

SECTION G — PHYSICS

G01 MEASURING; TESTING

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

Note(s) [5, 2006.01]

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

Subclass index

ELECTRIC MEASURING INSTRUMENTS

In general.....5/00, 7/00, 9/00
 Details.....1/00
 Manufacture; calibrating, testing.....3/00, 35/00

ELECTROMECHANICAL MEASUREMENT OF TIME INTEGRAL OF POWER OR CURRENT.....11/00

MEASURING ELECTRIC VARIABLES

Details of measuring arrangements.....11/02, 15/00
 Arrangements for displaying.....13/00
 Involving comparison with a reference value.....17/00
 Current or voltage; power, power factor; time integral of power or current; frequency; resistance, reactance, impedance.....19/00, 21/00, 22/00, 23/00, 27/00
 Other variables.....25/00, 29/00

TESTING ELECTRIC PROPERTIES OR LOCATING FAULTS.....31/00

MEASURING MAGNETIC VARIABLES.....33/00

- | | |
|--|--|
| <p>1/00 Details of instruments or arrangements of the types covered by groups G01R 5/00-G01R 13/00 or G01R 31/00 (constructional details particular to electromechanical arrangements for measuring the electric consumption G01R 11/02) [1, 3, 2006.01]</p> <p>1/02 • General constructional details [1, 2006.01]</p> <p>1/04 • • Housings; Supporting members; Arrangements of terminals [1, 2006.01]</p> <p>1/06 • • Measuring leads; Measuring probes (G01R 19/145, G01R 19/165 take precedence) [1, 3, 2006.01]</p> <p>1/067 • • • Measuring probes [3, 2006.01]</p> | <p>1/07 • • • Non contact-making probes [6, 2006.01]</p> <p>1/073 • • • Multiple probes [3, 2006.01]</p> <p>1/08 • • Pointers; Scales, Scale illumination [1, 2006.01]</p> <p>1/10 • • Arrangements of bearings [1, 2006.01]</p> <p>1/12 • • • of strip or wire bearings [1, 2006.01]</p> <p>1/14 • • Braking arrangements; Damping arrangements [1, 2006.01]</p> <p>1/16 • • Magnets [1, 2006.01]</p> <p>1/18 • • Screening arrangements against electric or magnetic fields, e.g. against earth's field [1, 2006.01]</p> |
|--|--|

