G01D

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

Definition statement

This place covers:

Measuring arrangements or apparatus giving results other than momentary value of a variable, and not specially adapted for a variable covered by a single other subclass, e.g.

giving mean values, root mean square [RMS] or integral values

signalling that a predetermined value has been exceeded.

Measuring arrangements with provision for special purposes, e.g.

for altering or correcting the transfer function

for mitigating undesired influences, such as temperature or pressure.

Component parts of said measuring apparatus or arrangements.

Testing or calibrating said measuring apparatus or arrangements.

Indicating or recording measured values not specially adapted for a specific variable

- Apparatus or arrangements for indicating or recording the results of measurements, not specially adapted for variables covered by a single other subclass, e.g. general recording by stylus and paper roll.
- Component parts of said indicating or recording apparatus or arrangements.
- Testing or calibrating said indicating or recording apparatus or arrangements.
- Tariff meters
- Apparatus or arrangements for tariff metering in general.
- Component parts of taiff metering apparatus or arrangements.
- Testing or calibrating tariff metering apparatus or arrangements.

Relationships with other classification places

G01D covers measuring arrangements, or arrangements for indicating, recording or transducing measurements not specially adapted for a specific variable covered by a single other subclass. Therefore when the variable is specified and covered by a single other subclass of G01, classification should be directed to that subclass.

For example, classification should be directed to G01D for measuring arrangements giving the RMS value of an unspecified variable, or signalling that a predetermined value of an unspecified variable has been exceeded. Instead, when the variable under consideration is specified (e.g. a voltage, liquid level or temperature), and a single other subclass exists that covers measurements of that variable (e.g. G01R, G01F or G01K respectively) then classification should be directed to that subclass.

References

Informative references

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

Data loggers (animals/veterinary)	A01K 11/006

Data loggers (medical)	A61B 5/335
Ink-jet printers	B41J
Instruments specially adapted for vehicles; Arrangement of instruments in or on vehicles	B60K 35/00
Illumination of dashboard instruments	B60Q 3/10
Steering sensors	B62D 15/02
Light sources	F21V
Measuring length, thickness, dimensions etc.	G01B
Measuring of force, pressure, strain, torque etc.	G01L
Testing of machines	G01M
Bearings incorporating rotation sensors	G01P 3/443
Measuring electric or magnetic variables	G01R
Tariff meters for measuring the time integral of electric power or current, e.g. electric consumption	G01R 11/56
Measuring root mean square [RMS] values of currents or voltages	G01R 19/02
Control systems	G05B, G05D
Graphical User Interfaces	G06F 1/00, G06F 3/00
Data loggers (architecture)	G06F 17/40
Tariff metering apparatus in taxi's, i.e. taximeters	G07B 13/00
Apparatus actuated by coins, cards or the like with meter-controlled dispensing of liquid, gas, or electricity	G07F 15/00
Telemetry	G08C, H04Q
displaying information in general	G09F
Recording in a way which requires playback through a transducer	G11B
Resistors	H01C
Smart metering/smart homes	H02J
A/D converters	H03M 1/00
Wireless communication networks	H04W

Special rules of classification

Any documents discussing the compensation or correction of errors in position encoding systems should be classified in G01D 5/244 and sub-groups rather than in G01D 3/00.

G01D 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)

Definition statement

This place covers:

Analysis of measured values

- Root Mean Square (RMS)
- Integration
- Differentiation
- Distribution

Detecting the maxima or minima of a measured value

Producing a product or a ratio of measured values

Signalling that an unspecified parameter has exceeded a predetermined value

References

Limiting references

This place does not cover:

Measuring arrangements with provision for the special purposes referred to	G01D 3/00
In tariff metering apparatus	G01D 4/00
Transducers not specially adapted for a specific variable	G01D 5/00

Informative references

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

Indication that a specified parameter has exceeded a predetermined value for fluid level	G01F
Indication that a specified parameter has exceeded a predetermined value for temperature	G01K
Root Mean Square values of current or voltage	G01R 19/02

G01D 3/00

Indicating or recording apparatus with provision for the special purposes referred to in the subgroups

Definition statement

This place covers:

Correcting or altering the law of variation

Using purely analogue techniques

Using digital techniques (i.e. correction data stored in a memory)

Mitigating undesired influences (due to e.g. temperature or pressure changes)

By averaging, gating undesired signals etc.

