

G01B

MEASURING LENGTH, THICKNESS OR SIMILAR LINEAR DIMENSIONS; MEASURING ANGLES; MEASURING AREAS; MEASURING IRREGULARITIES OF SURFACES OR CONTOURS [N: (measuring human body, see the relevant places, where such exist, e.g. A41H1/00, A43D1/02, A61B5/103; measuring appliances combined with walking-sticks A45B3/08; sorting according to dimensions B07; tool-setting or drawing instruments not specially modified for measuring B23B49/00, B23Q15/00 to B23Q17/00, B43L; combinations of measuring devices with writing-appliances B43K29/08; geodetical, nautical or aeronautical measuring, surveying, rangefinding G01C; photogrammetry G01C11/00; measuring force or stress, in general G01L1/00; investigating or analysing particle size, investigating or analysing surface area of porous material G01N; measuring position, distance or direction, in general, by reception or emission of radiowaves or other waves and based on propagation effects, e.g. Doppler effect, propagation time, direction of propagation G01S; geophysical measuring G01V; measuring length or roll diameter of film in cameras or projectors G03B1/60; 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 G06K11/00; measuring elapsed travel of recording medium in recording and playback equipment, sensing diameter of record in autochange gramophones G11B; means structurally associated with electric rotary current collectors for indicating brush wear H01R39/58; indicating consumption of electrodes in arc lamps H05B31/34)]

Definition statement

This subclass/group covers:

Methods of measuring geometrical parameters of objects (e.g. shape or surface configuration, measurement of volume, coordinates, height, length, width, thickness, contours, surface roughness or evenness, diameters, roundness, eccentricity, angles, alignment, deformation, displacement), devices for carrying out these methods and related calibration aspects.

Classification within [G01B](#) into the main groups is to a large extent based on the underlying measurement principle:

Optical	G01B 11/00
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Using fluid	G01B 13/00
Use of radiation	G01B 15/00
Use of subsonic, sonic, ultrasonic vibrations	G01B 17/00
If no particular measurement principle prevails or if more than one of the above mentioned underlying measurement principles equally apply	G01B 21/00
Mechanical	G01B 3/00 , G01B 5/00
Electric or magnetic	G01B 7/00

An exception is [G01B 1/00](#), where documents should be classified which have aspects related to the material selected for the geometrical parameter measuring instrument.

Another exception is [G01B 9/00](#), which is a hardware group mainly containing interferometers. Only when a distance or displacement measurement is concerned (or a related measurement, such as an orientation measurement based on distance measurements to various locations on the object), then an interferometer should be classified in [G01B 9/00](#).

Small, hand-held mechanical devices (such as those available in hardware stores) are classified in [G01B 3/00](#), whereas large mechanical set-ups (industrial machines, such as coordinate measuring machines) are classified in [G01B 5/00](#).

Starting at the low-frequency end of the electro-magnetic spectrum, the electromagnetic spectrum is covered by the main groups as follows:

Up to approximately 100 MHz	G01B 7/00
Far infrared - ultraviolet	G01B 11/00
Approximately 100 MHz - far infrared as well as frequencies higher than ultraviolet	G01B 15/00

Relationship between large subject matter areas

Only documents with the emphasis on details of the actual geometrical measurement method, measurement apparatus and/or calibration aspects are to be classified in [G01B](#). Documents covering devices or methods which themselves do not belong in [G01B](#), but which use or incorporate geometrical measuring devices or steps should normally not be classified in [G01B](#), but rather in the respective field of their application. A drill, for example, in combination with a device for measuring the distance from the drill to the object being drilled should not be classified as a distance measuring device, as long as the actual way of distance measuring is not presented as the invention. Similarly, a document about a machine for sorting articles according to their diameter should not be classified with diameter determination as long as details of the diameter determination are not the invention.

If investigating or analysing an object is concerned (e.g. determination of material properties or defect analysis for quality control purposes), then [G01N](#) has to be considered for classification.

If testing an object or apparatus is concerned, then [G01M](#) has to be considered for classification.

The general subject matters of measuring linear dimensions, distances, or angles is covered by several subclasses besides [G01B](#):

[G01C](#): measuring distances, levels, or bearings; surveying; navigation; gyroscopic instruments; photogrammetry or videogrammetry.