- 1/20 • Modifications of basic electric elements for use in electric measuring instruments; Structural combinations of such elements with such instruments [1, 2006.01]
- 1/22 • • Tong testers acting as secondary windings of current transformers [1, 2006.01]
- 1/24 • • Transmission-line, e.g. waveguide, measuring sections, e.g. slotted section [1, 2006.01]
- 1/26 • • • with linear movement of probe [1, 2006.01]
- 1/28 • Provision in measuring instruments for reference values, e.g. standard voltage, standard waveform [1, 2006.01]
- 1/30 • Structural combination of electric measuring instruments with basic electronic circuits, e.g. with amplifier [1, 2006.01]
- 1/36 • Overload-protection arrangements or circuits for electric measuring instruments [1, 2006.01]
- 1/38 • Arrangements for altering the indicating characteristic, e.g. by modifying the air gap [1, 2006.01]
- 1/40 • Modifications of instruments to indicate the maximum or the minimum value reached in a time interval, e.g. by maximum indicator pointer [1, 3, 2006.01]
- 1/42 • • thermally operated [1, 2006.01]
- 1/44 • Modifications of instruments for temperature compensation [2, 2006.01]
- 3/00 Apparatus or processes specially adapted for the manufacture of measuring instruments [1, 2006.01]**
- 5/00 Instruments for converting a single current or a single voltage into a mechanical displacement [1, 2006.01]**
- 5/02 • Moving-coil instruments [1, 2006.01]
- 5/04 • • with magnet external to the coil [1, 2006.01]
- 5/06 • • with core magnet [1, 2006.01]
- 5/08 • • specially adapted for wide angle deflection; with eccentrically-pivoted moving coil [1, 2006.01]
- 5/10 • String galvanometers [1, 2006.01]
- 5/12 • Loop galvanometers [1, 2006.01]
- 5/14 • Moving-iron instruments [1, 2006.01]
- 5/16 • • with pivoting magnet [1, 2006.01]
- 5/18 • • with pivoting soft iron, e.g. needle galvanometer [1, 2006.01]
- 5/20 • Induction instruments e.g. Ferraris instruments [1, 2006.01]
- 5/22 • Thermoelectric instruments [1, 2006.01]
- 5/24 • • operated by elongation of a strip or wire or by expansion of a gas or fluid [1, 2006.01]
- 5/26 • • operated by deformation of a bimetallic element [1, 2006.01]
- 5/28 • Electrostatic instruments [1, 2006.01]
- 5/30 • • Leaf electrometers [1, 2006.01]
- 5/32 • • Wire electrometers; Needle electrometers [1, 2006.01]
- 5/34 • • Quadrant electrometers [1, 2006.01]
- 7/00 Instruments capable of converting two or more currents or voltages into a single mechanical displacement (G01R 9/00 takes precedence) [1, 2006.01]**
- 7/02 • for forming a sum or a difference [1, 2006.01]
- 7/04 • for forming a quotient (for measuring resistance G01R 27/08) [1, 2006.01]
- 7/06 • • moving-iron type [1, 2006.01]
- 7/08 • • moving-coil type, e.g. crossed-coil type [1, 2006.01]
- 7/10 • • • having more than two moving coils [1, 2006.01]
- 7/12 • for forming product [1, 2006.01]
- 7/14 • • moving-iron type [1, 2006.01]
- 7/16 • • having both fixed and moving coils, i.e. dynamometers [1, 2006.01]
- 7/18 • • • with iron core magnetically coupling fixed and moving coils [1, 2006.01]
- 9/00 Instruments employing mechanical resonance [1, 2006.01]**
- 9/02 • Vibration galvanometers, e.g. for measuring current [1, 2006.01]
- 9/04 • using vibrating reeds, e.g. for measuring frequency [1, 2006.01]
- 9/06 • • magnetically driven [1, 2006.01]
- 9/08 • • piezo-electrically driven [1, 2006.01]
- 11/00 Electromechanical arrangements for measuring time integral of electric power or current, e.g. of consumption (monitoring electric consumption of electrically-propelled vehicles B60L 3/00) [1, 2006.01]**
- 11/02 • Constructional details [1, 2006.01]
- 11/04 • • Housings; Supporting racks; Arrangements of terminals [1, 2006.01]
- 11/06 • • Magnetic circuits of induction meters [1, 2, 2006.01]
- 11/067 • • • Coils therefor [2, 2006.01]
- 11/073 • • • Armatures therefor [2, 2006.01]
- 11/09 • • • Disc armatures [2, 2006.01]
- 11/10 • • Braking magnets; Damping arrangements [1, 2006.01]
- 11/12 • • Arrangements of bearings [1, 2006.01]
- 11/14 • • • with magnetic relief [1, 2006.01]
- 11/16 • • Adaptations of counters to electricity meters [1, 2006.01]
- 11/17 • • Compensating for errors; Adjusting or regulating means therefor [2, 2006.01]
- 11/18 • • • Compensating for variations in ambient conditions [1, 2, 2006.01]
- 11/185 • • • • Temperature compensation [2, 2006.01]
- 11/19 • • • Compensating for errors caused by disturbing torque, e.g. rotating-field errors of polyphase meters [2, 2006.01]
- 11/20 • • • Compensating for phase errors in induction meters [1, 2, 2006.01]
- 11/21 • • • Compensating for errors caused by damping effects of the current, e.g. adjustment in the overload range [2, 2006.01]
- 11/22 • • • Adjusting torque, e.g. adjusting starting torque, adjusting of polyphase meters for obtaining equal torques [1, 2, 2006.01]
- 11/23 • • • Compensating for errors caused by friction, e.g. adjustment in the light-load range [2, 2006.01]
- 11/24 • • Arrangements for avoiding or indicating fraudulent use [1, 4, 2006.01]
- 11/25 • • Arrangements for indicating or signalling faults [2, 4, 2006.01]
- Note(s) [4]**
- Groups G01R 11/48-G01R 11/56 take precedence over groups G01R 11/30-G01R 11/46.
- 11/30 • Dynamo-electric motor meters [1, 2006.01]
- 11/32 • • Watt-hour meters [1, 2006.01]
- 11/34 • • Ampère-hour meters [1, 2006.01]