By detecting the undesired influence and correcting for its effect

Determining the correct operation of a measuring apparatus

Further details of subgroups

G01D 3/02

- Includes mechanical/electro-mechanical systems, any analogue circuits which involve switching, digital arrangements not involving use of a memory;
- Correcting/compensating for non-linearities;
- Compensating for temperature, pressure etc., see G01D 3/028 and sub-groups.

G01D 3/028
- Includes mechanical arrangements, materials etc.; sub-groups take precedence.

G01D 3/021
- Includes systems having feedback, but no switching.

G01D 3/022
- Only digital or analogue/digital systems using memories; also include temperature correction methods involving memories;
- TEDS (Transducer Electronic Data Sheet);
- Overlaps with G01D 18/008 (Calibration). Documents classified here deal with how calibration data is used and not how calibration data is produced, which is classified in G01D 18/008

G01D 3/032

G01D 3/036 and G01D 3/0365 take precedence.

G01D 3/036
- Sensors having a "self-correction" action, inc. those having components sensitive to the undesired effect, but not producing actual signals;
- Signals fed-back to sensor, to regulate supply voltage, frequency, gain etc.;
- Dual sensors measuring the desired parameter, the signals being combined to remove undesired effects;
- Sensors producing e.g. temperature dependent signal (resistive value of inductive sensor) as well as the sensed parameter;
- G01D 3/0365 takes precedence.

G01D 3/0365
- Dual (identical) sensor arrangements where only one sensor is affected by desired parameter, while the other sensor is only affected by undesired parameter;
- A signal representing the undesired parameter must be produced, which is further processed;
- For sensor arrangements where a sensitive element is placed e.g. in a feedback loop, see G01D 3/036.

G01D 3/08
- Includes systems for monitoring sensor operation;
- See also G01D 18/00 and G01R 31/2829.

G01D 3/10
- e.g. after reaching a certain threshold.

References

Limiting references

This place does not cover:

Incremental/absolute/pulse type position encoders	G01D 5/244

Informative references

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

Testing or monitoring circuits in sensor systems	G01R 31/2829

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

TEDS	Transducer Electronic Data Sheet

G01D 3/066

{Balancing a force which represents the measuring value, by means of a reference force}

References

Informative references

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

Force measuring per se	G01L

G01D 4/00

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

Definition statement

This place covers:

Smart utility meters

Remote reading of utility meters

Reading directly to a remote (e.g. central) location

Reading indirectly (e.g. via a mobile or handheld reader)

Adaptation of existing meters, for conversion into smart meters

Display of actual utility consumption and/or the pricing or cost

Determination of the layout or topology of utility meters connected to an electricity grid

Outage detection in an electrical grid

Real-time monitoring of power generated by renewable sources.

Further details of subgroups

G01D 4/00

- In general, G01R takes precedence;
- For remote meter reading, see also G06M 3/06, G01F 15/061, H04Q 9/00, and H02J.

Relationships with other classification places

The measuring of electrical power is to be classified in G01R.

Although transmission of utility data is covered by G01D, the techniques for transmitting such data should be classified in G08C, H04Q 9/00 and H04W .

Although smart utility meters should be in G01D, where smart utility meters are combined within a building (smart homes), H02J should be used

Where the utility being measured is a fluid (i.e. gas or water), then G01F 15/00 should also be considered.

References

Limiting references

This place does not cover:

Taximeters	G07B 13/00
Coin-freed apparatus with meter-controlled dispensing of liquid, gas or electricity	G07B 15/00

Informative references

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

Measurement of electrical voltage, current or power	G01R
Tariff meters for measuring the time integral of electric power or current	G01R 11/56
Coin-feed mechanisms for taximeters	G07F
Smart homes	H02J

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

SCADA	Supervisory Command And Data Acquisition
AMR	Automatic Meter Reading
Smart meter	A utility meter which is either able to transmit measured utility data to a remote/central location and/or is able to display accurate consumption, pricing and/or cost information to the consumer

G01D 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)

Definition statement

This place covers:

Sensors, transducers

- Hall sensors
- Magneto-resistive sensors
- Inductive sensors
- Capacitive sensors
- Optical sensors
- Fiber-optic sensors
- Magnetostrictive sensors
- Other sensor types (i.e. piezoelectric, Wiegand, magneto-optical)

Sensors using particle or wave means (i.e. ultrasonic, microwave)

Sensors using gears, levers, magnetic coupling etc.

Encoders
- Incremental encoders
- Absolute encoders
- Pseudo-random encoders
- Error correction/prevention in encoders

Further details of subgroups

G01D 5/142, G01D 5/145, G01D 5/147
- Position sensing arrangements using magnetically sensitive (semiconductor) devices;
- Inductive sensors, see G01D 5/20 and G01D 5/22 and sub-groups;
- Magneto-resistive devices in general, see G01R 33/09;
- Joysticks, see G05G 9/047 and G06F 3/0338.

