

# CPC COOPERATIVE PATENT CLASSIFICATION

## G PHYSICS (NOTES omitted)

### INSTRUMENTS

#### G01 MEASURING; TESTING (NOTES omitted)

#### G01L MEASURING FORCE, STRESS, TORQUE, WORK, MECHANICAL POWER, MECHANICAL EFFICIENCY, OR FLUID PRESSURE (weighing [G01G](#))

##### 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.

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|-------|---|--------|---|
| 1/00  | Measuring force or stress, in general (measuring force due to impact <a href="#">G01L 5/00</a> )  | 1/162  | . . {using piezoelectric resonators}  |
| 1/005 | . {by electrical means and not provided for in <a href="#">G01L 1/06</a> - <a href="#">G01L 1/22</a> }  | 1/165  | . . . {with acoustic surface waves}   |
| 1/02  | . by hydraulic or pneumatic means   | 1/167  | . . . {optical excitation or measuring of vibrations}   |
| 1/04  | . by measuring elastic deformation of gauges, e.g. of springs   | 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  |
| 1/042 | . . {of helical springs}  | 1/183  | . . {by measuring variations of frequency of vibrating piezo-resistive material}  |
| 1/044 | . . {of leaf springs}   | 1/186  | . . . {optical excitation or measuring of vibrations}   |
| 1/046 | . . {of spiral springs}   | 1/20   | . by measuring variations in ohmic resistance of solid materials or of electrically-conductive fluids (of piezo-resistive materials <a href="#">G01L 1/18</a> ); by making use of electrokinetic cells, i.e. liquid-containing cells wherein an electrical potential is produced or varied upon the application of stress |
| 1/048 | . . {of torsionally deformable elements}  | 1/205  | . . {using distributed sensing elements}  |
| 1/06  | . by measuring the permanent deformation of gauges, e.g. of compressed bodies   | 1/22   | . . using resistance strain gauges  |
| 1/08  | . by the use of counterbalancing forces   | 1/2206 | . . . {Special supports with preselected places to mount the resistance strain gauges; Mounting of supports}  |
| 1/083 | . . {using hydraulic or pneumatic counterbalancing forces}  | 1/2212 | . . . . {particularly adapted to unbounded-wire-type strain gauges}   |
| 1/086 | . . {using electrostatic or electromagnetic counterbalancing forces}  | 1/2218 | . . . . {the supports being of the column type, e.g. cylindric, adapted for measuring a force along a single direction}   |
| 1/10  | . by measuring variations of frequency of stressed vibrating elements, e.g. of stressed strings (using resistance strain gauges <a href="#">G01L 1/22</a> ) | 1/2225 | . . . . . {the direction being perpendicular to the central axis}   |
| 1/103 | . . {optical excitation or measuring of vibrations}   | 1/2231 | . . . . . {the supports being disc- or ring-shaped, adapted for measuring a force along a single direction}   |
| 1/106 | . . {Constructional details}  | 1/2237 | . . . . . {the direction being perpendicular to the central axis}   |
| 1/12  | . by measuring variations in the magnetic properties of materials resulting from the application of stress  | 1/2243 | . . . . . {the supports being parallelogram-shaped}   |
| 1/122 | . . {by using permanent magnets}  | 1/225  | . . . . {Measuring circuits therefor}   |
| 1/125 | . . {by using magnetostrictive means (magnetostrictive sensors <a href="#">H10N 35/101</a> )}   | 1/2256 | . . . . {involving digital counting}  |
| 1/127 | . . {by using inductive means ( <a href="#">G01L 1/122</a> , <a href="#">G01L 1/125</a> take precedence)}   | 1/2262 | . . . . {involving simple electrical bridges}   |
| 1/14  | . by measuring variations in capacitance or inductance of electrical elements, e.g. by measuring variations of frequency of electrical oscillators          | 1/2268 | . . . . {Arrangements for correcting or for compensating unwanted effects}  |
| 1/142 | . . {using capacitors}  | 1/2275 | . . . . {for non linearity}   |
| 1/144 | . . . {with associated circuitry ( <a href="#">G01L 1/146</a> and <a href="#">G01L 1/148</a> take precedence)}  |        |   |
