

CPC COOPERATIVE PATENT CLASSIFICATION

B PERFORMING OPERATIONS; TRANSPORTING

(NOTES omitted)

TRANSPORTING

B60 VEHICLES IN GENERAL

(NOTE omitted)

B60W CONJOINT CONTROL OF VEHICLE SUB-UNITS OF DIFFERENT TYPE OR DIFFERENT FUNCTION; CONTROL SYSTEMS SPECIALLY ADAPTED FOR HYBRID VEHICLES; ROAD VEHICLE DRIVE CONTROL SYSTEMS FOR PURPOSES NOT RELATED TO THE CONTROL OF A PARTICULAR SUB-UNIT

NOTES

1. This subclass does not cover the control of a single sub-unit; such control is classified in the relevant place for the sub-unit, e.g. [F02D](#), [F16H](#). Where a single sub-unit is controlled by means of signals or commands from other sub-units, the control of this single sub-unit is classified in the relevant place for this sub-unit. For example, the control of variable-ratio gearing by means of signals from the engine or the accelerator is classified in the subclass for gearing, [F16H](#).
2. Conjoint control of driveline units, e.g. engines, and variable-ratio gearing occurring only transiently during ratio shift and being also characterised by the control of the gearing is also classified in the subclass for gearing, [F16H](#).
3. In groups [B60W 20/00](#) - [B60W 50/00](#), the first place priority rule is applied, i.e. at each hierarchical level, classification is made in the first appropriate place.
4. When classifying in group [B60W 10/00](#), classification must also be made in groups [B60W 20/00](#)-[B60W 50/00](#) in order to identify the purpose or use of the control.
5. In this subclass, the following terms are used with the meanings indicated:
 - "conjoint control" means that a programmed or condition-responsive { main } automatic controller on board the vehicle, embodying control logic for vehicle sub-units of different type or different function, sends control signals to actuators of two or more vehicle sub-units, { three or more vehicle sub-units for groups [B60W 30/00](#)-[B60W 30/16](#) }, so that the sub-units act together to solve a particular problem or in response to a particular driving condition, { in order to improve stability, comfort or safety by managing the global dynamics of the vehicle };
 - "drive control system" means an electronic system in a road vehicle for automatically controlling the movement { by managing the global dynamics } of that vehicle in order to take certain actions { in order to improve stability, comfort or safety };
 - "road vehicle" means a { motorised passenger } vehicle normally under the control of a human driver for transportation on roads, e.g. an automobile, truck or bus;
 - "sub-unit" means one of the following vehicle systems: { driveline systems, e.g. } propulsion system, clutch system, change-speed gearing system, system for distributing drive torque between front and rear axles, axle differential system, brake system, steering system, suspension system, { and, particularly for hybrid vehicles, } energy storage means, fuel cells, or auxiliary equipment.

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| 10/00 | Conjoint control of vehicle sub-units of different type or different function (for propulsion of purely electrically-propelled vehicles with power supplied within the vehicle B60L 11/00) | 10/101 | . . . Infinitely variable gearings |
| | | 10/103 | of fluid type |
| | | 10/105 | of electric type |
| | | 10/107 | with endless flexible members |
| | | 10/108 | Friction gearings |
| | | 10/109 | of the toroid type |
| | | 10/11 | . . . Stepped gearings |
| | | 10/111 | with separate change-speed gear trains arranged in series |
| | | 10/113 | with two input flow paths, e.g. double clutch transmission selection of one of the torque flow paths by the corresponding input clutch |
| | | 10/115 | with planetary gears |
| | | 10/119 | . including control of all-wheel-driveline means, e.g. transfer gears or clutches for dividing torque between front and rear axle (B60W 10/14 takes precedence) |
| | | 10/12 | . including control of differentials |
| 10/02 | . including control of driveline clutches | | |
| 10/023 | . . {Fluid clutches, e.g. torque converters} | | |
| 10/026 | . . {Clutches for bridging a fluid gearing, e.g. lock-up} | | |
| 10/04 | . including control of propulsion units | | |
| 10/06 | . . including control of combustion engines | | |
| 10/08 | . . including control of electric propulsion units, e.g. motors or generators | | |
| 10/10 | . including control of change-speed gearings | | |

NOTE

When classifying in this group, each controlled sub-unit must be separately identified by a classification in a relevant place in this group.

