G01R

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

Definition statement

This place covers:

Measuring electric variables or properties.

Measuring electric variables directly, e.g. electromechanical instruments (see Glossary of terms) where the measured electric variables directly effect the indication of the measured value.

Measuring electric variables by derivation from other electric variables, i.e. arrangements (see Glossary of terms) 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.

Measuring or investigating electric properties of materials.

Electric testing of analogue or digital electric devices, apparatus or networks, or measuring their characteristics.

Indicating presence or sign of current or voltage.

The following technical subjects are therefore covered, the list being non-exhaustive:

Measuring time integral of electric power or current (i.e. Energy), e.g. Of consumption

Displaying electric variables or waveforms

Measuring currents or voltages or for indicating presence or sign thereof

Measuring electric power or power factor

Measuring time integral of electric power or current, e.g. By electronic methods

Measuring frequencies (of electric signals); measuring and analysing frequency spectra (of electric signals)

Measuring phase angle between a voltage and a current or between voltages or currents

Measuring resistance, reactance, impedance, or electric characteristics derived therefrom

Testing electric properties of apparatus, e.g. Discharge tubes, amplifiers, transistors, integrated circuits

Locating electric faults

Electrical testing characterised by what is being tested not provided for elsewhere

Testing for digital signal parameters (delay, skew, signal level) and characterization of device performance by use of test patterns; test apparatus or integrated test circuits therefor; methods for test pattern generation

Details, testing or calibrating of G01R related instruments or arrangements

Measuring magnetic variables or properties

Measuring magnetic variables.

Measuring or investigating magnetic properties of materials.

The following technical subjects are therefore covered, the list being non-exhaustive:

Measuring direction or amount of magnetic fields, or measuring characteristics of magnetic materials

Apparatus based on magnetic resonance, e.g. Nmr, mri, epr (i.e. Esr) (see synonyms and keywords) and not specially adapted for a particular application

Details, testing or calibrating of related instruments or arrangements

Relationships with other classification places

Investigating electric variables or properties

This subclass covers measuring or investigating electric properties of materials, whereas measuring or investigating non-electric or non-magnetic properties of materials by the use of electric means or based on electrical variables is covered by e.g. group G01N 27/00.

Investigating magnetic variable or properties

This subclass also covers, under group G01R 33/00, measuring or investigating magnetic properties of materials, whereas measuring or investigating non-magnetic or non-electric properties of materials by the use of magnetic means is covered by group G01N 27/72.

In particular, group G01R 33/20 covers measuring magnetic variables/properties by using magnetic resonance, e.g. NMR, EPR or other spin effects, whereas investigating or analysing materials by using such spin effects is covered by group G01N 24/00.

References

Limiting references

This place does not cover:

Indicating correct tuning of resonant circuits	H03J 3/12

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Medical diagnosis by means of magnetic fields, e.g. involving ESR, NMR or MRI	A61B 5/05, A61B 5/055
Medical diagnosis by electric means, e.g. by measuring bioelectric currents or voltages, or the impedance of a part of the body	A61B 5/24, A61B 5/05, A61B 5/053
Monitoring electric consumption of electrically-propelled vehicles	B60L 3/00, B60L 58/00
Ascertaining earth's true or magnetic north for navigation or surveying purposes	G01C 17/00
Magnetic resonance gyrometers	G01C 19/60
Investigating or analysing materials by using NMR, EPR (i.e. ESR) or other spin effects	G01N 24/00
Investigating non-electric or non-magnetic properties of materials by the use of electric means	G01N 27/00
Investigating non-electric or non-magnetic properties of materials by the use of magnetic means	G01N 27/72
Electric prospecting or detecting	G01V 3/00

Measuring direction or magnitude of the magnetic earth's field; Magnetic prospecting or detecting, e.g. well logging involving NMR	G01V 3/00
Measuring atmospheric potential differences, e.g. due to electrical charges in clouds	G01W 1/16

References out of a residual place

Examples of places in relation to which this place is residual:

Electrical testing characterised by what is being tested not provided for elsewhere	G01R 31/00
Electric testing of control systems	G05B 23/02
Testing computers during standby operation or idle time	G06F 11/22
Testing of switches in structural association with the switches themselves	H01H
Testing discharge tubes during manufacture	H01J 9/42
Testing or measuring semiconductors or solid state devices during manufacture or treatment	H01L 22/00
Accumulators with integrated arrangements for testing condition	H01M 10/48
Testing of A/D or D/A conversion	H03M 1/10
Testing line transmission systems	H04B 3/46
Testing arrangements of data switching networks	H04L 41/06
Testing arrangements of telephone substation equipments	H04M 1/24
Testing of television systems or details thereof	H04N 17/00
Testing arrangements of loudspeakers, microphones or similar electromechanical transducers	H04R 29/00
Testing lamps structurally associated with light source circuit arrangements for detecting lamp failure	H05B 47/20

Informative references

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

Electrotherapy	A61N 1/00
Magnetotherapy	A61N 2/00
Measuring not specially adapted for a specific variable	G01D
Tariff metering apparatus	G01D 4/00
Measuring temperature based on the use of electric elements directly sensitive to heat	G01K 7/00
Measuring temperature based on the use of magnetic elements directly sensitive to heat	G01K 7/36
Measuring diffusion of ions in an electric field, e.g. electrophoresis, electro-osmosis	G01N
Systems for regulating electric variables	G05F 1/00 - G05F 5/00
Systems for regulating magnetic variables	G05F 7/00
Image data processing or generation	G06T
Monitoring of signal or alarm line circuits, e.g. signalling of line faults	G08B 29/06

Superconducting magnets	H01F 6/00
Magnets	H01F 7/00
Electric switches; Emergency protective devices	H01H
Cathode-ray tubes	H01J 31/00
Aerials	H01Q
Emergency protective circuit arrangements	H02H
Circuit arrangements for charging, or depolarising batteries or for supplying loads from batteries	H02J 7/00
Methods or apparatus specially adapted for manufacturing, assembling, maintaining or repairing dynamo-electric machines	H02K 15/00
Generation of oscillations	H03B
Modulation	H03C
Frequency discriminators; Phase discriminators	H03D
Amplifiers	H03F
Impedance networks, e.g. resonant circuits; Resonators	H03H
Tuning resonant circuits; Selecting resonant circuits	H03J
Pulse technique	H03K
Monitoring electronic pulse counters	H03K 21/40
A/D or D/A conversion	H03M 1/00
Monitoring operation of communication systems	H04
Housings for electric apparatus	H05K
Screening of electric apparatus or components against electric fields	H05K 9/00
Screening of electric apparatus or components against magnetic fields	H05K 9/00
Arrangements for monitoring manufacture of assemblages of electric components	H05K 13/08
Thermo-electric solid state devices	H10N 10/00 , H10N 15/00
Thermo-magnetic solid state devices	H10N 10/00, H10N 15/00
Devices using galvano-magnetic or similar magnetic effects, e.g. Hall effect	H10N 50/00

Special rules of classification

General remark: G01R (electric part) is a big subclass with many low level subgroups. When classifying at group or subgroup level, care should be taken to see to it that the document(s) really concern the measuring of an electric variable and that all higher level (subclass, group, subgroup) definitions are met with.

The scheme was created at a time when electromechanical instruments were common. The groups closely linked to such instruments are rarely used for classifying measuring or testing devices that fall under G01R.

Glossary of terms

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

Measuring properties	can also be interpreted as investigating properties. Remark: Measuring "properties" is rarely a subject for patenting in G01R.

Instruments or measuring instruments	means electro-mechanical measuring mechanisms Remark: This rule is of little relevance, as electromechanical devices are basically obsolete.
DUT	Device Under Test
Arrangements for measuring	means apparatus, circuits, or methods for measuring

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

EPR	Electron paramagnetic resonance
ESR	Electron spin resonance
NMR	Nuclear magnetic resonance
MRI	Magnetic resonance imaging
MRS	Magnetic resonance spectroscopy
NQR	Nuclear quadrupole resonance

G01R 1/02

General constructional details

Definition statement

This place covers:

Structural, tangible details of devices.

References

Informative references

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

Details of a kind applicable to measuring arrangements not specially adapted for a specific variable	G01D 7/00
Constructional details common to different types of electric apparatus	H05K 7/00

G01R 1/04

Housings; Supporting members; Arrangements of terminals

Relationships with other classification places

Details concerning arrangements of terminals for the testing of circuits, which do not fit into the definitions of G01R 1/04 and dependent subgroups, are classified in G01R 31/2886. Examples: Contacting devices or procedures without clear mechanical or geometrical features (as defined in the subgroups of G01R 1/04).

References

Informative references

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

External aspects, e.g. related to chambers, contacting devices or handlers	G01R 31/286
Terminals	H01R
Terminal strips or boards	H02B
Housings for electrical apparatus	H05K

G01R 1/0425

{Test clips, e.g. for IC's}

Definition statement

This place covers:

Test clips, which are contacting devices that clip onto the integrated circuit to be tested.

G01R 1/06

Measuring leads; Measuring probes (G01R 19/145, G01R 19/165 take precedence)

References

Limiting references

This place does not cover:

Indicating the presence of current or voltage	G01R 19/145
Indicating that current or voltage is either above or below a predetermined value or within or outside a predetermined range of values	G01R 19/165

Informative references

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

End pieces for leads	H01R 11/00

G01R 1/067

Measuring probes

Definition statement

This place covers:

Probes for connecting to electric devices for measuring or testing purposes.

Relationships with other classification places

Connecting devices or methods for the testing of electrical circuits which do not fit into G01R 1/067 or a subgroup of G01R 1/067 are classified in G01R 31/2886.

Sockets, and details of sockets such as contacts, for receiving integrated circuits for testing are classified in G01R 1/0433.

References

Informative references

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

Plugs, sockets or clips	G01R 1/0408
Contacting IC's for test purposes when probe design is not the essential feature	G01R 31/2886
Using radiation beam as probe	G01R 31/302
Testing of connections	G01R 31/66
End pieces for wires terminating in a probe	H01R 11/18

G01R 1/06711

{Probe needles; Cantilever beams; "Bump" contacts; Replaceable probe pins}

Definition statement

This place covers:

Constructional details of individual probe elements or tips.

References

Limiting references

This place does not cover:

Contact pieces of test sockets	G01R 1/0466

Informative references

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

End pieces terminating in a probe	H01R 11/18

G01R 1/06744

{Microprobes, i.e. having dimensions as IC details}

Definition statement

This place covers:

Geometric details where the dimensions are of microscopic dimensions, corresponding to features of integrated elements.

G01R 1/06755

{Material aspects}

Definition statement

This place covers:

Details related to the material as such (alloy, heat treatment, surface deposit...)

G01R 1/06766

{Input circuits therefor}

Definition statement

This place covers:

Circuits being part of or closely linked to a probe, such as amplifiers, filters or power supplies integrated in a probe.

G01R 1/06772

{High frequency probes}

Definition statement

This place covers:

Probes adapted for the measuring of high frequencies, for example by having low inductance leads, low loss or linear frequency properties.

G01R 1/06777

{High voltage probes}

Definition statement

This place covers:

Probes specially adapted for measuring high voltages.

G01R 1/07

Non contact-making probes

References

Informative references

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

Wireless interface with the DUT	G01R 31/3025

G01R 1/073

Multiple probes

Definition statement

This place covers:

Probes having multiple contacting points

G01R 1/0735

{arranged on a flexible frame or film}

Definition statement

This place covers:

Probes mounted on a flexible membrane, such as so called "membrane probes".

G01R 1/07357

{with flexible bodies, e.g. buckling beams}

Definition statement

This place covers:

Probes having long needles, which flex when pressed against the DUT.

References

Limiting references

This place does not cover:

Probes with spring loaded pogo pins	G01R 1/07314

Glossary of terms

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

DUT	Device under test

G01R 1/07364

{with provisions for altering position, number or connection of probe tips; Adapting to differences in pitch}

Definition statement

This place covers:

Features related to geometrical adaption between probe tips and probe output, e.g. using an adapter board.