| 1/146 | . . . {for measuring force distributions, e.g. using force arrays ( <a href="#">G01L 1/148</a> takes precedence)}   |        |   |
| 1/148 | . . . {using semiconductive material, e.g. silicon}   |        |   |
| 1/16  | . using properties of piezoelectric devices   |        |   |

- 1/2281 . . . . {for temperature variations}
- 1/2287 . . . {constructional details of the strain gauges  
(adjustable resistors [H01C 10/00](#))}
- 1/2293 . . . . {of the semi-conductor type}
- 1/24 . . by measuring variations of optical properties of material when it is stressed, e.g. by photoelastic stress analysis {using infrared, visible light, ultraviolet}
- 1/241 . . {by photoelastic stress analysis}
- 1/242 . . {the material being an optical fibre}
- 1/243 . . . {using means for applying force perpendicular to the fibre axis}
- 1/245 . . . . {using microbending}
- 1/246 . . . {using integrated gratings, e.g. Bragg gratings}
- 1/247 . . {using distributed sensing elements, e.g. microcapsules (along a single optical fibre [G01L 1/242](#))}
- 1/248 . . {using infrared ([G01L 1/241](#), [G01L 1/242](#) take precedence)}
- 1/25 . . using wave or particle radiation, e.g. X-rays {, microwaves}, neutrons ([G01L 1/24](#) takes precedence)
- 1/255 . . {using acoustic waves, or acoustic emission ([G01L 1/10](#) and [G01L 1/16](#) take precedence)}
- 1/26 . . Auxiliary measures taken, or devices used, in connection with the measurement of force, e.g. for preventing influence of transverse components of force, for preventing overload
- 3/00 Measuring torque, work, mechanical power, or mechanical efficiency, in general**
- 3/02 . . Rotary-transmission dynamometers
- 3/04 . . wherein the torque-transmitting element comprises a torsionally-flexible shaft
- 3/045 . . . {by measuring variations of frequency of stressed vibrating elements}
- 3/06 . . . involving mechanical means for indicating
- 3/08 . . . involving optical means for indicating
- 3/10 . . . involving electric or magnetic means for indicating
- 3/101 . . . . {involving magnetic or electromagnetic means}
- 3/102 . . . . . {involving magnetostrictive means (magnetostrictive sensors [H10N 35/101](#))}
- 3/103 . . . . . {Details about the magnetic material used}
- 3/104 . . . . . {involving permanent magnets}
- 3/105 . . . . . {involving inductive means ([G01L 3/102](#), [G01L 3/104](#) take precedence)}
- 3/106 . . . . {involving electrostatic means}
- 3/107 . . . . {involving potentiometric means}
- 3/108 . . . . {involving resistance strain gauges}
- 3/109 . . . . {involving measuring phase difference of two signals or pulse trains}
- 3/12 . . . . involving photoelectric means
- 3/14 . . wherein the torque-transmitting element is other than a torsionally-flexible shaft
- 3/1407 . . . {involving springs}
- 3/1414 . . . . {using mechanical or hydraulic transducers}
- 3/1421 . . . . {using optical transducers}
- 3/1428 . . . . {using electrical transducers}
- 3/1435 . . . . . {involving magnetic or electromagnetic means}
- 3/1442 . . . . . {involving electrostatic means}
- 3/145 . . . . . {involving potentiometric means}
- 3/1457 . . . . . {involving resistance strain gauges}
- 3/1464 . . . {involving screws and nuts, screw-gears or cams}
- 3/1471 . . . . {using planet wheels or conical gears}
- 3/1478 . . . {involving hinged levers}
- 3/1485 . . . {involving fluidic means}
- 3/1492 . . . {involving electric couplings}
- 3/16 . . Rotary-absorption dynamometers, e.g. of brake type
- 3/18 . . mechanically actuated
- 3/20 . . fluid actuated
- 3/205 . . . {of the air brake type}
- 3/22 . . electrically or magnetically actuated
- 3/24 . . 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
- 3/242 . . {by measuring and simultaneously multiplying torque and velocity}
- 3/245 . . {by measuring and simultaneously multiplying pressure and velocity}
- 3/247 . . {by measuring and simultaneously multiplying tractive or propulsive force and velocity}
- 3/26 . . Devices for measuring efficiency, i.e. the ratio of power output to power input
- 5/00 Apparatus for, or methods of, measuring force, work, mechanical power, or torque, specially adapted for specific purposes**