- 11/36 • Induction meters, e.g. Ferraris meters [1, 2006.01]
- 11/38 • • for single-phase operation [1, 2006.01]
- 11/40 • • for polyphase operation [1, 2006.01]
- 11/42 • • • Circuitry therefor [1, 2006.01]
- 11/46 • Electrically-operated clockwork meters; Oscillatory meters; Pendulum meters [1, 2006.01]
- 11/48 • Meters specially adapted for measuring real or reactive components; Meters specially adapted for measuring apparent energy [1, 2006.01]
- 11/50 • • for measuring real component [1, 2006.01]
- 11/52 • • for measuring reactive component [1, 2006.01]
- 11/54 • • for measuring simultaneously at least two of the following three variables: real component, reactive component, apparent energy [1, 2006.01]
- 11/56 • Special tariff meters [1, 2006.01]
- 11/57 • • Multi-rate meters (G01R 11/63 takes precedence) [2, 2006.01]
- 11/58 • • • Tariff-switching devices therefor [1, 2, 2006.01]
- 11/60 • • Subtraction meters; Meters measuring maximum or minimum-load hours [1, 2006.01]
- 11/63 • • Over-consumption meters, e.g. measuring consumption while a predetermined level of power is exceeded [2, 2006.01]
- 11/64 • • Maximum meters, e.g. tariff for a period is based on maximum demand within that period [1, 2006.01]
- 11/66 • • • Circuitry [1, 2006.01]
- 13/00 Arrangements for displaying electric variables or waveforms [1, 4, 2006.01]**
- 13/02 • for displaying measured electric variables in digital form [1, 4, 2006.01]
- 13/04 • for producing permanent records [1, 4, 2006.01]
- 13/06 • • Modifications for recording transient disturbances, e.g. by starting or accelerating a recording medium [1, 2006.01]
- 13/08 • • Electromechanical recording system using a mechanical direct-writing method [1, 2006.01]
- 13/10 • • • with intermittent recording by representing the variable by the length of a stroke or by the position of a dot [1, 2006.01]
- 13/12 • • Chemical recording, e.g. clydonographs (G01R 13/14 takes precedence) [1, 2006.01]
- 13/14 • • Recording on a light-sensitive material [1, 2006.01]
- 13/16 • • Recording on a magnetic medium [1, 2006.01]
- 13/18 • • • using boundary displacement [1, 2006.01]
- 13/20 • Cathode-ray oscilloscopes [1, 2006.01]
- 13/22 • • Circuits therefor [1, 2006.01]
- 13/24 • • • Time-base deflection circuits [1, 2006.01]
- 13/26 • • • Circuits for controlling the intensity of the electron beam [1, 2006.01]
- 13/28 • • • Circuits for simultaneous or sequential presentation of more than one variable [1, 2006.01]
- 13/30 • • • Circuits for inserting reference markers, e.g. for timing, for calibrating, for frequency marking [1, 2006.01]
- 13/32 • • • Circuits for displaying non-recurrent functions such as transients; Circuits for triggering; Circuits for synchronisation; Circuits for time-base expansion [1, 2006.01]
- 13/34 • • • Circuits for representing a single waveform by sampling, e.g. for very high frequencies [1, 2, 2006.01]
- 13/36 • using length of glow discharge, e.g. glowlight oscilloscopes [1, 4, 2006.01]
- 13/38 • using the steady or oscillatory displacement of a light beam by an electromechanical measuring system [1, 4, 2006.01]
- 13/40 • using modulation of a light beam otherwise than by mechanical displacement, e.g. by Kerr effect [1, 4, 2006.01]
- 13/42 • Instruments using length of spark discharge, e.g. by measuring maximum separation of electrodes to produce spark [1, 2006.01]
- 15/00 Details of measuring arrangements of the types provided for in groups G01R 17/00-G01R 29/00, G01R 33/00-G01R 33/26 or G01R 35/00 [1, 2006.01]**
- 15/04 • Voltage dividers [1, 6, 2006.01]
- 15/06 • • having reactive components, e.g. capacitive transformer [1, 6, 2006.01]
- 15/08 • Circuits for altering the measuring range [1, 2006.01]
- 15/09 • • Autoranging circuits [6, 2006.01]
- 15/12 • Circuits for multi-testers, e.g. for measuring voltage, current, or impedance at will [1, 2006.01]
- 15/14 • Adaptations providing voltage or current isolation, e.g. for high-voltage or high-current networks [6, 2006.01]
- 15/16 • • using capacitive devices [6, 2006.01]
- 15/18 • • using inductive devices, e.g. transformers [6, 2006.01]
- 15/20 • • using galvano-magnetic devices, e.g. Hall-effect devices [6, 2006.01]
- 15/22 • • using light-emitting devices, e.g. LED, optocouplers [6, 2006.01]
- 15/24 • • using light-modulating devices [6, 2006.01]
- 15/26 • • using modulation of waves other than light, e.g. radio or acoustic waves [6, 2006.01]
- 17/00 Measuring arrangements involving comparison with a reference value, e.g. bridge [1, 2006.01]**
- 17/02 • Arrangements in which the value to be measured is automatically compared with a reference value [1, 2006.01]
- 17/04 • • in which the reference value is continuously or periodically swept over the range of values to be measured [1, 2006.01]
- 17/06 • • Automatic balancing arrangements [1, 2006.01]
- 17/08 • • • in which a force or torque representing the measured value is balanced by a force or torque representing the reference value [1, 2006.01]
- 17/10 • ac or dc measuring bridges [1, 2006.01]
- 17/12 • • using comparison of currents, e.g. bridges with differential current output [1, 2006.01]
- 17/14 • • with indication of measured value by calibrated null indicator, e.g. percent bridge, tolerance bridge (G01R 17/12, G01R 17/16 take precedence) [1, 2006.01]
- 17/16 • • with discharge tubes or semiconductor devices in one or more arms of the bridge, e.g. voltmeter using a difference amplifier [1, 2006.01]
- 17/18 • • with more than four branches [1, 2006.01]
- 17/20 • ac or dc potentiometric measuring arrangements [1, 2006.01]
- 17/22 • • with indication of measured value by calibrated null indicator [1, 2006.01]
- 19/00 Arrangements for measuring currents or voltages or for indicating presence or sign thereof (G01R 5/00 takes precedence; for measuring bioelectric currents or voltages A61B 5/04) [1, 4, 2006.01]**