G01R 1/07392

{manipulating each probe element or tip individually}

Definition statement

This place covers:

Manipulation of one or more individual probe elements, e.g. the tip part.

References

Informative references

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

Manipulating a single (i.e. single contact) probe.	G01R 1/06705
Manipulating a complete "multi probe"	G01R 31/2886

G01R 1/10

Arrangements of bearings

References

Informative references

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

Bearings in general	F16C

G01R 1/18

Screening arrangements against electric or magnetic fields, e.g. against earth's field

References

Informative references

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

Screening of electrical apparatus or components in general	H05K 9/00
Measuring shielding efficiency	H05K 9/0069

G01R 1/20

Modifications of basic electric elements for use in electric measuring instruments; Structural combinations of such elements with such instruments

References

Informative references

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

Instrument transformers per se	H01F 38/20

G01R 1/22

Tong testers acting as secondary windings of current transformers

References

Informative references

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

Voltage or current isolation using transformers	G01R 15/18

G01R 1/38

Arrangements for altering the indicating characteristic, e.g. by modifying the air gap

References

Informative references

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

Circuits	G01R 15/005

G01R 1/44

Modifications of instruments for temperature compensation

References

Informative references

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

When measuring current or voltage	G01R 19/32

G01R 5/00

Instruments for converting a single current or a single voltage into a mechanical displacement

Definition statement

This place covers:

Instruments classified in this group may be used as indicating instruments for electric or non-electric variables.

References

Informative references

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

Vibration galvanometers	G01R 9/02

G01R 5/22

Thermoelectric instruments

References

Informative references

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

Measuring effective values of currents or voltages using thermoconverters	G01R 19/03

G01R 5/28

Electrostatic instruments

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Combined with radiation detector	G01T

Informative references

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

Electrometers without passively moving electrodes	G01R 15/165
Measuring electrostatic fields	G01R 29/12
Measuring charge	G01R 29/24

G01R 7/00

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

Definition statement

This place covers:

Instruments classified in this group may be used as indicating instruments for electric or non-electric variables.

References

Limiting references

This place does not cover:

Instruments employing mechanical resonance	G01R 9/00

G01R 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)

Definition statement

This place covers:

Electromechanical arrangements for measuring time integral of electric power or current such as conventional electromechanical electricity meters, i.e. comprising a rotating disk.

References

Limiting references

This place does not cover:

Monitoring electric consumption of electrically-propelled vehicles	B60L 3/00

Informative references

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

Electronic power meters are classified	G01R 21/133
Other arrangements for measuring time integral of electric power or current	G01R 22/00
Electronic electricity (energy) meters	G01R 22/06
Monitoring or controlling batteries or fuel cells	B60L 58/00
Tariff metering apparatus, e.g. for measuring gas or water consumption but also for general metering where the type of consumption is not of interest; utility meters	G01D 4/00
Remote reading of utility meters	G01D 4/002
Boards, panels, desks (and parts or accessories therefor) for energy meters	H02B 1/03

G01R 11/02

Constructional details

Definition statement

This place covers:

Unless one of the subgroups apply, add-ons, such as electronic counters or optical ports, are seen as "constructional details".

References

Informative references

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

Applicable to electric measuring instruments in general	G01R 1/00

G01R 11/04

Housings; Supporting racks; Arrangements of terminals

Definition statement

This place covers:

Housings for electromechanical electricity meters. "Supporting racks" are the internal supports for holding the Ferraris wheels, decade counters, transformers and other internal components of the electromechanical electricity meters. See e.g. US4791362, CH158284.

Relationships with other classification places

Housings which are used only for electronic meters are classified in G01R 22/065.

Supporting, cabinets comprising installation places for electricity meters but also other installation places e.g. for circuit breakers are classified in H02B 1/03.

References

Limiting references

This place does not cover:

Boards, panels, parts, accessories for energy meters	H02B 1/03
Casings, cabinets or drawers for electric apparatus	H05K 5/00

G01R 11/12

Arrangements of bearings

References

Informative references

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

Bearings in general	F16C

G01R 11/24

Arrangements for avoiding or indicating fraudulent use

Relationships with other classification places

If the arrangement for avoiding or indicating fraudulent use is related to electronic electricity meters the document should be classified in the corresponding subgroups of G01R 22/066 .

References

Informative references

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

Measures against unauthorised operation of bolts, nuts or pins	F16B 41/005
Preventing of tampering with detection circuits in signaling or alarm circuits	G08B 29/046
Security seals	G09F 3/03

G01R 11/25

Arrangements for indicating or signalling faults

Relationships with other classification places

If the arrangement for indicating or signalling faults is related to electronic electricity meters the document should be classified in the corresponding subgroups of G01R 22/068 .

References

Informative references

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

Preventing tampering with detection circuits in signalling or alarm circuits	G08B 29/046
Seals	G09F 3/03

G01R 11/36

Induction meters, e.g. Ferraris meters

References

Informative references

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

Ferraris instruments	G01R 5/20

G01R 11/56

Special tariff meters

References

Informative references

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

Tariff metering in general	G01D 4/00

G01R 11/57

Multi-rate meters (G01R 11/63 takes precedence)

References

Limiting references

This place does not cover:

Over-consumption meters, e.g. measuring consumption while a predetermined level of power is exceeded	G01R 11/63

G01R 13/00

Arrangements for displaying electric variables or waveforms

Definition statement

This place covers:

Oscilloscopes and the like for measuring and displaying waveforms.

Relationships with other classification places

If the document is directed to aspects of measuring of current or voltage (e.g. A/D conversion, signal conditioning) the classes G01R 19/2506 and lower take preference.

Modular arrangements for computer based systems (e.g. virtual systems) are classified in G01R 19/2516 (when the document is related to the measuring part).

Display by mechanical displacement only is classified in G01R 5/00, G01R 7/00, G01R 9/00.

Recording frequency spectrum is classified in G01R 23/18

References

Informative references

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

Display by mechanical displacement only	G01R 5/00, G01R 7/00, G01R 9/00
Frequency spectrum	G01R 23/18
Recognising patterns in signals	G06F 2218/00
Control arrangements or circuits for visual indicators common to CRT indicators and other visual indicators	G09G 5/00

G01R 13/02

for displaying measured electric variables in digital form

Definition statement

This place covers:

All digital oscilloscopes.

Relationships with other classification places

Older type cathode-ray oscilloscopes using digital processors and intermediate A.D. and D.A. converters are classified in G01R 13/345.

If the emphasis is set on the current or voltage measuring part, e.g. signal conditioning, details concerning sampling, digitizing G01R 19/2506 and lower, as well as G01R 19/252, G01R 19/255 and G01R 19/257 take preference.

Modular arrangements for computer based systems are classified in G01R 19/2516.

When the type of the display is of importance, e.g. LCD display G01R 13/403 is used.

References

Informative references

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

Cathode-ray oscilloscopes with intermediate digital signal processing	G01R 13/345
LCD display of oscilloscopes	G01R 13/403
Two or three dimensional representation of values	G01R 13/408
General arrangements for monitoring or analysing measured signals, using A.D. converters measuring current or voltage using digital measurement techniques	G01R 19/25
Modular arrangements for computer based systems for measuringcurrent or voltage	G01R 19/2516
Data acquisition and logging in general	G06F 17/40
Counters	G06M
Analogue/digital conversion in general	H03M 1/00

G01R 13/0209

{in numerical form}

Definition statement

This place covers:

Systems for displaying a waveform by a table or the like with numerical values. Other characterising values, even single values, of waveforms are also covered here.

Relationships with other classification places

Displaying charts of waveforms are classified in G01R 13/0218 and lower and in G01R 13/029 or in the parent class G01R 13/02.

G01R 13/0254

{for triggering, synchronisation}

References

Limiting references

This place does not cover:

Detection of starting points in a waveform, when the waveform is not displayed	G01N 29/00
Ultrasonic measurements for analysing materials	G01S 13/00
Determination of distance by electromagnetic or acoustic wave reflection	G01S 15/00

G01R 13/0272

{for sampling}

Definition statement

This place covers:

Details of sampling circuits when they are used only in digital oscilloscopes.

Relationships with other classification places

More general details of sampling are classified in G01R 19/2506 and lower. These classes can in cases of interest also be given in parallel.

References

Limiting references

This place does not cover:

Details of sampling and waveform capturing which are not part of digital oscilloscopes	G01R 19/2506, G01R 19/2509, G01R 19/252, G01R 19/255, G01R 19/257
A.D. converters	H03M 1/00

G01R 13/029

{Software therefor}

Definition statement

This place covers:

Software used in digital oscilloscopes and the like.

References

Limiting references

This place does not cover:

Detection of starting points in a waveform, when the waveform is not displayed	G01N 29/00
Ultrasonic measurements for analysing materials	G01S 13/00
Determination of distance by electromagnetic or acoustic wave reflection	G01S 15/00

Special rules of classification

If the software calculates a trigger event an additional class is given in G01R 13/0254 (although the title thereof relates to circuits). Similarly the other groups of G01R 13/0218 are given in parallel to G01R 13/029.

G01R 13/20

Cathode-ray oscilloscopes

Definition statement

This place covers:

Analogue oscilloscopes with cathode-ray screens or oscilloscopes which have an intermediate digital part but which use a traditional cathode-ray screen.

Relationships with other classification places

Digital oscilloscopes are classified in G01R 13/02 and lower. If the type of display is of interest, G01R 13/40 and lower is used, e.g. G01R 13/403 for liquid crystal displays (LCD).

References

Informative references

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

Digital oscilloscopes	G01R 13/02
LCD displays of oscilloscopes	G01R 13/403
Control arrangements or circuits for cathode-ray tube indicators	G09G 1/00
Cathode ray tubes	H01J 31/00

G01R 13/202

{Non-electric appliances, e.g. scales, masks (luminescent screens for CRT provided with permanent marks or references H01J 29/34; optical or photographic arrangements combined with CRT vessels H01J 29/89)}

References

Limiting references

This place does not cover:

Luminescent screens for CRT provided with permanent marks or references	H01J 29/34
Optical or photographic arrangements combined with CRT vessels	H01J 29/89

G01R 13/204

{Using means for generating permanent registrations, e.g. photographs (optical or photographic arrangements combined with CRT vessel H01J 29/89)}

References

Limiting references

This place does not cover:

Optical or photographic arrangements combined with CRT vessel	H01J 29/89

G01R 13/206

{Arrangements for obtaining a 3- dimensional representation (stereoscopic T.V. H04N 13/00)}

References

Limiting references

This place does not cover:

Two or three dimensional representation of measured values in general	G01R 13/408
Stereoscopic T.V.	H04N 13/00

G01R 13/22

Circuits therefor

References

Informative references

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

Circuits for generating pulses, e.g. saw-tooth waveforms	H03K 3/00

G01R 13/225

{particularly adapted for storage oscilloscopes}

Definition statement

This place covers:

Circuits of analogue storage oscilloscopes.

References

Limiting references

This place does not cover:

Brilliance control in general	H01J 29/98

G01R 13/26

Circuits for controlling the intensity of the electron beam {or the colour of the display}

References

Informative references

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

Brilliance control	H01J 29/98

G01R 13/28

Circuits for simultaneous or sequential presentation of more than one variable

References

Informative references

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

Electronic switches	H03K 17/00

G01R 13/34

Circuits for representing a single waveform by sampling, e.g. for very high frequencies

References

Informative references

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

Sample and hold arrangements in general	G11C 27/02

G01R 13/342

{for displaying periodic H.F. signals (G01R 13/345 takes precedence)}

References

Limiting references

This place does not cover:

For displaying sampled signals by using digital processors by intermediate A.D. and D.A. convertors	G01R 13/345

G01R 13/345

{for displaying sampled signals by using digital processors by intermediate A.D. and D.A. convertors (control circuits for CRT indicators)}

Definition statement

This place covers:

Cathode-ray oscilloscopes whereby the intermediary signal processing is performed by a digital processor but the resulting waveform is converted back to an analogue signal to be displayed on the cathode-ray screen.