- 5/0004 . . {Force transducers adapted for mounting in a bore of the force receiving structure ([G01L 5/0009](#) takes precedence)}
- 5/0009 . . {Force sensors associated with a bearing (testing of bearings [G01M 13/04](#))}
- 5/0014 . . . {by using capacitive sensors}
- 5/0019 . . . {by using strain gages, piezoelectric, piezo-resistive or other ohmic-resistance based sensors}
- 5/0023 . . . {by using magnetic sensors}
- 5/0028 . . {Force sensors associated with force applying means ([G01L 5/0052](#), [G01L 5/0057](#), [G01L 5/0061](#) take precedence)}
- 5/0033 . . . {applying a pulling force}
- 5/0038 . . . {applying a pushing force}
- 5/0042 . . . {applying a torque}
- 5/0047 . . {measuring forces due to residual stresses}
- 5/0052 . . {measuring forces due to impact ([G01L 5/0061](#), [G01L 5/14](#) take precedence; impact testing of structures [G01M 7/08](#); impact testing of material [G01N 3/00](#))}
- 5/0057 . . {measuring forces due to spring-shaped elements}
- 5/0061 . . {Force sensors associated with industrial machines or actuators (for the specific machine or actuator involved see relevant class, e.g. [F01](#), [F04](#), [F16](#), [B66](#), [E21](#))}
- 5/0066 . . . {Calibration arrangements}
- 5/0071 . . . {Specific indicating arrangements, e.g. of overload}
- 5/0076 . . . {Force sensors associated with manufacturing machines ([G01L 5/0066](#), [G01L 5/0071](#) and [B23Q 17/09](#) take precedence; for the specific machine or operation involved see relevant class, e.g. [B21](#) - [B42](#))}

- 5/008 . . . {Force sensors integrated in an article or a dummy workpiece}
  - 5/0085 . . . {Force sensors adapted for insertion between cooperating machine elements, e.g. for measuring the nip force between rollers}
  - 5/009 . . . {Force sensors associated with material gripping devices}
  - 5/0095 . {measuring work or mechanical power}
  - 5/03 . for measuring release force of ski safety bindings
  - 5/04 . for measuring tension in flexible members, e.g. ropes, cables, wires, threads, belts or bands  
(G01L 5/0004 takes precedence)}
  - 5/042 . . {by measuring vibrational characteristics of the flexible member}
  - 5/045 . . {for measuring the tension across the width of a band-shaped flexible member (measuring flatness G01B)}
  - 5/047 . . {Specific indicating or recording arrangements, e.g. for remote indication, for indicating overload or underload}
  - 5/06 . . using mechanical means {(G01L 5/042, G01L 5/045 take precedence)}
  - 5/08 . . using fluid means {(G01L 5/042, G01L 5/045 take precedence)}
  - 5/10 . . using electrical means
  - 5/101 . . . using sensors inserted into the flexible member
  - 5/102 . . . using sensors located at a non-interrupted part of the flexible member
  - 5/103 . . . using sensors fixed at one end of the flexible member
  - 5/105 . . . using electro-optical means
  - 5/106 . . . for measuring a reaction force applied on a cantilever beam
  - 5/107 . . . for measuring a reaction force applied on an element disposed between two supports, e.g. on a plurality of rollers or gliders
  - 5/108 . . . for measuring a reaction force applied on a single support, e.g. a glider
  - 5/12 . for measuring axial thrust in a rotary shaft, e.g. of propulsion plants
  - 5/13 . for measuring the tractive or propulsive power of vehicles
  - 5/133 . . {for measuring thrust of propulsive devices, e.g. of propellers (aeroplanes B64C; marine propulsion B63H; jet-engines F02K)}
  - 5/136 . . {Force sensors associated with a vehicle traction coupling (vehicle connections B60D; control of vehicle brakes B60T)}
  - 5/14 . for measuring the force of explosions; for measuring the energy of projectiles
  - 5/16 . for measuring several components of force
  - 5/161 . . using variations in ohmic resistance
  - 5/162 . . . of piezoresistors
  - 5/1623 . . . of pressure sensitive conductors (using piezoresistors G01L 5/162)
  - 5/1627 . . . of strain gauges (using piezoresistors G01L 5/162)
  - 5/163 . . . of potentiometers