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| 10/14 | . . Central differentials for dividing torque between front and rear axles | 20/50 | . Control strategies for responding to system failures, e.g. for fault diagnosis, failsafe operation or limp mode |
| 10/16 | . . Axle differentials, e.g. for dividing torque between left and right wheels | | |
| 10/18 | . including control of braking systems | 30/00 | Purposes of road vehicle drive control systems not related to the control of a particular sub-unit, e.g. of systems using conjoint control of vehicle sub-units {, or advanced driver assistance systems for ensuring comfort, stability and safety or drive control systems for propelling or retarding the vehicle (anti-lock brake systems [ABS] B60T 8/00)} |
| 10/182 | . . {including control of parking brakes} | | |
| 10/184 | . . with wheel brakes | | |
| 10/188 | . . . hydraulic brakes | | |
| | <u>WARNING</u> | | |
| | this group is not complete pending a reorganisation, see also B60W 10/184 | 30/02 | . Control of vehicle driving stability |
| 10/192 | . . . electric brakes | 30/025 | . . {related to comfort of drivers or passengers} |
| | <u>WARNING</u> | 30/04 | . . related to roll-over prevention |
| | this group is not complete pending a reorganisation, see also B60W 10/184 | 2030/041 | . . . {about the pitch axis} |
| 10/196 | . . acting within the driveline, e.g. retarders | 2030/043 | . . . {about the roll axis} |
| 10/198 | . . with exhaust brakes | 30/045 | . . Improving turning performance |
| 10/20 | . including control of steering systems | | <u>WARNING</u> |
| 10/22 | . including control of suspension systems | | This group is not complete pending a reorganisation, see also B60W 30/02 |
| 10/24 | . including control of energy storage means | 30/06 | . Automatic manoeuvring for parking (controlling only the steering B62D 15/0285) |
| 10/26 | . . for electrical energy, e.g. batteries or capacitors | | <u>WARNING</u> |
| 10/28 | . including control of fuel cells | | B60W 30/06 and subgroups are not complete pending a reorganisation; see provisionally also group B62D 15/0285 |
| 10/30 | . including control of auxiliary equipment, e.g. air-conditioning compressors or oil pumps | | |
| 20/00 | Control systems specially adapted for hybrid vehicles {(hybrid vehicle design, B60K 6/00; electric vehicles B60L)} | 30/08 | . {Active safety systems} predicting or avoiding probable or impending collision {or attempting to minimise its consequences} |
| 20/10 | . Controlling the power contribution of each of the prime movers to meet required power demand | 2030/082 | . . {Vehicle operation after collision} |
| 20/11 | . . using model predictive control [MPC] strategies, i.e. control methods based on models predicting performance {(utilising navigation and traffic information in the control strategy B60W 20/12)} | 30/085 | . . Taking automatic action to adjust vehicle attitude in preparation for collision, e.g. braking for nose dropping |
| 20/12 | . . using control strategies taking into account route information {(estimation or calculation of non-directly measurable driving parameters B60W 40/00)} | 30/09 | . . Taking automatic action to avoid collision, e.g. braking and steering |
| 20/13 | . . in order to stay within battery power input or output limits; in order to prevent overcharging or battery depletion | 30/095 | . . Predicting travel path or likelihood of collision |
| 20/14 | . . . in conjunction with braking regeneration | 30/0953 | . . . {the prediction being responsive to vehicle dynamic parameters} |
| 20/15 | . . Control strategies specially adapted for achieving a particular effect | 30/0956 | . . . {the prediction being responsive to traffic or environmental parameters} |
| 20/16 | . . . for reducing engine exhaust emissions | 30/10 | . Path keeping {(cruise control for automatically following a preceding vehicle B60W 30/165)} |
| 20/17 | . . . for noise reduction | 30/12 | . . Lane keeping |
| 20/18 | . . . for avoiding ageing of fuel | 30/14 | . {Adaptive} cruise control |
| 20/19 | . . . for achieving enhanced acceleration | 30/143 | . . {Speed control (B60W 30/16 takes precedence)} |
| 20/20 | . Control strategies involving selection of hybrid configuration, e.g. selection between series or parallel configuration | 30/146 | . . . {Speed limiting} |
| 20/30 | . Control strategies involving selection of transmission gear ratio {(control of change speed gearings, together with other vehicle sub-units B60W 10/10 ; HEV transmission gearing B60K 6/36 ; gearings and control thereof F16H)} | 30/16 | . . Control of distance between vehicles, e.g. keeping a distance to preceding vehicle |
| 20/40 | . Controlling the engagement or disengagement of prime movers, e.g. for transition between prime movers {(power-up or power-down of the driveline B60W 30/192)} | 30/162 | . . . {Speed limiting therefor} |
| | | 30/165 | . . . Automatically following the path of a preceding lead vehicle, e.g. "electronic tow-bar" |
| | | 30/17 | . . . with provision for special action when the preceding vehicle comes to a halt, e.g. stop and go |

