

# 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. When classifying in group [B60W 10/00](#), classification must also be made in groups [B60W 20/00](#) - [B60W 60/00](#) in order to identify the purpose or use of the control.
4. 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, 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 on board 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 vehicle for transportation on roads, e.g. an automobile, truck or bus;
  - "autonomous road vehicle" means a road vehicle capable of controlling all dynamic driving tasks without human intervention during {a plurality of} driving scenarios by using on-board computer hardware and software to execute decision making processes in real-time.
  - "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.

### 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.

**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 50/00](#) - [B60L 58/00](#))

### NOTE

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

### WARNING

Group [B60W 10/00](#) is incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 10/02 . including control of driveline clutches

**WARNING**

Group [B60W 10/02](#) is incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 10/023 . . {Fluid clutches}

**WARNING**

Group [B60W 10/023](#) is incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#). Group [B60W 10/023](#) is also impacted by reclassification into groups [B60W 10/024](#) and [B60W 10/026](#).

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

- 10/024 . . {including control of torque converters}

**WARNING**

Group [B60W 10/024](#) is incomplete pending reclassification of documents from groups [B60W 10/023](#), [B60W 10/026](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 10/026 . . . {of lock-up clutches}

**WARNING**

Group [B60W 10/026](#) is incomplete pending reclassification of documents from groups [B60W 10/023](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#) and [G05D 1/0223](#).

Group [B60W 10/026](#) is also impacted by reclassification into group [B60W 10/024](#).

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

- 10/04 . including control of propulsion units

**WARNING**

Groups [B60W 10/04](#) - [B60W 10/08](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 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

**WARNING**

Groups [B60W 10/10](#) - [B60W 10/115](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 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)

**WARNING**

Group [B60W 10/119](#) is incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 10/12 . including control of differentials

**WARNING**

Groups [B60W 10/12](#) - [B60W 10/16](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 10/14 . . Central differentials for dividing torque between front and rear axles

- 10/16 . . Axle differentials, e.g. for dividing torque between left and right wheels

