magnetic resonance effects G01R 33/20) [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 to 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 (by investigating thermal conductivity G01N 25/18)
- 27/00 Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means** (G01N 3/00 to 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; involving polarography G01N 27/48; measuring electric resistance of fluids G01R 27/22)
- 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 (regulating G05D)
- 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 (investigating resistance to corrosion G01N 17/00; investigating or analysing materials by separation into components using adsorption, absorption or similar phenomena or using ion-exchange, e.g. chromatography, G01N 30/00; immunoelectrophoresis G01N 33/561; electrochemical processes or apparatus in general B01J; standard cells H01M 6/28) [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 (by investigating capacitance G01N 27/22)
- 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 (particle spectrometers H01J 49/00)
- 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; testing of articles or specimens of solids or fluids for dielectric strength or breakdown voltage G01R 31/12) [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 to G01N 27/00 take precedence; measuring or indicating of ultrasonic, sonic or infrasonic waves in general G01H; systems using the reflection or reradiation of acoustic waves, e.g. acoustic imaging, G01S 15/00; obtaining records by techniques analogous to photography using ultrasonic, sonic or infrasonic waves G03B 42/06) [4]
- 29/02 . *Analysing fluids (using acoustic emission techniques G01N 29/14) [5,8]*
- 29/024 . . *by measuring propagation velocity or propagation time of acoustic waves [8]*
- 29/028 . . *by measuring mechanical or acoustic impedance [8]*
- 29/032 . . *by measuring attenuation of acoustic waves [8]*
- 29/036 . . *by measuring frequency or resonance of acoustic waves [8]*
- 29/04 . *Analysing solids (using acoustic emission techniques G01N 29/14) [4,5,8]*
- 29/06 . . *Visualisation of the interior, e.g. acoustic microscopy [4,8]*
- 29/07 . . *by measuring propagation velocity or propagation time of acoustic waves [8]*
- 29/08 *(transferred to G01N 29/07, G01N 29/09, G01N 29/11, G01N 29/12)*
- 29/09 . . *by measuring mechanical or acoustic impedance [8]*
- 29/10 *(transferred to G01N 29/07, G01N 29/09, G01N 29/11, G01N 29/12)*
- 29/11 . . *by measuring attenuation of acoustic waves [8]*
- 29/12 . . *by measuring frequency or resonance of acoustic waves [5,8]*
- 29/14 . *using acoustic emission techniques [5,8]*
- 29/16 *(transferred to G01N 29/028, G01N 29/09)*
- 29/18 *(transferred to G01N 29/024, G01N 29/07)*
- 29/20 *(transferred to G01N 29/032, G01N 29/11)*
- 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 [8]*
- 29/27 . . . *by moving the material relative to a stationary sensor [8]*
- 29/275 . . . *by moving both the sensor and the material [8]*
- 29/28 . . providing acoustic coupling [5]
- 29/30 . . Arrangements for calibrating or comparing, e.g. with standard objects [8]
- 29/32 . . Arrangements for suppressing undesired influences, e.g. temperature or pressure variations [8]
- 29/34 . *Generating the ultrasonic, sonic or infrasonic waves [8]*
- 29/36 . *Detecting the response signal [8]*
- 29/38 . . *by time filtering, e.g. using time gates [8]*
- 29/40 . . *by amplitude filtering, e.g. by applying a threshold [8]*
- 29/42 . . *by frequency filtering [8]*
- 29/44 . *Processing the detected response signal [8]*
- 29/46 . . *by spectral analysis, e.g. Fourier analysis [8]*
- 29/48 . . *by amplitude comparison [8]*
- 29/50 . . *using auto-correlation techniques or cross-correlation techniques [8]*
- 29/52 . . *using inversion methods other than spectral analysis, e.g. conjugated gradient inversion [8]*

- 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 to G01N 29/00 take precedence; separation for the preparation or production of components B01D 15/00, B01D 53/02, B01D 53/14) [4]

- 30/02 . Column chromatography [4]

Note

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. [4]

- 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]
- 30/48 (*transferred to B01J 20/281 to B01J 20/292*)
- 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 to G01N 30/86 (signal analysis systems in general G06F, G06G, G06T) [4]
- 30/89 . *Inverse chromatography, i.e. with the analyte in stationary phase* [8]
- 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** (testing the effectiveness or completeness of sterilisation procedures without using enzymes or microorganisms A61L 2/28; measuring or testing processes involving enzymes or micro-organisms C12Q 1/00); **Apparatus specially adapted for such methods** [4]

Note

The observation of the progress of the reactions covered by groups G01N 31/02 to G01N 31/22 by any of the methods specified in groups G01N 3/00 to 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 (burettes in general B01L 3/02)
- 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 to 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 to G01N 33/14, G01N 33/26, G01N 33/44, G01N 33/46 take precedence; determining the germinating capacity of seeds A01C 1/02); Haemocytometers (counting blood corpuscles 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

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. [3]

Note

In groups G01N 33/52 to G01N 33/98, in the absence of an indication to the contrary, classification is made in the last appropriate place. [3]

- 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 (medicinal preparations containing antigens or antibodies A61K; haptens in general, see the relevant places in class C07; peptides, e.g. proteins, in general C07K) [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; for testing in vivo A61K 51/00) [3]
- 33/60 involving radioactive labelled substances (tracers G21H 5/02) [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]