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| 30/18 | . Propelling the vehicle | 2030/206 | . . . {related or induced by the engine} |
| | WARNING | 40/00 | Estimation or calculation of {non-directly measurable} driving parameters for road vehicle drive control systems not related to the control of a particular sub unit, {e.g. by using mathematical models} |
| | Subgroups of B60W 30/18 are not complete. Documents from B60K 41/00 and B60W 30/18 are in the process of being reorganised to the new groups | 40/02 | . related to ambient conditions |
| 30/18009 | . . {related to particular drive situations} | 40/04 | . . Traffic conditions |
| 30/18018 | . . . {Start-stop drive, e.g. in a traffic jam} | 40/06 | . . Road conditions |
| 30/18027 | . . . {Drive off, accelerating from standstill} | 40/064 | . . . Degree of grip |
| 30/18036 | . . . {Reversing} | 40/068 | . . . Road friction coefficient |
| 30/18045 | {Rocking, i.e. fast change between forward and reverse} | 40/072 | . . . Curvature of the road |
| 30/18054 | . . . {at stand still, e.g. engine in idling state (hill holding B60W 30/18118)} | 40/076 | . . . Slope angle of the road |
| 30/18063 | . . . {Creeping} | 40/08 | . related to drivers or passengers |
| 30/18072 | . . . {Coasting} | 2040/0809 | . . {Driver authorisation; Driver identical check} |
| 2030/18081 | {With torque flow from driveshaft to engine, i.e. engine being driven by vehicle} | 2040/0818 | . . {Inactivity or incapacity of driver} |
| 2030/1809 | {Without torque flow between driveshaft and engine, e.g. with clutch disengaged or transmission in neutral} | 2040/0827 | . . . {due to sleepiness} |
| 30/181 | . . . {Preparing for stopping} | 2040/0836 | . . . {due to alcohol} |
| 30/18109 | . . . {Braking} | 2040/0845 | . . . {due to drugs} |
| 30/18118 | {Hill holding} | 2040/0854 | . . . {due to driver cheating, e.g. to circumvent driver tests} |
| 30/18127 | {Regenerative braking} | 2040/0863 | . . . {due to erroneous selection or response of the driver} |
| 30/18136 | {Engine braking} | 2040/0872 | . . {Driver physiology} |
| 30/18145 | . . . {Cornering} | 2040/0881 | . . {Seat occupation; Driver or passenger presence} |
| 30/18154 | . . . {Approaching an intersection} | 2040/089 | . . {Driver voice} |
| 30/18163 | . . . {Lane change; Overtaking manoeuvres} | 40/09 | . . Driving style or behaviour |
| 30/18172 | . . {Preventing, or responsive to skidding of wheels} | 40/10 | . related to vehicle motion |
| 30/18181 | . . {Propulsion control with common controlling member for different functions} | 40/1005 | . . {Driving resistance} |
| 30/1819 | . . {Propulsion control with control means using analogue circuits, relays or mechanical links} | 40/101 | . . Side slip angle of tyre |
| 30/182 | . . Selecting between different operative modes, e.g. comfort and performance modes | 40/103 | . . Side slip angle of vehicle body |
| 30/184 | . . Preventing damage resulting from overload or excessive wear of the driveline | 40/105 | . . Speed |
| 30/1843 | . . . {Overheating of driveline components (B60W 30/186 takes precedence)} | 40/107 | . . Longitudinal acceleration |
| 30/1846 | . . . {Preventing of breakage of drive line components, e.g. parts of the gearing} | 40/109 | . . Lateral acceleration |
| 30/186 | . . . excessive wear or burn out of friction elements, e.g. clutches | 40/11 | . . Pitch movement |
| 30/188 | . . Controlling power parameters of the driveline, e.g. determining the required power | 40/112 | . . Roll movement |
| 30/1882 | . . . {characterised by the working point of the engine, e.g. by using engine output chart} | 40/114 | . . Yaw movement |
| 30/1884 | . . . {Avoiding stall or overspeed of the engine} | 40/12 | . related to parameters of the vehicle itself {, e.g. tyre models} |
| 30/1886 | . . . {Controlling power supply to auxiliary devices} | 40/13 | . . Load or weight |
| 30/1888 | {Control of power take off [PTO]} | 2040/1307 | . . . {Load distribution on each wheel suspension} |
| 30/19 | . . Improvement of gear change, e.g. by synchronisation or smoothing gear shift | 2040/1315 | . . . {Location of the centre of gravity} |
| 30/192 | . . Mitigating problems related to power-up or power-down of the driveline, e.g. start-up of a cold engine | 2040/1323 | . . . {Moment of inertia of the vehicle body} |
| 30/194 | . . . related to low temperature conditions, e.g. high viscosity of hydraulic fluid | 2040/133 | {about the roll axis} |
| 30/20 | . . Reducing vibrations in the driveline | 2040/1338 | {about the pitch axis} |
| 2030/203 | . . . {related or induced by the clutch} | 2040/1346 | {about the yaw axis} |
| | | 2040/1353 | . . . {Moment of inertia of a sub-unit} |
| | | 2040/1361 | {the component being the engine} |
| | | 2040/1369 | {the component being the clutch} |
| | | 2040/1376 | {the component being the transmission} |
| | | 2040/1384 | {the component being the wheel} |
| | | 2040/1392 | . . . {Natural frequency of components} |