10/18	<ul style="list-style-type: none"> <li>including control of braking systems</li> </ul> <p><b>WARNING</b></p> <p>Groups <a href="#">B60W 10/18</a> - <a href="#">B60W 10/198</a> are incomplete pending reclassification of documents from groups <a href="#">G05D 1/0061</a>, <a href="#">G05D 1/0088</a>, <a href="#">G05D 1/021</a>, <a href="#">G05D 1/0214</a>, <a href="#">G05D 1/0221</a>, and <a href="#">G05D 1/0223</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>	10/30	<ul style="list-style-type: none"> <li>including control of auxiliary equipment, e.g. air-conditioning compressors or oil pumps</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60W 10/30</a> is incomplete pending reclassification of documents from groups <a href="#">G05D 1/0061</a>, <a href="#">G05D 1/0088</a>, <a href="#">G05D 1/021</a>, <a href="#">G05D 1/0214</a>, <a href="#">G05D 1/0221</a>, and <a href="#">G05D 1/0223</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>
10/182	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>{including control of parking brakes}</li> </ul> </li> </ul>	20/00	<p><b>Control systems specially adapted for hybrid vehicles</b> {(hybrid vehicle design, <a href="#">B60K 6/00</a>; electric vehicles <a href="#">B60L</a>)}</p> <p><b>WARNING</b></p> <p>Groups <a href="#">B60W 20/00</a> - <a href="#">B60W 20/50</a> are incomplete pending reclassification of documents from groups <a href="#">G05D 1/0061</a>, <a href="#">G05D 1/0088</a>, <a href="#">G05D 1/021</a>, <a href="#">G05D 1/0214</a>, <a href="#">G05D 1/0221</a>, and <a href="#">G05D 1/0223</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>
10/184	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>with wheel brakes</li> </ul> </li> </ul>	20/10	<ul style="list-style-type: none"> <li>Controlling the power contribution of each of the prime movers to meet required power demand</li> </ul>
10/188	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>hydraulic brakes</li> </ul> </li> </ul>	20/11	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>using model predictive control [MPC] strategies, i.e. control methods based on models predicting performance {(utilising navigation and traffic information in the control strategy <a href="#">B60W 20/12</a>)}</li> </ul> </li> </ul>
10/192	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>electric brakes</li> </ul> </li> </ul>	20/12	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>using control strategies taking into account route information {(estimation or calculation of non-directly measurable driving parameters <a href="#">B60W 40/00</a>)}</li> </ul> </li> </ul>
10/196	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>acting within the driveline, e.g. retarders</li> </ul> </li> </ul>	20/13	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>in order to stay within battery power input or output limits; in order to prevent overcharging or battery depletion</li> </ul> </li> </ul>
10/198	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>with exhaust brakes</li> </ul> </li> </ul>	20/14	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>in conjunction with braking regeneration</li> </ul> </li> </ul>
10/20	<ul style="list-style-type: none"> <li>including control of steering systems</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60W 10/20</a> is incomplete pending reclassification of documents from groups <a href="#">G05D 1/0061</a>, <a href="#">G05D 1/0088</a>, <a href="#">G05D 1/021</a>, <a href="#">G05D 1/0214</a>, <a href="#">G05D 1/0221</a>, and <a href="#">G05D 1/0223</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>	20/15	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>Control strategies specially adapted for achieving a particular effect</li> </ul> </li> </ul>
10/22	<ul style="list-style-type: none"> <li>including control of suspension systems</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60W 10/22</a> is incomplete pending reclassification of documents from groups <a href="#">G05D 1/0061</a>, <a href="#">G05D 1/0088</a>, <a href="#">G05D 1/021</a>, <a href="#">G05D 1/0214</a>, <a href="#">G05D 1/0221</a>, and <a href="#">G05D 1/0223</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>	20/16	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>for reducing engine exhaust emissions</li> </ul> </li> </ul>
10/24	<ul style="list-style-type: none"> <li>including control of energy storage means</li> </ul> <p><b>WARNING</b></p> <p>Groups <a href="#">B60W 10/24</a> - <a href="#">B60W 10/26</a> are incomplete pending reclassification of documents from groups <a href="#">G05D 1/0061</a>, <a href="#">G05D 1/0088</a>, <a href="#">G05D 1/021</a>, <a href="#">G05D 1/0214</a>, <a href="#">G05D 1/0221</a>, and <a href="#">G05D 1/0223</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>	20/17	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>for noise reduction</li> </ul> </li> </ul>
10/26	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>for electrical energy, e.g. batteries or capacitors</li> </ul> </li> </ul>	20/18	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>for avoiding ageing of fuel</li> </ul> </li> </ul>
10/28	<ul style="list-style-type: none"> <li>including control of fuel cells</li> </ul> <p><b>WARNING</b></p> <p>Group <a href="#">B60W 10/28</a> is incomplete pending reclassification of documents from groups <a href="#">G05D 1/0061</a>, <a href="#">G05D 1/0088</a>, <a href="#">G05D 1/021</a>, <a href="#">G05D 1/0214</a>, <a href="#">G05D 1/0221</a>, and <a href="#">G05D 1/0223</a>.</p> <p>All groups listed in this Warning should be considered in order to perform a complete search.</p>	20/19	<ul style="list-style-type: none"> <li> <ul style="list-style-type: none"> <li>for achieving enhanced acceleration</li> </ul> </li> </ul>
		20/20	<ul style="list-style-type: none"> <li>Control strategies involving selection of hybrid configuration, e.g. selection between series or parallel configuration</li> </ul>
		20/30	<ul style="list-style-type: none"> <li>Control strategies involving selection of transmission gear ratio {(control of change speed gearings, together with other vehicle sub-units <a href="#">B60W 10/10</a>; HEV transmission gearing <a href="#">B60K 6/36</a>; gearings and control thereof <a href="#">F16H</a>)}</li> </ul>
		20/40	<ul style="list-style-type: none"> <li>Controlling the engagement or disengagement of prime movers, e.g. for transition between prime movers {(power-up or power-down of the driveline <a href="#">B60W 30/192</a>)}</li> </ul>
		20/50	<ul style="list-style-type: none"> <li>Control strategies for responding to system failures, e.g. for fault diagnosis, failsafe operation or limp mode</li> </ul>