G01D 5/165

Adjustable resistors, see H01C 10/00.

G01D 5/1655

Rotary switches, see H01H 19/00.

G01D 5/24

Includes circuits associated with measuring the capacitance of capacitive sensors;

see also proximity switches (H03K 17/955) and touch switches (H03K 17/96);

See also G01R 27/26.

G01D 5/2417

See H04R 3/00 and H04R 19/00.

G01D 5/244
- This is the head group for incremental/absolute/pulse type position encoders, but should not be used for classification purposes;
- It contains all documents which do not fit in the sub-groups of G01D 5/244, G01D 5/245 & G01D 5/249;
- See also H03M 1/22 - H03M 1/308

G01D 5/24404

Includes counting high frequency clock pulses as well as combining, inverting or delaying input pulses to produce higher frequency pulses.

G01D 5/24409

Includes documents using memories to produce SIN/COS (i.e. interpolation of incremental signals).

G01D 5/245

Not to be used (virtually empty).

G01D 5/2451

Either quadrature or single detector incremental encoders.

G01D 5/2457

Reference marks either on same encoder or on separate encoder;

See also G01D 5/366.

G01D 5/247

e.g. PPM (pulse position modulation).

G01D 5/249

Virtually empty, sub-groups take precedence;

See also H03M 1/22 - H03M 1/308

G01D 5/2492

Single track encoders with single or multiple detectors;

See G01D 5/2455 for single track encoders equipped with incremental or clocking track.

G01D 5/2495

As for G01D 5/2492, but includes only those documents which specifically mention using a pseudo-random code.

G01D 5/2497

Multi-track/multi-detector encoders.

G01D 5/25

Includes conductive encoders;

Rotary switches, see H01H 19/00.

G01D 5/2515

Typically Reed switches are found here.

G01D 5/264

Compensation of undesired effects in optical measuring systems.

G01D 5/266

Not using optical fibres;

See also G01B 9/02041.

G01D 5/268

The fibre is only used as transmitting means and not for sensing.

G01D 5/305

e.g. Twin diodes for following a line.

G01D 5/344

Not polarisation encoders.

G01D 5/345

e.g. Polariser and analyser system.

G01D 5/347

Optical encoders.

G01D 5/34707

Not the coding part: only the physical construction of the scale.

G01D 5/34715

e.g. lens arrangement for concentrating the light.

G01D 5/34738

Coupling between the axis of rotation and the encoder.

G01D 5/34776

How the encoding is made;

Encoder without incremental coding.

G01D 5/34784

Coding must have some incremental coding and some analogue coding.

G01D 5/34792

Coding must have some incremental coding and no analogue coding at all.

G01D 5/353

The fibre is the sensitive element;

G01D 5/35303

Also contains fibre interferometer and Bragg sensors;

See also G01D 5/268 for Bragg.

G01D 5/36

Relates to the processing of the detected pulses of light.

G01D 5/366

Reference of incremental scales.

G01D 5/38

Encoders with diffraction gratings are also here.

G01D 5/48

Data loggers incorporating wireless transmission means should have the class G01D 9/005.

G01D 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.

References

Limiting references

This place does not cover:

Measuring arrangements with provision for the special purposes referred to in the subgroups	G01D 3/00

Informative references

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

Calibrating encoders	G01D 18/001
Measurement of specific parameters, i.e. length, thickness, alignment, angles etc.	G01B
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, G08C 19/00

Special rules of classification

Reference G01D 1/00 is non-limiting in the main group G01D 5/00. CPC will be updated/corrected once this inconsistency is resolved in IPC.

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

GMR	Giant magneto-resistance
AMR	Anisotropic magneto-resistance

G01D 5/2266

{specially adapted circuits therefor}

References

Informative references

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

Measuring inductance per se	G01R 27/2611
Measuring transformation ration or coupling factor of windings per se	G01R 29/20

G01D 7/00

Indicating measured values

Definition statement

This place covers:

The displaying of measured values

- Analogue and numerical indication
- Indication by colour change
- Indication using tactile feedback

Indicating two or more values simultaneously

On the same of different screen

In co-ordinate form

Audible indication of measured values

- Measuring arrangements incorporating speech synthesizers
- Representing measurements using tones

Arrangements of instruments in vehicles or aircraft cockpits

References

Informative references

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

Instruments specially adapted for vehicles; Arrangement of instruments in or on vehicles	B60K 35/00
Aircraft cockpits in genera	B64C
General constructional details of displays	G12B 11/00

Special rules of classification

See also B60K 35/00.