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| 50/00 | Details of control systems for road vehicle drive control not related to the control of a particular sub-unit {, e.g. process diagnostic or vehicle driver interfaces} | | |
| | WARNING | | |
| | New subgroups of IPC8 are not yet complete. Documents from B60K , in particular B60K 41/00 and subgroups, are in the process of being reclassified to the new groups | | |
| 2050/0001 | . {Details of the control system} | 2050/0044 | . . . {In digital systems} |
| 2050/0002 | . . {Automatic control, details of type of controller or control system architecture} | 2050/0045 | {using databus protocols} |
| 2050/0003 | . . . {In analogue systems, e.g. continuous systems} | 2050/0047 | . . . {Digital-analogue (D/A) or analogue-digital (A/D) conversion} |
| 2050/0004 | . . . {In digital systems, e.g. discrete-time systems involving sampling} | 2050/0048 | . . . {Addition or subtraction of signals} |
| 2050/0005 | {Processor details or data handling, e.g. memory registers or chip architecture} | 2050/0049 | {Signal offset} |
| 2050/0006 | {Digital architecture hierarchy} | 2050/005 | . . . {Sampling} |
| 2050/0008 | . . . {Feedback, closed loop systems or details of feedback error signal} | 2050/0051 | {combined with averaging} |
| 2050/0009 | {Proportional differential [PD] controller} | 2050/0052 | {Filtering, filters} |
| 2050/001 | {Proportional integral [PI] controller} | 2050/0054 | {Cut-off filters, retarders, delaying means, dead zones, threshold values or cut-off frequency} |
| 2050/0011 | {Proportional Integral Differential [PID] controller} | 2050/0055 | {High-pass filters} |
| 2050/0012 | {Feedforward or open loop systems} | 2050/0056 | {Low-pass filters} |
| 2050/0013 | {Optimal controllers} | 2050/0057 | {Frequency analysis, spectral techniques or transforms} |
| 2050/0014 | {Adaptive controllers} | 2050/0058 | {Signal modulation for data transmission} |
| 2050/0016 | {State machine analysis} | 2050/0059 | {Signal noise suppression} |
| 2050/0017 | {Modal analysis, e.g. for determining system stability} | 2050/006 | {Interpolation; Extrapolation} |
| 2050/0018 | {Method for the design of a control system} | 2050/0062 | . {Adapting control system settings} |
| 2050/0019 | . . . {Control system elements or transfer functions} | 2050/0063 | . . . {Manual parameter input, manual setting means, manual initialising or calibrating means (for vehicle control input means, control panels see B60K 37/00)} |
| 2050/002 | {Integrating means} | 2050/0064 | {using a remote, e.g. cordless, transmitter or receiver unit, e.g. remote keypad or mobile phone} |
| 2050/0021 | {Differentiating means} | 2050/0065 | {using a personalised data carrier, e.g. magnetic card, memory card or electronic ignition key} |
| 2050/0022 | {Gains, weighting coefficients or weighting functions} | 2050/0066 | {using buttons or a keyboard connected to the on-board processor} |
| 2050/0024 | {Variable gains} | 2050/0067 | {Confirmation by the driver} |
| 2050/0025 | {Transfer function weighting factor} | 2050/0068 | {Giving intention of direction, e.g. by indicator lights, steering input} |
| 2050/0026 | {Lookup tables or parameter maps} | 2050/007 | {Switching between manual and automatic parameter input, and vice versa} |
| 2050/0027 | {Minimum/maximum value selectors} | 2050/0071 | {Controller overrides driver automatically} |
| 2050/0028 | {Mathematical models, e.g. for simulation} | 2050/0072 | {Controller asks driver to take over} |
| 2050/0029 | {Mathematical model of the driver} | 2050/0073 | {Driver overrides controller} |
| 2050/0031 | {Mathematical model of the vehicle} | 2050/0074 | {Driver shifts control to the controller, e.g. by pressing a button} |
| 2050/0032 | {Quarter vehicle model, i.e. only one vehicle corner} | 2050/0075 | {Automatic parameter input, automatic initialising or calibrating means} |
| 2050/0033 | {Single-track, 2D vehicle model, i.e. two-wheel bicycle model} | 2050/0077 | {involving external transmission of data to or from the vehicle} |
| 2050/0034 | {Multiple-track, 2D vehicle model, e.g. four-wheel model} | 2050/0078 | {using Global Position System data} |
| 2050/0035 | {Multiple-track, 3D vehicle model, e.g. including roll and pitch conditions} | 2050/0079 | {using telemetry} |
| 2050/0036 | {Multiple-track, 3D multi-body vehicle model, e.g. combination of models for vehicle sub-units} | 2050/008 | {using data transmitted between vehicles, e.g. for platooning, control of inter-vehicle distance} |
| 2050/0037 | {Mathematical models of vehicle sub-units} | 2050/0081 | {using satellite communication} |
| 2050/0039 | {of the propulsion unit} | 2050/0082 | {for initialising the control system} |
| 2050/004 | {of the clutch} | 2050/0083 | {Setting, resetting, calibration} |
| 2050/0041 | {of the drive line} | 2050/0085 | {Setting or resetting initial positions} |
| 2050/0042 | {Transfer function lag; delays} | 2050/0086 | {Recalibrating datum positions, e.g. by using check cycles} |
| 2050/0043 | {Signal treatments, identification of variables or parameters, parameter estimation or state estimation} | 2050/0087 | {Resetting start and end points of actuator travel} |
| | | 2050/0088 | {Adaptive recalibration} |
| | | 2050/0089 | {Historical data record of previous events} |
| | | 2050/009 | {Priority selection} |
| | | 2050/0091 | {of control inputs} |