  - 5/164 . . using variations in inductance
  - 5/165 . . using variations in capacitance
  - 5/166 . . using photoelectric means
  - 5/167 . . using piezoelectric means
  - 5/168 . . using counterbalancing forces
  - 5/169 . . using magnetic means
  - 5/171 . . using fluid means
  - 5/173 . . using acoustic means
  - 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}
  - 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 11/004 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)
  - 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	9/0008	. . {using vibrations}
7/061	. . . {construction or mounting of bellows}	9/001	. . . {of an element not provided for in the following subgroups of <a href="#">G01L 9/0008</a> }
7/063	. . . {with mechanical transmitting or indicating means}	9/0011	. . . . {Optical excitation or measuring}
7/065	. . . {with optical transmitting or indicating means}	9/0013	. . . {of a string}
7/066	. . . {with exhausted bellows}	9/0014	. . . . {Optical excitation or measuring of vibrations}
7/068	. . . {correcting or regulating means for bellows}	9/0016	. . . {of a diaphragm}
7/08	. . of the flexible-diaphragm type	9/0017	. . . . {Optical excitation or measuring}
7/082	. . . {construction or mounting of diaphragms (of semiconductive diaphragms <a href="#">G01L 9/0042</a> )}	9/0019	. . . {of a semiconductive element}
7/084	. . . {with mechanical transmitting or indicating means}	9/002	. . . . {Optical excitation or measuring}
7/086	. . . {with optical transmitting or indicating means}	9/0022	. . . {of a piezoelectric element}
7/088	. . . {correcting or regulating means for flexible diaphragms}	9/0023	. . . . {Optical excitation or measuring}
7/10	. . of the capsule type	9/0025	. . . . {with acoustic surface waves}
7/102	. . . {construction or mounting of capsules}	9/0026	. {Transmitting or indicating the displacement of flexible, deformable tubes by electric, electromechanical, magnetic or electromagnetic means ( <a href="#">G01L 9/0008</a> takes precedence)}
7/104	. . . {with mechanical transmitting or indicating means}	9/0027	. . {using variations in ohmic resistance}
7/106	. . . {with optical transmitting or indicating means}	9/0029	. . {using variations in inductance}
7/108	. . . {correcting or regulating means for capsules}	9/003	. . {using variations in capacitance}
7/12	. . . with exhausted chamber; Aneroid barometers	9/0032	. . {using photoelectric means}
7/14	. . . . with zero-setting means	9/0033	. {Transmitting or indicating the displacement of bellows by electric, electromechanical, magnetic, or electromagnetic means ( <a href="#">G01L 9/0008</a> takes precedence)}
7/16	. in the form of pistons	9/0035	. . {using variations in ohmic resistance}
7/163	. . {construction or mounting of pistons}	9/0036	. . {using variations in inductance}
7/166	. . {with mechanical transmitting or indicating means}	9/0038	. . {using variations in capacitance}
7/18	. using liquid as the pressure-sensitive medium, e.g. liquid-column gauges	9/0039	. . {using photoelectric means}
7/182	. . {constructional details, e.g. mounting}	9/0041	. {Transmitting or indicating the displacement of flexible diaphragms}
7/185	. . {with mechanical transmitting or indicating means}	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 <a href="#">G01L 9/0052</a> and <a href="#">G01L 9/0057</a> respectively)}
7/187	. . {with optical transmitting or indicating means}	9/0044	. . . {Constructional details of non-semiconductive diaphragms}
7/20	. . involving a closed chamber above the liquid level, the chamber being exhausted or housing low-pressure gas; Liquid barometers	9/0045	. . . {Diaphragm associated with a buried cavity}
7/22	. . involving floats, e.g. floating bells	9/0047	. . . {Diaphragm with non uniform thickness, e.g. with grooves, bosses or continuously varying thickness}
7/24	. . involving balances in the form of rings partly filled with liquid	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}
