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

WARNING
In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

1/00 Measuring force or stress, in general (measuring force due to impact G01L 5/00)
   1/005 . . [by electrical means and not provided for in G01L 1/06 - G01L 1/22]
   1/02 . . by hydraulic or pneumatic means
   1/04 . . by measuring elastic deformation of gauges, e.g. of springs
   1/042 . . . [of helical springs]
   1/044 . . . [of leaf springs]
   1/046 . . . [of spiral springs]
   1/048 . . . [of torsionally deformable elements]
   1/06 . . by measuring the permanent deformation of gauges, e.g. of compressed bodies
   1/08 . . by the use of counterbalancing forces (automatic balancing arrangements for measuring electric variables in which a force or torque representing the measured value is balanced by a force or torque representing the reference value G01R 17/08)
   1/083 . . . [using hydraulic or pneumatic counterbalancing forces]
   1/086 . . . [using electrostatic or electromagnetic counterbalancing forces]
   1/10 . . by measuring variations of frequency of stressed vibrating elements, e.g. of stressed strings (using resistance strain gauges G01L 1/22 [using piezoresistive vibrators G01L 1/183])
   1/103 . . . [optical excitation or measuring of vibrations]
   1/106 . . . [Constructional details]
   1/12 . . by measuring variations in the magnetic properties of materials resulting from the application of stress
   1/122 . . . [by using permanent magnets]
   1/125 . . . [by using magnetostriective means (magnetostriective devices in general H01L 41/12; magnetostriective sensors H01L 41/125)]
   1/127 . . . [by using inductive means (G01L 1/122, G01L 1/125 take precedence)]
   1/14 . . by measuring variations in capacitance or inductance of electrical elements, e.g. by measuring variations of frequency of electrical oscillators
   1/142 . . . [using capacitors]
   1/144 . . . [with associated circuitry (G01L 1/146 and G01L 1/148 take precedence)]
   1/146 . . . [for measuring force distributions, e.g. using force arrays (G01L 1/148 takes precedence)]
   1/148 . . . [using semiconductive material, e.g. silicon]
   1/16 . . using properties of piezo-electric devices
   1/162 . . . [using piezo-electric resonators]
   1/165 . . . [with acoustic surface waves]
   1/167 . . . [optical excitation or measuring of vibrations]
   1/18 . . using properties of piezo-resistive materials, i.e. materials of which the ohmic resistance varies according to changes in magnitude or direction of force applied to the material
   1/183 . . . [by measuring variations of frequency of vibrating piezo-resistive material]
   1/186 . . . [optical excitation or measuring of vibrations]
   1/20 . . by measuring variations in ohmic resistance of solid materials or of electrically-conductive fluids (of piezo-resistive materials G01L 1/18); by making use of electrokinetic cells, i.e. liquid-containing cells wherein an electrical potential is produced or varied upon the application of stress
   1/205 . . . [using distributed sensing elements]
   1/22 . . using resistance strain gauges
   1/2206 . . . [Special supports with preselected places to mount the resistance strain gauges; Mounting of supports]
   1/2212 . . . . . . . [particularly adapted to unbounded-wire-type strain gauges]
   1/2218 . . . . . . . [the supports being of the column type, e.g. cylindric, adapted for measuring a force along a single direction]
   1/2225 . . . . . . . [the direction being perpendicular to the central axis]
   1/2231 . . . . . . . [the supports being disc- or ring-shaped, adapted for measuring a force along a single direction]
   1/2237 . . . . . . . [the direction being perpendicular to the central axis]
   1/2243 . . . . . . . [the supports being parallelogram-shaped]
Auxiliary measures taken, or devices used, in involving measuring phase difference of two signals or pulse trains.

Devices for determining the value of power, e.g. by measuring and simultaneously multiplying the values of torque and revolutions per unit of time, by multiplying the values of tractive or propulsive force and velocity.

Devices for efficiency, i.e. the ratio of power output to power input.
the energy of projectiles for measuring the force of explosions; for measuring vehicles for measuring the tractive or propulsive power of propulsion plants for measuring axial thrust in a rotary shaft, e.g. of propellers, etc.

For measuring the nip force between rollers, using sensors fixed at one end of the flexible member using sensors located at a non-interrupted part of the flexible member using sensors inserted into the flexible member using sensors located at a non-interrupted part of the flexible member using sensors fixed at one end of the flexible member using electro-optical means for measuring a reaction force applied on a cantilever beam for measuring a reaction force applied on an element disposed between two supports, e.g. on a plurality of rollers or gliders for measuring a reaction force applied on a single support, e.g. a glider for measuring thrust of propulsive devices, e.g. of propellers, e.g. of jet-engines, etc.