Note(s) [3]

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

- 19/02 • Measuring effective values, i.e. root-mean-square values [1, 2006.01]
- 19/03 • • using thermoconverters [4, 2006.01]
- 19/04 • Measuring peak values of ac or of pulses [1, 2, 2006.01]
- 19/06 • Measuring real component; Measuring reactive component [1, 2006.01]
- 19/08 • Measuring current density [1, 2006.01]
- 19/10 • Measuring sum, difference, or ratio [1, 2006.01]
- 19/12 • Measuring rate of change [1, 2006.01]
- 19/14 • Indicating direction of current; Indicating polarity of voltage [1, 2006.01]
- 19/145 • Indicating the presence of current or voltage [3, 2006.01]
- 19/15 • • Indicating the presence of current [3, 2006.01]
- 19/155 • • Indicating the presence of voltage [3, 2006.01]
- 19/165 • Indicating that current or voltage is either above or below a predetermined value or within or outside a predetermined range of values [3, 2006.01]
- 19/17 • • giving an indication of the number of times this occurs [3, 2006.01]
- 19/175 • Indicating the instants of passage of current or voltage through a given value, e.g. passage through zero [3, 2006.01]
- 19/18 • using conversion of dc into ac, e.g. with choppers [1, 2006.01]
- 19/20 • • using transducers [1, 2006.01]
- 19/22 • using conversion of ac into dc [1, 2006.01]
- 19/25 • using digital measurement techniques [3, 2006.01]
- 19/252 • • using analogue/digital converters of the type with conversion of voltage or current into frequency and measuring of this frequency [4, 2006.01]
- 19/255 • • using analogue/digital converters of the type with counting of pulses during a period of time proportional to voltage or current, delivered by a pulse generator with fixed frequency [4, 2006.01]
- 19/257 • • using analogue/digital converters of the type with comparison of different reference values with the value of voltage or current, e.g. using step-by-step method [4, 2006.01]
- 19/28 • adapted for measuring in circuits having distributed constants [1, 2006.01]
- 19/30 • Measuring the maximum or the minimum value of current or voltage reached in a time interval (G01R 19/04 takes precedence) [2, 3, 2006.01]
- 19/32 • Compensating for temperature change [2, 2006.01]

21/00 Arrangements for measuring electric power or power factor (G01R 7/12 takes precedence) [1, 4, 2006.01]