<b>9/00</b>	<b>Measuring steady of quasi-steady pressure of fluid or fluent solid material by electric or magnetic pressure-sensitive elements {(<a href="#">G01L 11/004</a> 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 <a href="#">G01L 13/00</a>; measuring two or more pressure values simultaneously <a href="#">G01L 15/00</a>)</b>	9/005	. . . {Non square semiconductive diaphragm}
9/0001	. {Transmitting or indicating the displacement of elastically deformable gauges by electric, electro-mechanical, magnetic or electro-magnetic means ( <a href="#">G01L 9/0026</a> , <a href="#">G01L 9/0033</a> , <a href="#">G01L 9/0082</a> , <a href="#">G01L 9/0089</a> , <a href="#">G01L 9/0091</a> take precedence)}	9/0051	. . {using variations in ohmic resistance}
9/0002	. . {using variations in ohmic resistance ( <a href="#">G01L 9/0051</a> takes precedence)}	9/0052	. . . {of piezoresistive elements ( <a href="#">circuits therefor G01L 9/06</a> )}
9/0004	. . {using variations in inductance ( <a href="#">G01L 9/007</a> takes precedence)}	9/0054	. . . . {integral with a semiconducting diaphragm}
9/0005	. . {using variations in capacitance ( <a href="#">G01L 9/0072</a> takes precedence)}	9/0055	. . . . {bonded on a diaphragm}
9/0007	. . {using photoelectric means ( <a href="#">G01L 9/0076</a> takes precedence)}	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}	9/12	. by making use of variations in capacitance {, i.e. electric circuits therefor}
2009/0067	. . . . {with additional isolating diaphragms}	9/125	. . {with temperature compensating means (non electric temperature compensating means <a href="#">G01L 19/04</a> )}
2009/0069	. . . . {the transducer being mounted on a flexible element}	9/14	. involving the displacement of magnets, e.g. electromagnets
9/007	. . {using variations in inductance}	9/16	. by making use of variations in the magnetic properties of material resulting from the application of stress
9/0072	. . {using variations in capacitance}	9/18	. by making use of electrokinetic cells, i.e. liquid-containing cells wherein an electric potential is produced or varied upon the application of stress
9/0073	. . . {using a semiconductive diaphragm}	11/00	<b>Measuring steady or quasi-steady pressure of a fluid or a fluent solid material by means not provided for in group <a href="#">G01L 7/00</a> or <a href="#">G01L 9/00</a></b>
9/0075	. . . {using a ceramic diaphragm, e.g. alumina, fused quartz, glass}	11/002	. {by thermal means, e.g. hypsometer}
9/0076	. . {using photoelectric means}	11/004	. {by the use of counterbalancing forces (measuring force by the use of counterbalancing forces <a href="#">G01L 1/08</a> )}
9/0077	. . . {for measuring reflected light}	11/006	. . {hydraulic or pneumatic counterbalancing forces}
9/0079	. . . . {with Fabry-Perot arrangements}	11/008	. . {electrostatic or electromagnetic counterbalancing forces}
9/008	. . {using piezoelectric devices (piezoelectric resonators <a href="#">G01L 9/0022</a> ; surface acoustic waves <a href="#">G01L 9/0025</a> )}	11/02	. by optical means
9/0082	. {Transmitting or indicating the displacement of capsules by electric, electromechanical, magnetic, or electromechanical means ( <a href="#">G01L 9/0008</a> takes precedence)}	11/025	. . {using a pressure-sensitive optical fibre}
9/0083	. . {using variations in ohmic resistance}	11/04	. by acoustic means
9/0085	. . {using variations in inductance}	11/06	. . Ultrasonic means
9/0086	. . {using variations in capacitance}	13/00	<b>Devices or apparatus for measuring differences of two or more fluid pressure values</b>
9/0088	. . {using photoelectric means}	13/02	. using elastically-deformable members or pistons as sensing elements
9/0089	. {Transmitting or indicating the displacement of pistons by electrical, electromechanical, magnetic or electromagnetic means ( <a href="#">G01L 9/0008</a> takes precedence)}	13/021	. . {using deformable tubes}
9/0091	. {Transmitting or indicating the displacement of liquid mediums by electrical, electromechanical, magnetic or electromagnetic means ( <a href="#">G01L 9/0008</a> takes precedence)}	13/023	. . {using bellows}