References

Limiting references

This place does not cover:

Digital oscilloscopes	G01R 13/02

G01R 13/347

{using electro-optic elements}

References

Limiting references

This place does not cover:

Discharge tubes in general	H01J 11/00 - H01J 17/00

G01R 13/36

using length of glow discharge, e.g. glowlight oscilloscopes

References

Informative references

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

Discharge tubes	H01J

G01R 13/38

using the steady or oscillatory displacement of a light beam by an electromechanical measuring system

References

Informative references

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

Measuring systems per se	G01R 5/00, G01R 7/00, G01R 9/00

G01R 13/40

using modulation of a light beam otherwise than by mechanical displacement, e.g. by Kerr effect {(visual indication of correct tuning H03J 3/14)}

Definition statement

This place covers:

Documents where the type of the display of the oscilloscope is of interest.

Relationships with other classification places

Cathode ray oscilloscopes are classified in G01R 13/20 and lower. Digital oscilloscopes wherein the type of display is not of importance are classified in G01R 13/02 and lower.

References

Limiting references

This place does not cover:

Visual indication of correct tuning	H03J 3/14

G01R 13/402

{using active, i.e. light-emitting display devices, e.g. electroluminescent display (G01R 13/36 and G01R 13/42 take precedence)}

References

Limiting references

This place does not cover:

Instruments using length of spark discharge e.g. by measuring maximum separation of electrodes to produce spark	G01R 13/42

G01R 13/403

{using passive display devices, e.g. liquid crystal display or Kerr effect display devices}

Definition statement

This place covers:

Documents where the type of the display of the oscilloscope is of interest.

Relationships with other classification places

Cathode ray oscilloscopes are classified in G01R 13/20 and lower. Digital oscilloscopes wherein the type of display is not of importance are classified in G01R 13/02 and lower.

G01R 13/404

{for discontinuous display, i.e. display of discrete values (analogue/digital conversion H03M 1/00)}

References

Informative references

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

Analogue/digital conversion	H03M 1/00

G01R 13/406

{representing measured value by a dot or a single line (G01R 13/408 takes precedence)}

References

Limiting references

This place does not cover:

Two or three dimensional representation of measured values	G01R 13/408

G01R 13/407

{using a plurality of passive display elements, e.g. liquid crystal or Kerr-effect display elements (G01R 13/408 takes precedence)}

References

Limiting references

This place does not cover:

Two or three dimensional representation of measured values	G01R 13/408

G01R 15/00

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

References

Informative references

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

Details of instruments	G01R 1/00
Overload protection arrangements	G01R 1/36

G01R 15/005

{Circuits for altering the indicating characteristic, e.g. making it non-linear}

References

Informative references

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

Altering a transfer function when measuring not specially adapted for a specific (e.g. electric) variable	G01D 3/02

G01R 15/06

having reactive components, e.g. capacitive transformer

References

Informative references

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

When the HV capacitor/sensor as such is the essential	G01R 15/16

G01R 15/08

Circuits for altering the measuring range

References

Informative references

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

Range change when measuring not specially adapted for a specific (e.g. electric) variable	G01D 3/024

G01R 15/14

Adaptations providing voltage or current isolation, e.g. for high-voltage or high-current networks

References

Informative references

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

Voltage dividers	G01R 15/04
Means for converting the output of a sensing member to another variable	G01D 5/00
Visible signalling arrangements or devices	G08B 5/00
Transmission systems for measured values	G08C 17/00, G08C 23/00
Instrument transformers	H01F 38/20

G01R 15/16

using capacitive devices

Definition statement

This place covers:

Measuring of voltage or through capacitive coupling with the conductor to be measured.

References

Informative references

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

Circuits constituting a voltage divider	G01R 15/06
Measuring an electric field as such	G01R 29/08

G01R 15/18

using inductive devices, e.g. transformers

Definition statement

This place covers:

Measuring current or voltage using coils or transformers (having interacting windings; the primary winding can be made up by a straight conductor surrounded by the secondary).

References

Limiting references

This place does not cover:

Measuring a current via the magnetic field, using a coil as sensor	G01R 15/148

Informative references

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

Transformers and inductances as such	H01F

G01R 15/20

using galvano-magnetic devices, e.g. Hall-effect devices {, i.e. measuring a magnetic field via the interaction between a current and a magnetic field, e.g. magneto resistive or Hall effect devices}

References

Informative references

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

Measuring magnetic fields as such, using galvano-magnetic devices	G01R 33/06

Glossary of terms

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

Galvano magnetic device	Having an interaction between a current and a magnetic field in the device itself

G01R 15/202

{using Hall-effect devices (Hall elements in arrangements for measuring electrical power G01R 21/08)}

References

Informative references

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

Hall effect devices as such	H10N 52/00

G01R 15/241

{using electro-optical modulators, e.g. electro-absorption (probes containing electro-optic elements G01R 1/071)}

References

Informative references

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

Measuring an electric field as such, using electro-optical modulation	G01R 29/0885

G01R 17/10

AC or DC measuring bridges

References

Informative references

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

Automatic comparison or rebalancing arrangements	G01R 17/02

G01R 17/20

AC or DC potentiometric measuring arrangements

References

Informative references

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

Automatic comparison or re-balancing arrangements	G01R 17/02

G01R 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 5/24)

References

Limiting references

This place does not cover:

Instruments for converting a single current or a single voltage into a mechanical displacement	G01R 5/00
For measuring bioelectric currents or voltages	A61B 5/24

Informative references

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

Voltage measurements using secondary electron emission when testing electronic circuits	G01R 31/305

G01R 19/003

{Measuring mean values of current or voltage during a given time interval}

References

Informative references

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

When not specially adapted for a specific variable	G01D 1/02

G01R 19/0038

{Circuits for comparing several input signals and for indicating the result of this comparison, e.g. equal, different, greater, smaller (comparing pulses or pulse trains according to amplitude)}

References

Informative references

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

Logic circuits characterised by logic function	H03K 19/20

G01R 19/02

Measuring effective values, i.e. root-mean-square values

References

Informative references

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

Measuring RMS values when not specially adapted for a current or voltage measurement	G01D 1/02
Analogue computers for evaluating mean square values.	**G07G7/20**

G01R 19/03

using thermoconverters

References

Informative references

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

Using ac-dc conversion by means of thermocouples or other heat sensitive elements	G01R 19/225

G01R 19/04

Measuring peak values {or amplitude or envelope} of ac or of pulses

Definition statement

This place covers:

Measuring of amplitude of periodic voltage or current is also covered.

References

Informative references

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

Peak detectors for pulses.	H03K 5/1532

G01R 19/12

Measuring rate of change

References

Informative references

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

Emergency protective circuit arrangements responsive to the rate of change of electrical quantities	H02H 3/44

G01R 19/145

Indicating the presence of current or voltage

References

Informative references

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

Measuring probes in general	G01R 1/06
Indicating continuity or short circuits in electric apparatus or lines or components	G01R 31/50

G01R 19/165

Indicating that current or voltage is either above or below a predetermined value or within or outside a predetermined range of values

Definition statement

This place covers:

Threshold detectors as such, when seen as a measurement circuit (for current or voltage).

References

Informative references

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

Circuits with regenerative action, e.g. Schmitt trigger	H03K 3/00
Transition or edge detectors for pulses	H03K 5/1534
Threshold switches	H03K 17/00

G01R 19/175

Indicating the instants of passage of current or voltage through a given value, e.g. passage through zero

References

Informative references

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

Zero-crossing detectors for pulses	H03K 5/1536

G01R 19/18

using conversion of DC into AC, e.g. with choppers

References

Informative references

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

DC amplifiers with modulators at input and demodulator at output	H03F 3/38

G01R 19/20

using transductors {, i.e. a magnetic core transducer the saturation of which is cyclically reversed by an AC source on the secondary side}

References

Informative references

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

Other DC current transducers, e.g. using the 0-flux principle	G01R 15/185
Magnetic amplifiers	H03F 9/00

G01R 19/25

using digital measurement techniques

References

Informative references

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

Arrangements for displaying measured electric variables in digital form	G01R 13/02
Analogue/digital conversion	H03M

G01R 19/252

using analogue/digital converters of the type with conversion of voltage or current into frequency and measuring of this frequency

References

Informative references

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

Analog to digital converters as such	H03M 1/12

G01R 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

References

Informative references

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

Analogue to digital converters as such	H03M 1/12

G01R 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

References

Informative references

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

Analogue to digital converters as such	H03M 1/12

G01R 19/28

adapted for measuring in circuits having distributed constants

Definition statement

This place covers:

Adaptations where the measured signals have wavelengths in the order of magnitude of the circuits present, i.e. high frequencies (theoretically, signals on very long conductors are also covered, but such applications are unusual).

References

Informative references

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

Testing of microwave or radiofrequency circuits	G01R 31/2822

G01R 19/30

Measuring the maximum or the minimum value of current or voltage reached in a time interval (G01R 19/04 takes precedence)

References

Limiting references

This place does not cover:

Measuring peak values	G01R 19/04

Informative references

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

Modifications of instruments to indicate the maximum or the minimum value reached in a time interval	G01R 1/40
Using digital methods	G01R 19/2506

G01R 19/32

Compensating for temperature change

References

Informative references

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

Modifications of instruments for temperature compensation	G01R 1/44

G01R 21/00

Arrangements for measuring electric power or power factor (G01R 7/12 takes precedence)

Definition statement

This place covers:

Analogue and digital measurements of power or power factor.

Also measurements of power for high frequency signals.

This group covers additionally the measurement of power when it is an essential aspect of a measurement of electric energy (time integral of power).

Relationships with other classification places

Electronic measurements of energy (time integral of power) is classified in G01R 22/06 when the power measurement therein is not the essential part.

References

Limiting references

This place does not cover:

Arrangements for monitoring electric power systems	G01R 19/2513
Arrangements for AC mains network controlling	H02J 3/00
Arrangements for providing remote indication of network conditions	H02J 13/00

G01R 21/001

{Measuring real or reactive component; Measuring apparent energy (G01R 21/01, G01R 21/02, G01R 21/08, G01R 21/10 and G01R 21/127 take precedence)}

References

Limiting references

This place does not cover:

In circuits having distributed constants	G01R 21/01
By thermal methods	G01R 21/02
By using galvanomagnetic effect devices	G01R 21/08
By using square-law characteristics of circuit elements	G01R 21/10
By using pulse modulation	G01R 21/127
Measurements of real or reactive component or of apparent energy measured by digital technique	G01R 21/1331

G01R 21/002

{Measuring real component}

References

Limiting references

This place does not cover:

Measurements of real component measured by digital technique	G01R 21/1331

G01R 21/003

{Measuring reactive component}

References

Limiting references

This place does not cover:

Measurements of reactive component measured by digital technique	G01R 21/1331

G01R 21/005

{Measuring apparent power}

References

Limiting references

This place does not cover:

Measurements of apparent energy measured by digital technique	G01R 21/1331

G01R 21/007

{Adapted for special tariff measuring (G01R 21/01, G01R 21/02, G01R 21/08, G01R 21/10, G01R 21/1278 and G01R 21/1333 take precedence)}

References

Limiting references

This place does not cover:

In circuits having distributed constants	G01R 21/01
By thermal methods	G01R 21/02
By using galvanomagnetic effect devices	G01R 21/08
By using square-law characteristics of circuit elements	G01R 21/10
By using pulse modulation	G01R 21/127
Digital meters adapted for special tariff measuring	G01R 21/1333

G01R 21/008

{Measuring maximum demand}

Definition statement

This place covers:

maximum load or demand monitors.

