

CPC COOPERATIVE PATENT CLASSIFICATION

G PHYSICS (NOTES omitted)

INSTRUMENTS

G01 MEASURING; TESTING (NOTES omitted)

G01C MEASURING DISTANCES, LEVELS OR BEARINGS; SURVEYING; NAVIGATION; GYROSCOPIC INSTRUMENTS; PHOTOGRAMMETRY OR VIDEOGRAMMETRY (measuring liquid level [G01F](#); radio navigation, determining distance or velocity by use of propagation effects, e.g. Doppler effects, propagation time, of radio waves, analogous arrangements using other waves [G01S](#))

NOTES

1. In this subclass, the following term is used with the meaning indicated:
"navigation" means determining the position and course of land vehicles, ships, aircraft, and space vehicles.
2. 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 angles | 3/22 | • using a parallactic triangle with variable angles and a base of fixed length at, near, or formed by the object |
| 1/02 | • Theodolites | | |
| 1/04 | • . combined with cameras | | |
| 1/06 | • . Arrangements for reading scales | 3/24 | • using a parallactic triangle with fixed angles and a base of variable length in the observation station, e.g. in the instrument |
| 1/08 | • Sextants | | |
| 1/10 | • . including an artificial horizon (G01C 1/14 takes precedence) | 3/26 | • using a parallactic triangle with fixed angles and a base of variable length, at, near, or formed by the object |
| 1/12 | • . . with a stabilised mirror | | |
| 1/14 | • . Periscopic sextants | 3/28 | • . with provision for reduction of the distance into the horizontal plane |
| 3/00 | Measuring distances in line of sight; Optical rangefinders (tapes, chains or wheels for measuring length G01B 3/00; active triangulation systems, i.e. using the transmission and reflection of electromagnetic waves other than radio waves, G01S 17/48) | 3/30 | • . . with adaptation to the measurement of the height of an object, e.g. tachometers |
| 3/02 | • Details | 3/32 | • by focusing the object, e.g. on a ground glass screen |
| 3/04 | • . Adaptation of rangefinders for combination with telescopes or binoculars | 5/00 | Measuring height; Measuring distances transverse to line of sight; Levelling between separated points; Surveyors' levels (G01C 3/20, G01C 3/30 take precedence) |
| 3/06 | • . Use of electric means to obtain final indication | 5/005 | • {altimeters for aircraft (G01C 5/02 , G01C 5/06 take precedence)} |
| 3/08 | • . . Use of electric radiation detectors | 5/02 | • involving automatic stabilisation of the line of sight |
| 3/085 | • . . . {with electronic parallax measurement} | 5/04 | • Hydrostatic levelling, i.e. by flexibly interconnected liquid containers at separated points |
| 3/10 | • using a parallactic triangle with variable angles and a base of fixed length in the observation station, e.g. in the instrument | 5/06 | • by using barometric means |
| 3/12 | • . with monocular observation at a single point, e.g. coincidence type (G01C 3/20 takes precedence) | 7/00 | Tracing profiles (by photogrammetry or videogrammetry G01C 11/00) |
| 3/14 | • . with binocular observation at a single point, e.g. stereoscopic type (G01C 3/20 takes precedence) | 7/02 | • of land surfaces |
| 3/16 | • . . Measuring marks | 7/04 | • . involving a vehicle which moves along the profile to be traced |
| 3/18 | • . with one observation point at each end of the base (G01C 3/20 takes precedence) | 7/06 | • of cavities, e.g. tunnels |
| 3/20 | • . with adaptation to the measurement of the height of an object | 9/00 | Measuring inclination, e.g. by clinometers, by levels |
| | | 9/005 | • {specially adapted for use in aircraft} |