- 21/01 • in circuits having distributed constants (G01R 21/04, G01R 21/07, G01R 21/09, G01R 21/12 take precedence) [2, 2006.01]
- 21/02 • by thermal methods [1, 2, 2006.01]
- 21/04 • • in circuits having distributed constants [1, 2006.01]
- 21/06 • by measuring current and voltage (G01R 21/08-G01R 21/133 take precedence) [1, 4, 2006.01]
- 21/07 • • in circuits having distributed constants (G01R 21/09 takes precedence) [2, 2006.01]
- 21/08 • by using galvanomagnetic-effect devices, e.g. Hall-effect devices [1, 2, 2006.01]

- 21/09 • • in circuits having distributed constants [2, 2006.01]
- 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) [1, 2, 2006.01]
- 21/12 • • in circuits having distributed constants [1, 2006.01]
- 21/127 • by using pulse modulation (G01R 21/133 takes precedence) [4, 2006.01]
- 21/133 • by using digital technique [4, 2006.01]
- 21/14 • Compensating for temperature change [2, 2006.01]

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

Note(s) [4]

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

- 22/02 • by electrolytic methods [4, 2006.01]
- 22/04 • by calorimetric methods [4, 2006.01]
- 22/06 • by electronic methods [2006.01]
- 22/08 • • using analogue techniques [2006.01]
- 22/10 • • using digital techniques [2006.01]

23/00 Arrangements for measuring frequencies; Arrangements for analysing frequency spectra [1, 2006.01]

- 23/02 • Arrangements for measuring frequency, e.g. pulse repetition rate; Arrangements for measuring period of current or voltage [1, 2006.01]
- 23/04 • • adapted for measuring in circuits having distributed constants [1, 2006.01]
- 23/06 • • by converting frequency into an amplitude of current or voltage [1, 2006.01]
- 23/07 • • • using response of circuits tuned on resonance, e.g. grid-drip meter [2, 2006.01]
- 23/08 • • • using response of circuits tuned off resonance [1, 2006.01]
- 23/09 • • • using analogue integrators, e.g. capacitors establishing a mean value by balance of input signals and defined discharge signals or leakage [2, 2006.01]
- 23/10 • • by converting frequency into a train of pulses, which are then counted [1, 2006.01]
- 23/12 • • by converting frequency into phase shift [1, 2006.01]
- 23/14 • • by heterodyning; by beat-frequency comparison [1, 2, 2006.01]
- 23/15 • • Indicating that frequency of pulses is either above or below a predetermined value or within or outside a predetermined range of values, by making use of non-linear or digital elements [3, 2006.01]
- 23/16 • Spectrum analysis; Fourier analysis [1, 2006.01]
- 23/163 • • adapted for measuring in circuits having distributed constants [3, 2006.01]
- 23/165 • • using filters [3, 2006.01]
- 23/167 • • • with digital filters [3, 2006.01]
- 23/17 • • with optical auxiliary devices [3, 2006.01]
- 23/173 • • Wobblulating devices similar to swept panoramic receivers [3, 2006.01]
- 23/175 • • by delay means, e.g. tapped delay lines [3, 2006.01]
- 23/177 • • Analysis of very low frequencies [3, 2006.01]