G01R 21/01

in circuits having distributed constants (G01R 21/04, G01R 21/07, G01R 21/09, G01R 21/12 take precedence)

Definition statement

This place covers:

Power measurements whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

References

Limiting references

This place does not cover:

Arrangements for monitoring electric power systems, logging	G01R 19/2513
By thermal methods	G01R 21/04
By measuring current and voltage	G01R 21/07
By using galvanomagnetic effect devices	G01R 21/09
By using square-law characteristics of circuit elements	G01R 21/12
Arrangements for providing remote indication of network conditions	H02J 13/00

G01R 21/02

by thermal methods {, e.g. calorimetric}

Definition statement

This place covers:

Power measurements by thermal methods for high frequency signals.

G01R 21/04

in circuits having distributed constants

Definition statement

This place covers:

Power measurements by thermal methods whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

G01R 21/06

by measuring current and voltage (G01R 21/08 - G01R 21/133 take precedence)

References

Limiting references

This place does not cover:

By using: galvanomagnetic effect devices; square-law characteristics of circuit elements; pulse modulation; digital techniques	G01R 21/08 - G01R 21/133

G01R 21/07

in circuits having distributed constants (G01R 21/09 takes precedence)

Definition statement

This place covers:

Power measurements by using voltage and current measurements whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

References

Limiting references

This place does not cover:

By using galvanomagnetic effect devices, in circuits having distributed constants	G01R 21/09

G01R 21/08

by using galvanomagnetic-effect devices, e.g. Hall-effect devices

References

Informative references

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

Galvano-magnetic effect devices, e.g. Hall effect devices, for current measurements only	G01R 15/20
Such devices per se	H01L
Hall effect devices per se	H10N 52/00, G01R 33/07

G01R 21/09

in circuits having distributed constants

Definition statement

This place covers:

Power measurements by using galvano-magnetic effect devices whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

G01R 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)

Definition statement

This place covers:

Power measurement for high frequency signals which use such square-law characteristics of circuit elements.

References

Limiting references

This place does not cover:

By thermal methods	G01R 21/02

G01R 21/12

in circuits having distributed constants

Definition statement

This place covers:

Power measurements by using square-law characteristics of circuit elements whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

G01R 21/127

by using pulse modulation (G01R 21/133 takes precedence)

References

Limiting references

This place does not cover:

By using digital tecnhique	G01R 21/133

Informative references

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

Digital multiplication via delta sigma modulation	G06F 7/60

G01R 21/133

by using digital technique

Definition statement

This place covers:

Power meters using a digital processor.

Additionally measurements of power in meters for electric energy (time integral of power) when the measurement of power is the essential aspect.

Relationships with other classification places

Digital energy meters (time integral of power) are classified in G01R 22/10 when the power measuring part thereof is not of main importance. However if the power measuring aspect in such digital energy meters is of main interest then it is classified here in G01R 21/133 and lower.

Digital measurements of voltages or currents in electric power systems are classified in G01R 19/2513, e.g. for monitoring the quality of the power signal.

References

Limiting references

This place does not cover:

Electromechanical arrangements for measuring time integral of power or current	G01R 11/00
Arrangements for monitoring electric power systems by using digital measurement techniques	G01R 19/2513

Electronic energy meters	G01R 22/06
Digital energy meters	G01R 22/10
Monitoring electric consumption of electrically-propelled vehicles	B60L 3/00, B60L 58/00
Coin-freed apparatus with meter-controlled dispensing of electricity	G07F 15/003
Arrangements for AC mains network controlling	H02J 3/00
Arrangements for providing remote indication of network conditions	H02J 13/00

G01R 21/1338

{Measuring maximum demand}

Definition statement

This place covers:

Maximum load or maximum demand power meters.

G01R 22/00

Arrangements for measuring time integral of electric power or current, e.g. electricity meters

Definition statement

This place covers:

Methods other than electromechanical for measuring time integral of electric power.

Relationships with other classification places

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.

References

Informative references

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

Electromechanical arrangements for measuring time integral of power or current	G01R 11/00
Arrangements for measuring electric power	G01R 21/00
Monitoring electric consumption of electrically-propelled vehicles	B60L 3/00, B60L 58/00
Coin freed devices	G07F 15/00
Arrangements for AC mains network controlling	H02J 3/00
Arrangements for providing remote indication of network conditions	H02J 13/00

G01R 22/06

by electronic methods

Definition statement

This place covers:

Electronic methods for measuring time integral of power, whereby analogue or digital techniques can be used.

G01R 22/063

{related to remote communication}

Definition statement

This place covers:

Aspects of electricity meters for remote reading in the sense that the meter has special adaptations which go beyond standard communication systems.

Relationships with other classification places

Managing power networks by using distributed power monitors and using standard communication protocols is classified in H02J 13/00.

If the communication protocol as such is of interest the document is classified in H04B 1/00.

References

Limiting references

This place does not cover:

Remote reading of utility meters	G01D 4/002, G01D 4/008
Telemetrie	G08C 19/00
Circuit arrangements for providing remote indication of network conditions	H02J 13/00
Data transmission systems	H04B 1/00

G01R 22/065

{related to mechanical aspects}

Definition statement

This place covers:

Housings specially adapted (or used only) for electronic electricity meters.

This group also covers adaptations to the housing of an electronic electricity meter in order to add a certain functionality and whereby mechanical aspects of this adaptation are of importance.

References

Limiting references

This place does not cover:

Cabinets which also can be used for electricity meters Distribution boards or subassemblies, which may comprise installation places for electricity meters but which also have installation places for other units such as circuit breakers etc.	H02B 1/03
Casings, cabinets or drawers for electric apparatus	H05K 5/00

G01R 22/066

{Arrangements for avoiding or indicating fraudulent use}

References

Limiting references

This place does not cover:

Arrangements for avoiding or indication of fraudulent use in electromechanical electricity meters	G01R 11/24
Security arrangements for protecting computers against unauthorized activity	G06F 21/00

G01R 22/08

using analogue techniques

Definition statement

This place covers:

Electricity meters which are based on an analogue electronic circuit.

References

Limiting references

This place does not cover:

Electromechanical electricity meters	G01R 11/00

G01R 22/10

using digital techniques

Definition statement

This place covers:

Digital arrangements for measuring time integral of electric power, such as electricity meters, whereby the digital processing is of importance.

Relationships with other classification places

Details relating to measuring of electric power are classified in G01R 21/133.

Digital measurements of voltages or currents in electric power systems are classified in G01R 19/2513, e.g. for monitoring the quality of the power signal.

G01R 23/00

Arrangements for measuring frequencies; Arrangements for analysing frequency spectra

Definition statement

This place covers:

Arrangements for measuring frequencies of electrical signals as such.

arrangements for analysing frequency spectra of electric signals if the analysis thereof comprises aspects of the determination of frequency components.

Relationships with other classification places

The mere use of known frequency measurement or analysis methods or devices is classified in the appropriate application class, such as G01N 27/00 or G01N 22/00.

References

Informative references

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

High frequency probes	G01R 1/06772
Investigating materials by use of microwaves	G01N 22/00
Investigating materials by use of electric or magnetic means	G01N 27/00
Arrangements for providing remote indication of network conditions	H02J 13/00
Frequency discriminators	H03D 1/00
Demodulation of frequency modulated signals	H03D 3/00
Receivers for broadcast information	H04H 40/18

G01R 23/005

{Circuits for comparing several input signals and for indicating the result of this comparison, e.g. equal, different, greater, smaller (comparing phase or frequency of 2 mutually independent oscillations in demodulators)}

References

Limiting references

This place does not cover:

By heterodyning; by beat-frequency comparison	G01R 23/14
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	G01R 23/15
Circuits for comparing the frequencies of two mutually independent oscillations	H03D 13/00

G01R 23/02

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

References

Informative references

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

Arrangements for measuring frequency using vibrating reeds	G01R 9/04
Measuring short-time intervals	G04F 1/00

G01R 23/04

adapted for measuring in circuits having distributed constants

Definition statement

This place covers:

Measurements of frequencies whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

G01R 23/07

using response of circuits tuned on resonance, e.g. grid-drip meter

Definition statement

This place covers:

Measuring instruments using a resonant frequency, e.g. an oscillator output energy which changes in the vicinity of a resonant circuit which is tuned to the frequency the oscillator generates.

G01R 23/09

using analogue integrators, e.g. capacitors establishing a mean value by balance of input signals and defined discharge signals or leakage

References

Informative references

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

Radiation-measuring instruments in which pulses generated by a radiation detector are integrated	G01T 1/15

G01R 23/14

by heterodyning; by beat-frequency comparison

Definition statement

This place covers:

Frequency measurements wherein signals of different frequencies are combined in order to generate intermediate frequencies / interference signals which are used for the measurement (heterodyning).

Also frequency measurements based on a comparison to a signal of a similar reference frequency.

References

Informative references

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

Generation of oscillations by beating unmodulated signals of different frequencies	H03B 21/00

G01R 23/145

{by heterodyning or by beat-frequency comparison with the harmonic of an oscillator}

Definition statement

This place covers:

Frequency measurements wherein the reference signal is a harmonic signal of an (adjustable) oscillator.

G01R 23/155

{giving an indication of the number of times this occurs, i.e. multi-channel analysers (for pulse characteristics)}

Definition statement

This place covers:

Also digital determinations of a single frequency.

G01R 23/16

Spectrum analysis; Fourier analysis

Definition statement

This place covers:

Spectrum-analysers and the like, e.g. digital spectrum analysers using algorithms performed on a microprocessor whereby the electric signal measurement apparatus, and not only a pure mathematical algorithm, is of interest.

Relationships with other classification places

Digital spectrum analysers are normally classified in this class unless one or more of the subgroups are relevant. The subgroups are however directed to devices for spectrum analysis which were not based on algorithm performed on microprocessors.

Determination of a single frequency is classified in G01R 23/15. Frequency selective measuring of voltage level is classified in G01R 19/04.

References

Informative references

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

Investigating materials by use of microwaves	G01N 22/00
Investigating materials by use of electric or magnetic means	G01N 27/00
Computing with Fourier series or Walsh functions	G06F 17/14, G06G 7/19
Feature extraction from signals	G06F 2218/08
Demodulation of frequency modulated signals	H03D 3/00
Receivers for broadcast information	H04H 40/18

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

FFT	Fast Fourier Transformation
DFT	Discrete Fourier Transformation

G01R 23/163

adapted for measuring in circuits having distributed constants

Definition statement

This place covers:

Spectrum analysis for frequencies whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

References

Limiting references

This place does not cover:

For measuring a single frequency in circuits having distributed constants	G01R 23/04

G01R 23/167

with digital filters

Relationships with other classification places

Digital spectrum analysers using an algorithm performed on a microprocessor are classified in G01R 23/16.

G01R 23/173

Wobbulating devices similar to swept panoramic receivers

References

Informative references

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

Panoramic receivers per se	H03J 7/32

G01R 23/18

with provision for recording frequency spectrum

Definition statement

This place covers:

For example devices which such provisions for recording in order to display the result on a screen.

G01R 23/20

Measurement of non-linear distortion

Definition statement

This place covers:

The measurement of non-linear distortion by frequency analysis.

References

Informative references

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

Measurement of phase shift of four pole networks	G01R 27/28
Measurement of noise figure, signal-to-noise ratio or jitter (phase noise)	G01R 29/26
Testing of individual semiconductor devices	G01R 31/26
Testing (or characterising) of electronic circuits	G01R 31/28
Analysis of signal quality	G01R 31/31708

G01R 25/00

Arrangements for measuring phase angle between a voltage and a current or between voltages or currents

Definition statement

This place covers:

Phase measurements of electrical signals as such.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Investigating or analysing materials by the use of electric, electro-chemical, or magnetic means	G01N 27/00
Automatic control of frequency or phase; Synchronisation	H03L 7/00
Phase-modulated carrier systems, i.e. using phase-shift keying	H04L 27/18

Informative references

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

Measuring power factor	G01R 21/00
Measuring position of individual pulses in a pulse train	G01R 29/02
Phase discriminators	H03D
Circuits for comparing the phase of two mutually independent oscillations	H03D 13/00
Phase locked loops	H03L 7/08

G01R 25/005

{Circuits for comparing several input signals and for indicating the result of this comparison, e.g. equal, different, greater, smaller, or for passing one of the input signals as output signal}

References

Limiting references

This place does not cover:

Phase locked loops	H03L 7/08

G01R 25/02

in circuits having distributed constants

Definition statement

This place covers:

Phase measurements whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

G01R 25/08

by counting of standard pulses

References

Informative references

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

Measuring position of individual pulses in a pulse train	G01R 29/02
Measuring time intervals	G04F 1/00

G01R 27/00

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

Definition statement

This place covers:

Measurements of resistance, reactance or impedance as such whereby the measurement comprises aspects which are not generally known in the art.