G01N – G01P

- | | |
|---|---|
| 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 to G01N 33/00; Handling materials therefor [3]

35/02 . using a plurality of sample containers moved by a conveyer system past one or more treatment or analysis stations [3] | 35/04 . . Details of the conveyer 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, ABSENCE, OR DIRECTION, OF MOVEMENT (measuring or recording blood flow A61B 5/02, A61B 8/06; monitoring speed or deceleration of electrically-propelled vehicles B60L 3/00; vehicle lighting systems adapted to indicate speed B60Q 1/54; determining position or course in navigation, measuring ground distance in geodesy or surveying G01C; combined measuring devices for measuring two or more variables of movement G01C 23/00; measuring velocity of sound G01H; 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, direction of propagation, G01S; measuring speed of nuclear radiation G01T; measuring acceleration of gravity G01V)

Notes

- (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”. [4]
(2) Attention is drawn to the Notes following the title of class G01.

Subclass Index

INDICATING MOVEMENT OR DIRECTION OF MOVEMENT13/00
MEASURING LINEAR OR ANGULAR SPEED OF SOLID BODIES
 Characterised by prevailing principle of action of the means3/00
 By integration; by gyroscopic effect; by averaging 7/00; 9/00; 11/00

MEASURING SPEED OF FLUIDS OR RELATIVE SPEED OF SOLID TO FLUID OR FLUID TO SOLID..... 5/00
MEASURING ACCELERATION OR SUDDEN CHANGE OF ACCELERATION 15/00
DETAILS 1/00
FUNCTIONAL TESTING OR CALIBRATING 21/00

- 1/00 Details of instruments**
1/02 . Housings
1/04 . Special adaptations of driving means
1/07 . Indicating devices, e.g. for remote indication (indicating working conditions of vehicles G07C 5/00) [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 (registering working conditions of vehicles G07C 5/00) [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 to G01P 11/00 take precedence; counting mechanisms G06M)

Note

Groups G01P 3/02 to 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.

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| 3/02

3/04
3/06
3/08
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3/12
3/14

3/16

3/18

3/20 | . Devices characterised by the use of mechanical means

. . by comparing two speeds
. . . using a friction gear
. . . using differential gearing
. . by actuating an indicating element, e.g. pointer, for a fixed time

. . by making use of a system excited by impact
. . by exciting one or more mechanical resonance systems
. . by using centrifugal forces of solid masses (governors G05D 13/00)
. . . transferred to the indicator by mechanical means
. . . 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; gyroscopes using the Sagnac effect, i.e. rotation-induced shifts between counter-rotating electromagnetic beams, G01C 19/64)
- 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; measuring electric or magnetic values in general G01R)
- 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 (measuring pressure in general G01L)
- 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; measuring short time intervals G04F) [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 (measuring speed of rotating shafts G01P 3/00)
- 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 (analogue computers therefor G06G 7/57) [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** (measuring travelled distance by double integration of acceleration G01C 21/16)
- 9/00 **Measuring speed by using gyroscopic effect, e.g. using gas, using electron beam** (gyroscopes or turn-sensitive devices per se G01C 19/00)
- 9/02 . using rotary gyroscopes
- 9/04 . using turn-sensitive devices with vibrating masses, e.g. tuning-fork
- 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, absence, or direction, of movement** (counting moving objects G06M 7/00; electric switches H01H)
- 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	15/125 . . . by capacitive pick-up [3]
15/02	. by making use of inertia forces (G01P 15/14, G01P 15/18 take precedence) [1,7]	15/13 . . . by measuring the force required to restore a proofmass subjected to inertial forces to a null position [3]
15/03	. . by using non-electrical means [3]	15/135 . . . by making use of contacts which are actuated by a movable inertial mass [3]
15/04	. . for indicating maximum value	15/14 . by making use of gyroscopes (G01P 15/18 takes precedence; gyroscopes <i>per se</i> G01C 19/00) [1,7]
15/06	. . . using members subjected to a permanent deformation	15/16 . by evaluating the time-derivative of a measured speed signal (G01P 15/18 takes precedence) [3,7]
15/08	. . with conversion into electric or magnetic values	15/18 . in two or more dimensions [7]
15/09	. . . by piezo-electric pick-up [3]	21/00 Testing or calibrating of apparatus or devices covered by the other groups of this subclass
15/093	. . . by photoelectric pick-up [7]	21/02 . of speedometers
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	

G01R MEASURING ELECTRIC VARIABLES; MEASURING MAGNETIC VARIABLES (measuring physical variables of any kind by conversion into electric variables, *see* Note (4) following the title of class G01; measuring diffusion of ions in an electric field, e.g. electrophoresis, electro-osmosis, G01N; investigating non-electric or non-magnetic properties of materials by using electric or magnetic methods G01N; indicating correct tuning of resonant circuits H03J 3/12; monitoring electronic pulse counters H03K 21/40; monitoring operation of communication systems H04)

Notes

- (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; [5]
 - 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: [8]*
 - *Electromechanical instruments where the measured electric variables directly effect the indication of the measured value, including combined effects of two or more values, are classified in groups G01R 5/00 to G01R 11/00. [8]*
 - *Details common to different types of the instruments covered by groups G01R 5/00 to G01R 11/00 are classified in group G01R 1/00. [8]*
 - *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 to G01R 29/00. [8]*
 - *Details common to different types of arrangements covered by groups G01R 17/00 to G01R 29/00 are classified in group G01R 15/00. [8]*
- (5) In this subclass, group G01R 17/00 takes precedence over groups G01R 19/00 to G01R 31/00.