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|--------------|--|--------------|---|
| 9/02 | . Details | 11/24 | with optical-mechanical projection (G01C 11/26 takes precedence) |
| 9/04 | . . Transmission means between sensing element and final indicator for giving an enlarged reading | 11/26 | using computers to control the position of the pictures |
| 9/06 | . . Electric or photoelectric indication or reading means | 11/28 | Special adaptation for recording picture point data, e.g. for profiles |
| 2009/062 | . . . {capacitive} | 11/30 | . . by triangulation |
| 2009/064 | . . . {inductive} | 11/32 | . . . Radial triangulation |
| 2009/066 | . . . {optical} | 11/34 | . . . Aerial triangulation |
| 2009/068 | . . . {resistive} | 11/36 | . Videogrammetry, i.e. electronic processing of video signals {from a single source or } from different sources to give parallax or range information |
| 9/08 | . . Means for compensating acceleration forces due to movement of instrument | 13/00 | Surveying specially adapted to open water, e.g. sea, lake, river or canal (liquid level metering G01F) |
| 9/10 | . by using rolling bodies {, e.g. spheres, cylinders, mercury droplets} | 13/002 | . {Measuring the movement of open water} |
| 2009/102 | . . {cylinders} | 13/004 | . . {vertical movement} |
| 2009/105 | . . {mercury droplets} | 13/006 | . . {horizontal movement} |
| 2009/107 | . . {spheres} | 13/008 | . {measuring depth of open water} |
| 9/12 | . by using a single pendulum {plumb lines G01C 15/10 } | 15/00 | Surveying instruments or accessories not provided for in groups G01C 1/00 - G01C 13/00 |
| 9/14 | . . movable in more than one direction | 15/002 | . {Active optical surveying means (optical plumbing G01C 15/105)} |
| 9/16 | . by using more than one pendulum | 15/004 | . . {Reference lines, planes or sectors} |
| 9/18 | . by using liquids | 15/006 | . . . {Detectors therefor} |
| 2009/182 | . . {conductive} | 15/008 | . . {combined with inclination sensor} |
| 2009/185 | . . {dielectric} | 15/02 | . Means for marking measuring points |
| 2009/187 | . . {magnetic, e.g. ferromagnetic} | 15/04 | . . Permanent marks; Boundary markers |
| 9/20 | . . the indication being based on the inclination of the surface of a liquid relative to its container | 15/06 | . . Surveyors' staffs; Movable markers |
| 9/22 | . . . with interconnected containers in fixed relation to each other | 15/08 | . . . Plumbing or registering staffs or markers over ground marks |
| 9/24 | . . in closed containers partially filled with liquid so as to leave a gas bubble | 15/10 | . Plumb lines |
| 9/26 | . . . Details | 15/105 | . . {Optical plumbing} |
| 9/28 | Mountings | 15/12 | . Instruments for setting out fixed angles, e.g. right angles |
| 9/30 | Means for adjusting dimensions of bubble | 15/14 | . Artificial horizons |
| 9/32 | Means for facilitating the observation of the position of the bubble, e.g. illuminating means | 17/00 | Compasses; Devices for ascertaining true or magnetic north for navigation or surveying purposes (using gyroscopic effect G01C 19/00) |
| 9/34 | . . . of the tubular type, i.e. for indicating the level in one direction only | 17/02 | . Magnetic compasses |
| 9/36 | . . . of the spherical type, i.e. for indicating the level in all directions | 17/04 | . . with north-seeking magnetic elements, e.g. needles |
| 11/00 | Photogrammetry or videogrammetry, e.g. stereogrammetry; Photographic surveying | 17/06 | . . . Suspending magnetic elements |
| 11/02 | . Picture taking arrangements specially adapted for photogrammetry or photographic surveying, e.g. controlling overlapping of pictures | 17/08 | by flotation |
| 11/025 | . . {by scanning the object} | 17/10 | . . . Comparing observed direction with north indication |
| 11/04 | . Interpretation of pictures | 17/12 | by sighting means, e.g. for surveyors' compasses |
| 11/06 | . . by comparison of two or more pictures of the same area | 17/14 | by reference marks, e.g. for ships' compasses |
| 11/08 | . . . the pictures not being supported in the same relative position as when they were taken | 17/16 | by clinometers, e.g. for determining dip or strike of geological strata |
| 11/10 | using computers to control the position of the pictures | 17/18 | . . . Supporting or suspending compasses, e.g. by gimbal, by flotation |
| 11/12 | . . . the pictures being supported in the same relative position as when they were taken | 17/20 | . . . Observing the compass card or needle |
| 11/14 | with optical projection (G01C 11/26 takes precedence) | 17/22 | by projection |
| 11/16 | in a common plane | 17/24 | Illumination |
| 11/18 | involving scanning means | 17/26 | using electric pick-offs for transmission to final indicator, e.g. photocell |
| 11/20 | in separate planes | 17/28 | . . Electromagnetic compasses (with north seeking magnetic elements and having electric pick-offs G01C 17/26) |
| 11/22 | with mechanical projection (G01C 11/26 takes precedence) | 17/30 | . . . Earth-inductor compasses |