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| 2050/0093 | {of the engine} | 50/16 | . . . Tactile feedback to the driver, e.g. vibration or force feedback to the driver on the steering wheel or the accelerator pedal |
| 2050/0094 | {of control units} | | |
| 2050/0095 | . . . {Automatic control mode change} | | |
| 2050/0096 | {Control during transition between modes} | | |
| 50/0097 | . {Predicting future conditions} | | |
| 50/0098 | . {Details of control systems ensuring comfort, safety or stability not otherwise provided for} | | |
| 50/02 | . Ensuring safety in case of control system failures, e.g. by diagnosing, circumventing or fixing failures | | |
| 50/0205 | . . {Diagnosing or detecting failures; Failure detection models} | | |
| 2050/021 | . . . {Means for detecting failure or malfunction} | | |
| 2050/0215 | . . . {Sensor drifts or sensor failures} | | |
| 2050/022 | . . . {Actuator failures} | | |
| 50/0225 | . . {Failure correction strategy} | | |
| 50/023 | . . Avoiding failures by using redundant parts | | |
| 50/029 | . . Adapting to failures or work around with other constraints, e.g. circumvention by avoiding use of failed parts | | |
| 2050/0292 | . . . {Fail-safe or redundant systems, e.g. limp-home or backup systems} | | |
| 2050/0295 | . . . {Inhibiting action of specific actuators or systems} | | |
| 2050/0297 | . . . {Control Giving priority to different actuators or systems} | | |
| 50/032 | . . Fixing failures by repairing failed parts, e.g. loosening a sticking valve | | |
| 50/035 | . . Bringing the control units into a predefined state, e.g. giving priority to particular actuators | | |
| 50/038 | . . Limiting the input power, torque or speed | | |
| 50/04 | . Monitoring the functioning of the control system | | |
| 2050/041 | . . {Built in Test Equipment [BITE]} | | |
| 2050/043 | . . . {Testing equipment at KEY-ON} | | |
| 50/045 | . . {Monitoring control system parameters} | | |
| 2050/046 | . . . {involving external transmission of data to or from the vehicle, e.g. via telemetry, satellite, Global Positioning System [GPS]} | | |
| 2050/048 | {displaying data transmitted between vehicles, e.g. for platooning, control of inter-vehicle distance} | | |
| 50/06 | . Improving the dynamic response of the control system, e.g. improving the speed of regulation or avoiding hunting or overshoot | | |
| 2050/065 | . . {by reducing the computational load on the digital processor of the control computer} | | |
| 50/08 | . Interaction between the driver and the control system | | |
| 50/082 | . . {Selecting or switching between different modes of propelling} | | |
| 50/085 | . . {Changing the parameters of the control units, e.g. changing limit values, working points by control input} | | |
| 50/087 | . . {where the control system corrects or modifies a request from the driver} | | |
| 50/10 | . . Interpretation of driver requests or demands | | |
| 50/12 | . . Limiting control by the driver depending on vehicle state, e.g. interlocking means for the control input for preventing unsafe operation | | |
| 50/14 | . . Means for informing the driver, warning the driver or prompting a driver intervention | | |
| 2050/143 | . . . {Alarm means (B60W 50/16 takes precedence)} | | |
| 2050/146 | . . . {Display means} | | |
| | | 2300/00 | Indexing codes relating to the type of vehicle |
| | | 2300/10 | . Buses |
| | | 2300/105 | . . Ambulances |
| | | 2300/12 | . Trucks; Load vehicles |
| | | 2300/121 | . . Fork lift trucks, Clarks |
| | | 2300/123 | . . Light trucks |
| | | 2300/125 | . . Heavy duty trucks |
| | | 2300/126 | . . . Multi-axles trucks |
| | | 2300/128 | . . . Silo or fluid transporting vehicles |
| | | 2300/13 | . Independent Multi-axle long vehicles |
| | | 2300/135 | . . Vehicles having wheels mounted on a vertical steerable column |
| | | 2300/14 | . Trailers, e.g. full trailers, caravans (relation between towing and towed vehicle B60Y 2300/28) |
| | | 2300/145 | . . Semi-trailers |
| | | 2300/15 | . Agricultural vehicles |
| | | 2300/152 | . . Tractors |
| | | 2300/154 | . . Boom carrying vehicles, e.g. for crop spraying |
| | | 2300/156 | . . Ridable lawn mowers |
| | | 2300/158 | . . Harvesters |
| | | 2300/16 | . Cranes |
| | | 2300/17 | . Construction vehicles, e.g. graders, excavators |
| | | 2300/18 | . Four-wheel drive vehicles |
| | | 2300/185 | . . Off-road vehicles |
| | | 2300/26 | . Military |
| | | 2300/28 | . Racing vehicles, e.g. Formula one cars |
| | | 2300/285 | . . Go-karts |
| | | 2300/30 | . Toys |
| | | 2300/32 | . Amphibious vehicles |
| | | 2300/34 | . Compact city vehicles |
| | | 2300/345 | . . Three wheelers not including single track vehicles |
| | | 2300/36 | . Cycles; Motorcycles; Scooters |
| | | 2300/362 | . . Buggies; Quads |
| | | 2300/365 | . . Scooters |
| | | 2300/367 | . . Tricycles |
| | | 2300/38 | . Wheelchairs; Perambulators |
| | | 2300/40 | . Carts, e.g. trolleys |
| | | 2300/405 | . . Golf carts |
| | | 2300/42 | . Loading ramps |
| | | 2300/43 | . Snowmobile |
| | | 2300/44 | . Tracked vehicles |
| | | 2300/45 | . Skid-steer |
| | | 2300/46 | . Variable track or wheelbase vehicles |
| | | 2300/48 | . Low or lowerable bed vehicles |
| | | 2300/50 | . Tilting frame vehicles |
| | | 2400/00 | Indexing codes relating to detected, measured or calculated conditions or factors |
| | | 2420/00 | Indexing codes relating to the type of sensors based on the principle of their operation |
| | | 2420/10 | . Transducer, e.g. piezoelectric elements |
| | | 2420/20 | . Resistance type, e.g. potentiometer as level indicator |
| | | 2420/22 | . Strain gauge |
| | | 2420/225 | . . Wheatstone bridge circuit |
| | | 2420/24 | . Capacitance type, e.g. as level indicator |
| | | 2420/30 | . Switches, e.g. mercury or ball type switches |
| | | 2420/40 | . Photo or light sensitive means, e.g. infrared sensors |
| | | 2420/403 | . . Image sensing, e.g. optical camera |