23/18	• • with provision for recording frequency spectrum [1, 2006.01]	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 [1, 2006.01]
23/20	• • Measurement of non-linear distortion [1, 2006.01]	29/06	• Measuring depth of modulation [1, 2006.01]
25/00	Arrangements for measuring phase angle between a voltage and a current or between voltages or currents [1, 2, 2006.01]	29/08	• Measuring electromagnetic field characteristics [1, 2006.01]
25/02	• in circuits having distributed constants [1, 2006.01]	29/10	• • Radiation diagrams of aerials [1, 2006.01]
25/04	• involving adjustment of a phase shifter to produce a predetermined phase difference, e.g. zero difference [1, 2006.01]	29/12	• Measuring electrostatic fields [1, 2006.01]
25/06	• employing quotient instrument [1, 2006.01]	29/14	• • Measuring field distribution [1, 2006.01]
25/08	• by counting of standard pulses [2, 2006.01]	29/16	• Measuring asymmetry of polyphase networks [1, 2006.01]
27/00	Arrangements for measuring resistance, reactance, impedance, or electric characteristics derived therefrom [1, 2006.01]	29/18	• Indicating phase sequence; Indicating synchronism [1, 2006.01]
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) [1, 2006.01]	29/20	• Measuring number of turns; Measuring transformation ratio or coupling factor of windings [1, 2006.01]
27/04	• • in circuits having distributed constants [1, 2006.01]	29/22	• Measuring piezo-electric properties [1, 2006.01]
27/06	• • • Measuring reflection coefficients; Measuring standing-wave ratio [1, 2006.01]	29/24	• Arrangements for measuring quantities of charge [2, 2006.01]
27/08	• • Measuring resistance by measuring both voltage and current [1, 2006.01]	29/26	• Measuring noise figure; Measuring signal-to-noise ratio [2, 2006.01]
27/10	• • • using two-coil or crossed-coil instruments forming quotient [1, 2006.01]	31/00	Arrangements for testing electric properties; Arrangements for locating electric faults; Arrangements for electrical testing characterised by what is being tested not provided for elsewhere (testing or measuring semiconductors or solid state devices during manufacture H01L 21/66; testing line transmission systems H04B 3/46) [1, 2006.01]
27/12	• • • • using hand generators, e.g. meggers [1, 2006.01]	31/01	• Subjecting similar articles in turn to test, e.g. "go/no-go" tests in mass production; Testing objects at points as they pass through a testing station (G01R 31/18 takes precedence) [6, 2006.01]
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) [1, 2006.01]	31/02	• Testing of electric apparatus, lines, or components for short-circuits, discontinuities, leakage, or incorrect line connection [1, 2006.01]
27/16	• • Measuring impedance of element or network through which a current is passing from another source, e.g. cable, power line [1, 2006.01]	31/04	• • Testing connections, e.g. of plugs, of non-disconnectable joints [1, 2006.01]
27/18	• • • Measuring resistance to earth [1, 2006.01]	31/06	• • Testing of electric windings, e.g. for polarity [1, 2006.01]
27/20	• • Measuring earth resistance; Measuring contact resistance of earth connections, e.g. plates [1, 2006.01]	31/07	• • Testing of fuses [6, 2006.01]
27/22	• • Measuring resistance of fluids [1, 2006.01]	31/08	• Locating faults in cables, transmission lines, or networks [1, 2006.01]
27/26	• • Measuring inductance or capacitance; Measuring quality factor, e.g. by using the resonance method; Measuring loss factor; Measuring dielectric constants [1, 2006.01]	31/10	• • by increasing destruction at fault, e.g. burning-in by using a pulse generator operating a special programme [1, 2006.01]
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) [1, 2006.01]	31/11	• • using pulse-reflection methods [1, 2006.01]
27/30	• • with provision for recording characteristics, e.g. by plotting Nyquist diagram [1, 2006.01]	31/12	• Testing dielectric strength or breakdown voltage [1, 2006.01]
27/32	• • in circuits having distributed constants [2, 2006.01]	31/14	• • Circuits therefor [1, 2006.01]
29/00	Arrangements for measuring or indicating electric quantities not covered by groups G01R 19/00-G01R 27/00 [1, 2006.01]	31/16	• • Construction of testing vessels; Electrodes therefor [1, 2006.01]
29/02	• Measuring characteristics of individual pulses, e.g. deviation from pulse flatness, rise time or duration [1, 3, 2006.01]	31/18	• • Subjecting similar articles in turn to test, e.g. "go/no-go" tests in mass production [1, 2006.01]
29/027	• • Indicating that a pulse characteristic is either above or below a predetermined value or within or beyond a predetermined range of values [3, 2006.01]	31/20	• • Preparation of articles or specimens to facilitate testing [1, 2006.01]
29/033	• • • giving an indication of the number of times this occurs [3, 2006.01]	31/24	• Testing of discharge tubes (during manufacture H01J 9/42) [1, 2, 2006.01]
		31/25	• • Testing of vacuum tubes [2, 2006.01]
		31/26	• Testing of individual semiconductor devices (testing or measuring during manufacture or treatment H01L 21/66; testing of photovoltaic devices H02S 50/10) [1, 2, 2006.01, 2014.01]
		31/265	• • Contactless testing [6, 2006.01]