Relationships with other classification places

The use of such measurements is classified in the appropriate application places.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Measuring contours by electric means	G01B 7/28
Flow measurements	G01F 1/00
Temperature measurements	G01K 7/00
Pressure/ Force measurements	G01L 7/00
Analysing materials by investigating resistance	G01N 27/04
Analysing materials by investigating capacitance	G01N 27/22
Acceleration measurements	G01P 15/00

Informative references

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

Sensors using a resistive element	G01R 5/16
Sensors using an inductive element	G01R 5/20
Measuring superconductive properties	G01R 33/1238
Sensors using a capacitive element	G01D 5/24

G01R 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)

Definition statement

This place covers:

Measurements of complex impedance.

Groups G01R 27/02 - G01R 27/22 cover variables that directly or indirectly can be measured over two poles of a component or a Thevenin two-pole equivalent. Subgroup G01R 27/26 also covers other techniques, e.g. using electro-magnetic waves or network analyzers.

Measurements of capacitance only is classified in G01R 27/2605.

Measurements of inductance only is classified in G01R 27/2611.

References

Limiting references

This place does not cover:

Measuring phase angle only	G01R 25/00

G01R 27/025

{Measuring very high resistances, e.g. isolation resistances, i.e. megohm-meters}

References

Limiting references

This place does not cover:

Measuring resistance to earth	G01R 27/18
Testing dielectric strength of cable insulation	G01R 31/1263
Testing of leakage or ground faults	G01R 31/52

G01R 27/04

in circuits having distributed constants {, e.g. having very long conductors or involving high frequencies}

Definition statement

This place covers:

Impedance measurements whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies.

G01R 27/06

Measuring reflection coefficients; Measuring standing-wave ratio

References

Limiting references

This place does not cover:

Measuring dielectric loss, e.g. loss angle	G01R 27/2688

G01R 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)

References

Limiting references

This place does not cover:

Measuring impedance of element or network through which a current is passing from another source	G01R 27/16
Measuring earth resistance; Measuring contact resistance	G01R 27/20
Measuring resistance of fluids	G01R 27/22

G01R 27/18

Measuring resistance to earth {, i.e. line to ground}

Definition statement

This place covers:

Measurements of resistance between a high voltage line and ground when current from another source is passing the high voltage line.

References

Informative references

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

Measurement of isolation resistance	G01R 27/025
Testing of leakage or ground faults	G01R 31/52

G01R 27/20

Measuring earth resistance; Measuring contact resistance, {e.g.} of earth connections, e.g. plates

Definition statement

This place covers:

Measurements of resistance of lines which are intended for grounding, such as the resistance of the PE line or of the resistance of the earth as such.

References

Informative references

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

Testing of continuity	G01R 31/54
Testing of connections	G01R 31/66

G01R 27/205

{Measuring contact resistance of connections, e.g. of earth connections}

Definition statement

This place covers:

Contact resistance measurements, e.g. of earth connections, but also of other connections, e.g. between terminal blades and sockets.

References

Limiting references

This place does not cover:

Testing of continuity	G01R 31/54
Testing of connections	G01R 31/66

G01R 27/22

Measuring resistance of fluids

References

Informative references

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

Measuring vessels, electrodes for measuring resistance of fluids	G01N 27/07

G01R 27/26

Measuring inductance or capacitance; Measuring quality factor, e.g. by using the resonance method; Measuring loss factor; Measuring dielectric constants {; Measuring impedance or related variables}

Special rules of classification

The group G01R 27/26 represents only a parent-class which is not actively used. Instead the groups G01R 27/2605 - G01R 27/2688 are used.

In cases where an impedance with a real and an imaginary part is determined, and none of the groups listed hereabove are relevant, the group G01R 27/02 is used.

G01R 27/2605

{Measuring capacitance (capacitive sensors G01D 5/24)}

Definition statement

This place covers:

Measurements of capacitance as such in the sense that particular steps of the measurement or particular features thereof are disclosed.

Only in very rare and exceptional cases where the capacity measurement has particular aspects capacitive sensors may be classified here.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Sensors using a capacitive element	G01D 5/24
Flow measurements	G01F 1/00
Temperature measurements	G01K 7/00
Pressure/ Force measurements	G01L 7/00
Analysing materials by capacitive methods	G01N 27/22
Acceleration measurements	G01P 15/00
Proximity switches	H03K 17/955

Special rules of classification

The mere use of an existing capacity measurement method or device should not be classified in this group. In particular no sensors which are based on capacitance effects are classified here. Such sensors are classified in the classes of the corresponding applications.

G01R 27/2611

{Measuring inductance}

Definition statement

This place covers:

Measurements of inductance as such in the sense that particular steps of the measurement or particular features thereof are disclosed.

Only in very rare and exceptional cases where the inductance measurement has particular aspects, sensors may be classified here.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Sensors using an inductive element	G01D 5/20
Flow measurements	G01F 1/56
Temperature measurements	G01K 7/00
Pressure/ Force measurements	G01L 7/00
Analysing materials by investigating the impedance	G01N 27/22
Acceleration measurements	G01P 15/00

G01R 27/2617

{Measuring dielectric properties, e.g. constants (testing dielectric strength G01R 31/12; detecting insulation faults G01R 31/52; G01R 27/2688 takes precedence)}

Definition statement

This place covers:

Measurements of the relative permittivity ε_r or electric susceptibility X_e

or the like of a dielectric material.

References

Limiting references

This place does not cover:

Measuring quality factor or dielectric loss, e.g. loss angle, or power factor	G01R 27/2688
Testing dielectric strength	G01R 31/12
Detecting insulation faults	G01R 31/52
Analysing materials by use of microwaves	G01N 22/00
Analysing materials by use of electric or magnetic means	G01N 27/00

G01R 27/2623

{Measuring-systems or electronic circuits (G01R 27/2635, G01R 27/2682 take precedence)}

References

Limiting references

This place does not cover:

Sample holders, electrodes or excitation arrangements	G01R 27/2635
Using optical methods or electron beams	G01R 27/2682

G01R 27/2629

{Bridge circuits (bridges for measuring loss angle G01R 27/2694)}

References

Limiting references

This place does not cover:

Bridges for measuring loss angle	G01R 27/2694

G01R 27/2658

{Cavities, resonators, free space arrangements, reflexion or interference arrangements (G01R 27/2647 takes precedence; optical methods G01R 27/2682)}

References

Limiting references

This place does not cover:

Sample holders, electrodes or excitation arrangements of coaxial or concentric type	G01R 27/2647
Optical methods	G01R 27/2682

G01R 27/2688

{Measuring quality factor or dielectric loss, e.g. loss angle, or power factor (power factor related to power measurements G01R 21/006; testing capacitors G01R 31/016)}

Definition statement

This place covers:

Dielectric loss measurements e.g. of cables.

References

Limiting references

This place does not cover:

Power factor related to power measurements	G01R 21/006
Measuring reflection coefficients, measuring standing-wave ratio	G01R 27/06
Testing capacitors	G01R 31/016

G01R 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)

Definition statement

This place covers:

For example hf network analysers.

Relationships with other classification places

Calibrations of network analysers are classified in G01R 35/005 and G01R 27/28 in parallel if the network analyser differs from known network analysers.

The use of known network analysers for special applications is classified in the corresponding classes of the applications, e.g. for analysis of materials in G01N 27/00.

References

Limiting references

This place does not cover:

Measuring attenuation, gain, phase shift in line transmission systems	H04B 3/46

G01R 27/32

in circuits having distributed constants {, e.g. having very long conductors or involving high frequencies}

Definition statement

This place covers:

Measuring attenuation, gain, phase shift or derived characteristics of electric four pole networks whereby the wavelength comes into the geometrical order of the underlying medium, i.e. for very high frequencies, and this fact is essential for the invention.

G01R 29/02

Measuring characteristics of individual pulses, e.g. deviation from pulse flatness, rise time or duration

References

Informative references

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

Amplitude	G01R 19/00
Measuring peak values	G01R 19/04
Of repetition rate	G01R 23/00
Of phase difference of two cyclic pulse trains	G01R 25/00
Clock generators with changeable/programmable clock frequency	G06F 1/08
Manipulating pulses using a chain of active delay devices	H03K 5/133
Monitoring pattern of pulse trains	H03K 5/19

G01R 29/0276

{the pulse characteristic being rise time (measuring rate of change G01R 19/12)}

References

Limiting references

This place does not cover:

Measuring rate of change	G01R 19/12

G01R 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

References

Informative references

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

Measuring effective values, i.e. root-mean square values	G01R 19/02

G01R 29/06

Measuring depth of modulation

References

Informative references

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

Monitoring, testing of transmission systems	H04B 3/46

G01R 29/08

Measuring electromagnetic field characteristics

References

Informative references

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

Measuring or estimating received signal strength	H04B 17/318

G01R 29/0814

{Field measurements related to measuring influence on or from apparatus, components or humans (EMC, EMI and similar testing in general G01R 31/001), e.g. in ESD, EMI, EMC, EMP testing, measuring radiation leakage; detecting presence of micro- or radiowave emitters; dosimetry; testing shielding; measurements related to lightning}

References

Informative references

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

EMC, EMI and similar testing in general	G01R 31/001

G01R 29/0821

{rooms and test sites therefor, e.g. anechoic chambers, open field sites or TEM cells (for testing antennas G01R 29/105)}

References

Limiting references

This place does not cover:

Rooms and test sites for testing antennas	G01R 29/105

G01R 29/085

{for detecting presence or location of electric lines or cables (fault detection G01R 31/50; fault location G01R 31/08)}

References

Limiting references

This place does not cover:

Locating faults in cables, transmission lines or networks	G01R 31/08
Testing of electric apparatus, lines or components for short circuits, discontinuities or leakage	G01R 31/50
Identification of wires in a multi-core cable	G01R 31/60
Electric or magnetic prospecting, e.g. for detecting hidden cables in walls	G01V 3/00

G01R 29/0857

{Dosimetry, i.e. measuring the time integral of radiation intensity; Level warning devices for personal safety use (nuclear radiation dosimetry G01T)}

References

Limiting references

This place does not cover:

Nuclear radiation dosimetry	G01T 1/00

G01R 29/0871

{Complete apparatus or systems; circuits, e.g. receivers or amplifiers (G01R 29/0878, G01R 29/0892 take precedence; dosimeters, warning devices G01R 29/0857)}

References

Limiting references

This place does not cover:

Warning devices	G01R 29/0857
Sensors; antennas; probes; detectors	G01R 29/0878
Details related to signal analysis or treatment; presenting results	G01R 29/0892

G01R 29/0878

{Sensors; antennas; probes; detectors (wave guide measuring sections G01R 1/24)}

References

Limiting references

This place does not cover:

Wave guide measuring sections	G01R 1/24

G01R 29/10

Radiation diagrams of antennas

Definition statement

This place covers:

Testing of antennas and/or measurements of radiation diagrams of aerials.