Subclass Index

ELECTRIC MEASURING INSTRUMENTS		Involving comparison with a reference value	17/00
In general	5/00, 7/00, 9/00	Current or voltage; power, power factor; time integral of power or current; frequency; resistance, reactance, impedance	19/00; 21/00; 22/00; 23/00; 27/00
Details	1/00	Other variables	25/00, 29/00
Manufacture; calibrating, testing	3/00; 35/00	TESTING ELECTRIC PROPERTIES OR LOCATING FAULTS	31/00
ELECTROMECHANICAL MEASUREMENT OF TIME INTEGRAL OF POWER OR CURRENT		MEASURING MAGNETIC VARIABLES	33/00
MEASURING ELECTRIC VARIABLES			
Details of measuring arrangements	11/02, 15/00		
Arrangements for displaying	13/00		

1/00	<i>Details of instruments or arrangements of the types included in groups G01R 5/00 to G01R 13/00 and G01R 31/00 (constructional details particular to arrangements for measuring the electric consumption G01R 11/02) [3,8]</i>	5/22	• Thermoelectric instruments (measuring effective values of currents or voltages using thermoconverters G01R 19/03)
1/02	• General constructional details (details of a kind applicable to measuring arrangements not specially adapted for a specific variable G01D 7/00)	5/24	• . . operated by elongation of a strip or wire or by expansion of a gas or fluid
1/04	• . . Housings; Supporting members; Arrangements of terminals	5/26	• . . operated by deformation of a bimetallic element
1/06	• . . Measuring leads; Measuring probes (G01R 19/145, G01R 19/165 take precedence; end pieces for leads H01R 11/00) [3]	5/28	• Electrostatic instruments (combined with radiation detector G01T)
1/067	• . . . Measuring probes [3]	5/30	• . . Leaf electrometers
1/07	• Non contact-making probes [6]	5/32	• . . Wire electrometers; Needle electrometers
1/073	• Multiple probes [3]	5/34	• . . Quadrant electrometers
1/08	• . . Pointers; Scales, Scale illumination	7/00	Instruments capable of converting two or more currents or voltages into a single mechanical displacement (G01R 9/00 takes precedence)
1/10	• . . Arrangements of bearings	7/02	• for forming a sum or a difference
1/12	• . . . of strip or wire bearings	7/04	• for forming a quotient (for measuring resistance G01R 27/08)
1/14	• . . Braking arrangements; Damping arrangements	7/06	• . . moving-iron type
1/16	• . . Magnets	7/08	• . . moving-coil type, e.g. crossed-coil type
1/18	• . . Screening arrangements against electric or magnetic fields, e.g. against earth's field	7/10	• . . . having more than two moving coils
1/20	• Modifications of basic electric elements for use in electric measuring instruments; Structural combinations of such elements with such instruments	7/12	• for forming product
1/22	• . . Tong testers acting as secondary windings of current transformers (voltage or current isolation using transformers G01R 15/18)	7/14	• . . moving-iron type
1/24	• . . Transmission-line, e.g. waveguide, measuring sections, e.g. slotted section	7/16	• . . having both fixed and moving coils, i.e. dynamometers
1/26	• . . . with linear movement of probe	7/18	• . . . with iron core magnetically coupling fixed and moving coils
1/28	• Provision in measuring instruments for reference values, e.g. standard voltage, standard waveform	9/00	Instruments employing mechanical resonance
1/30	• Structural combination of electric measuring instruments with basic electronic circuits, e.g. with amplifier	9/02	• Vibration galvanometers, e.g. for measuring current
1/36	• Overload-protection arrangements or circuits for electric measuring instruments	9/04	• using vibrating reeds, e.g. for measuring frequency
1/38	• Arrangements for altering the indicating characteristic, e.g. by modifying the air gap (circuits G01D 3/02)	9/06	• . . magnetically driven
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]	9/08	• . . piezo-electrically driven
1/42	• . . thermally operated	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)
1/44	• Modifications of instruments for temperature compensation [2]	11/02	• Constructional details (applicable to electric measuring instruments in general G01R 1/00)
3/00	Apparatus or processes specially adapted for the manufacture of measuring instruments	11/04	• . . Housings; Supporting racks; Arrangements of terminals
5/00	Instruments for converting a single current or a single voltage into a mechanical displacement (vibration galvanometers G01R 9/02)	11/06	• . . Magnetic circuits of induction meters [2]
5/02	• Moving-coil instruments	11/067	• . . . Coils therefor [2]
5/04	• . . with magnet external to the coil	11/073	• . . . Armatures therefor [2]
5/06	• . . with core magnet	11/09	• Disc armatures [2]
5/08	• . . specially adapted for wide angle deflection; with eccentrically-pivoted moving coil	11/10	• . . Braking magnets; Damping arrangements
5/10	• String galvanometers	11/12	• . . Arrangements of bearings
5/12	• Loop galvanometers	11/14	• . . . with magnetic relief
5/14	• Moving-iron instruments	11/16	• . . Adaptations of counters to electricity meters
5/16	• . . with pivoting magnet	11/17	• . . Compensating for errors; Adjusting or regulating means therefor [2]
5/18	• . . with pivoting soft iron, e.g. needle galvanometer	11/18	• . . . Compensating for variations in ambient conditions [2]
5/20	• Induction instruments e.g. Ferraris instruments	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]