### 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

#### WARNING

Groups [B60W 30/00](#) - [B60W 2030/206](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 30/02 . Control of vehicle driving stability
- 30/025 . . {related to comfort of drivers or passengers}
- 30/04 . . related to roll-over prevention
- 2030/041 . . . {about the pitch axis}
- 2030/043 . . . {about the roll axis}
- 30/045 . . Improving turning performance
- 30/06 . Automatic manoeuvring for parking
- 30/08 . {Active safety systems} predicting or avoiding probable or impending collision {or attempting to minimise its consequences}
- 2030/082 . . {Vehicle operation after collision}
- 30/085 . . Taking automatic action to adjust vehicle attitude in preparation for collision, e.g. braking for nose dropping
- 30/09 . . Taking automatic action to avoid collision, e.g. braking and steering
- 30/095 . . Predicting travel path or likelihood of collision
- 30/0953 . . . {the prediction being responsive to vehicle dynamic parameters}
- 30/0956 . . . {the prediction being responsive to traffic or environmental parameters}
- 30/10 . Path keeping {(cruise control for automatically following a preceding vehicle [B60W 30/165](#))}
- 30/12 . . Lane keeping
- 30/14 . {Adaptive} cruise control
- 30/143 . . {Speed control ([B60W 30/16](#) takes precedence)}
- 30/146 . . . {Speed limiting}
- 30/16 . . Control of distance between vehicles, e.g. keeping a distance to preceding vehicle
- 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
- 30/18 . Propelling the vehicle
- 30/18009 . . {related to particular drive situations}
- 30/18018 . . . {Start-stop drive, e.g. in a traffic jam}
- 30/18027 . . . {Drive off, accelerating from standstill}
- 30/18036 . . . {Reversing}
- 30/18045 . . . . {Rocking, i.e. fast change between forward and reverse}
- 30/18054 . . . {at stand still, e.g. engine in idling state (hill holding [B60W 30/18118](#))}
- 30/18063 . . . {Creeping}
- 30/18072 . . . {Coasting}
- 2030/18081 . . . . {With torque flow from driveshaft to engine, i.e. engine being driven by vehicle}

- 2030/1809 . . . . {Without torque flow between driveshaft and engine, e.g. with clutch disengaged or transmission in neutral}
- 30/181 . . . {Preparing for stopping}
- 30/18109 . . . {Braking}
- 30/18118 . . . . {Hill holding}
- 30/18127 . . . . {Regenerative braking}
- 30/18136 . . . . {Engine braking}
- 30/18145 . . . {Cornering}
- 30/18154 . . . {Approaching an intersection}
- 30/18159 . . . {Traversing an intersection}

#### WARNING

Group [B60W 30/18159](#) is incomplete pending reclassification of documents from groups [B60W 30/12](#), [B60W 30/16](#), [B60W 30/162](#), [B60W 30/165](#), [B60W 30/17](#), [B60W 30/182](#), [B60W 50/082](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 30/18163 . . . {Lane change; Overtaking manoeuvres}
- 30/18172 . . . {Preventing, or responsive to skidding of wheels}
- 30/18181 . . {Propulsion control with common controlling member for different functions}
- 30/1819 . . {Propulsion control with control means using analogue circuits, relays or mechanical links}
- 30/182 . . Selecting between different operative modes, e.g. comfort and performance modes
- 30/184 . . Preventing damage resulting from overload or excessive wear of the driveline
- 30/1843 . . . {Overheating of driveline components ([B60W 30/186](#) takes precedence)}
- 30/1846 . . . {Preventing of breakage of drive line components, e.g. parts of the gearing}
- 30/186 . . . excessive wear or burn out of friction elements, e.g. clutches
- 30/188 . . Controlling power parameters of the driveline, e.g. determining the required power
- 30/1882 . . . {characterised by the working point of the engine, e.g. by using engine output chart}
- 30/1884 . . . {Avoiding stall or overspeed of the engine}
- 30/1886 . . . {Controlling power supply to auxiliary devices}
- 30/1888 . . . . {Control of power take off [PTO]}
- 30/19 . . Improvement of gear change, e.g. by synchronisation or smoothing gear shift
- 30/192 . . Mitigating problems related to power-up or power-down of the driveline, e.g. start-up of a cold engine
- 30/194 . . . related to low temperature conditions, e.g. high viscosity of hydraulic fluid
- 30/20 . . Reducing vibrations in the driveline
- 2030/203 . . . {related or induced by the clutch}
- 2030/206 . . . {related or induced by the engine}