- 17/32 . . . Electron compasses
- 17/34 . Sun- or astro-compasses
- 17/36 . Repeaters for remote indication of readings of a master compass
- 17/38 . Testing, calibrating, or compensating of compasses
- 19/00 Gyroscopes; Turn-sensitive devices using vibrating masses; Turn-sensitive devices without moving masses; Measuring angular rate using gyroscopic effects**
 - 19/005 . {Measuring angular rate using gyroscopic effects}
 - 19/02 . Rotary gyroscopes
 - 19/025 . . {Gyroscopes functioning for short periods}
 - 19/04 . . Details
 - 19/06 . . . Rotors
 - 19/065 {Means for measuring or controlling of rotors' angular velocity}
 - 19/08 electrically driven ([G01C 19/14 takes precedence](#))
 - 19/10 Power supply
 - 19/12 fluid driven ([G01C 19/14 takes precedence](#))
 - 19/14 Fluid rotors
 - 19/16 Suspensions; Bearings
 - 19/18 providing movement of rotor with respect to its rotational axes ([G01C 19/20](#), [G01C 19/24 take precedence](#))
 - 19/20 in fluid
 - 19/22 torsional
 - 19/24 using magnetic or electrostatic fields
 - 19/26 Caging, i.e. immobilising moving parts, e.g. for transport
 - 19/28 Pick-offs, i.e. devices for taking-off an indication of the displacement of the rotor axis
 - 19/30 Erection devices, i.e. devices for restoring rotor axis to a desired position ([for instrument indicating the vertical G01C 19/46](#))
 - 19/32 Indicating or recording means specially adapted for rotary gyroscopes
 - 19/34 for indicating a direction in the horizontal plane, e.g. directional gyroscopes
 - 19/36 with north-seeking action by magnetic means, e.g. gyromagnetic compasses
 - 19/38 with north-seeking action by other than magnetic means, e.g. gyrocompasses using earth's rotation
 - 19/40 for control by signals from a master compass, i.e. repeater compasses
 - 19/42 for indicating rate of turn; for integrating rate of turn
 - 19/44 for indicating the vertical
 - 19/46 Erection devices for restoring rotor axis to a desired position
 - 19/48 operating by electrical means ([G01C 19/54 takes precedence](#))
 - 19/50 operating by mechanical means ([G01C 19/54 takes precedence](#))
 - 19/52 operating by fluid means ([G01C 19/54 takes precedence](#))
 - 19/54 with correction for acceleration forces due to movement of instrument
 - 19/56 Turn-sensitive devices using vibrating masses, e.g. vibratory angular rate sensors based on Coriolis forces
- 19/5607 . . . using vibrating tuning forks ([double-ended tuning forks using planar vibrating masses suspended at opposite ends G01C 19/5719](#))
- 19/5614 Signal processing
- 19/5621 the devices involving a micromechanical structure
- 19/5628 Manufacturing; Trimming; Mounting; Housings
- 19/5635 using vibrating wires or strings
- 19/5642 using vibrating bars or beams
- 19/5649 Signal processing
- 19/5656 the devices involving a micromechanical structure
- 19/5663 Manufacturing; Trimming; Mounting; Housings
- 19/567 using the phase shift of a vibration node or antinode
- 19/5677 of essentially two-dimensional vibrators, e.g. ring-shaped vibrators
- 19/5684 the devices involving a micromechanical structure
- 19/5691 of essentially three-dimensional vibrators, e.g. wine glass-type vibrators
- 19/5698 using acoustic waves, e.g. surface acoustic wave gyros
- 19/5705 using masses driven in reciprocating rotary motion about an axis
- 19/5712 the devices involving a micromechanical structure
- 19/5719 using planar vibrating masses driven in a translation vibration along an axis
- 19/5726 Signal processing
- 19/5733 Structural details or topology
- 19/574 the devices having two sensing masses in anti-phase motion
- 19/5747 each sensing mass being connected to a driving mass, e.g. driving frames
- 19/5755 the devices having a single sensing mass
- 19/5762 the sensing mass being connected to a driving mass, e.g. driving frames
- 19/5769 Manufacturing; Mounting; Housings
- 19/5776 Signal processing not specific to any of the devices covered by groups [G01C 19/5607](#) - [G01C 19/5719](#)
- 19/5783 Mountings or housings not specific to any of the devices covered by groups [G01C 19/5607](#) - [G01C 19/5719](#)
- 19/58 . . . Turn-sensitive devices without moving masses
- 19/60 . . . Electronic or nuclear magnetic resonance gyrometers
- 19/62 with optical pumping
- 19/64 Gyrometers using the Sagnac effect, i.e. rotation-induced shifts between counter-rotating electromagnetic beams
- 19/66 Ring laser gyrometers
- 19/661 {details}
- 19/662 {signal readout; dither compensators}
- 19/664 {means for removing the dither signal}
- 19/665 {control of the cavity}
- 19/667 {using a multioscillator ring laser}
- 19/668 {Assemblies for measuring along different axes, e.g. triads}
- 19/68 Lock-in prevention