G01R

- 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

Groups G01R 11/48 to G01R 11/56 take precedence over groups G01R 11/30 to G01R 11/46. [4]

- 11/30 . Dynamo-electric motor meters
- 11/32 . . Watt-hour meters
- 11/34 . . Ampère-hour meters
- 11/36 . Induction meters, e.g. Ferraris meters (Ferraris instruments G01R 5/20)
- 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** (display by mechanical displacement only G01R 5/00, G01R 7/00, G01R 9/00; recording frequency spectrum G01R 23/18) [4]
- 13/02 . for displaying measured electric variables in digital form (counters G06M; analogue/digital conversion in general H03M 1/00) [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 (cathode-ray tubes H01J 31/00)
- 13/22 . . Circuits therefor (circuits for generating pulses, e.g. sawtooth waveforms H03K 3/00)

- 13/24 . . . Time-base deflection circuits
- 13/26 . . . Circuits for controlling the intensity of the electron beam (brilliance control H01J 29/98)
- 13/28 . . . Circuits for simultaneous or sequential presentation of more than one variable (electronic switches H03K 17/00)
- 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 (sample-and-hold arrangements G11C 27/02) [2]
- 13/36 . using length of glow discharge, e.g. glowlight oscilloscopes (discharge tubes H01J) [4]
- 13/38 . using the steady or oscillatory displacement of a light beam by an electromechanical measuring system (such measuring systems *per se* G01R 5/00, G01R 7/00, G01R 9/00) [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 to G01R 29/00, G01R 33/00 to G01R 33/26 and G01R 35/00** (details of instruments G01R 1/00; measuring leads, measuring probes G01R 1/06; overload protection arrangements G01R 1/36; circuits for correcting the transfer function G01D 3/02) [1,8]
- 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 (voltage dividers G01R 15/04) [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 (automatic comparison or re-balancing arrangements G01R 17/02)

- 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 (automatic comparison or re-balancing arrangements G01R 17/02)
- 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

Within groups G01R 19/02 to G01R 19/32, group G01R 19/28 takes precedence. Groups G01R 19/18 to G01R 19/25 take precedence over groups G01R 19/02 to G01R 19/165 and G01R 19/30. [3]

- 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 (circuits with regenerative action, e.g. Schmitt trigger H03K 3/00; threshold switches H03K 17/00) [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 transducers
- 19/22 . using conversion of ac into dc
- 19/25 . using digital measurement techniques (arrangements for displaying measured electric variables in digital form G01R 13/02) [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; modifications of instruments to indicate the maximum or the minimum value reached in a time interval G01R 1/40) [2,3]
- 19/32 . Compensating for temperature change (modifications of instruments for temperature compensation G01R 1/44) [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 to 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 (such devices *per se* H01L) [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 (electromechanical arrangements therefor G01R 11/00; monitoring electric consumption of electrically-propelled vehicles B60L 3/00) [4,8]

Note

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. [4]

- 22/02 . by electrolytic methods [4]
- 22/04 . by calorimetric methods [4]
- 22/06 . by electronic methods [8]
- 22/08 . . using analogue techniques [8]
- 22/10 . . using digital techniques [8]

23/00 Arrangements for measuring frequencies; Arrangements for analysing frequency spectra (frequency discriminators H03D)