**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}**

**WARNING**

Groups [B60W 40/00](#) - [B60W 2040/1392](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 40/02 . related to ambient conditions
- 40/04 . . Traffic conditions
- 40/06 . . Road conditions
- 40/064 . . . Degree of grip
- 40/068 . . . Road friction coefficient
- 40/072 . . . Curvature of the road
- 40/076 . . . Slope angle of the road
- 40/08 . related to drivers or passengers
- 2040/0809 . . {Driver authorisation; Driver identity check}
- 2040/0818 . . {Inactivity or incapacity of driver}
- 2040/0827 . . . {due to sleepiness}
- 2040/0836 . . . {due to alcohol}
- 2040/0845 . . . {due to drugs}
- 2040/0854 . . . {due to driver cheating, e.g. to circumvent driver tests}
- 2040/0863 . . . {due to erroneous selection or response of the driver}
- 2040/0872 . . {Driver physiology}
- 2040/0881 . . {Seat occupation; Driver or passenger presence}
- 2040/089 . . {Driver voice}
- 40/09 . . Driving style or behaviour
- 40/10 . related to vehicle motion
- 40/1005 . . {Driving resistance}
- 40/101 . . Side slip angle of tyre
- 40/103 . . Side slip angle of vehicle body
- 40/105 . . Speed
- 40/107 . . Longitudinal acceleration
- 40/109 . . Lateral acceleration
- 40/11 . . Pitch movement
- 40/112 . . Roll movement
- 40/114 . . Yaw movement
- 40/12 . related to parameters of the vehicle itself {, e.g. tyre models}
- 40/13 . . Load or weight
- 2040/1307 . . . {Load distribution on each wheel suspension}
- 2040/1315 . . . {Location of the centre of gravity}
- 2040/1323 . . . {Moment of inertia of the vehicle body}
- 2040/133 . . . . {about the roll axis}
- 2040/1338 . . . . {about the pitch axis}
- 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}