- 19/70 by mechanical means
- 19/72 . . . with counter-rotating light beams in a passive ring, e.g. fibre laser gyrometers
- 19/721 {Details}
- 19/722 {of the mechanical construction}
- 19/723 {Heterodyning fibre optic gyrometers}
- 19/725 {using nxn optical couplers, e.g. 3x3 couplers}
- 19/726 {Phase nulling gyrometers, i.e. compensating the Sagnac phase shift in a closed loop system}
- 19/727 {using a passive ring resonator}
- 19/728 {Assemblies for measuring along different axes, e.g. triads}
- 21/00** **Navigation; Navigational instruments not provided for in groups [G01C 1/00](#) - [G01C 19/00](#) (measuring distance traversed on the ground by a vehicle [G01C 22/00](#); control of position, course, altitude or attitude of vehicles [G05D 1/00](#); traffic control systems for road vehicles involving transmission of navigation instructions to the vehicle [G08G 1/0968](#))**
- 21/005 . {with correlation of navigation data from several sources, e.g. map or contour matching ([G01C 21/30](#) takes precedence)}
- 21/02 . by astronomical means ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/025 . . {with the use of startrackers}
- 21/04 . by terrestrial means ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/06 . . involving measuring of drift angle; involving correction for drift
- 21/08 . . involving use of the magnetic field of the earth
- 21/10 . by using measurements of speed or acceleration ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/12 . . executed aboard the object being navigated; Dead reckoning
- 21/14 . . . by recording the course traversed by the object ([G01C 21/16](#) takes precedence)
- 21/16 . . . by integrating acceleration or speed, i.e. inertial navigation
- 21/165 {combined with non-inertial navigation instruments}
- 21/1652 {with ranging devices, e.g. LIDAR or RADAR}
- 21/1654 {with electromagnetic compass}
- 21/1656 {with passive imaging devices, e.g. cameras}
- 21/166 {Mechanical, construction or arrangement details of inertial navigation systems}
- 21/18 Stabilised platforms, e.g. by gyroscope
- 21/183 {Compensation of inertial measurements, e.g. for temperature effects}
- 21/185 {for gravity}
- 21/188 {for accumulated errors, e.g. by coupling inertial systems with absolute positioning systems}
- 21/20 . Instruments for performing navigational calculations ([G01C 21/24](#), [G01C 21/26](#) take precedence)
- 21/203 . . {Specially adapted for sailing ships}
- 21/206 . . {specially adapted for indoor navigation}
- 21/22 . . Plotting boards
- 21/24 . specially adapted for cosmonautical navigation
- 21/26 . specially adapted for navigation in a road network
- 21/265 . . {constructional aspects of navigation devices, e.g. housings, mountings, displays ([G01C 21/3688](#) takes precedence)}
- 21/28 . . with correlation of data from several navigational instruments
- 21/30 . . . Map- or contour-matching
- 21/32 Structuring or formatting of map data
- 21/34 . . Route searching; Route guidance
- 21/3407 . . . {specially adapted for specific applications}
- 21/3415 {Dynamic re-routing, e.g. recalculating the route when the user deviates from calculated route or after detecting real-time traffic data or accidents}
- 21/3423 {Multimodal routing, i.e. combining two or more modes of transportation, where the modes can be any of, e.g. driving, walking, cycling, public transport}
- 21/343 {Calculating itineraries, i.e. routes leading from a starting point to a series of categorical destinations using a global route restraint, round trips, touristic trips ([travelling salesman problem \[G06Q 10/04\]\(#\); optimisation of routes \[G06Q 10/047\]\(#\)](#))}
- 21/3438 {Rendez-vous, i.e. searching a destination where several users can meet, and the routes to this destination for these users; Ride sharing, i.e. searching a route such that at least two users can share a vehicle for at least part of the route}
- 21/3446 . . . {Details of route searching algorithms, e.g. Dijkstra, A*, arc-flags, using precalculated routes}
- 21/3453 . . . {Special cost functions, i.e. other than distance or default speed limit of road segments}
- 21/3461 {Preferred or disfavoured areas, e.g. dangerous zones, toll or emission zones, intersections, manoeuvre types, segments such as motorways, toll roads, ferries}
- 21/3469 {Fuel consumption; Energy use; Emission aspects}
- 21/3476 {using point of interest [POI] information, e.g. a route passing visible POIs}
- 21/3484 {Personalized, e.g. from learned user behaviour or user-defined profiles}
- 21/3492 {employing speed data or traffic data, e.g. real-time or historical ([traffic control systems for road vehicles involving transmission of navigation instructions to the vehicle \[G08G 1/0968\]\(#\)](#))}
- 21/36 . . . Input/output arrangements for on-board computers
- 21/3602 {Input other than that of destination using image analysis, e.g. detection of road signs, lanes, buildings, real preceding vehicles using a camera}
- 21/3605 {Destination input or retrieval}
- 21/3608 {using speech input, e.g. using speech recognition}
- 21/3611 {using character input or menus, e.g. menus of POIs ([character input methods in general \[G06F 3/0233\]\(#\)](#))}
- 21/3614 {through interaction with a road map, e.g. selecting a POI icon on a road map}