References

Informative references

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

Analysing the shape of a waveform	G06F 2218/10
Antennas in general	H01Q 1/00
Phased-array testing or checking devices	H01Q 3/267

G01R 29/105

{using anechoic chambers; Chambers or open field sites used therefor (test sites used for measuring on other objects than aerials G01R 29/0828; wave absorbing devices H01Q 17/00)}

References

Limiting references

This place does not cover:

Test sites used for measuring on other objects than aerials	G01R 29/0828
Wave absorbing devices	H01Q 17/00

G01R 29/12

Measuring electrostatic fields {or voltage-potential}

References

Informative references

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

Analysing materials by investigating electrostatic variables	G01N 27/60

G01R 29/14

Measuring field distribution

References

Informative references

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

Measuring radiation diagrams of antennas	G01R 29/10
Analysing materials by investigating electrostatic variables	G01N 27/60

G01R 29/16

Measuring asymmetry of polyphase networks

References

Informative references

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

Testing AC power supplies, e.g. frequency converters	G01R 31/42

G01R 29/18

Indicating phase sequence; Indicating synchronism

Definition statement

This place covers:

Indicating phase sequence or Indicating synchronism of power supply networks.

References

Informative references

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

Arrangements for synchronising receiver with transmitter in communication networks	H04L 7/00

G01R 29/20

Measuring number of turns; Measuring transformation ratio or coupling factor of windings

References

Informative references

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

Testing of transformers for e.g. short circuits	G01R 31/62
Testing of electric windings	G01R 31/72
Testing or calibrating of instrument transformers	G01R 35/02
Transformers in general	H01F 19/00 - H01F 38/00

G01R 29/22

Measuring piezoelectric properties

References

Informative references

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

Piezoelectric devices in general	H10N 30/00

G01R 29/24

Arrangements for measuring quantities of charge

Relationships with other classification places

The measurement of charge often goes together with the measurement of the electrostatic field.

The classes G01R 29/12, G01R 15/165 and G01R 5/28 should therefore also be considered and in cases where the measurement of the electrostatic field as such is also of particular interest one of these classes can be given in parallel to G01R 29/24. Otherwise G01R 29/24 takes precedence for charge measurements.

References

Informative references

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

Electrostatic instruments	G01R 5/28
Measuring electrostatic potential, e.g. with electrostatic voltmeters or electrometers, when the design of the sensor is essential	G01R 15/165
Indicating presence of current	G01R 19/15
Electrolytic meters, calorimetric meters, for measuring time integral of electric current	G01R 22/02, G01R 22/04
Measuring electrostatic fields	G01R 29/12

G01R 29/26

Measuring noise figure; Measuring signal-to-noise ratio

Definition statement

This place covers:

The measurement of noise figure, signal-to-noise ratio and of jitter (phase noise).

References

Informative references

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

Measurement of non-linear distortion, e.g. relation of harmonics to input signal	G01R 23/20
Noise measuring in individual transistors	G01R 31/2616
Analysis of signal quality or jitter of digital circuits	G01R 31/31708

G01R 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 superconductive properties G01R 33/1238;} testing or measuring semiconductors or solid state devices during manufacture {H01L 22/00}; testing line transmission systems H04B 3/46)

Definition statement

This place covers:

Electric testing of electric devices.

References

Limiting references

This place does not cover:

Measuring superconductive properties	G01R 33/1238
Testing or measuring semiconductors or solid state devices during manufacture	H01L 22/00
Testing line transmission systems	H04B 3/46

Informative references

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

Measuring leads or measuring probes	G01R 1/06
Testing or monitoring of control systems	G05B 23/02
Indicating electrical condition of switchgear or protective devices	H01H 71/04, H01H 73/12, H02B 11/10, H02H 3/04
Testing substation equipment, e.g. mobile phones	H04M 1/24

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

DUT	device under test

G01R 31/003

{Environmental or reliability tests (of individual semiconductors G01R 31/2642; of PCB's G01R 31/2817; of IC's G01R 31/2855; of other circuits G01R 31/2849)}

Definition statement

This place covers:

Stress and burn-in testing, subjecting the DUT to hot or cold temperatures, radiation, vibration or similar.

G01R 31/005

{Testing of electric installations on transport means}

References

Informative references

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

Safety, indicating or supervising devices for combustion engines.	F02B 77/08

G01R 31/008

{on air- or spacecraft, railway rolling stock or sea-going vessels}

References

Informative references

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

Testing or inspecting aircraft components or systems	B64F 5/60

G01R 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 (testing of cables continuously passing the testing apparatus G01R 31/59; testing dielectric strength or breakdown voltage G01R 31/12)

References

Limiting references

This place does not cover:

Testing dielectric strength or breakdown voltage	G01R 31/12
Testing of cables continuously passing the testing apparatus	G01R 31/59

Informative references

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

Testing, measuring or monitoring the electrical condition of accumulators or electric batteries	G01R 31/36
Sorting according to electric or electromagnetic properties	B07C 5/344

G01R 31/016

{Testing of capacitors (measuring capacitance G01R 27/2605)}

References

Informative references

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

Other testing of capacitors	G01R 31/64

G01R 31/08

Locating faults in cables, transmission lines, or networks

Definition statement

This place covers:

Determining the exact location of a fault on a cable, transmission line or network.

References

Informative references

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

Testing of circuits	G01R 31/28
Installing, maintaining, repairing or dismantling electric cables or lines	H02G 1/00
Emergency protective circuit arrangements	H02H
Testing LAN's	H04L 43/50

Glossary of terms

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

Transmission line	Line, such as an aerial line, for transmitting electric power, e.g. from power plants to consumers.

G01R 31/11

using pulse reflection methods

Definition statement

This place covers:

Time domain and frequency domain reflectometry.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

TDR	time domain reflectometry

G01R 31/12

Testing dielectric strength or breakdown voltage {; Testing or monitoring effectiveness or level of insulation, e.g. of a cable or of an apparatus, for example using partial discharge measurements; Electrostatic testing (G01R 31/08, G01R 31/327 and G01R 31/72 take precedence; measuring in plasmas G01R 19/0061; measuring dielectric constants G01R 27/2617; ESD, EMC or EMP testing of circuits G01R 31/002)}

References

Limiting references

This place does not cover:

Measuring in plasmas	G01R 19/0061
Measuring dielectric properties, e.g. constants	G01R 27/2617
ESD, EMC or EMP stesting of circuits	G01R 31/002
Locating faults in cables, transmission lines, or networks	G01R 31/08
Testing of circuit interrupters, switches or circuit-breakers of high voltage or medium voltage devices	G01R 31/327
Testing of electric windings	G01R 31/72

Glossary of terms

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

Dielectric strength or breakdown voltage	in addition to the immediate meaning, also: effectiveness or level of insulation; faulty insulation, e.g. so as to produce arcing faults.

G01R 31/26

Testing of individual semiconductor devices (testing or measuring during manufacture or treatment {H01L 22/00}; testing of photovoltaic devices H02S 50/10)

References

Limiting references

This place does not cover:

Testing or measuring during manufacture or treatment	H01L 22/00
Testing of photovoltaic devices	H02S 50/10

Informative references

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

Testing of integrated circuits	G01R 31/28
Measurement of impurity content of materials	G01N

Glossary of terms

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

Individual semiconductor device	Basic semiconductor component or building block such as a diode or a transistor.

G01R 31/2648

{Characterising semiconductor materials (testing of materials or semi-finished products G01R 31/2831; testing during manufacture H01L 22/00)}

Special rules of classification

A raw wafer, not having any circuits or parts of circuits on it, is considered as an individual semiconductor element.

G01R 31/28

Testing of electronic circuits, e.g. by signal tracer ({EMC, EMP or similar testing of electronic circuits G01R 31/002;} testing for short-circuits, discontinuities, leakage or incorrect line connection G01R 31/50; checking computers {or computer components} G06F 11/00; checking static stores for correct operation G11C 29/00 {; testing receivers or transmitters of transmission systems H04B 17/00})

Definition statement

This place covers:

Testing of printed circuits, integrated and hard-wired circuits.

References

Limiting references

This place does not cover:

ESD, EMC, or EMP testing of circuits	G01R 31/002
Testing of electric apparatus, lines, cables or components	G01R 31/50
Checking computers or computer components	G06F 11/00
Checking static stores for correct operation	G11C 29/00
Testing transmission (electric communication) systems	H04B 17/00

Informative references

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

Multiple probes	G01R 1/073

Testing arrangements in data switching networks	H04L 41/06
Arrangements for testing substation (telephonic equipment) equipment	H04M 1/24

G01R 31/2801

{Testing of printed circuits, backplanes, motherboards, hybrid circuits or carriers for multichip packages [MCP] (G01R 31/318508 takes precedence; contactless testing G01R 31/302; testing contacts or connections G01R 31/66)}

References

Limiting references

This place does not cover:

Contactless testing	G01R 31/302
Board Level Test	G01R 31/318508
Testing contacts or connections	G01R 31/66

Informative references

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

Monitoring of manufacture of assemblages of electric components	H05K 13/08

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

PCB	Printed Circuit Board
MCP	multichip packages

G01R 31/2894

{Aspects of quality control [QC] (G01R 31/31718 takes precedence; program control for QC G05B 19/41875)}

Definition statement

This place covers:

Statistical aspects of IC testing. Quality control procedures for IC testing.

References

Limiting references

This place does not cover:

Logistic aspects	G01R 31/31718

Informative references

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

Electric programme-control systems for total factory control	G05B 19/418

Data processing systems or methods for administration or managment	G06Q 10/00

G01R 31/2896

{Testing of IC packages; Test features related to IC packages (containers per se H01L 23/02, encapsulations per se H01L 23/28)}

Definition statement

This place covers:

Testing of integrated circuit packages as such, i.e. not involving the solid state circuits they surround.

Glossary of terms

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

IC package	IC encapsulation

G01R 31/30

Marginal testing, e.g. by varying supply voltage (testing computers during standby operation or idle time G06F 11/22)

References

Limiting references

This place does not cover:

Testing computers during standby operation or idle time	G06F 11/22

G01R 31/302

Contactless testing {(G01R 31/66 takes precedence)}

Definition statement

This place covers:

Testing of electric aspects of electronic circuits using contact-less exchange of information or energy, e.g. contact-less exciting or signal-sampling.

References

Limiting references

This place does not cover:

Testing of connections, e.g. of plugs or non-disconnectable joints	G01R 31/66

Informative references

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

Investigating flaws by inspecting patterns on the surface of objects	G01N 21/956
Image analysis	G06T 7/00

G01R 31/3025

{Wireless interface with the DUT}

Definition statement

This place covers:

Wireless exchange of information between tester apparatus and DUT during electronic testing of integrated circuits.

References

Informative references

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

Electromagnetic sensing of record carriers	G06K 7/10
Wireless transmission of measured values or control signals	G08C 17/00

G01R 31/319

Tester hardware, i.e. output processing circuits

References

Informative references

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

Logic analysers	G01R 31/3177
Memory tester hardware	G11C 29/56

G01R 31/327

Testing of circuit interrupters, switches or circuit-breakers

References

Informative references

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

Testing contacts of switches, e.g. wear indicators	H01H 1/0015
Gas insulated switchgear with means for detecting mechanical or electrical defects	H02B 13/065
Indication of state of electronic switch	H03K 17/18

G01R 31/36

Arrangements for testing, measuring or monitoring the electrical condition of accumulators or electric batteries, e.g. capacity or state of charge [SoC]

Definition statement

This place covers:

The testing, measuring or monitoring—through electrical means—of accumulators or electric batteries.

Relationships with other classification places

G01R 31/36 covers the testing, measuring or monitoring of accumulators or electric batteries taking place through electrical measurements. The testing, measuring or monitoring of batteries making use of other variables, e.g. ultrasonic measurements or chemical analysis of electrolyte, is covered in other subclasses, in particular subclasses G01N or H01M.

In particular, testing or monitoring of fuel cells by analysing reactants or residues is classified in subclass H01M.

Furthermore, electric testing arrangements structurally associated with the batteries are covered by H01M as shown by the references out of the residual place G01R 31/36.