9/0092	. . {using variations in ohmic resistance}	13/025	. . {using diaphragms}
9/0094	. . {using variations in inductance}	13/026	. . . {involving double diaphragm}
9/0095	. . {using variations in capacitance}	13/028	. . {using capsules}
9/0097	. . {using photoelectric means}	13/04	. using floats or liquids as sensing elements
9/0098	. {using semiconductor body comprising at least one PN junction as detecting element}	13/06	. using electric or magnetic pressure-sensitive elements
9/02	. by making use of variations in ohmic resistance, e.g. of potentiometers {, electric circuits therefor, e.g. bridges, amplifiers or signal conditioning}	15/00	<b>Devices or apparatus for measuring two or more fluid pressure values simultaneously</b>
9/025	. . {with temperature compensating means (non electric temperature compensating means <a href="#">G01L 19/04</a> )}	17/00	<b>Devices or apparatus for measuring tyre pressure or the pressure in other inflated bodies</b>
9/04	. . of resistance-strain gauges	17/005	. {using a sensor contacting the exterior surface, e.g. for measuring deformation}
9/045	. . . {with electric temperature compensating means (non electric temperature compensating means <a href="#">G01L 19/04</a> )}	19/00	<b>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</b>
9/06	. . of piezo-resistive devices	19/0007	. {Fluidic connecting means}
9/065	. . . {with temperature compensating means (non electric temperature compensating means <a href="#">G01L 19/04</a> )}	19/0015	. . {using switching means}
9/08	. by making use of piezoelectric devices {, i.e. electric circuits therefor}	19/0023	. . {for flowthrough systems having a flexible pressure transmitting element}
9/085	. . {with temperature compensating means (non electric temperature compensating means <a href="#">G01L 19/04</a> )}	19/003	. . {using a detachable interface or adapter between the process medium and the pressure gauge}
9/10	. by making use of variations in inductance {, i.e. electric circuits therefor}	19/0038	. . {being part of the housing (other details about the housing <a href="#">G01L 19/14</a> )}
9/105	. . {with temperature compensating means (non electric temperature compensating means <a href="#">G01L 19/04</a> )}	19/0046	. . {using isolation membranes ( <a href="#">G01L 13/026</a> and <a href="#">G01L 19/0645</a> take precedence)}

2019/0053	<ul style="list-style-type: none"> <li>• {Pressure sensors associated with other sensors, e.g. for measuring acceleration, temperature}</li> </ul>	19/149	<ul style="list-style-type: none"> <li>• • {of immersion sensor, e.g. where the sensor is immersed in the measuring medium or for <u>in vivo</u> measurements, e.g. by using catheter tips}</li> </ul>
19/0061	<ul style="list-style-type: none"> <li>• {Electrical connection means}</li> </ul>	19/16	<ul style="list-style-type: none"> <li>• Dials; Mounting of dials</li> </ul>
19/0069	<ul style="list-style-type: none"> <li>• • {from the sensor to its support}</li> </ul>	<b>21/00</b>	<b>Vacuum gauges</b>
19/0076	<ul style="list-style-type: none"> <li>• • • {using buried connections}</li> </ul>	21/02	<ul style="list-style-type: none"> <li>• having a compression chamber in which gas, whose pressure is to be measured, is compressed</li> </ul>
19/0084	<ul style="list-style-type: none"> <li>• • {to the outside of the housing (other details about the housing see <a href="#">G01L 19/14</a>)}</li> </ul>	21/04	<ul style="list-style-type: none"> <li>• • wherein the chamber is closed by liquid; Vacuum gauges of the McLeod type</li> </ul>
19/0092	<ul style="list-style-type: none"> <li>• {Pressure sensor associated with other sensors, e.g. for measuring acceleration or temperature (<a href="#">G01L 9/025</a>, <a href="#">G01L 9/045</a>, <a href="#">G01L 9/065</a>, <a href="#">G01L 9/085</a>, <a href="#">G01L 9/105</a>, <a href="#">G01L 9/125</a>, <a href="#">G01L 19/02</a>, <a href="#">G01L 19/04</a> take precedence; measuring two or more variable <a href="#">G01D 21/02</a>; temperature sensors with pressure compensation <a href="#">G01K 1/26</a>)}</li> </ul>	21/06	<ul style="list-style-type: none"> <li>• • • actuated by rotating or inverting the measuring device</li> </ul>