B60W

- 2420/406 . . Fiber optic sensor
- 2420/42 . Image sensing, e.g. optical camera
- 2420/50 . Magnetic or electromagnetic sensors
- 2420/503 . . Hall effect or magnetoresistive, i.e. active wheel speed sensors
- 2420/506 . . Inductive sensors, i.e. passive wheel sensors
- 2420/52 . Radar, Lidar
- 2420/54 . Audio sensitive means, e.g. ultrasound
- 2420/60 . Doppler effect
- 2420/62 . Laser
- 2420/90 . Single sensor for two or more measurements
- 2420/905 . . the sensor being an xyz axis sensor
- 2422/00 Indexing codes relating to the special location or mounting of sensors**
- 2422/10 . on a suspension arm
- 2422/20 . on or inside a spring
- 2422/202 . . the spring being a coil spring
- 2422/205 . . the spring being a pneumatic spring
- 2422/207 . . the spring being a leaf spring
- 2422/40 . on a damper
- 2422/50 . on a steering column
- 2422/70 . on the wheel or the tire
- 2422/80 . on wheel hub bearing
- 2422/90 . on bumper, e.g. collision sensor
- 2422/95 . Measuring the same parameter at multiple locations of the vehicle
- 2510/00 Input parameters relating to a particular sub-units**
- 2510/02 . Clutches
- 2510/0208 . . Clutch engagement state, e.g. engaged or disengaged
- 2510/0216 . . . Clutch engagement rate
- 2510/0225 . . . Clutch actuator position
- 2510/0233 . . . of torque converter lock-up clutch
- 2510/0241 . . Clutch slip, i.e. difference between input and output speeds
- 2510/025 . . . Slip change rate
- 2510/0258 . . Clutch friction coefficient
- 2510/0266 . . Moment of inertia
- 2510/0275 . . Clutch torque
- 2510/0283 . . Clutch input shaft speed
- 2510/0291 . . Clutch temperature
- 2510/06 . Combustion engines, Gas turbines
- 2510/0604 . . Throttle position
- 2510/0609 . . . Throttle change rate
- 2510/0614 . . Position of fuel or air injector
- 2510/0619 . . . Air-fuel ratio
- 2510/0623 . . . Fuel flow rate
- 2510/0628 . . . Inlet air flow rate
- 2510/0633 . . Turbocharger state
- 2510/0638 . . Engine speed
- 2510/0642 . . . Idle condition
- 2510/0647 . . . Coasting condition
- 2510/0652 . . . Speed change rate
- 2510/0657 . . Engine torque
- 2510/0661 . . . Torque change rate
- 2510/0666 . . Engine power
- 2510/0671 . . Engine manifold pressure
- 2510/0676 . . Engine temperature
- 2510/068 . . Engine exhaust temperature
- 2510/0685 . . Engine crank angle
- 2510/069 . . Engine braking signal
- 2510/0695 . . Inertia
- 2510/08 . Electric propulsion units
- 2510/081 . . Speed
- 2510/082 . . . Speed change rate
- 2510/083 . . Torque
- 2510/084 . . . Torque change rate
- 2510/085 . . Power
- 2510/086 . . . Power change rate
- 2510/087 . . Temperature
- 2510/088 . . Inertia
- 2510/09 . Other types of propulsion units, e.g. fluid motors, or type not specified
- 2510/10 . Change speed gearings
- 2510/1005 . . Transmission ratio engaged
- 2510/101 . . . Transmission neutral state
- 2510/1015 . . Input shaft speed, e.g. turbine speed
- 2510/102 . . . Input speed change rate
- 2510/1025 . . Input torque
- 2510/103 . . . Input torque change rate
- 2510/1035 . . Input power
- 2510/104 . . Output speed
- 2510/1045 . . . Output speed change rate
- 2510/105 . . Output torque
- 2510/1055 . . . Output torque change rate
- 2510/106 . . Output power
- 2510/1065 . . . Transmission of zero torque
- 2510/107 . . Temperature
- 2510/1075 . . fluid pressure, e.g. oil pressure
- 2510/108 . . . pressure of control fluid
- 2510/1085 . . . pressure of working fluid
- 2510/109 . . Direction of power flow
- 2510/1095 . . Inertia
- 2510/12 . Differentials
- 2510/125 . . Locking status
- 2510/18 . Braking system
- 2510/182 . . Brake pressure, e.g. of fluid or between pad and disc
- 2510/184 . . Brake temperature, e.g. of fluid, pads or discs
- 2510/186 . . Status of parking brakes
- 2510/188 . . Parking lock mechanisms
- 2510/20 . Steering systems
- 2510/202 . . Steering torque
- 2510/205 . . Steering speed
- 2510/207 . . Oversteer or understeer
- 2510/22 . Suspension systems
- 2510/222 . . Stiffness
- 2510/225 . . Damping
- 2510/227 . . Oscillation frequency
- 2510/24 . Energy storage means
- 2510/242 . . for electrical energy
- 2510/244 . . . Charge state
- 2510/246 . . . Temperature
- 2510/248 . . . Age of storage means
- 2510/28 . Fuel cells
- 2510/285 . . Temperature
- 2510/30 . Auxiliary equipments
- 2510/305 . . Power absorbed by auxiliaries
- 2520/00 Input parameters relating to overall vehicle dynamics**
- 2520/04 . Vehicle stop
- 2520/06 . Direction of travel