[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.

When propagation effects of waves are relevant for such measurements [G01S](#) is in general the appropriate subclass.

For measuring ground distance between points in geodesy, surveying, and navigation [G01C](#) is the appropriate subclass when no radio waves are used or when propagation effects of waves other than radio waves are not relevant.

References relevant to classification in this subclass

This subclass/group does not cover:

Machine tools	B23Q
Robotics	B25J
Micro mechanical devices (MEMS)	B81B , B81C
Nano-technology	B82B , B82Y
Measuring in boreholes or wells	E21B 47/00

Range finders, inclinometers, photogrammetry, surveying, gyroscopes	G01C 3/00 , G01C 9/00 , G01C 11/00 , G01C 13/00 , G01C 15/00 , G01C 19/00
Linear and rotary encoders	G01D 5/00
Measuring volume flow or level of fluids or fluent solid material	G01F
Spectroscopy	G01J
Measuring force, stress, torque, pressure	G01L
Speed, acceleration	G01P
Scanning probe microscopy	G01Q
Measuring electric or magnetic variables	G01R
Radio direction-finding, determining distance or velocity and locating or detecting by use of radio waves	G01S
Geophysics, detecting, prospecting	G01V
Optical microscopes	G02B 21/00
Lithography (incl. interferometric stage position measurement)	G03F 7/00
Holography	G03H
Joysticks	G05G 9/00
Computer input devices (such as mice, touch pads)	G06F 3/00
Image analysis	G06T 7/00
Electron/ion microscopes	H01J 37/00
Interferometer aspects not relating to distance or displacement measurements (e.g signal modulation)	H04B 10/00 , H04L 27/00 , G02F 1/00

or control)	
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Human body, dentistry	A61B , A61C
Ball games	A63B
Gears	B23F
Writing, drawing	B43K , B43L
Vehicles	B60, B61
Yarns	D01H
Paper webs, currency	D21F , G07D 7/00
Building	E04D , E04F , E04G
Turbines	F01D
Bearings	F16C
Pigs, moles	F16L 55/00
Testing	G01M
Investigating/analysing	G01N
Optical coherence tomography (OCT)	G01N 21/00 , A61B 3/00 , A61B 5/00
Trackers	G01S
Optical elements	G02B
Scales (e.g. Vernier)	G02B 27/00 , G06G 1/00 , G01D 5/00 , G01D 13/00
Spectacle frames	G02C 13/00
Cameras	G03B , H04N

Numerical control	G05B 19/00
Commerce	G06Q
Wafers and semiconductors	H01L 21/00 , H01L 31/00

Special rules of classification within this subclass

One or more [G01B 3/00](#) breakup Indexing Codes should be given when information is concerned which is more detailed than the corresponding [G01B 3/00](#) or when assigning a [G01B 3/00](#) is not appropriate (i.e. in cases where the geometrical measurement information is only of additional nature).

At least one [G01B 2210/00](#) Indexing Code is compulsory for wheel alignment ([G01B 2210/10](#)), calliper-like sensors ([G01B 2210/40](#)) as well as in the following cases:

Using chromatic effects to achieve wavelength-dependent depth resolution	G01B 2210/50
Combining partially overlapping images to an overall image	G01B 2210/52
Measuring geometric parameters of semiconductor structures, such as for example profile, critical dimensions (CD) or trench depth	G01B 2210/56
Wireless transmission of information between a sensor or probe and a control or evaluation unit	G01B 2210/58
Unique sensor ID to enable sensors to be recognised and appropriate amplification or error compensation or calibration curves etc. to be used (e.g. by resistor value across connector terminals)	G01B 2210/60

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Measuring areas	quantifying, by measurement, the size of areas (not: the act of measuring in certain spatial regions or the spatial regions where measurements are taken)
Irregularities of surfaces	smaller-scale surface textures
Contour	envelope-like description of (part of) the shape of an object

Synonyms and Keywords

In patent documents the following abbreviations are often used:

CMM	Coordinate Measuring Machine
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In patent documents the following expressions/words "warp", "warpage", "waviness" and "evenness" are often used as synonyms.