19/02	<ul style="list-style-type: none"> <li>• Arrangements for preventing, or for compensating for, effects of inclination or acceleration of the measuring device; Zero-setting means (for aneroid barometers <a href="#">G01L 7/14</a>)</li> </ul>	21/08	<ul style="list-style-type: none"> <li>• by measuring variations in the transmission of acoustic waves through the medium, the pressure of which is to be measured</li> </ul>
19/04	<ul style="list-style-type: none"> <li>• Means for compensating for effects of changes of temperature {, i.e. other than electric compensation}</li> </ul>	21/10	<ul style="list-style-type: none"> <li>• by measuring variations in the heat conductivity of the medium, the pressure of which is to be measured</li> </ul>
19/06	<ul style="list-style-type: none"> <li>• Means for preventing overload or deleterious influence of the measured medium on the measuring device or <u>vice versa</u></li> </ul>	21/12	<ul style="list-style-type: none"> <li>• • measuring changes in electric resistance of measuring members, e.g. of filaments; Vacuum gauges of the Pirani type</li> </ul>
19/0609	<ul style="list-style-type: none"> <li>• • {Pressure pulsation damping arrangements}</li> </ul>	21/14	<ul style="list-style-type: none"> <li>• • using thermocouples</li> </ul>
19/0618	<ul style="list-style-type: none"> <li>• • {Overload protection}</li> </ul>	21/16	<ul style="list-style-type: none"> <li>• by measuring variation of frictional resistance of gases</li> </ul>
19/0627	<ul style="list-style-type: none"> <li>• • {Protection against aggressive medium in general}</li> </ul>	21/18	<ul style="list-style-type: none"> <li>• • using a pendulum</li> </ul>
19/0636	<ul style="list-style-type: none"> <li>• • • {using particle filters}</li> </ul>	21/20	<ul style="list-style-type: none"> <li>• • using members oscillating about a vertical axis</li> </ul>
19/0645	<ul style="list-style-type: none"> <li>• • • {using isolation membranes, specially adapted for protection}</li> </ul>	21/22	<ul style="list-style-type: none"> <li>• • using resonance effects of a vibrating body; Vacuum gauges of the Klumb type</li> </ul>
19/0654	<ul style="list-style-type: none"> <li>• • • {against moisture or humidity}</li> </ul>	21/24	<ul style="list-style-type: none"> <li>• • using rotating members; Vacuum gauges of the Langmuir type</li> </ul>
19/0663	<ul style="list-style-type: none"> <li>• • {Flame protection; Flame barriers}</li> </ul>	21/26	<ul style="list-style-type: none"> <li>• 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</li> </ul>
19/0672	<ul style="list-style-type: none"> <li>• • {Leakage or rupture protection or detection}</li> </ul>	21/28	<ul style="list-style-type: none"> <li>• • using torsional rotary measuring members</li> </ul>
19/0681	<ul style="list-style-type: none"> <li>• • {Protection against excessive heat}</li> </ul>	21/30	<ul style="list-style-type: none"> <li>• by making use of ionisation effects</li> </ul>
19/069	<ul style="list-style-type: none"> <li>• • {Protection against electromagnetic or electrostatic interferences}</li> </ul>	21/32	<ul style="list-style-type: none"> <li>• • using electric discharge tubes with thermionic cathodes</li> </ul>
19/08	<ul style="list-style-type: none"> <li>• Means for indicating or recording, e.g. for remote indication</li> </ul>	21/34	<ul style="list-style-type: none"> <li>• • using electric discharge tubes with cold cathodes</li> </ul>
19/083	<ul style="list-style-type: none"> <li>• • {electrical}</li> </ul>	21/36	<ul style="list-style-type: none"> <li>• • using radioactive substances</li> </ul>
19/086	<ul style="list-style-type: none"> <li>• • {for remote indication}</li> </ul>	<b>23/00</b>	<b>Devices or apparatus for measuring or indicating or recording rapid changes, such as oscillations, in the pressure of steam, gas, or liquid; Indicators for determining work or energy of steam, internal-combustion, or other fluid-pressure engines from the condition of the working fluid</b>