**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**

Groups [B60W 50/00](#) - [B60W 50/16](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2050/0001 . {Details of the control system}
- 2050/0002 . . {Automatic control, details of type of controller or control system architecture}
- 2050/0003 . . . {In analogue systems, e.g. continuous systems}
- 2050/0004 . . . {In digital systems, e.g. discrete-time systems involving sampling}
- 2050/0005 . . . . {Processor details or data handling, e.g. memory registers or chip architecture}
- 2050/0006 . . . . {Digital architecture hierarchy}
- 2050/0008 . . . {Feedback, closed loop systems or details of feedback error signal}
- 2050/0009 . . . . {Proportional differential [PD] controller}
- 2050/001 . . . . {Proportional integral [PI] controller}
- 2050/0011 . . . . {Proportional Integral Differential [PID] controller}
- 2050/0012 . . . {Feedforward or open loop systems}
- 2050/0013 . . . {Optimal controllers}
- 2050/0014 . . . {Adaptive controllers}
- 2050/0016 . . . {State machine analysis}
- 2050/0017 . . . {Modal analysis, e.g. for determining system stability}
- 2050/0018 . . . {Method for the design of a control system}
- 2050/0019 . . {Control system elements or transfer functions}
- 2050/002 . . . {Integrating means}
- 2050/0021 . . . {Differentiating means}
- 2050/0022 . . . {Gains, weighting coefficients or weighting functions}
- 2050/0024 . . . . {Variable gains}
- 2050/0025 . . . . {Transfer function weighting factor}
- 2050/0026 . . . {Lookup tables or parameter maps}
- 2050/0027 . . . {Minimum/maximum value selectors}
- 2050/0028 . . . {Mathematical models, e.g. for simulation}
- 2050/0029 . . . . {Mathematical model of the driver}
- 2050/0031 . . . . {Mathematical model of the vehicle}
- 2050/0032 . . . . . {Quarter vehicle model, i.e. only one vehicle corner}
- 2050/0033 . . . . . {Single-track, 2D vehicle model, i.e. two-wheel bicycle model}
- 2050/0034 . . . . . {Multiple-track, 2D vehicle model, e.g. four-wheel model}
- 2050/0035 . . . . . {Multiple-track, 3D vehicle model, e.g. including roll and pitch conditions}
- 2050/0036 . . . . . {Multiple-track, 3D multi-body vehicle model, e.g. combination of models for vehicle sub-units}
- 2050/0037 . . . . . {Mathematical models of vehicle sub-units}
- 2050/0039 . . . . . {of the propulsion unit}
- 2050/004 . . . . . {of the clutch}
- 2050/0041 . . . . . {of the drive line}
- 2050/0042 . . . {Transfer function lag; delays}



2050/0043	. . {Signal treatments, identification of variables or parameters, parameter estimation or state estimation}	50/02	. Ensuring safety in case of control system failures, e.g. by diagnosing, circumventing or fixing failures
2050/0044	. . . {In digital systems}	50/0205	. . {Diagnosing or detecting failures; Failure detection models}
2050/0045	. . . . {using databus protocols}	2050/021	. . . {Means for detecting failure or malfunction}
2050/0047	. . . {Digital-analogue (D/A) or analogue-digital (A/D) conversion}	2050/0215	. . . {Sensor drifts or sensor failures}
2050/0048	. . . {Addition or subtraction of signals}	2050/022	. . . {Actuator failures}
2050/0049	. . . . {Signal offset}	50/0225	. . {Failure correction strategy}
2050/005	. . . {Sampling}	50/023	. . Avoiding failures by using redundant parts
2050/0051	. . . . {combined with averaging}	50/029	. . Adapting to failures or work around with other constraints, e.g. circumvention by avoiding use of failed parts
2050/0052	. . . {Filtering, filters}	2050/0292	. . . {Fail-safe or redundant systems, e.g. limp-home or backup systems}
2050/0054	. . . . {Cut-off filters, retarders, delaying means, dead zones, threshold values or cut-off frequency}	2050/0295	. . . {Inhibiting action of specific actuators or systems}
2050/0055	. . . . . {High-pass filters}	2050/0297	. . . {Control Giving priority to different actuators or systems}
2050/0056	. . . . . {Low-pass filters}	50/032	. . Fixing failures by repairing failed parts, e.g. loosening a sticking valve
2050/0057	. . . {Frequency analysis, spectral techniques or transforms}	50/035	. . Bringing the control units into a predefined state, e.g. giving priority to particular actuators
2050/0058	. . . {Signal modulation for data transmission}	50/038	. . Limiting the input power, torque or speed
2050/0059	. . . {Signal noise suppression}	50/04	. . Monitoring the functioning of the control system
2050/006	. . . {Interpolation; Extrapolation}	2050/041	. . {Built in Test Equipment [BITE]}
2050/0062	. {Adapting control system settings}	2050/043	. . . {Testing equipment at KEY-ON}
2050/0063	. . {Manual parameter input, manual setting means, manual initialising or calibrating means}	50/045	. . {Monitoring control system parameters}
2050/0064	. . . {using a remote, e.g. cordless, transmitter or receiver unit, e.g. remote keypad or mobile phone}	2050/046	. . . {involving external transmission of data to or from the vehicle, e.g. via telemetry, satellite, Global Positioning System [GPS]}
2050/0065	. . . {using a personalised data carrier, e.g. magnetic card, memory card or electronic ignition key}	2050/048	. . . . {displaying data transmitted between vehicles, e.g. for platooning, control of inter-vehicle distance}
2050/0066	. . . {using buttons or a keyboard connected to the on-board processor}	50/06	. Improving the dynamic response of the control system, e.g. improving the speed of regulation or avoiding hunting or overshoot
2050/0067	. . . . {Confirmation by the driver}	2050/065	. . {by reducing the computational load on the digital processor of the control computer}
2050/0068	. . . {Giving intention of direction, e.g. by indicator lights, steering input}	50/08	. Interaction between the driver and the control system
2050/007	. . {Switching between manual and automatic parameter input, and vice versa}	50/082	. . {Selecting or switching between different modes of propelling}
2050/0071	. . . {Controller overrides driver automatically}	50/085	. . {Changing the parameters of the control units, e.g. changing limit values, working points by control input}
2050/0072	. . . {Controller asks driver to take over}	50/087	. . {where the control system corrects or modifies a request from the driver}
2050/0073	. . . {Driver overrides controller}	50/10	. . Interpretation of driver requests or demands
2050/0074	. . . {Driver shifts control to the controller, e.g. by pressing a button}	50/12	. . Limiting control by the driver depending on vehicle state, e.g. interlocking means for the control input for preventing unsafe operation
2050/0075	. . {Automatic parameter input, automatic initialising or calibrating means}	50/14	. . Means for informing the driver, warning the driver or prompting a driver intervention
2050/0082	. . . {for initialising the control system}	2050/143	. . . {Alarm means}
2050/0083	. . . {Setting, resetting, calibration}	2050/146	. . . {Display means}
2050/0085	. . . . {Setting or resetting initial positions}	50/16	. . . Tactile feedback to the driver, e.g. vibration or force feedback to the driver on the steering wheel or the accelerator pedal
2050/0086	. . . . {Recalibrating datum positions, e.g. by using check cycles}		
2050/0087	. . . . {Resetting start and end points of actuator travel}		
2050/0088	. . . . {Adaptive recalibration}		
2050/009	. . . {Priority selection}		
2050/0091	. . . . {of control inputs}		
2050/0093	. . . . . {of the engine}		
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}		