- 23/02 . Arrangements for measuring frequency, e.g. pulse repetition rate; Arrangements for measuring period of current or voltage (measuring short time intervals G04F)
- 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 (radiation-measuring instruments in which pulses generated by a radiation detector are integrated G01T 1/15) [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 (generation of oscillations by beating unmodulated signals of different frequencies H03B 21/00) [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 . . Wobulating devices similar to swept panoramic receivers (panoramic receivers per se H03J 7/32) [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** (measuring power factor G01R 21/00; measuring position of individual pulses in a pulse train G01R 29/02; phase discriminators H03D) [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 (measuring time intervals G04F) [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 (measuring vessels, electrodes therefor G01N 27/07)
- 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 to G01R 27/00**
- 29/02 . Measuring characteristics of individual pulses, e.g. deviation from pulse flatness, rise time, duration (of amplitude G01R 19/00; of repetition rate G01R 23/00; of phase difference of two cyclic pulse trains G01R 25/00; monitoring pattern of pulse trains H03K 5/19) [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 (calibrating instrument transformers G01R 35/02)
- 29/22 . Measuring piezo-electric properties
- 29/24 . Arrangements for measuring quantities of charge (electrostatic instruments G01R 5/28; indicating presence of current G01R 19/15; arrangements for measuring time integral of electric power or current G01R 22/00) [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** (measuring leads, measuring probes G01R 1/06; indicating electrical condition of switchgear or protective devices H01H 71/04, H01H 73/12, H02B 11/10, H02H 3/04; 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 (measuring number of turns, transformation ratio, or coupling factor G01R 29/20)
- 31/07 . . . Testing of fuses (means for indicating condition of fuse structurally associated with the fuse H01H 85/30) [6]
- 31/08 . . . Locating faults in cables, transmission lines, or networks (emergency protective circuit arrangements H02H)
- 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 (measurement of impurity content of materials G01N) [2]
- 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 for short-circuits, discontinuities, leakage or incorrect line connection G01R 31/02; checking computers G06F 11/00; checking static stores for correct operation or testing static stores during standby or offline operation G11C 29/00)
- 31/30 . . . Marginal testing, e.g. by varying supply voltage (marginal testing of computers G06) [2]
- 31/302 . . . Contactless testing (non contact-making probes G01R 1/07) [5]
- 31/303 . . . of integrated circuits (G01R 31/305 to G01R 31/315 take precedence) [6]
- 31/304 . . . of printed or hybrid circuits (G01R 31/305 to 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 (structural association with switches H01H) [6]
- 31/333 . . . Testing of the switching capacity of high-voltage circuit-breakers (means for detecting the presence of an arc or discharge in switching devices H01H 9/50, H01H 33/26) [6]
- 31/34 . . . Testing dynamo-electric machines (testing electric windings G01R 31/06; methods or apparatus specially adapted for manufacturing, assembling, maintaining or repairing dynamo-electric machines H02K 15/00) [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; circuit arrangements for charging, or depolarising batteries or for supplying loads from batteries H02J 7/00) [3]
- 31/38 . . . Testing of sparking-plugs (testing non-electrical properties G01M 19/02) [6]
- 31/40 . . . Testing power supplies [6]
- 31/42 . . . AC power supplies [6]
- 31/44 . . . Testing lamps (discharge lamps G01R 31/24; structurally associated with light source circuit arrangements for detecting lamp failure H05B 37/03) [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; measuring direction or magnitude of the earth's field for navigation or surveying G01C; for prospecting, for measuring the magnetic field of the earth G01V 3/00) [4]
- 33/022 . . . Measuring gradient [3]
- Note**
- Group G01R 33/022 or group G01R 33/10 takes precedence over groups G01R 33/025 to G01R 33/06.
- 33/025 . . . Compensating stray fields [3]
- 33/028 . . . Electrodynamical 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 to 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**
- Groups G01R 33/385 to G01R 33/389 take precedence over groups G01R 33/381 to G01R 33/383. [6]
- 33/381 . . . using electromagnets (electromagnets *per se* H01F 7/06) [6]
- 33/3815 . . . with superconducting coils, e.g. power supply therefor (superconductive magnets H01F 6/00) [6]
- 33/383 . . . using permanent magnets (permanent magnets *per se* H01F 7/02) [6]
- 33/385 . . . using gradient magnetic field coils [6]
- 33/387 . . . Compensation of inhomogeneities (screening G01R 33/42) [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 (screening in general H05K 9/00) [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

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 (detecting masses or objects by methods not involving reflection or reradiation of radio, acoustic or other waves G01V)

Notes

- (1) In this subclass, the following term is used with the meaning indicated: [6]
 – “transponder” means an arrangement which reacts to an incoming interrogating or detecting wave by emitting a specific answering or identifying wave. [6]
- (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

BEACON SYSTEMS; DIRECTION-FINDERS; POSITION FIXING..... 1/00; 3/00;
 5/00

RADAR OR ANALOGOUS SYSTEMS
 Details 7/00

Using radio waves, using other waves where the wavelength or the kind of wave is irrelevant or unspecified..... 13/00
Using acoustic waves..... 15/00

Using electromagnetic waves other than radio waves..... 17/00
SYSTEMS FOR DETERMINING DISTANCE OR VELOCITY NOT USING REFLECTION OR RERADIATION..... 11/00