19/10	<ul style="list-style-type: none"> <li>• • mechanical</li> </ul>	23/02	<ul style="list-style-type: none"> <li>• mechanically indicating or recording and involving loaded or return springs</li> </ul>
19/12	<ul style="list-style-type: none"> <li>• • Alarms or signals</li> </ul>	23/04	<ul style="list-style-type: none"> <li>• involving means subjected to known counteracting pressure</li> </ul>
19/14	<ul style="list-style-type: none"> <li>• Housings {(<a href="#">G01L 19/0007</a>, <a href="#">G01L 19/0084</a>, <a href="#">G01L 19/0092</a>, <a href="#">G01L 19/04</a>, <a href="#">G01L 19/06</a> take precedence)}</li> </ul>	23/06	<ul style="list-style-type: none"> <li>• Indicating or recording by optical means</li> </ul>
19/141	<ul style="list-style-type: none"> <li>• • {Monolithic housings, e.g. molded or one-piece housings}</li> </ul>	23/08	<ul style="list-style-type: none"> <li>• operated electrically {(<a href="#">G01L 23/22</a> takes precedence)}</li> </ul>
19/142	<ul style="list-style-type: none"> <li>• • {Multiple part housings}</li> </ul>	23/085	<ul style="list-style-type: none"> <li>• • {by measuring fluctuations of starter motor current or of battery voltage (battery testing arrangements <a href="#">G01R 31/36</a>; testing of electrical installation on transport means <a href="#">G01R 31/005</a>; battery testing arrangements <a href="#">G01R 31/36</a>)}</li> </ul>
19/143	<ul style="list-style-type: none"> <li>• • • {Two part housings}</li> </ul>	23/10	<ul style="list-style-type: none"> <li>• • by pressure-sensitive members of the piezoelectric type</li> </ul>
19/144	<ul style="list-style-type: none"> <li>• • • {with dismountable parts, e.g. for maintenance purposes or for ensuring sterile conditions (for detachable interface or adapter between the process medium and the pressure gauge <a href="#">G01L 19/003</a>)}</li> </ul>	23/12	<ul style="list-style-type: none"> <li>• • by changing capacitance or inductance</li> </ul>
19/145	<ul style="list-style-type: none"> <li>• • {with stress relieving means}</li> </ul>	23/125	<ul style="list-style-type: none"> <li>• • • {by changing capacitance}</li> </ul>
19/146	<ul style="list-style-type: none"> <li>• • • {using flexible element between the transducer and the support}</li> </ul>	23/14	<ul style="list-style-type: none"> <li>• • by electromagnetic elements</li> </ul>
19/147	<ul style="list-style-type: none"> <li>• • {Details about the mounting of the sensor to support or covering means}</li> </ul>	23/145	<ul style="list-style-type: none"> <li>• • • {by magnetostrictive elements}</li> </ul>
19/148	<ul style="list-style-type: none"> <li>• • {Details about the circuit board integration, e.g. integrated with the diaphragm surface or encapsulation}</li> </ul>	23/16	<ul style="list-style-type: none"> <li>• • by photoelectric means</li> </ul>

- 23/18 . . by resistance strain gauges
- 23/20 . combined with planimeters or integrators
- 23/22 . for detecting or indicating knocks in internal-combustion engines; Units comprising pressure-sensitive members combined with ignitors for firing internal-combustion engines
- 23/221 . . {for detecting or indicating knocks in internal combustion engines}
- 23/222 . . . {using piezoelectric devices}
- 23/223 . . . {using magnetic or magnetostrictive means}
- 23/225 . . . {circuit arrangements therefor}
- 23/226 . . . . {using specific filtering}
- 23/227 . . . . {using numerical analyses}
- 2023/228 . . {circuit arrangements therefor}
- 23/24 . {specially adapted} for measuring pressure in inlet or exhaust ducts of internal-combustion engines
- 23/26 . Details or accessories
- 23/28 . . Cooling means
- 23/30 . . Means for indicating consecutively positions of pistons or cranks of internal-combustion engines in combination with pressure indicators
- 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}
- 27/005 . . {Apparatus for calibrating pressure sensors}
- 27/007 . {Malfunction diagnosis, i.e. diagnosing a sensor defect}
- 27/02 . of indicators