**60/00 Drive control systems specially adapted for autonomous road vehicles****WARNING**

Groups [B60W 60/00](#) - [B60W 60/007](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 30/12](#), [B60W 30/16](#), [B60W 30/162](#), [B60W 30/165](#), [B60W 30/17](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 60/001 . {Planning or execution of driving tasks}
- 60/0011 . . {involving control alternatives for a single driving scenario, e.g. planning several paths to avoid obstacles}
- 60/0013 . . {specially adapted for occupant comfort}
- 60/00133 . . . {for resting}
- 60/00136 . . . {for intellectual activities, e.g. reading, gaming or working}
- 60/00139 . . . {for sight-seeing}
- 60/0015 . . {specially adapted for safety}
- 60/0016 . . . {of the vehicle or its occupants}
- 60/0017 . . . {of other traffic participants}
- 60/0018 . . . {by employing degraded modes, e.g. reducing speed, in response to suboptimal conditions}
- 60/00182 . . . . {in response to weather conditions}
- 60/00184 . . . . {related to infrastructure}
- 60/00186 . . . . {related to the vehicle}
- 60/00188 . . . . {related to detected security violation of control systems, e.g. hacking of moving vehicle}
- 60/0021 . . {specially adapted for travel time}
- 60/0023 . . {in response to energy consumption}
- 60/0024 . . {with mediation between passenger and vehicle requirements, e.g. decision between dropping off a passenger or urgent vehicle service}
- 60/0025 . . {specially adapted for specific operations}
- 60/00253 . . . {Taxi operations}
- 60/00256 . . . {Delivery operations}
- 60/00259 . . . {Surveillance operations}
- 60/0027 . . {using trajectory prediction for other traffic participants}
- 60/00272 . . . {relying on extrapolation of current movement}
- 60/00274 . . . {considering possible movement changes}
- 60/00276 . . . {for two or more other traffic participants}
- 60/005 . {Handover processes ([Handing over between remote control and on-board control or handing over between remote control arrangements G05D 1/227](#))}
- 60/0051 . . {from occupants to vehicle}
- 60/0053 . . {from vehicle to occupant}
- 60/0054 . . . {Selection of occupant to assume driving tasks}
- 60/0055 . . . {only part of driving tasks shifted to occupants}
- 60/0057 . . {Estimation of the time available or required for the handover}
- 60/0059 . . {Estimation of the risk associated with autonomous or manual driving, e.g. situation too complex, sensor failure or driver incapacity}
- 60/0061 . . {Aborting handover process}