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

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 (signalling devices G08B)
- 1/74 Details [5]
- 1/76 Systems for determining direction or position line (sound focusing or directing using electrical steering of transducer arrays, e.g. beam steering, in general, G10K 11/34) [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; for geophysical measurement G01C; telescope mountings G02B)
- 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, 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; modifications of aerials or aerial systems H01Q)
- 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 3/14 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 (radar cathode-ray tube indicators providing co-ordinated display of distance and direction G01S 7/10)
- 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 (sound-focusing or directing using electrical steering of transducer arrays, e.g. beam steering, in general, G10K 11/34) [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]	7/16	. . . . . Signals displayed as intensity modulation with rectangular co-ordinates representing distance and bearing, e.g. type B
5/02	. using radio waves	7/18	. . . . . Distance-height displays; Distance-elevation displays, e.g. type RHI, type E
5/04	. . Position of source determined by a plurality of spaced direction-finders	7/20	. . . . . Stereoscopic displays; Three-dimensional displays; Pseudo-three-dimensional displays
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]	7/22	. . . . . Producing cursor lines and indicia by electronic means
5/08	. . Position of single direction-finder fixed by determining direction of a plurality of spaced sources of known location	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
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]	7/26	. . . . . Displays using electroluminescent panels
5/12	. . by co-ordinating position lines of different shape, e.g. hyperbolic, circular, elliptical, radial (radar indicators providing co-ordinated display of direction and distance G01S 7/10)	7/28	. . . Details of pulse systems
5/14	. . Determining absolute distances from a plurality of spaced points of known location	7/282	. . . Transmitters [5]
5/16	. using electromagnetic waves other than radio waves	7/285	. . . Receivers [5]
5/18	. using ultrasonic, sonic, or infrasonic waves	7/288	. . . . . Coherent receivers [5]
5/20	. . Position of source determined by a plurality of spaced direction-finders [5]	7/292	. . . . . Extracting wanted echo-signals (Doppler systems G01S 13/50) [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]	7/295	. . . . . Means for transforming co-ordinates or for evaluating data, e.g. using computers [5]
5/24	. . Position of single direction-finder fixed by determining direction of a plurality of spaced sources of known location [5]	7/298	. . . . . Scan converters [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]	7/32	. . . . . Shaping echo pulse signals; Deriving non-pulse signals from echo pulse signals [5]
5/28	. . by co-ordinating position lines of different shape, e.g. hyperbolic, circular, elliptical, radial (sonar indicators providing co-ordinated display of direction and distance G01S 7/62) [5]	7/34	. . . . . Gain of receiver varied automatically during pulse-recurrence period, e.g. anti-clutter gain control [5]
5/30	. . Determining absolute distances from a plurality of spaced points of known location [5]	7/35	. . . Details of non-pulse systems [5]
7/00	Details of systems according to groups G01S 13/00, G01S 15/00, G01S 17/00	7/36	. . . Means for anti-jamming
7/02	. of systems according to group G01S 13/00	7/38	. . . Jamming means, e.g. producing false echoes [2]
7/03	. . Details of HF subsystems specially adapted therefor, e.g. common to transmitter and receiver (TR boxes H01J 17/64; waveguides or resonators or other devices of the waveguide type H01P; aerials H01Q; basic electronic circuitry, e.g. generation of oscillations, modulation, demodulation, amplification, pulse technique H03; impedance networks, resonators H03H) [5]	7/40	. . . Means for monitoring or calibrating
7/04	. . . Display arrangements	7/41	. . . using analysis of echo signal for target characterisation; Target signature; Target cross-section [6]
7/06	. . . . Cathode-ray tube displays	7/42	. . . Diversity systems specially adapted for radar
7/08	. . . . . with vernier indication of distance, e.g. using two cathode-ray tubes	7/48	. . . of systems according to group G01S 17/00
7/10	. . . . . Providing two-dimensional co-ordinated display of distance and direction	7/481	. . . Constructional features, e.g. arrangements of optical elements [6]
7/12	. . . . . Plan-position indicators, i.e. P. P. I.	7/483	. . . Details of pulse systems [6]
7/14	. . . . . Sector, off-centre, or expanded- angle display	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 (measuring polarisation of light G01J) [6]
		7/51	. . . Display arrangements [6]
		7/52	. . . of systems according to group G01S 15/00
		7/521	. . . Constructional features (constructional features of transducers B06B; mounting transducers G10K 11/00) [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]	13/06	. . . Systems determining position data of a target [3]
7/534	. . Details of non-pulse systems [6]	13/08	. . . . Systems for measuring distance only (indirect measurement G01S 13/46) [3]
7/536	. . . Extracting wanted echo signals [6]	13/10	. . . . . using transmission of interrupted pulse modulated waves (determination of distance by phase measurement G01S 13/32) [3]
7/537	. . Counter measures or counter-counter-measures, e.g. jamming, anti-jamming [6]	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]
7/539	. . using analysis of echo signal for target characterisation; Target signature; Target cross-section [6]	13/14	. . . . . wherein a voltage or current pulse is initiated and terminated in accordance respectively with the pulse transmission and echo reception [3]
7/54	. . with receivers spaced apart	13/16	. . . . . using counters [3]
7/56	. . Display arrangements	13/18	. . . . . wherein range gates are used [3]
7/58	. . . for providing variable ranges	13/20	. . . . . whereby multiple time-around echos are used or eliminated [3]
7/60	. . . for providing a permanent recording	13/22	. . . . . using irregular pulse repetition frequency [3]
7/62	. . . Cathode-ray tube displays	13/24	. . . . . using frequency agility of carrier wave [3]
7/64	. . Luminous indications (G01S 7/62 takes precedence) [5]	13/26	. . . . . wherein the transmitted pulses use a frequency- or phase-modulated carrier wave [3]
11/00	Systems for determining distance or velocity not using reflection or reradiation (direction-finders G01S 3/00; position-fixing by co-ordinating two or more distance determinations G01S 5/00) [2]	13/28	. . . . . with time compression of received pulses [3]
11/02	. using radio waves [5]	13/30	. . . . . using more than one pulse per radar period [3]
11/04	. . using angle measurements [5]	13/32	. . . . . using transmission of continuous unmodulated waves, amplitude-, frequency- or phase-modulated waves [3]
11/06	. . using intensity measurements [5]	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]
11/08	. . using synchronised clocks (synchronisation of electronic clocks G04G 7/02) [5]	13/36	. . . . . with phase comparison between the received signal and the contemporaneously transmitted signal [3]
11/10	. . using Doppler effect [5]	13/38	. . . . . wherein more than one modulation frequency is used [3]
11/12	. using electromagnetic waves other than radio waves [5]	13/40	. . . . . wherein the frequency of transmitted signal is adjusted to give a predetermined phase relationship [3]
11/14	. using ultrasonic, sonic or infrasonic waves [5]	13/42	. . . Simultaneous measurement of distance and other coordinates (indirect measurement G01S 13/46) [3]
11/16	. using difference in transit time between electromagnetic and sonic waves [5]	13/44	. . . . Monopulse radar, i.e. simultaneous lobing [3]
Notes		13/46	. . . Indirect determination of position data [3]
(1)	Groups G01S 13/00 to G01S 17/00 cover:	13/48	. . . . using multiple beams at emission or reception [3]
	– 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; [3]	13/50	. . Systems of measurement based on relative movement of target [3]
	– 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. [3]	13/52	. . . Discriminating between fixed and moving objects or between objects moving at different speeds [3]
(2)	Groups G01S 13/00 to G01S 17/00 do not cover:	13/522	. . . . using transmissions of interrupted pulse modulated waves [5]
	– 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; [3]	13/524	. . . . . based upon the phase or frequency shift resulting from movement of objects, with reference to the transmitted signals, e.g. coherent MTi (coherent receivers G01S 7/288) [5]
	– systems for determining distance or velocity of an object by means not employing reflection or reradiation, which are covered by group G01S 11/00. [3]		
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 (using acoustic waves G01S 15/00; using electromagnetic waves other than radio waves G01S 17/00) [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]		