See also G12B 11/00 and sub-groups.

G01D 9/00

Recording measured values

Definition statement

This place covers:

The recording of measured values

- Solid state data-loggers
- Recording measured values on a recording medium
- Recording measured values with respect to time
- Recording measured values with respect to another measured value

Further details of subgroups

G01D 9/005

- See also G06F 17/40, G01P 1/06 and A61B 5/335.

References

Informative references

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

Animal/veterinary data loggers	A01K 11/006
Medical data-loggers	A61B 5/335
Construction of data-loggers	G06F 17/40

G01D 11/00

Component parts of measuring arrangements not specially adapted for a specific variable (G01D 13/00, G01D 15/00 take precedence)

Definition statement

This place covers:

Constructional aspects of measuring arrangements

- Bearings, suspensions
- Balancing or damping movement
- Housings for instruments
- Housings for sensors
- Illumination of measuring devices
- Mountings for sensors or instruments

Further details of subgroups

G01D 11/00

Also includes details of rotary shaft couplings;

Check also G01D 5/34738.

G01D 11/20

See also G01D 5/34738.

G01D 11/24

See also G12B 9/02, H05K 5/00, H03K 17/9505.

G01D 11/245

Also includes details of sensor mountings;

G01D 11/26

Covers for utility meters, see H02B 1/03;

Flanged joints and sealings, see F16L 23/00.

G01D 11/28

See also G01D 13/265;

See also B60Q 3/10, F21V 7/00, G12B 11/02, and B60K 37/00;

G01D 11/30

Includes supports for sensor housings;

H03K 17/9505 constructional details of proximity switches;

F16M 11/00 or F16M 13/00 supports in general.

References

Limiting references

This place does not cover:

Component parts of indicators for measuring arrangements not specially adapted for a specific variable	G01D 13/00
Component parts of recorders for measuring arrangements not specially adapted for a specific variable	G01D 15/00

Informative references

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

Vehicle dashboards	B60K 37/00
Illumination of vehicle instruments	B60Q 3/10
Light sources in general	F21V 7/00
General constructional details	H05K, G12B

G01D 11/245

{Housings for sensors}

References

Informative references

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

Casings for radiation pyrometry	G01J 5/04
Supports or fastening devices for thermometers; Mounting thermometers	G01K 1/14

Housings for measuring steady or quasi-steady pressure of a fluent medium in general	G01L 19/14
Housings for measuring linear or angular speed, acceleration, deceleration or shock or for indicating presence, absence, or direction of movement	G01P 1/02
Housings, supporting members or arranging of terminals of instruments or arrangements for measuring electric or magnetic variables	G01R 1/04
Mounting transducers in devices for transmitting, conducting or directing sound in general or in devices for protecting against, or for damping, noise or other acoustic waves in general	G10K 11/004

G01D 13/00

Component parts of indicators for measuring arrangements not specially adapted for a specific variable

Definition statement

This place covers:

Component parts of measurement indicators

- Scales
- Dials
- Graduation
- Pointers
- Pointers adapted to transmit light

Further details of subgroups

G01D 13/28

Transparent pointers for conducting light are found in G01D 13/265;

See also G01D 11/28.

G01D 15/00

Component parts of recorders for measuring arrangements not specially adapted for a specific variable

Definition statement

This place covers:

Recording type

- Punching or deforming the recording medium
- Heating the recording medium
- Recording magnetically
- Recording optically
- Printing

Drives for bringing the recording element into contact with the recording medium

Holding devices for the recording medium

The shape of the recording medium

Circular

Cylindrical

Strip or tape

References

Informative references

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

Printing per se	B41J
Chemical composition of ink	C09D 11/00

G01D 15/34

Recording surfaces

References

Informative references

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

Printing or duplicating processes	B41M

G01D 18/00

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

Definition statement

This place covers:

Further details of subgroups

G01D 18/008

- Deals with how calibration data is created;
- Overlaps with G01D 3/022 (the use of stored calibration data to improve measurement accuracy).

G01D 21/00

Measuring or testing not otherwise provided for

Definition statement

This place covers:

Measuring or testing not specifically covered by other sub-groups

Measuring two or more variables simultaneously

i.e. pressure and temperature sensors in the same housing

Transmission of measured values

- Wirelessly
- Sensor networks
- Two-wire transmitters