- 21/3617 {using user history, behaviour, conditions or preferences, e.g. predicted or inferred from previous use or current movement}
- 21/362 {received from an external device or application, e.g. PDA, mobile phone or calendar application}
- 21/3623 {using a camera or code reader, e.g. for optical or magnetic codes}
- 21/3626 {Details of the output of route guidance instructions (traffic control systems for road vehicles involving transmission of navigation instructions to the vehicle [G08G 1/0968](#))}
- 21/3629 {Guidance using speech or audio output, e.g. text-to-speech (text to speech systems per se [G10L 13/00](#))}
- 21/3632 {Guidance using simplified or iconic instructions, e.g. using arrows ([G01C 21/365](#) takes precedence)}
- 21/3635 {Guidance using 3D or perspective road maps}
- 21/3638 {including 3D objects and buildings (three dimensional [3D] modelling, e.g. data description of 3D objects [G06T 17/00](#); geographic models [G06T 17/05](#))}
- 21/3641 {Personalized guidance, e.g. limited guidance on previously travelled routes}
- 21/3644 {Landmark guidance, e.g. using POIs or conspicuous other objects}
- 21/3647 {Guidance involving output of stored or live camera images or video streams}
- 21/365 {Guidance using head up displays or projectors, e.g. virtual vehicles or arrows projected on the windscreen or on the road itself}
- 21/3652 {Guidance using non-audiovisual output, e.g. tactile, haptic or electric stimuli}
- 21/3655 {Timing of guidance instructions}
- 21/3658 {Lane guidance}
- 21/3661 {Guidance output on an external device, e.g. car radio}
- 21/3664 {Details of the user input interface, e.g. buttons, knobs or sliders, including those provided on a touch screen; remote controllers; input using gestures}
- 21/3667 {Display of a road map ([G01C 21/3614](#) takes precedence; guidance using 3D or perspective road maps [G01C 21/3635](#))}
- 21/367 {Details, e.g. map scale, orientation, zooming, illumination, level of detail, scrolling of road map or positioning of current position marker}
- 21/3673 {Labelling using text of road map data items, e.g. road names, POI names}
- 21/3676 {Overview of the route on the road map}
- 21/3679 {Retrieval, searching and output of POI information, e.g. hotels, restaurants, shops, filling stations, parking facilities ([G01C 21/3611](#) takes precedence)}
- 21/3682 {output of POI information on a road map ([G01C 21/3614](#), [G01C 21/3685](#) take precedence)}
- 21/3685 {the POI's being parking facilities}
- 21/3688 {Systems comprising multiple parts or multiple output devices (not client-server), e.g. detachable faceplates, key fobs or multiple output screens}
- 21/3691 {Retrieval, searching and output of information related to real-time traffic, weather, or environmental conditions (arrangements for giving variable traffic instructions [G08G 1/09](#))}