G01R

- 31/27 • • Testing of devices without physical removal from the circuit of which they form part, e.g. compensating for effects due to surrounding elements [6, 2006.01]
- 31/28 • Testing of electronic circuits, e.g. by signal tracer (testing computers during standby operation or idle time G06F 11/22) [1, 2006.01]
- 31/30 • • Marginal testing, e.g. by varying supply voltage (testing computers during standby operation or idle time G06F 11/22) [1, 2, 2006.01]
- 31/302 • • Contactless testing [5, 2006.01]
- 31/303 • • • of integrated circuits (G01R 31/305-G01R 31/315 take precedence) [6, 2006.01]
- 31/304 • • • of printed or hybrid circuits (G01R 31/305-G01R 31/315 take precedence) [6, 2006.01]
- 31/305 • • • using electron beams [5, 2006.01]
- 31/306 • • • • of printed or hybrid circuits [6, 2006.01]
- 31/307 • • • • of integrated circuits [6, 2006.01]
- 31/308 • • • using non-ionising electromagnetic radiation, e.g. optical radiation [5, 2006.01]
- 31/309 • • • • of printed or hybrid circuits [6, 2006.01]
- 31/311 • • • • of integrated circuits [6, 2006.01]
- 31/312 • • • by capacitive methods [5, 2006.01]
- 31/315 • • • by inductive methods [5, 2006.01]
- 31/316 • • Testing of analog circuits [6, 2006.01]
- 31/3161 • • • Marginal testing [6, 2006.01]
- 31/3163 • • • Functional testing [6, 2006.01]
- 31/3167 • • Testing of combined analog and digital circuits [6, 2006.01]
- 31/317 • • Testing of digital circuits [6, 2006.01]
- 31/3173 • • • Marginal testing [6, 2006.01]
- 31/3177 • • • Testing of logic operation, e.g. by logic analysers [6, 2006.01]
- 31/3181 • • • Functional testing (G01R 31/3177 takes precedence) [6, 2006.01]
- 31/3183 • • • • Generation of test inputs, e.g. test vectors, patterns or sequences [6, 2006.01]
- 31/3185 • • • • Reconfiguring for testing, e.g. LSSD, partitioning [6, 2006.01]
- 31/3187 • • • • Built-in tests [6, 2006.01]
- 31/319 • • • • Tester hardware, i.e. output processing circuits [6, 2006.01]
- 31/3193 • • • • with comparison between actual response and known fault-free response [6, 2006.01]
- 31/327 • Testing of circuit interrupters, switches or circuit-breakers [6, 2006.01]
- 31/333 • • Testing of the switching capacity of high-voltage circuit-breakers [6, 2006.01]
- 31/34 • Testing dynamo-electric machines [3, 2006.01]
- 31/36 • Apparatus for testing electrical condition of accumulators or electric batteries, e.g. capacity or charge condition (accumulators combined with arrangements for measuring, testing or indicating condition H01M 10/48) [3, 2006.01]
- 31/40 • Testing power supplies (testing photovoltaic devices H02S 50/10) [6, 2006.01, 2014.01]
- 31/42 • • AC power supplies [6, 2006.01]
- 31/44 • Testing lamps [6, 2006.01]
- 33/00 Arrangements or instruments for measuring magnetic variables [1, 2006.01]**
- 33/02 • Measuring direction or magnitude of magnetic fields or magnetic flux (G01R 33/20 takes precedence) [1, 4, 2006.01]
- 33/022 • • Measuring gradient [3, 2006.01]

Note(s)