- 60/007 . {[Emergency override](#) ([Handing over between remote control and on-board control or handing over between remote control arrangements G05D 1/227](#))}

**Indexing scheme relating to vehicle control covered by groups B60W 10/00 – B60W 60/007.****2300/00 Indexing codes relating to the type of vehicle****WARNING**

Groups [B60W 2300/00](#) - [B60W 2300/50](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2300/10 . Buses
- 2300/105 . Emergency vehicles, e.g. ambulances
- 2300/12 . Trucks; Load vehicles
- 2300/121 . . Fork lift trucks, Clarks
- 2300/123 . . Light trucks
- 2300/125 . . Heavy duty 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 . Tractor-trailers, i.e. combinations of a towing vehicle and one or more towed vehicles, e.g. caravans; Road trains
- 2300/145 . . Semi-trailers
- 2300/147 . . Road trains
- 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
- 2300/17 . Construction vehicles, e.g. graders, excavators
- 2300/175 . . Skid-steer loaders
- 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
- 2300/34 . Compact city vehicles, e.g., microcars or kei cars
- 2300/345 . . Three wheelers not including single track vehicles
- 2300/36 . Cycles; Motorcycles; Scooters
- 2300/362 . . Buggies; Quads
- 2300/365 . . Scooters
- 2300/367 . . Tricycles
- 2300/40 . Carts, e.g. trolleys
- 2300/405 . . Golf carts
- 2300/44 . Tracked vehicles
- 2300/46 . Variable track or wheelbase vehicles
- 2300/50 . Tilting frame vehicles

**2400/00 Indexing codes relating to detected, measured or calculated conditions or factors****WARNING**

Group [B60W 2400/00](#) is incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

**2420/00 Indexing codes relating to the type of sensors based on the principle of their operation****WARNING**

Groups [B60W 2420/00](#) - [B60W 2420/905](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 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, light or radio wave sensitive means, e.g. infrared sensors
- 2420/403 . . Image sensing, e.g. optical camera
- 2420/406 . . Fiber optic sensor
- 2420/408 . . Radar; Laser, e.g. lidar
- 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
- 2420/54 . Audio sensitive means, e.g. ultrasound
- 2420/60 . Doppler effect
- 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****WARNING**

Groups [B60W 2422/00](#) - [B60W 2422/95](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 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 tyre
- 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****WARNING**

Groups [B60W 2510/00](#) - [B60W 2510/305](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 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

##### **WARNING**

Groups [B60W 2520/00](#) - [B60W 2520/406](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

2520/04	. Vehicle stop
2520/06	. Direction of travel
2520/10	. Longitudinal speed
2520/105	. . Longitudinal acceleration
2520/12	. Lateral speed
2520/125	. . Lateral acceleration
2520/14	. Yaw
2520/16	. Pitch

2520/18	. Roll
2520/20	. Sideslip angle
2520/22	. Articulation angle, e.g. between tractor and trailer
2520/26	. Wheel slip
2520/263	. . Slip values between front and rear axle
2520/266	. . Slip values between left and right wheel
2520/28	. Wheel speed
2520/30	. Wheel torque
2520/40	. Torque distribution
2520/403	. . between front and rear axle
2520/406	. . between left and right wheel