References

References out of a residual place

Examples of places in relation to which this place is residual:

Arrangements for measuring, testing or indicating condition structurally associated with primary cells	H01M 6/50
Detection or assessment of electric variables for controlling fuel cells	H01M 8/04537
Detection of failure or abnormal function in fuel cells	H01M 8/04664
Structurally associated with secondary cells	H01M 10/48

Informative references

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

Current or voltage threshold detection in batteries.	G01R 19/16542
Recording operating variables of electrically-propelled vehicles	B60L 3/12
Removing batteries from vehicles	B60S 5/06

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

SoC	State of charge
SoH	State of health

G01R 31/367

Software therefor, e.g. for battery testing using modelling or look-up tables

Definition statement

This place covers:

The software aspect of testing of accumulators or electric batteries, e.g. computational or data processing aspects.

Examples include:

- use of self-learning or adaptive systems, e.g. neural networks;
- use of look-up tables or fuzzy logic;
- Kalman filters;
- testing characterized by battery modelling.

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Acquisition or processing of data to test or to monitor individual cells or groups of cells within a battery	G01R 31/396

Informative references

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

Processes for controlling fuel cells or fuel cell systems characterised by the implementation of mathematical or computational algorithms, e.g. feedback control loops, fuzzy logic, neural networks or artificial intelligence	H01M 8/04992

G01R 31/371

with remote indication, e.g. on external chargers

Definition statement

This place covers:

The testing, measuring or monitoring of accumulators or electric batteries where the electric-variable sensing and the display of the result occur in different locations, characterized by different environmental parameters, e.g. temperature, pressure, noise.

The display can be a system with another main function, e.g. a mobile phone, provided that that system does not encompass the battery-sensing element(s), although it could perform a controlling function on these elements.

Another example of subject matter covered in this group is an indicator mounted on a vehicle's dashboard, indicating the electrical condition of the vehicle's battery.

Glossary of terms

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

Remote	Taking place in a different environment than the sensing

G01R 31/3835

involving only voltage measurements

References

References out of a residual place

Examples of places in relation to which this place is residual:

Monitoring battery variables by comparing with a reference voltage	G01R 19/165

G01R 31/385

Arrangements for measuring battery or accumulator variables (for monitoring G01R 31/382)

References

Limiting references

This place does not cover:

Monitoring of batteries	G01R 31/382

G01R 31/396

Acquisition or processing of data for testing or for monitoring individual cells or groups of cells within a battery

Definition statement

This place covers:

Methods to assess the condition of an individual cell or group or cells in a multi-cell battery, in which data are transmitted to processing means outside the battery, allowing the condition of a subset of cells (e.g. one) within the battery to be determined without dismantling the battery.

Relationships with other classification places

When electrochemical cells are tested or monitored through integrated means, as if they were stand-alone cells, classification is made in subclass H01M. G01R 31/396 covers the collecting and use or processing of data taking place outside the battery, but leading to knowledge of the condition of cells within the battery, without intrusive measurements.

G01R 31/40

Testing power supplies (testing photovoltaic devices H02S 50/10)

References

Limiting references

This place does not cover:

Testing photovoltaic devices	H02S 50/10

Informative references

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

Comparing current or voltage with a reference level in AC or DC supplies	G01R 19/16538

G01R 31/50

Testing of electric apparatus, lines, cables or components for short-circuits, continuity, leakage current or incorrect line connections (testing of sparking plugs H01T 13/58)

References

Limiting references

This place does not cover:

Testing of sparking plugs	H01T 13/58

Informative references

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

Measuring resistance to earth	G01R 27/18
Measuring electromagnetic field leakage	G01R 29/0821
Locating faults in cables, transmission lines, or networks	G01R 31/08
Testing dielectric strength or breakdown voltage	G01R 31/12
Testing of discharge tubes	G01R 31/24
Testing of circuit interrupters, switches or circuit-breakers	G01R 31/327
Testing dynamo-electric machines	G01R 31/34
Testing of individual semiconductor devices	G01R 31/36
Apparatus for testing electrical condition of accumulators or electric batteries	G01R 31/36
Testing power supplies	G01R 31/40
Testing lamps	G01R 31/44
Testing of electric windings	G01R 31/72
Checking or monitoring of signalling or alarm systems	G08B 29/00

G01R 31/54

Testing for continuity

Definition statement

This place covers:

Tests for open circuits (lack of continuity) .

References

Informative references

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

Testing lamps	G01R 31/44

G01R 31/55

Testing for incorrect line connections

Definition statement

This place covers:

Testing line connections, e.g. for correctness or for electrical characteristics.

References

Informative references

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

Testing of circuits	G01R 31/28
Installing, maintaining, repairing or dismantling electric cables or lines	H02G 1/00
Emergency protective circuit arrangements	H02H

Synonyms and Keywords

In patent documents, the following words/expressions are often used with the meaning indicated:

Transmission line	Line, such as an aerial line, for transmitting electric power, e.g. from power plants to consumers.

G01R 31/58

Testing of lines, cables or conductors (testing of electric windings G01R 31/72)

References

Limiting references

This place does not cover:

Testing of electric windings	G01R 31/72

Informative references

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

Testing of insulation of cables	G01R 31/1272
Testing line transmission systems	H04B 3/46

G01R 31/64

Testing of capacitors

References

Informative references

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

Measuring of capacitance	G01R 27/2605

Go/no-go testing of capacitors	G01R 31/016

G01R 31/66

Testing of connections, e.g. of plugs or non-disconnectable joints (testing for incorrect line connections G01R 31/55)

References

Limiting references

This place does not cover:

Testing for incorrect line connections	G01R 31/55

Informative references

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

Testing of connections in integrated circuits, chip-to lead connections, bond wires	G01R 31/2853
Interconnect testing	G01R 31/71

G01R 31/67

Testing the correctness of wire connections in electric apparatus or circuits

Definition statement

This place covers:

Testing to validate the correct position or placement of conductors or connections, e.g. in a wiring loom.

G01R 31/72

Testing of electric windings (testing of transformers G01R 31/62)

References

Limiting references

This place does not cover:

Testing of transformers	G01R 31/62

Informative references

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

Measuring number of turns	G01R 29/20
Testing of armature or field windings	G01R 31/346
Monitoring or fail-safe circuits	H01F 7/1844

G01R 33/00

Arrangements or instruments for measuring magnetic variables

Definition statement

This place covers:

Magnetic sensors and measuring aspects for measuring all kind of magnetic variables.

Special rules of classification

NMR is classified in the subgroups of G01R 33/20, but general aspects of measuring magnetic variables is classified in G01R 33/0005-M.

G01R 33/02

Measuring direction or magnitude of magnetic fields or magnetic flux (G01R 33/20 takes precedence)

Definition statement

This place covers:

The different types of magnetic sensors.

References

Limiting references

This place does not cover:

Measuring direction or magnitude of magnetic fields or magnetic flux	G01R 33/20

Informative references

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

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

Special rules of classification

G01R 33/0005 - G01R 33/0052 concern general aspects of measuring magnetic variables and may also be given as additional class to the sub-classes of G01R 33/02.

G01R 33/0206

{Three-component magnetometers}

Definition statement

This place covers:

3D Magnetometers.

G01R 33/0213

{using deviation of charged particles by the magnetic field}

Definition statement

This place covers:

Apparatus and methods concerning measurements with charged or magnetic particles.

G01R 33/022

Measuring gradient

Definition statement

This place covers:

Gradiometers.

G01R 33/025

Compensating stray fields {(G01R 33/0017 takes precedence)}

Definition statement

This place covers:

Devices using compensation measurements.

References

Limiting references

This place does not cover:

Means for compensating offset magnetic fields or the magnetic flux to be measured	G01R 33/0017

Informative references

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

Compensating compasses	G01C 17/38

G01R 33/028

Electrodynamic magnetometers

Definition statement

This place covers:

Magnetometers using the relationship between currents, magnetic fields and/or magnetic force.

G01R 33/0286

{comprising microelectromechanical systems [MEMS] (MEMS devices in general B81B)}

Definition statement

This place covers:

All kind of MEMS devices.

G01R 33/032

using magneto-optic devices, e.g. Faraday {or Cotton-Mouton effect}

Definition statement

This place covers:

All kind of magneto-optical devices and methods, e.g. Cotton-Mouton (magnetic double refraction in liquid, caused by lining-up of anisotropic molecules in magnetic field. Analogue of ELECTRO-optic Kerr effect, not related to Zeeman effect.)

References

Informative references

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

Magneto-optics in general	G02F 1/09

G01R 33/0322

{using the Faraday or Voigt effect}

Definition statement

This place covers:

e.g. Faraday effect (rotation of polarization plane of plane-polarized light, consequence of longitudinal Zeeman effect, field parallel to light beam); e.g. Voigt effect (magnetic double refraction, different diffraction for polarization parallel to field and polarization perpendicular to field, consequence of transverse Zeeman effect, field perpendicular to light beam)

G01R 33/0325

{using the Kerr effect}

Definition statement

This place covers:

E.g. Kerr magneto-optic effect (normally incident plane-polarized light becomes elliptically polarized in magnetic field. To be distinguished from ordinary elliptical polarization under oblique incidence and from electro-optical Kerr effect).

G01R 33/0327

{with application of magnetostriction}

Definition statement

This place covers:

All aspects concerning the relationship between strain/stress/shape/volume of a material and a magnetic field/the magnetic properties of the material.

G01R 33/035

using superconductive devices

Definition statement

This place covers:

SQUIDs and superconductive magneto-resistance.

References

Informative references

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

Manufacture of superconducting elements	H10N 60/00

G01R 33/0352

{Superconductive magneto-resistances}

Definition statement

This place covers:

Magnetometers using the magneto-resistance in superconductors.

G01R 33/038

using permanent magnets, e.g. balances, torsion devices

References

Informative references

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

Electro-dynamic magnetometers	G01R 33/028

G01R 33/04

using the flux-gate principle

Definition statement

This place covers:

Fluxgate sensors.

G01R 33/05

in thin-film element

Definition statement

This place covers:

Microfluxgate sensors, e.g. manufactured in CMOS technology.

G01R 33/06

using galvano-magnetic devices

References

Informative references

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

Manufacture of galvano-magnetic elements	H10N 50/00

G01R 33/063

{Magneto-impedance sensors; Nanocristallin sensors}

Definition statement

This place covers:

Aspects concerning magneto-impedance.

G01R 33/072

{Constructional adaptation of the sensor to specific applications}

Definition statement

This place covers:

This class does not concern the sensors as such, but the adaptation of their environment for specific applications.

G01R 33/09

Magnetoresistive devices

Definition statement

This place covers:

AMR, GMR, TMR sensors.

G01R 33/091

{Constructional adaptation of the sensor to specific applications}

Definition statement

This place covers:

This class does not concern the sensors as such, but the adaptation of their environment for specific applications.

G01R 33/093

{using multilayer structures, e.g. giant magnetoresistance sensors (thin magnetic films H01F 10/00)}

Definition statement

This place covers:

GMR, spin valve and AMR sensors.

G01R 33/098

{comprising tunnel junctions, e.g. tunnel magnetoresistance sensors}

Definition statement

This place covers:

TMR sensors.

G01R 33/10

Plotting field distribution {; Measuring field distribution}

Definition statement

This place covers:

Imaging of magnetic variables.

G01R 33/12

Measuring magnetic properties of articles or specimens of solids or fluids (involving magnetic resonance G01R 33/20)

Definition statement

This place covers:

Aspects of measuring the different magnetic variables and may be classified in addition to the sub-classes of G01R 33/02.

References

Limiting references

This place does not cover:

Measuring direction or magnitude of magnetic fields or magnetic flux	G01R 33/20

Informative references

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

Using magnetic-optic devices	G01R 33/032

Special rules of classification

G01R 33/0005 - G01R 33/0052 may be considered additionally.

G01R 33/1207

{Testing individual magnetic storage devices, e.g. records carriers or digital storage elements (functional testing G06F 11/00, G06F 11/28)}

Definition statement

This place covers:

Qualification of hard disks and MRAMs.