- 21/3694 {Output thereof on a road map}
- 21/3697 {Output of additional, non-guidance related information, e.g. low fuel level ([G01C 21/3679](#) takes precedence)}
- 21/38 {Electronic maps specially adapted for navigation; Updating thereof}
- 21/3804 {Creation or updating of map data}
- 21/3807 {characterised by the type of data}
- 21/3811 {Point data, e.g. Point of Interest [POI]}
- 21/3815 {Road data}
- 21/3819 {Road shape data, e.g. outline of a route}
- 21/3822 {Road feature data, e.g. slope data}
- 21/3826 {Terrain data}
- 21/383 {Indoor data}
- 21/3833 {characterised by the source of data}
- 21/3837 {Data obtained from a single source}
- 21/3841 {Data obtained from two or more sources, e.g. probe vehicles}
- 21/3844 {Data obtained from position sensors only, e.g. from inertial navigation}
- 21/3848 {Data obtained from both position sensors and additional sensors}
- 21/3852 {Data derived from aerial or satellite images}
- 21/3856 {Data obtained from user input}
- 21/3859 {Differential updating map data}
- 21/3863 {Structures of map data}
- 21/3867 {Geometry of map features, e.g. shape points, polygons or for simplified maps}
- 21/387 {Organisation of map data, e.g. version management or database structures}
- 21/3874 {Structures specially adapted for data searching and retrieval}
- 21/3878 {Hierarchical structures, e.g. layering}
- 21/3881 {Tile-based structures}
- 21/3885 {Transmission of map data to client devices; Reception of map data by client devices}
- 21/3889 {Transmission of selected map data, e.g. depending on route}
- 21/3893 {Transmission of map data from distributed sources, e.g. from roadside stations}
- 21/3896 {Transmission of map data from central databases}
- 22/00** **Measuring distance traversed on the ground by vehicles, persons, animals or other moving solid bodies, e.g. using odometers, using pedometers**
- 22/002 {for cycles}
- 22/004 {for golf carts }
- 22/006 {Pedometers}
- 22/008 {for skates}
- 22/02 by conversion into electric waveforms and subsequent integration, e.g. using tachometer generator (([G01C 22/002](#), [G01C 22/004](#), [G01C 22/006](#) take precedence))

G01C

- 22/025 . . {Differential odometers}
- 23/00 **Combined instruments indicating more than one navigational value, e.g. for aircraft; Combined measuring devices for measuring two or more variables of movement, e.g. distance, speed or acceleration**
- 23/005 . {Flight directors (indicating arrangements specially adapted for rotary gyroscopes [G01C 19/32](#))}
- 25/00 **Manufacturing, calibrating, cleaning, or repairing instruments or devices referred to in the other groups of this subclass (testing, calibrating or compensating compasses [G01C 17/38](#))**
- 25/005 . {initial alignment, calibration or starting-up of inertial devices}