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|----------------|--|----------------|---|
| 2520/10 | . Longitudinal speed | 2550/30 | . . Distance or speed relative to other vehicles |
| 2520/105 | . . Longitudinal acceleration | 2550/302 | . . . the longitudinal speed of preceding vehicle |
| 2520/12 | . Lateral speed | 2550/304 | . . . the lateral speed of preceding vehicle |
| 2520/125 | . . Lateral acceleration | 2550/306 | . . . the position of preceding vehicle |
| 2520/14 | . Yaw | 2550/308 | . . . Distance between vehicles |
| 2520/16 | . Pitch | 2550/40 | . Involving external transmission of data to or from the vehicle |
| 2520/18 | . Roll | 2550/402 | . . for navigation systems |
| 2520/20 | . Sideslip angle | 2550/404 | . . using telemetry |
| 2520/22 | . Articulation angle, e.g. between tractor and trailer | 2550/406 | . . using satellite communication |
| 2520/26 | . Wheel slip | 2550/408 | . . Data transmitted between vehicles |
| 2520/263 | . . Slip values between front and rear axle | 2560/00 | Other vehicle related input parameters not covered by groups B60W 2510/00 - B60W 2550/00 |
| 2520/266 | . . Slip values between left and right wheel | 2560/02 | . Remaining fuel quantity in tank |
| 2520/28 | . Wheel speed | 2560/04 | . Fuel quality, e.g. water content due to age of fuel |
| 2520/30 | . Wheel torque | 2560/06 | . Fuel type |
| 2520/40 | . Torque distribution | 2600/00 | Indexing codes relating to automatic control systems or control processes |
| 2520/403 | . . between front and rear axle | 2710/00 | Output or target parameters relating to a particular sub-units |
| 2520/406 | . . between left and right wheel | 2710/02 | . Clutches |
| 2530/00 | Input parameters relating to other vehicle conditions or values | 2710/021 | . . Clutch engagement state |
| 2530/10 | . Weight | 2710/022 | . . . Clutch actuator position |
| 2530/12 | . Catalyst or filter state | 2710/023 | . . . Clutch engagement rate |
| 2530/14 | . Historical data | 2710/024 | . . . of torque converter lock-up clutch |
| 2530/145 | . . Mileage | 2710/025 | . . Clutch slip, i.e. difference between input and output speeds |
| 2530/16 | . Driving resistance | 2710/026 | . . . Slip change rate |
| 2530/18 | . Distance travelled | 2710/027 | . . Clutch torque |
| 2530/20 | . Tyre data | 2710/028 | . . Clutch input shaft speed |
| 2530/22 | . Towing force | 2710/029 | . . Clutch temperature |
| 2540/00 | Input parameters relating to the driver | 2710/06 | . Combustion engines, Gas turbines |
| 2540/02 | . Driver's voice | 2710/0605 | . . Throttle position |
| 2540/04 | . Driver selection, e.g. driver confirmation | 2710/0611 | . . . Throttle change rate |
| 2540/06 | . Ignition switch | 2710/0616 | . . Position of fuel or air injector |
| 2540/10 | . Accelerator pedal position | 2710/0622 | . . . Air-fuel ratio |
| 2540/103 | . . Accelerator thresholds, e.g. kickdown | 2710/0627 | . . . Fuel flow rate |
| 2540/106 | . . Rate of change | 2710/0633 | . . . Inlet air flow rate |
| 2540/12 | . Brake pedal position | 2710/0638 | . . Turbocharger state |
| 2540/14 | . Clutch pedal position | 2710/0644 | . . Engine speed |
| 2540/16 | . Ratio selector position | 2710/065 | . . . Idle condition |
| 2540/165 | . . Rate of change | 2710/0655 | . . . Coasting condition |
| 2540/18 | . Steering angle | 2710/0661 | . . . Speed change rate |
| 2540/20 | . Direction indicator values | 2710/0666 | . . Engine torque |
| 2540/22 | . Psychological state; Stress level or workload | 2710/0672 | . . . Torque change rate |
| 2540/24 | . Drug level, e.g. alcohol | 2710/0677 | . . Engine power |
| 2540/26 | . Incapacity of driver | 2710/0683 | . . Engine manifold pressure |
| 2540/28 | . Identity of driver | 2710/0688 | . . Engine temperature |
| 2540/30 | . Driving style | 2710/0694 | . . Engine exhaust temperature |
| 2550/00 | Input parameters relating to exterior conditions | 2710/08 | . Electric propulsion units |
| 2550/10 | . from obstacle detection | 2710/081 | . . Speed |
| 2550/12 | . Ambient conditions, e.g. wind or rain | 2710/082 | . . . Speed change rate |
| 2550/13 | . Altitude | 2710/083 | . . Torque |
| 2550/14 | . Road conditions, road types or road features | 2710/085 | . . . Torque change rate |
| 2550/141 | . . Type of road | 2710/086 | . . Power |
| 2550/142 | . . Road slope | 2710/087 | . . . Power change rate |
| 2550/143 | . . Road profile | 2710/088 | . . Temperature |
| 2550/145 | . . Road altitude | 2710/09 | . Other types of propulsion units, e.g. fluid motors, or type not specified |
| 2550/146 | . . Road curve radius | 2710/10 | . Change speed gearings |
| 2550/147 | . . Road bumpiness, e.g. pavement or potholes | | |
| 2550/148 | . . Coefficient of friction | | |
| 2550/16 | . Country codes | | |
| 2550/20 | . Traffic related input parameters | | |
| 2550/22 | . . Traffic rules, e.g. traffic signs | | |