(For measuring thrust of propulsive devices, e.g. of propellers, e.g. of jet-engines, etc.)

{ Force sensors associated with material gripping devices (manipulators in general G01L 5/22) } for measuring work or mechanical power for measuring release force of ski safety bindings for measuring tension in flexible members, e.g. ropes, cables, wires, threads, belts or bands using magnetic means using counterbalancing forces using piezo-electric means using photoelectric means using variations in capacitance using variations in inductance using variations in ohmic resistance using variations in ohmic resistance

WARNING

Group G01L 5/16 is impacted by reclassification into groups G01L 5/169, G01L 5/171 and G01L 5/173.

All groups listed in this Warning should be considered in order to perform a complete search.

5/162 . . . of piezoresistors

5/1623 . . . of pressure sensitive conductors (using piezoresistors G01L 5/162)

WARNING

Group G01L 5/162 is incomplete pending reclassification of documents from group G01L 5/161.

Groups G01L 5/161 and G01L 5/162 should be considered in order to perform a complete search.

5/1627 . . . of strain gauges (using piezoresistors G01L 5/162)

WARNING

Group G01L 5/1627 is incomplete pending reclassification of documents from group G01L 5/161.

Groups G01L 5/161 and G01L 5/1627 should be considered in order to perform a complete search.

5/163 . . . of potentiometers

5/164 . . . using variations in inductance

5/165 . . . using variations in capacitance

5/166 . . . using photoelectric means

5/167 . . . using piezo-electric means

5/168 . . . using counterbalancing forces

5/169 . . . using magnetic means

WARNING

Group G01L 5/169 is incomplete pending reclassification of documents from group G01L 5/16.

Groups G01L 5/16 and G01L 5/169 should be considered in order to perform a complete search.
5/171 . . using fluid means

**WARNING**

Group G01L 5/171 is incomplete pending reclassification of documents from group G01L 5/16.

Groups G01L 5/16 and G01L 5/171 should be considered in order to perform a complete search.

5/173 . . using acoustic means

**WARNING**

Group G01L 5/173 is incomplete pending reclassification of documents from group G01L 5/16.

Groups G01L 5/16 and G01L 5/173 should be considered in order to perform a complete search.

5/18 . . for measuring ratios of force
5/20 . . for measuring wheel side-thrust
5/22 . . for measuring the force applied to control members, e.g. control members of vehicles, triggers
5/221 . . (to steering wheels, e.g. for power assisted steering)
5/223 . . (to joystick controls)
5/225 . . (to foot actuated controls, e.g. brake pedals)
5/226 . . (to manipulators, e.g. the force due to gripping)
5/228 . . (using tactile array force sensors)
5/24 . . for determining value of torque or twisting moment for tightening a nut or other member which is similarly stressed
5/243 . . (using washers)
5/246 . . (using acoustic waves (for force in general)
5/26 . . for determining the characteristic of torque in relation to revolutions per unit of time
5/28 . . for testing brakes
5/282 . . (the vehicle wheels cooperating with rotatable rolls)
5/284 . . (Measuring braking-time or braking distance)
5/286 . . (Measuring deceleration)
5/288 . . (Measuring the force necessary to rotate a braked wheel)

**Measuring fluid pressure**

7/00 Measuring the steady or quasi-steady pressure of a fluid or a fluent solid material by mechanical or fluid pressure-sensitive elements ([G01L 11/04 takes precedence]; transmitting or indicating the displacement of mechanical pressure-sensitive elements by electric, e.g. photoelectric or magnetic means G01L 9/00; measuring differences of two or more pressure values G01L 13/00; measuring two or more pressure values simultaneously G01L 15/00; pressure sensitive fluidum level or volume measuring devices G01F 17/00, G01F 23/14; pressure sensitive depth meters G01C 13/008; aircraft altitude meters G01C 5/005))

7/02 . . in the form of elastically-deformable gauges
7/022 . . (constructional details, e.g. mounting of elastically-deformable gauges (G01L 7/041, G01L 7/061, G01L 7/082, G01L 7/102, G01L 7/163, G01L 7/182 take precedence))