G01R 33/1246

{Measuring critical current}

Definition statement

This place covers:

Investigation of magnetic properties and critical current of superconductors is classified.

G01R 33/1269

{of molecules labeled with magnetic beads (magnetic particles for bio assay G01N 33/54326)}

Definition statement

This place covers:

Magnetic Biosensors.

G01R 33/1284

{Spin resolved measurements; Influencing spins during measurements, e.g. in spintronics devices (G01R 33/093 takes precedence; semiconductor devices using spin polarized carriers H01L 29/66984)}

Definition statement

This place covers:

Spintronics devices.

G01R 33/1292

{Measuring domain wall position or domain wall motion}

Definition statement

This place covers:

Aspects concerning domain wall analysis and racetrack memories.

G01R 33/14

Measuring or plotting hysteresis curves {(G01R 33/1207 takes precedence)}

Definition statement

This place covers:

Hysteresis measurements.

G01R 33/16

Measuring susceptibility {(G01R 33/1238 takes precedence)}

Definition statement

This place covers:

Aspects concerning magnetic susceptibility measurements.

G01R 33/20

involving magnetic resonance (medical aspects A61B 5/055; magnetic resonance gyrometers G01C 19/60)

Definition statement

This place covers:

Equipment for making measurements involving magnetic resonance such as nuclear magnetic resonance [NMR], magnetic resonance imaging [MRI], electron paramagnetic resonance [EPR], nuclear quadrupole resonance [NQR] or other spin resonance effects;

Technical details of the equipment;

Testing or calibrating of the equipment;

Activities involved in making the measurements or in processing the signals collected during the measurements.

Relationships with other classification places

The following places may also be relevant for classification:

A61B 5/055: Detecting, measuring or recording for diagnostic purposes

involving electronic or nuclear magnetic resonance

There is an overlap between the scope of G01R 33/20 (or its relevant subgroup) and A61B 5/055 in the sense that, depending on the disclosure of a given document, the document may have to be classified in G01R 33/20 (or its relevant subgroup) only, in A61B 5/055 only or in both places.

For instance, if the invention information of a document to be classified was primarily directed to the MR process as such (e.g. a novel pulse sequence which, according to the document, facilitates the diagnosis of a disease on the basis of the resulting MR images wherein the document merely mentions the diagnosis but does not specifically disclose its implementation in detail), the document should be classified in G01R 33/20 (or its relevant subgroup) and the additional information related to the diagnosis may be classified using the appropriate Indexing Code corresponding to A61B 5/055.

However, if the invention information of the document was primarily directed to the diagnosis as such (e.g. a novel way of processing MRI data in order to enable the diagnosis of a disease wherein the MRI data was acquired using a commonly known standard MRI technique), the document should be classified in A61B 5/055 only.

G01N 24/00 : Investigating or analysing materials by the use of nuclear magnetic resonance, electron paramagnetic resonance or other spin effects

There is an overlap between the scope of G01R 33/20 (or its relevant subgroup) and G01N 24/00 (or its relevant subgroup) in the sense that, depending on the disclosure of a given document, the document may have to be classified in G01R 33/20 (or its relevant subgroup) only, in G01N 24/00 (or its relevant subgroup) only or in both places.

For instance, if the invention information of a document to be classified was primarily directed to the MR process as such (e.g. a novel pulse sequence which, according to the document, can be applied for analyzing materials wherein the document merely mentions this application but does not specifically disclose its implementation in detail), the document should be classified in G01R 33/20 (or its relevant subgroup) and the additional information related to the potential application for analyzing materials may be classified using the appropriate Indexing Code corresponding to G01N 24/00 (or its relevant subgroup).

However, if the invention information of the document was primarily directed to the analysis of a material using a known standard MR technique, the document should be classified in G01N 24/00 (or its relevant subgroup) only.

G01V 3/32: Electric or magnetic prospecting or detecting specially adapted for well-logging operating with electron or nuclear magnetic resonance

There is an overlap between the scope of G01R 33/20 (or its relevant subgroup) and G01V 3/32 in the sense that, depending on the disclosure of a given document, the document may have to be classified in G01R 33/20 (or its relevant subgroup) only, in G01V 3/32 only or in both places.

For instance, if the invention information of a document to be classified was primarily directed to the MR process as such (e.g. a novel pulse sequence which, according to the document, can be applied for MR in a borehole wherein the document merely mentions this application but does not specifically disclose its implementation in detail), the document should be classified in G01R 33/20 (or its relevant subgroup) and the additional information related to the potential application in the borehole may be classified using the appropriate Indexing Code of G01V 3/32.

However, if the invention information of the document was primarily directed to geophysics aspects or the application of MR in a borehole, the document should be classified in G01V 3/32 only.

References

Limiting references

This place does not cover:

Detecting, measuring or recording for diagnostic purposes involving electronic or nuclear magnetic resonance	A61B 5/055
Magnetic resonance gyrometers	G01C 19/60

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Investigating or analyzing materials by the use of nuclear magnetic resonance, electron paramagnetic resonance or other spin effects	G01N 24/08

Informative references

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

In vivo contrast agents	A61K 49/0002
Magnetic resonance gyrometers	G01C 19/00
Investigating or analyzing materials by the use of nuclear magnetic resonance, electron paramagnetic resonance or other spin effects	G01N 24/00
Prospecting or detecting using NMR	G01V 3/00
Electric or magnetic prospecting or detecting specially adapted for well-logging operating with electron or nuclear magnetic resonance	G01V 3/32
Two dimensional image generation, reconstruction from projection, e.g. tomography	G06T 11/003
Magnets or magnetic bodies characterised by the magnetic materials therefor; Selection of materials for their magnetic properties	H01F 1/00
Cores, Yokes, or armatures	H01F 3/00
Coils	H01F 5/00
Superconducting magnets	H01F 6/00
Permanent magnets	H01F 7/02
Electromagnets	H01F 7/06
Omegatrons using ion cyclotron resonance	H01J 49/38
Aerials	H01Q
Screening of an apparatus or of components against electric or magnetic fields	H05K 9/00

Special rules of classification

In this subgroup, classification of additional information, i.e. non-invention information, is compulsory using the appropriate Indexing Code (G01R 33/20 ... G01R 33/64).

Comments on subgroups:

G01R 33/323: For the purpose of classification in this subgroup, the expression "RF" is to be interpreted as referring to an RF magnetic field. Therefore, a document disclosing a technique of detecting MR using an RF electric field should be classified in this subgroup.

G01R 33/34046: For the purpose of classification in this subgroup, a "volume type coil" is to be understood as a coil which encloses the object to be investigated (in contrast to a surface coil which is positioned on a surface of the object to be investigated rather than enclosing the object).

G01R 33/34053: For the purpose of classification in this subgroup, a single-turn solenoid coil encircling the trunk of a patient to be investigated is understood as a volume type coil and therefore classified in subgroup G01R 33/34053.

In contrast thereto, a single-turn surface coil being placed on a surface of a patient is not understood as a volume type coil and should therefore not be classified in subgroup G01R 33/34053. Rather, classification symbol G01R 33/341 (or its subgroup G01R 33/3415) should be assigned in that case.

G01R 33/34061: For the purpose of classification in this subgroup, a Helmholtz coil is to be understood as any arrangement wherein two coils are placed symmetrically one on each side of the experimental area along a common axis.

Even if these coils are realized in the form of surface coils, the classification symbol G01R 33/341 should normally not be assigned.

G01R 33/34084 Implantable coils or coils being geometrically adaptable to the sample.

This subgroup does also cover coil assemblies with mutually movable parts, e.g. a Helmholtz coil assembly comprising two coils located on opposite sides of the trunk of a patient wherein the distance between the two coils can be adapted to the size of the trunk.

However, a single rigid surface coil which is mounted on a flexible mechanical support (e.g. a flexible arm) should not be classified in subgroup G01R 33/34084. Rather, classification symbol G01R 33/34007 should be assigned in that case.

G01R 33/3628: An RF coil being inductively matched to the transceiver in the sense that the RF coil is not galvanically connected to the transceiver, but only coupled to the transceiver via mutual inductance or mutual capacitance between the RF coil and a further coupling element (e.g. a driving coil), should not be classified in subgroup G01R 33/3628. Rather, classification symbol G01R 33/3642 should be assigned.

G01R 33/365 See comment under G01R 33/3657.

G01R 33/3657: For the purpose of classification in this subgroup as well as subgroup G01R 33/365, the "function" of the multiple RF coils is defined in relation to their use for spin excitation, MR signal reception or both.

For instance, an RF coil being used for exciting proton spins and another RF coil being used for exciting fluorine spins are therefore understood to perform the same function in MR, namely spin excitation.

G01R 33/4828: This group does not cover fat suppression which is to be classified under subgroup G01R 33/5607.

G01R 33/565: This subgroup does also cover the prevention of image distortions.

For instance, an RF coil being manufactured from susceptibility compensated wire, thereby preventing image distortions due to magnetic susceptibility variations, should be classified in the appropriate subgroup of G01R 33/565, probably using the corresponding Indexing Code (G01R 33/56536 in the example given above).

G01R 33/62: This subgroup covers the combined use of at least two different spin resonance techniques, e.g. the combined use of NMR and NQR.

This group does not cover RF coils being resonant at two distinct Larmor frequencies. Rather, such RF coils are covered by subgroup G01R 33/3635.

Glossary of terms

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

NMR	nuclear magnetic resonance
EMR	electron magnetic resonance
EPR	electron paramagnetic resonance

ESR	electron spin resonance
MRI	magnetic resonance imaging
NQR	nuclear quadrupole resonance

G01R 33/26

using optical pumping

References

Informative references

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

Optical pumping in general	G01N 24/006

G01R 33/34

Constructional details, e.g. resonators {, specially adapted to MR}

References

Informative references

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

Aerials in general	H01Q

G01R 33/381

using electromagnets

References

Informative references

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

Electromagnets per se	H01F 7/06

G01R 33/3815

with superconducting coils, e.g. power supply therefor

References

Informative references

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

Superconductive magnets	H01F 6/00

G01R 33/383

using permanent magnets

References

Informative references

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

Permanent magnets per se	H01F 7/02

G01R 33/387

Compensation of inhomogeneities

References

Informative references

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

Screening	G01R 33/42

G01R 33/42

Screening

References

Informative references

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

Screening in general	H05K 9/00

G01R 33/56

Image enhancement or correction, e.g. subtraction or averaging techniques {, e.g. improvement of signal-to-noise ratio and resolution}

References

Informative references

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

Image data processing in general	G06T

G01R 33/64

using cyclotron resonance (G01R 33/24 takes precedence)

References

Limiting references

This place does not cover:

For measuring direction or magnitude of magneticfields or magnetic flux	G01R 33/24

Informative references

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

Omegatrons per se	H01J 49/38

G01R 35/00

Testing or calibrating of apparatus covered by the other groups of this subclass

References

Informative references

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

Analysis of tester Performance; Tester Characterisation	G01R 31/31901

G01R 35/005

{Calibrating; Standards or reference devices, e.g. voltage or resistance standards, "golden" references (G01R 33/0035, G01R 35/002 take precedence)}

Definition statement

This place covers:

Calibrating of measuring devices such as network analysers, but also other measuring devices of the preceding groups.

References

Limiting references

This place does not cover:

Calibration of single magnetic sensors	G01R 33/0035

G01R 35/007

{Standards or reference devices, e.g. voltage or resistance standards, "golden references"}

Definition statement

This place covers:

Standards or reference devices comprising new aspects and being new over standards known in the art.

G01R 35/02

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

References

Informative references

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

Measuring number of turns, measuring transformation ratio	G01R 29/20
Testing of electric windings	G01R 31/72

G01R 35/04

of instruments for measuring time integral of power or current

References

Informative references

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

Electromechanical arrangements for measuring time integral of electric power or current	G01R 11/00
Other arrangements for measuring time integral of electric power or current, e.g. by electronic methods	G01R 22/00