G01B 1/00

Measuring instruments characterised by the selection of material therefor

Definition statement

This subclass/group covers:

Sensors which are characterised only or in part by the material from which they are made.

G01B 3/00

Instruments as specified in the subgroups and characterised by the use of mechanical measuring means (arrangements for measuring particular parameters G01B5/00; devices of general interest specially adapted or mounted for storing and repeatedly paying-out and re-storing lengths of material B65H75/34)

Definition statement

This subclass/group covers:

Small, hand-held mechanical devices, such as those available in retail stores.

Machines operating on similar principles to the hand-held devices specified in this group are also classified here with these devices. For example, arrangements for controlling a measuring force are classified in [G01B 3/008](#), even if they are not hand-held.

References relevant to classification in this group

This subclass/group does not cover:

Measuring arrangements characterised by the use of mechanical means, usually (aspects of) large mechanical set-ups (industrial machines, such as coordinate measuring machines)	G01B 5/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Marking or setting out work	B25H 7/00
Straightedges, triangles	B43L 7/00
Winding/unwinding	B65H
Templates for mounting doors or windows	E04F 21/0007
Protractors for use in geodesy	G01C 1/00

Special rules of classification within this group

One or more [G01B 3/00](#) Indexing Codes should only be given when information is concerned which is more detailed than the corresponding [G01B 3/00](#) or when assigning a [G01B 3/00](#) is not appropriate (i.e. in cases where the geometrical measurement information is only of additional nature).

G01B 5/00

Measuring arrangements characterised by the use of mechanical means (instruments of the types covered by

group G01B3/00 per se G01B3/00)

Definition statement

This subclass/group covers:

Large mechanical set-ups, such as industrial machines or coordinate measuring machines, and aspects of the large mechanical set-ups.

References relevant to classification in this group

This subclass/group does not cover:

Instruments as specified in the subgroups and characterised by the use of mechanical measuring means, usually small, hand-held mechanical devices, such as those available in hardware stores.	G01B 3/00
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Machine tools, probe magazines	B23Q
Robotics, manipulators	B25J
Supports in general	F16M 11/00

Special rules of classification within this group

At least one [G01B 2210/00](#) Indexing Code has to be given when [G01B 5/255](#) is given.

[G01B 5/0011](#), [G01B 5/0018](#), [G01B 5/0023](#), [G01B 5/0025](#), [G01B 5/003](#), [G01B 5/0035](#) and [G01B 5/0037](#) also contain methods and devices other than mechanical methods and devices.

[G01B 5/0035](#) also contains measurements of plants. Measuring of logs is not included.

[G01B 5/016](#) covers constructional details of contacts, which are meant to refer to the actual switch contacts within the probe head (not: the probe tip for contacting an object to be measured).

[G01B 5/255](#) also contains vehicle frame and ride height measurement.

When classifying in this group at least one [G01B 2210/00](#) Indexing Code has to be given.

G01B 7/00

Measuring arrangements characterised by the use of electric or magnetic means

Definition statement

This subclass/group covers:

Electric, magnetic and electro-magnetic (e.g. using eddy-currents) measuring principles. Frequencies up to approximately 100 MHz.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Angle or position sensing	G01D
Measuring electric or magnetic variables	G01R
Radio direction-finding, determining distance or velocity and locating or detecting by use of radio waves	G01S
Electric or magnetic detecting or prospecting	G01V 3/00
Measuring thickness during the manufacture of coatings	C23C 14/54
Manufacture of piezo-electric or electrostrictive resonators for obtaining desired frequency	H03H

Special rules of classification within this group

At least one [G01B 2210/00](#) Indexing Code has to be given when [G01B 7/315](#) is given.

[G01B 7/001](#) and [G01B 7/002](#) concern measuring heads which are not for coordinate measuring machines, whereas [G01B 7/012](#) is for heads for coordinate measuring machines.

[G01B 7/003](#) and [G01B 7/30](#) should not be assigned to linear and rotary encoders or transducers, respectively. Encoders and transducers are in [G01D](#).