7/024 . . (with mechanical transmitting or indicating means (G01L 7/043, G01L 7/063, G01L 7/084, G01L 7/104, G01L 7/166, G01L 7/185 take precedence))
7/026 . . (with optical transmitting or indicating means (G01L 7/045, G01L 7/065, G01L 7/086, G01L 7/106, G01L 7/187 take precedence))
7/028 . . (correcting or regulating means (G01L 7/048, G01L 7/068, G01L 7/088, G01L 7/108 take precedence))
7/04 . . in the form of flexible, deformable tubes, e.g. Bourdon gauges
7/041 . . (Construction or mounting of deformable tubes)
7/043 . . (with mechanical transmitting or indicating means)
7/045 . . (with optical transmitting or indicating means)
7/046 . . (with exhausted tubes)
7/048 . . (correcting or regulating means for flexible, deformable tubes)
7/06 . . of the bellows type
7/061 . . (construction or mounting of bellows)
7/063 . . (with mechanical transmitting or indicating means)
7/065 . . (with optical transmitting or indicating means)
7/066 . . (with exhausted bellows)
7/068 . . (correcting or regulating means for bellows)
7/08 . . of the flexible-diaphragm type
7/082 . . (construction or mounting of diaphragms (of semiconductive diaphragms G01L 9/0042))
7/084 . . (with mechanical transmitting or indicating means)
7/086 . . (with optical transmitting or indicating means)
7/088 . . (correcting or regulating means for flexible diaphragms)
7/10 . . of the capsule type
7/102 . . (construction or mounting of capsules)
7/104 . . (with mechanical transmitting or indicating means)
7/106 . . (with optical transmitting or indicating means)
7/108 . . (correcting or regulating means for capsules)
7/12 . . with exhausted chamber; Aneroid barometers
7/14 . . . . with zero-setting means
7/16 . . in the form of pistons
7/163 . . (construction or mounting of pistons)
7/166 . . (with mechanical transmitting or indicating means)
7/18 . . using liquid as the pressure-sensitive medium, e.g. liquid-column gauges
7/182 . . (constructional details, e.g. mounting)
7/185 . . (with mechanical transmitting or indicating means)
7/187 . . (with optical transmitting or indicating means)
7/20 . . involving a closed chamber above the liquid level, the chamber being exhausted or housing low-pressure gas; Liquid barometers
7/22 . . involving floats, e.g. floating bells
7/24 . . involving balances in the form of rings partly filled with liquid
Measuring fluid pressure

G01L

9/00 Measuring steady of quasi-steady pressure of fluid or fluent solid material by electric or magnetic pressure-sensitive elements (G01L 11/004 takes precedence); Transmitting or indicating the displacement of mechanical pressure-sensitive elements, used to measure the steady or quasi-steady pressure of a fluid or fluent solid material, by electric or magnetic means (measuring differences of two or more pressure values G01L 13/00; measuring two or more pressure values simultaneously G01L 15/00)

9/0001 . [Transmitting or indicating the displacement of elastically deformable gauges by electric, electro-mechanical, magnetic or electro-magnetic means (G01L 9/0026, G01L 9/0033, G01L 9/0082, G01L 9/0089, G01L 9/0091 take precedence)]

9/0002 . . . [using variations in ohmic resistance (G01L 9/0051 takes precedence)]

9/0004 . . . [using variations in inductance (G01L 9/007 takes precedence)]

9/0005 . . . [using variations in capacitance (G01L 9/0072 takes precedence)]

9/0007 . . . [using photoelectric means (G01L 9/0076 takes precedence)]

9/0008 . . . [using vibrations]

9/001 . . . [of an element not provided for in the following subgroups of G01L 9/0008]

9/0011 . . . [Optical excitation or measuring]

9/0013 . . . [of a string]

9/0014 . . . [Optical excitation or measuring of vibrations]

9/0016 . . . [of a diaphragm]

9/0017 . . . [Optical excitation or measuring]

9/0019 . . . [of a semiconductive element]

9/002 . . . [Optical excitation or measuring]

9/0022 . . . [of a piezoelectric element]

9/0023 . . . [Optical excitation or measuring]

9/0025 . . . [with acoustic surface waves]

9/0026 . [Transmitting or indicating the displacement of flexible, deformable tubes by electric, electro-mechanical, magnetic or electro-magnetic means (G01L 9/0008 takes precedence; pressure sensitive flexible, deformable tubes in general G01L 7/04)]

9/0027 . . . [using variations in ohmic resistance]

9/0029 . . . [using variations in inductance]

9/003 . . . [using variations in capacitance]