- 13/526 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 (G01S 13/89 to G01S 13/95 take precedence; electromagnetic prospecting or detecting of objects, e.g. near-field detection, G01V 3/00) [3,6]
- 13/89 Radar or analogous systems, designed for mapping or imaging [3]
- 13/90 using synthetic aperture techniques [3,6]
- 13/91 Radar or analogous systems, designed for traffic control (G01S 13/93 takes precedence) [3]
- 13/92 for velocity measurement [3]
- 13/93 Radar or analogous systems, designed for anti-collision purposes [3]
- 13/94 Radar or analogous systems, designed for terrain-avoidance [3]
- 13/95 Radar or analogous systems, designed 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 (G01S 15/89 to G01S 15/96 take precedence; seismic or acoustic prospecting or detecting G01V 1/00) [3,6]	17/42	. . . Simultaneous measurement of distance and other coordinates (indirect measurement G01S 17/46) [3]
15/89	. Sonar systems designed for mapping or imaging [3]	17/46	. . . Indirect determination of position data [3]
15/93	. Sonar systems designed for anti-collision purposes [3]	17/48	. . . . <i>Active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves (passive systems using a parallactic triangle G01C 3/10, G01C 3/22, G01C 3/24, G01C 3/26; active systems for automatic generation of focusing signals G02B 7/32) [8]</i>
15/96	. Sonar systems designed for locating fish [3]		
17/00	Systems using the reflection or reradiation of electromagnetic waves other than radio waves, e.g. lidar systems (photogrammetry or videogrammetry G01C 11/00) [3]	17/50	. . . Systems of measurement based on relative movement of target [3]
17/02	. Systems using the reflection of electromagnetic waves other than radio waves (G01S 17/66 takes precedence) [3]	17/58	. . . . Velocity or trajectory determination systems; Sense-of-movement determination systems [3]
17/06	. . . Systems determining position data of a target [3]	17/66	. Tracking systems using electromagnetic waves other than radio waves [3]
17/08	. . . . <i>for measuring distance only (indirect measurement G01S 17/46; active triangulation systems G01S 17/48; passive systems using a parallactic triangle G01C 3/10, G01C 3/22, G01C 3/24, G01C 3/26) [3,8]</i>	17/74	. Systems using reradiation of electromagnetic waves other than radio waves, e.g. IFF, i.e. identification of friend or foe [3]
17/10	. . . . using transmission of interrupted pulse-modulated waves (determination of distance by phase measurements G01S 17/32) [3]	17/87	. Combinations of systems using electromagnetic waves other than radio waves [3]
17/32	. . . . using transmission of continuous unmodulated waves, amplitude-, frequency-, or phase-modulated waves [3]	17/88	. Lidar systems, specially adapted for specific applications [3]
17/36	. . . . . with phase comparison between the received signal and the contemporaneously transmitted signal [3]	17/89	. . . <i>Lidar systems designed for mapping or imaging [6,8]</i>
		17/93	. . . <i>Lidar systems designed for anti-collision purposes [6,8]</i>
		17/95	. . . <i>Lidar systems designed for meteorological use [6,8]</i>

G01T MEASUREMENT OF NUCLEAR OR X-RADIATION (radiation analysis of materials, mass spectrometry G01N; counters per se G06M, H03K; electric discharge tubes for analysing radiation or particles H01J 40/00, H01J 47/00, H01J 49/00)

Notes

- (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]	1/16	. Measuring radiation intensity (G01T 1/29 takes precedence) [2]
1/02	. Dosimeters (G01T 1/15 takes precedence; measuring exposure time to X-rays H05G 1/28) [2]	1/161	. . . Applications in the field of nuclear medicine, e.g. <u>in vivo</u> counting (applying radioactive material to the body A61M 36/00) [2]
1/04	. . Chemical dosimeters (G01T 1/06, G01T 1/08 take precedence)	1/163	. . . . Whole-body counters [2]
1/06	. . Glass dosimeters	1/164	. . . . Scintigraphy (radio isotopes G21G 4/00; tracers G21H 5/00) [2]
1/08	. . Photographic dosimeters (photosensitive materials or processes for photographic purposes G03C)	1/166	. . . . involving relative movement between detector and subject [2]
1/10	. . Luminescent dosimeters	1/167	. . . Measuring radioactive content of objects, e.g. contamination (whole-body counters G01T 1/163) [2]
1/105	. . . Read-out devices (G01T 1/115 takes precedence) [2]	1/169	. . . Exploration, location of contaminated surface areas (prospecting by the use of nuclear radiation, natural or induced G01V 5/00) [2]
1/11	. . . . Thermo-luminescent dosimeters	1/17	. . . Circuit arrangements not adapted to a particular type of detector
1/115	. . . . Read-out devices [2]	1/172	. . . . with coincidence circuit arrangements (G01T 1/178 takes precedence) [2]
1/12	. . Calorimetric dosimeters	1/175	. . . Power supply circuits (converters H02M) [2]
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 (pulse rate meters in general G01R 23/02)		