[G01B 7/016](#) covers constructional details of contacts, which are meant to refer to the actual switch contacts within the probe head (not: the probe tip for contacting an object to be measured).

If "height" is specifically mentioned as parameter being measured, then [G01B 7/082](#) and [G01B 7/102](#) take precedence over [G01B 7/023](#).

[G01B 7/315](#) also contains vehicle frame and ride height measurement.

When classifying in this group at least one [G01B 2210/00](#) Indexing Code has to be given.

With roughness or irregularity ([G01B 7/34](#)) smaller-scale surface textures are meant, whereas with evenness ([G01B 7/345](#)) a larger-scale surface structure is meant.

G01B 9/00

Instruments as specified in the subgroups and characterised by the use of optical measuring means (arrangements for measuring particular parameters G01B11/00)

Definition statement

This subclass/group covers:

Interferometers, measuring microscopes, optical projection comparators and goniometers for measuring angles between surfaces.

References relevant to classification in this group

This subclass/group does not cover:

Arrangements for measuring particular parameters other than displacement	G01B 11/00
Diffraction gratings in sensors for measuring physical entities	G01D 5/38

Informative references

Attention is drawn to the following places, which may be of interest for search:

Interferometers for medical use	A61B
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Interferometers for spectral analysis	G01J 9/00
Interferometers for optical coherence tomography	G01N 21/4795
Microscopes in general	G02B 21/00
Telescopes in general	G02B 23/00
Interferometers for lithography	G03F 7/00 , G03F 9/00
Holography in general	G03H

Special rules of classification within this group

When classifying in [G01B 9/10](#), also [G01B 11/26](#) has to be considered for classification.

G01B 11/00

Measuring arrangements characterised by the use of optical means (instruments of the types covered by group G01B9/00 per se G01B9/00))

Definition statement

This subclass/group covers:

Optical measuring principles operating between far infrared (inclusive) and ultraviolet (inclusive), e.g. for volume measurement.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Instruments of the types covered by group G01B 9/00 per se	G01B 9/00
Investigating, analysing materials by the use of optical means	G01N 21/00
Image analysis for depth or shape recovery	G06T 7/0051

Special rules of classification within this group

At least one [G01B 2210/00](#) Indexing Code has to be given when [G01B 11/275](#) or [G01B 11/2755](#) is given.

"Pose" measurements (i.e. position plus orientation) go into [G01B 11/002](#).

[G01B 11/0625](#) - [G01B 11/0683](#) should be given when the pertinent measurement principle applies, even when the object being measured is not a coating ([G01B 11/0616](#)), but, for example, a pipe wall.

[G01B 11/26](#) should not be assigned to encoders or transducers, which are in [G01D](#).

[G01B 11/275](#) and [G01B 11/2755](#) also contain vehicle frame and ride height measurement. When classifying in this group at least one [G01B 2210/00](#) Indexing Code has to be given.

The expressions "using interferometry" [G01B 11/0675](#), "by interferometric means" in [G01B 11/161](#) and "using interferometry" in [G01B 11/2441](#) are meant to refer to using an interferometric measurement arrangement, i.e. with a measurement and reference path that combine into one path to a detector (not: measuring interfering reflections from different reflectors within an object being measured). To be used if no emphasis on particular interferometer details.

[G01B 11/0658](#) contains measurement of emissivity or reradiation, which is meant to cover fluorescence and Raman scattering.

[G01B 11/0666](#) is meant to cover measuring thickness by exciting an object with a laser beam that generates an ultrasonic beam into the object. Reflections of the ultrasonic beam are then analysed, often using an interferometer.

[G01B 11/165](#) contains deformation measurement by means of a grating deformed by the object. This is meant to refer to a grating being arranged on the object and its optical properties being measured as a function of deformation of the object (not: fiber Bragg gratings in general).

[G01B 11/18](#) contains Bragg gratings in general being used for measuring deformation.

The expression "contours or curvatures" in [G01B 11/24](#) is meant to refer to an envelope-like description of the shape or part of the shape of an object.

G01B 13/00

**Measuring arrangements characterised by the use of fluids
[N: (pressure regulation G05D16/00)]**

Definition statement

This subclass/group covers:
Measuring principles using fluids.