9/0032 . . . [using photoelectric means]

9/0033 . [Transmitting or indicating the displacement of bellows by electric, electro-mechanical, magnetic, or electro-magnetic means (G01L 9/0008 takes precedence; pressure sensitive bellows in general G01L 7/06)]

9/0035 . . . [using variations in ohmic resistance]

9/0036 . . . [using variations in inductance]

9/0038 . . . [using variations in capacitance]

9/0039 . . . [using photoelectric means]

9/0041 . [Transmitting or indicating the displacement of flexible diaphragms (pressure sensitive flexible diaphragms in general G01L 7/08)]

9/0042 . . . [Constructional details associated with semiconductive diaphragm sensors, e.g. etching, or constructional details of non-semiconductive diaphragms (details about the integration or bonding of piezoresistor in or on the diaphragm G01L 9/0052 and G01L 9/0057 respectively)]

9/0044 . . . [Constructional details of non-semiconductive diaphragms]

9/0045 . . . [Diaphragm associated with a buried cavity]

9/0047 . . . [Diaphragm with non uniform thickness, e.g. with grooves, bosses or continuously varying thickness]

9/0048 . . . [Details about the mounting of the diaphragm to its support or about the diaphragm edges, e.g. notches, round shapes for stress relief]

9/005 . . . [Non square semiconductive diaphragm]

9/0051 . . . [using variations in ohmic resistance]

9/0052 . . . [of piezoresistive elements (circuits therefor G01L 9/006)]

9/0054 . . . [integral with a semiconducting diaphragm]

9/0055 . . . [bonded on a diaphragm]

9/0057 . . . [of potentiometers]

9/0058 . . . [of pressure sensitive conductive solid or liquid material, e.g. carbon granules]

9/006 . . . [of metallic strain gauges fixed to an element other than the pressure transmitting diaphragm]

9/0061 . . . [using unbounded-wire-type strain gauges]

2009/0063 . . . [using a fluid coupling between strain gauge carrier and diaphragm]

9/0064 . . . [the element and the diaphragm being in intimate contact]

2009/0066 . . . [Mounting arrangements of diaphragm transducers; Details thereof, e.g. electromagnetic shielding means]

2009/0067 . . . [with additional isolating diaphragms]

2009/0069 . . . [the transducer being mounted on a flexible element]

9/007 . . . [using variations in inductance]

9/0072 . . . [using variations in capacitance]

9/0073 . . . [using a semiconductive diaphragm]

9/0075 . . . [using a ceramic diaphragm, e.g. alumina, fused quartz, glass]

9/0076 . . . [using photoelectric means]

9/0077 . . . [for measuring reflected light]

9/0079 . . . [with Fabry-Perot arrangements]

9/008 . . . [using piezoelectric devices (piezoelectric resonators G01L 9/0022; surface acoustic waves G01L 9/0025)]

9/0082 . [Transmitting or indicating the displacement of capsules by electric, electro-mechanical, magnetic, or electro-mechanical means (G01L 9/0008 takes precedence; pressure sensitive capsules in general G01L 7/101)]

9/0083 . . . [using variations in ohmic resistance]

9/0085 . . . [using variations in inductance]

9/0086 . . . [using variations in capacitance]

9/0088 . . . [using photoelectric means]

9/0089 . [Transmitting or indicating the displacement of pistons by electrical, electro-mechanical, magnetic or electro-magnetic means (G01L 9/0008 takes precedence; pressure sensitive pistons in general G01L 7/16)]
Measuring fluid pressure

11/00 Measuring steady or quasi-steady pressure of a fluid or a fluent solid material by means not provided for in group G01L 7/00 or G01L 9/00

11/002 . [by thermal means, e.g. hygrometer]
11/004 . [by the use of counterbalancing forces (measuring force by the use of counterbalancing forces G01L 1/08)]
11/006 . [hydraulic or pneumatic counterbalancing forces]
11/008 . [electrostatic or electromagnetic counterbalancing forces]
11/02 . by optical means
11/025 . (using a pressure-sensitive optical fibre)
11/04 . by acoustic means
11/06 . Ultrasonic means

13/00 Devices or apparatus for measuring differences of two or more fluid pressure values

13/02 . using elastically-deformable members or pistons as sensing elements
13/021 . [using deformable tubes]
13/023 . [using bellows]
13/025 . [using diaphragms]
13/026 . [involving double diaphragm]
13/028 . [using capsules]
13/04 . using floats or liquids as sensing elements
13/06 . using electric or magnetic pressure-sensitive elements