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- 2710/1005 . . Transmission ratio engaged
- 2710/1011 . . Input shaft speed, e.g. turbine speed
- 2710/1016 . . . Input speed change rate
- 2710/1022 . . Input torque
- 2710/1027 . . . Input torque change rate
- 2710/1033 . . Input power
- 2710/1038 . . Output speed
- 2710/1044 . . . Output speed change rate
- 2710/105 . . Output torque
- 2710/1055 . . . Output torque change rate
- 2710/1061 . . Output power
- 2710/1066 . . . Transmission of zero torque
- 2710/1072 . . Temperature
- 2710/1077 . . fluid pressure, e.g. oil pressure
- 2710/1083 . . . pressure of control fluid
- 2710/1088 . . . pressure of working fluid
- 2710/1094 . . Direction of power flow
- 2710/12 . . Differentials
- 2710/125 . . Locking status
- 2710/18 . . Braking system
- 2710/182 . . Brake pressure, e.g. of fluid or between pad and disc
- 2710/184 . . Brake temperature, e.g. of fluid, pads or discs
- 2710/186 . . Status of parking brakes
- 2710/188 . . Parking lock mechanisms
- 2710/20 . . Steering systems
- 2710/202 . . Steering torque
- 2710/205 . . Steering speed
- 2710/207 . . Steering angle of wheels
- 2710/22 . . Suspension systems
- 2710/223 . . Stiffness
- 2710/226 . . Damping
- 2710/24 . . Energy storage means
- 2710/242 . . for electrical energy
- 2710/244 . . . Charge state
- 2710/246 . . . Temperature
- 2710/248 . . . Current for loading or unloading
- 2710/28 . . Fuel cells
- 2710/285 . . Temperature
- 2710/30 . . Auxiliary equipments
- 2710/305 . . target power to auxiliaries
- 2720/00** . . **Output or target parameters relating to overall vehicle dynamics**
- 2720/10 . . Longitudinal speed
- 2720/103 . . . Speed profile
- 2720/106 . . . Longitudinal acceleration
- 2720/12 . . Lateral speed
- 2720/125 . . . Lateral acceleration
- 2720/14 . . Yaw
- 2720/16 . . Pitch
- 2720/18 . . Roll
- 2720/20 . . Sideslip angle
- 2720/22 . . Articulation angle, e.g. between tractor and trailer
- 2720/24 . . Direction of travel
- 2720/26 . . Wheel slip
- 2720/263 . . . Slip values between front and rear axle
- 2720/266 . . . Slip values between left and right wheel
- 2720/28 . . Wheel speed
- 2720/30 . . Wheel torque
- 2720/40 . . Torque distribution
- 2720/403 . . . between front and rear axle
- 2720/406 . . . between left and right wheel
- 2750/00** . . **Output or target parameters relating to exterior, e.g. between vehicles**
- 2750/30 . . Distance or speed in relation to other vehicles
- 2750/302 . . . the longitudinal speed of preceding vehicle
- 2750/304 . . . the lateral speed of preceding vehicle
- 2750/306 . . . the position of preceding vehicle
- 2750/308 . . . the distance between vehicles
- 2750/40 . . Involving external transmission of data to or from the vehicle
- 2900/00** . . **Indexing codes relating to the purpose of, or problem solved of road vehicle drive control systems not otherwise provided for in groups [B60W 30/00](#)**