Informative references

Attention is drawn to the following places, which may be of interest for search:

Lithography	G03F 7/00 , G03F 9/00
Volume measurement	G01F 17/00
Pressure regulation	G05D 16/00

Special rules of classification within this group

At least one [G01B 2210/00](#) Indexing Code has to be given when [G01B 13/195](#) is given.

The expression "contours or curvatures" in [G01B 13/16](#) is meant to refer to an envelope-like description of the shape or part of the shape of an object.

When classifying in [G01B 13/195](#) at least one [G01B 2210/00](#) Indexing Code has to be given

With roughness or irregularity ([G01B 13/22](#)) smaller-scale surface textures are meant.

Glossary of terms

In this subclass/group, the following terms (or expressions) are used with the meaning indicated:

Fluid	liquid or gas
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G01B 15/00

Measuring arrangements characterised by the use of wave or particle radiation (G01B9/00, G01B11/00 take precedence; [N: by radar technique G01S])

Definition statement

This subclass/group covers:

Measuring principles using wave or particle radiation, such as e- (beta), e+ (positron), gamma, X-ray, neutron, radar, microwaves, millimeter waves. Anything from about 100 MHz to far infrared as well as with a frequency higher than ultraviolet.

References relevant to classification in this group

This subclass/group does not cover:

Measuring arrangements by acoustic radiation	G01B 17/00
Measuring arrangements by optical means	G01B 9/00 , G01B 11/00
Radar	G01S

Informative references

Attention is drawn to the following places, which may be of interest for search:

Investigating, analysing	G01N 23/00
Scanning electron microscopes	G01Q 30/00
Electron microscopes	H01J 37/00

Special rules of classification within this group

In case of measuring a distance or clearance between spaced objects or apertures, [G01B 15/00](#) as well as [G01B 7/14](#) should be assigned.

The expression "contours or curvatures" in [G01B 15/04](#) is meant to refer to an envelope-like description of the shape or part of the shape of an object.

G01B 17/00

Measuring arrangements characterised by the use of subsonic, sonic or ultrasonic vibrations [N: (by sonar technique G01S15/00)]

Definition statement

This subclass/group covers:

Measuring principles using acoustic energy, e.g. for short range distance measurement.

References relevant to classification in this group

This subclass/group does not cover:

Measuring object thickness (e.g. pipe wall) by exciting an object with a laser beam that generates an ultrasonic beam into the object. Reflections of the ultrasonic beam are then analysed, often using an interferometer	G01B 11/0666
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Informative references

Attention is drawn to the following places, which may be of interest for search:

Investigating, analysing materials by the use of subsonic, sonic or ultrasonic vibrations	G01N 29/00
Sonar or long range distance measurements	G01S 15/00

Special rules of classification within this group

The expression "contours or curvatures" in [G01B 17/06](#) is meant to refer to an envelope-like description of the shape or part of the shape of an object.

G01B 21/00

Measuring arrangements or details thereof in so far as they are not adapted to particular types of measuring means of the preceding groups

Definition statement

This subclass/group covers:

Measurements based on unspecified measurement principles or on principles covered by two or more of groups [G01B 3/00](#) to [G01B 17/00](#).

Informative references

Attention is drawn to the following places, which may be of interest for search:

Machine tools	B23Q
Unwinding or rewinding apparatus incorporating length measuring devices	B65H 16/025
Internal diameters of boreholes or wells	E21B 47/08
Numerical control	G05B 19/00
Digital computing, data processing	G06F 17/00
Three-dimensional modelling	G06T 17/00

Special rules of classification within this group

At least one [G01B 2210/00](#) Indexing Code has to be given when [G01B 21/26](#) is given.

[G01B 21/04](#) covers processing of measurement data, e.g. outlier processing.

[G01B 21/042](#) covers calibration and calibration artifacts, which are meant as artifacts and methods used or applied before actual measurement of the workpiece.

[G01B 21/045](#) covers correction of measurements, which is meant as artifacts and methods used or applied during or after actual measurement of the workpiece.

When classifying in [G01B 21/26](#) at least one [G01B 2210/00](#) Indexing Code has to be given.