15/00 Devices or apparatus for measuring two or more fluid pressure values simultaneously

17/00 Devices or apparatus for measuring tyre pressure or the pressure in other inflated bodies

17/005 . [using a sensor contacting the exterior surface, e.g. for measuring deformation]

19/00 Details of, or accessories for, apparatus for measuring steady or quasi-steady pressure of a fluent medium insofar as such details or accessories are not special to particular types of pressure gauges

19/0007 . [Fluidic connecting means]
19/0015 . [using switching means]
19/0023 . [for flowthrough systems having a flexible pressure transmitting element]
19/003 . [using a detachable interface or adapter between the process medium and the pressure gauge]
19/0038 . [being part of the housing (other details about the housing G01L 19/14)]
19/0046 . [using isolation membranes G01L 13/026 and G01L 19/0645 take precedence]
19/0053 . [Pressure sensors associated with other sensors, e.g. for measuring acceleration, temperature]
19/0061 . [Electrical connection means]
19/0069 . [from the sensor to its support]
19/0076 . [using buried connections]
19/0084 . [to the outside of the housing (other details about the housing see G01L 19/14)]
19/0092 . [Pressure sensor associated with other sensors, e.g. for measuring acceleration or temperature G01L 9/025, G01L 9/045, G01L 9/065, G01L 9/085, G01L 9/105, G01L 9/125, G01L 19/02, G01L 19/04 take precedence; measuring two or more variable G01D 21/02; temperature sensors with pressure compensation G01K 1/26)]
19/02 . Arrangements for preventing, or for compensating for, effects of inclination or acceleration of the measuring device; Zero-setting means (for aneroid barometers G01L 7/14)
19/04 . Means for compensating for effects of changes of temperature, i.e. other than electric compensation (electric compensation G01L 9/025, G01L 9/045, G01L 9/065, G01L 9/085, G01L 9/105 or G01L 9/125)]
19/06 . Means for preventing overload or deleterious influence of the measured medium on the measuring device or vice versa
19/0609 . [Pressure pulsation damping arrangements]
19/0618 . [Overload protection]
Measuring fluid pressure

- Using a pendulum
- Using members oscillating about a vertical axis
- Using resonance effects of a vibrating body; Vacuum gauges of the Klumb type
- Using rotating members; Vacuum gauges of the Langmuir type (Langmuir probes for plasma diagnostics H05H 1/0006)
- By making use of radiometer action, i.e. of the pressure caused by the momentum of molecules passing from a hotter to a cooler member; Vacuum gauges of the Knudsen type
- Using torsional rotary measuring members
- Using magnetostrictive elements
- Using photoelectric means
- Using strain gauge
- By pressure-sensitive members of the piezo-electric type
- By changing capacitance or inductance
- By changing capacitance
- By electromagnetic elements
- By magnetostriuctive elements
- By photoelectric means
- By resistance strain gauges
- Combined with planimeters or integrators
- For detecting or indicating knocks in internal-combustion engines; Units comprising pressure-sensitive members combined with ignitors for firing internal-combustion engines
- For detecting or indicating knocks in internal-combustion engines
- Using piezoelectric devices
- Using magnetic or magnetostriective means
- Circuit arrangements therefor
- Using specific filtering
- Using numerical analyses
- Circuit arrangements therefor
- Specially adapted for measuring pressure in inlet or exhaust ducts of internal-combustion engines
- Details or accessories
- Cooling means
- Means for indicating consecutively positions of pistons or cranks of internal-combustion engines in combination with pressure indicators
Measuring fluid pressure

23/32  .  .  Apparatus specially adapted for recording
         pressure changes measured by indicators

25/00  Testing or calibrating of apparatus for measuring
       force, torque, work, mechanical power, or
       mechanical efficiency

25/003  [for measuring torque]
25/006  [for measuring work or mechanical power or
        mechanical efficiency]

27/00  Testing or calibrating of apparatus for measuring
       fluid pressure

27/002  [Calibrating, i.e. establishing true relation between
        transducer output value and value to be measured,
        zeroing, linearising or span error determination
        (calibration of sensors per se G01D 18/00)]
27/005  [Apparatus for calibrating pressure sensors]
27/007  [Malfunction diagnosis, i.e. diagnosing a sensor
        defect (malfunction detection of sensor not
        measuring a specific variable per se G01D 3/08)]
27/02  .  .  of indicators