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

- 33/025 • • Compensating stray fields [3, 2006.01]
- 33/028 • • Electrodynamic magnetometers [3, 2006.01]
- 33/032 • • using magneto-optic devices, e.g. Faraday [3, 2006.01]
- 33/035 • • using superconductive devices [3, 2006.01]
- 33/038 • • using permanent magnets, e.g. balances, torsion devices [3, 2006.01]
- 33/04 • • using the flux-gate principle [1, 2006.01]
- 33/05 • • • in thin-film element [3, 2006.01]
- 33/06 • • using galvano-magnetic devices [1, 2006.01]
- 33/07 • • • Hall-effect devices [6, 2006.01]
- 33/09 • • • Magneto-resistive devices [6, 2006.01]
- 33/10 • • Plotting field distribution [1, 2006.01]
- 33/12 • Measuring magnetic properties of articles or specimens of solids or fluids (involving magnetic resonance G01R 33/20) [1, 4, 2006.01]
- 33/14 • • Measuring or plotting hysteresis curves [1, 2006.01]
- 33/16 • • Measuring susceptibility [1, 2006.01]
- 33/18 • • Measuring magnetostrictive properties [1, 2006.01]
- 33/20 • • involving magnetic resonance (medical aspects A61B 5/055; magnetic resonance gyrometers G01C 19/60) [4, 5, 2006.01]
- 33/24 • • for measuring direction or magnitude of magnetic fields or magnetic flux [4, 2006.01]
- 33/26 • • • using optical pumping [4, 2006.01]
- 33/28 • • Details of apparatus provided for in groups G01R 33/44-G01R 33/64 [5, 2006.01]
- 33/30 • • • Sample handling arrangements, e.g. sample cells, spinning mechanisms [5, 2006.01]
- 33/31 • • • • Temperature control thereof [6, 2006.01]
- 33/32 • • • Excitation or detection systems, e.g. using radiofrequency signals [5, 2006.01]
- 33/34 • • • • Constructional details, e.g. resonators [5, 2006.01]
- 33/341 • • • • • comprising surface coils [6, 2006.01]
- 33/3415 • • • • • comprising arrays of sub-coils [6, 2006.01]
- 33/343 • • • • • of slotted-tube or loop-gap type [6, 2006.01]
- 33/345 • • • • • of waveguide type (G01R 33/343 takes precedence) [6, 2006.01]
- 33/36 • • • Electrical details, e.g. matching or coupling of the coil to the receiver [5, 2006.01]
- 33/38 • • • Systems for generation, homogenisation or stabilisation of the main or gradient magnetic field [5, 2006.01]

Note(s) [6]

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

- 33/381 • • • using electromagnets [6, 2006.01]
- 33/3815 • • • • with superconducting coils, e.g. power supply therefor [6, 2006.01]
- 33/383 • • • using permanent magnets [6, 2006.01]
- 33/385 • • • using gradient magnetic field coils [6, 2006.01]
- 33/387 • • • • Compensation of inhomogeneities [6, 2006.01]
- 33/3873 • • • • • using ferromagnetic bodies [6, 2006.01]
- 33/3875 • • • • • using correction coil assemblies, e.g. active shimming [6, 2006.01]

- 33/389 • • • • Field stabilisation [6, 2006.01]
- 33/42 • • • Screening [5, 6, 2006.01]
- 33/421 • • • • of main or gradient magnetic field [6, 2006.01]
- 33/422 • • • • of the radiofrequency field [6, 2006.01]
- 33/44 • • using nuclear magnetic resonance [NMR] (G01R 33/24, G01R 33/62 take precedence) [5, 2006.01]
- 33/46 • • • NMR spectroscopy [5, 2006.01]
- 33/465 • • • • applied to biological material, e.g. *in vitro* testing [6, 2006.01]
- 33/48 • • • NMR imaging systems [5, 2006.01]
- 33/483 • • • • with selection of signal or spectra from particular regions of the volume, e.g. *in vivo* spectroscopy [6, 2006.01]
- 33/485 • • • • based on chemical shift information [6, 2006.01]
- 33/50 • • • • based on the determination of relaxation times [5, 2006.01]
- 33/54 • • • • Signal processing systems, e.g. using pulse sequences [5, 2006.01]
- 33/56 • • • • Image enhancement or correction, e.g. subtraction or averaging techniques [5, 2006.01]
- 33/561 • • • • • by reduction of the scanning time, i.e. fast acquiring systems, e.g. using echo-planar pulse sequences [6, 2006.01]
- 33/563 • • • • • of moving material, e.g. flow-contrast angiography [6, 2006.01]
- 33/565 • • • • • Correction of image distortions, e.g. due to magnetic field inhomogeneities [6, 2006.01]
- 33/567 • • • • • gated by physiological signals [6, 2006.01]
- 33/58 • • • • Calibration of imaging systems, e.g. using test probes [5, 2006.01]
- 33/60 • • using electron paramagnetic resonance (G01R 33/24, G01R 33/62 take precedence) [5, 2006.01]
- 33/62 • • using double resonance (G01R 33/24 takes precedence) [5, 2006.01]
- 33/64 • • using cyclotron resonance (G01R 33/24 takes precedence) [5, 2006.01]
- 35/00 **Testing or calibrating of apparatus covered by the other groups of this subclass [1, 2, 2006.01]**
- 35/02 • of auxiliary devices, e.g. of instrument transformers according to prescribed transformation ratio, phase angle, or wattage rating [1, 2006.01]
- 35/04 • of instruments for measuring time integral of power or current [1, 2006.01]
- 35/06 • • by stroboscopic methods [1, 2006.01]