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 (construction of ionisation chambers H01J 47/02) [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 (semiconductor detectors <i>per se</i> H01L 31/00)
1/26	. . with resistance detectors
1/28	. . with secondary-emission detectors (secondary-electron-emitting electrodes in general H01J 1/32)
1/29	. Measurement performed on radiation beams, e.g. position or section of the beam; Measurement of spatial distribution of radiation (scintigraphy G01T 1/164) [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 (semiconductor detectors <i>per se</i> H01L 31/00) [2]
5/00	Recording of movements or tracks of particles (spark chambers H01J 47/00); 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; semiconductor devices H01L)
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 <i>per se</i> 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 (detecting or locating foreign bodies for diagnostic, surgical or person-identification purposes A61B; means for indicating the location of accidentally buried, e.g. snow-buried, persons A63B 29/02; investigating or analysing earth materials by determining their chemical or physical properties G01N; measuring electric or magnetic variables in general, other than direction or magnitude of the earth's field G01R; magnetic resonance arrangements in general G01R 33/20) [4,6]

Notes

- (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. [6]
- (2) In this subclass, the following term is used with the meaning indicated: [6]
 - “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. [6]
- (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

APPARATUS OR METHODS OF PROSPECTING OR DETECTING

Seismic or acoustic	1/00
Electric, magnetic; by nuclear radiation; gravimetric; by optical means	3/00; 5/00; 7/00; 8/00

Others or combined	9/00, 11/00
Detection using tags	15/00

MEASURING FIELDS

Magnetic; gravitational	3/00; 7/00
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MANUFACTURING, CALIBRATING,

MAINTENANCE	13/00
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- 1/00 Seismology; Seismic or acoustic prospecting or detecting**
- 1/02 . Generating seismic energy (blasting in general F42; nuclear explosives G21J)
 - 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 (spark gaps, discharge apparatus, not otherwise provided for H01T) [3]
 - 1/16 . Receiving elements for seismic signals (measuring vibrations G01H; measuring acceleration or shock G01P; microphones or like acoustic electromechanical transducers H04R); 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 (signal-transmitting systems in general G08C; electric transmission systems H04B)
 - 1/24 . Recording seismic data (transforming one recording into another G01V 1/32)
 - 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 (by optical means G01V 8/00); Measuring magnetic field characteristics of the earth, e.g. declination, deviation (for navigation, for surveying G01C) [2,4]**
- Note**
- Groups G01V 3/15 to G01V 3/18 take precedence over groups G01V 3/02 to G01V 3/14. [3]
- 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; measuring the magnetic field characteristics of the earth G01V 3/40)
 - 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 to 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, for correction (computing in general G06) [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 (determining the properties of materials G01N; measuring nuclear radiation G01T)

- 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 (balances in general G01G)
- 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 (photogrammetry or videogrammetry G01C 11/00; measurement of characteristics of light G01J; optical scanning systems G02B 26/10; discharge tubes detecting the presence of radiation H01J 40/00, H01J 47/00; semiconductor devices sensitive to light H01L 31/00) [6]

Note

This group covers the use of infra-red, visible or ultra-violet light. [6]

- 8/02 . Prospecting [6]
- 8/10 . Detecting, e.g. by using light barriers (by reflection from the object G01S 17/00; counting of objects carried by a conveyer G06M 7/00; signalling or calling arrangements G08B; detecting movement of traffic to be counted or controlled G08G 1/01; proximity switches H03K 17/945, H03K 17/965) [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 to 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 to G01V 9/00

13/00 Manufacturing, calibrating, cleaning, or repairing instruments or devices covered by groups G01V 1/00 to 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 G06K 19/00; signs, labels G09F) [6]

Note

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. [6]

G01W METEOROLOGY (influencing weather conditions A01G 15/00; dispersing fog E01H 13/00; instruments for measuring single variables in general, see the appropriate subclasses of class G01, e.g. G01K, G01L; radar, sonar, lidar or analogous systems, designed for meteorological use G01S 13/95, G01S 15/88, G01S 17/95)

Notes

- (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 (transmission systems for measured values G08C; transmitting circuits H04B)

- 1/10 . Devices for predicting weather conditions

- | | | | |
|---|--|---|---|
| <div>1/11</div> <div>1/12</div> <div>1/14</div> | <ul style="list-style-type: none">. Weather houses or other ornaments for indicating humidity. Sunshine-duration recorders (measuring intensity of sunshine G01J). Rainfall or precipitation gauges (measuring volume in general G01F) | <div>1/16</div> <div>1/17</div> <div>1/18</div> | <ul style="list-style-type: none">. Measuring atmospheric potential differences, e.g. due to electrical charges in clouds (measuring potentials in general G01R). Catathermometers for measuring “cooling value” related either to weather conditions or to comfort of other human environment. Testing or calibrating meteorological apparatus |
|---|--|---|---|