#### 2530/00 Input parameters relating to vehicle conditions or values, not covered by groups [B60W 2510/00](#) or [B60W 2520/00](#)

##### **WARNING**

Group [B60W 2530/00](#) - [B60W 2530/20](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

2530/10	. Weight
2530/12	. Catalyst or filter state
2530/13	. Mileage
2530/16	. Driving resistance
2530/18	. Distance travelled
2530/20	. Tyre data
2530/201	. Dimensions of vehicle

##### **WARNING**

Groups [B60W 2530/201](#) - [B60W 2530/213](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 30/12](#), [B60W 30/16](#), [B60W 30/162](#), [B60W 30/165](#), [B60W 30/17](#), [B60W 30/182](#), [B60W 50/082](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

2530/203	. Presence of trailer
2530/205	. . Dimensions of trailer
2530/207	. . Towing force
2530/209	. Fuel quantity remaining in tank
2530/211	. Fuel quality, e.g. water content due to age of fuel
2530/213	. Fuel type

#### 2540/00 Input parameters relating to occupants

##### **WARNING**

Group [B60W 2540/00](#) is incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2540/01 . Occupants other than the driver

**WARNING**

Groups [B60W 2540/01](#) - [B60W 2540/049](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 30/12](#), [B60W 30/16](#), [B60W 30/162](#), [B60W 30/165](#), [B60W 30/17](#), [B60W 30/182](#), [B60W 50/082](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2540/041 . Potential occupants  
 2540/043 . Identity of occupants  
 2540/045 . Occupant permissions  
 2540/047 . Prioritizing desires of multiple occupants, e.g. when setting climate control or driving behaviour  
 2540/049 . Number of occupants  
 2540/06 . Ignition switch

**WARNING**

Groups [B60W 2540/06](#) - [B60W 2540/20](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2540/10 . Accelerator pedal position  
 2540/103 . . Accelerator thresholds, e.g. kickdown  
 2540/106 . . Rate of change  
 2540/12 . Brake pedal position  
 2540/14 . Clutch pedal position  
 2540/16 . Ratio selector position  
 2540/165 . . Rate of change  
 2540/18 . Steering angle  
 2540/20 . Direction indicator values  
 2540/21 . Voice

**WARNING**

Groups [B60W 2540/21](#) - [B60W 2540/215](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 30/12](#), [B60W 30/16](#), [B60W 30/162](#), [B60W 30/165](#), [B60W 30/17](#), [B60W 30/182](#), [B60W 50/082](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2540/215 . Selection or confirmation of options

- 2540/22 . Psychological state; Stress level or workload

**WARNING**

Group [B60W 2540/22](#) is incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2540/221 . Physiology, e.g. weight, heartbeat, health or special needs

**WARNING**

Groups [B60W 2540/221](#) - [B60W 2540/229](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 30/12](#), [B60W 30/16](#), [B60W 30/162](#), [B60W 30/165](#), [B60W 30/17](#), [B60W 30/182](#), [B60W 50/082](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2540/223 . Posture, e.g. hand, foot, or seat position, turned or inclined  
 2540/225 . Direction of gaze  
 2540/227 . Position in the vehicle  
 2540/229 . Attention level, e.g. attentive to driving, reading or sleeping  
 2540/24 . Drug level, e.g. alcohol

**WARNING**

Groups [B60W 2540/24](#) - [B60W 2540/30](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2540/26 . Incapacity  
 2540/30 . Driving style

**2552/00 Input parameters relating to infrastructure****WARNING**

Group [B60W 2552/00](#) is incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#). Group [B60W 2552/00](#) is also impacted by reclassification into groups [B60W 2552/00](#) - [B60W 2552/53](#).

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

- 2552/05 . Type of road, e.g. motorways, local streets, paved or unpaved roads

**WARNING**

Group [B60W 2552/05](#) is incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).  
Group [B60W 2552/05](#) is also impacted by reclassification into groups [B60W 2552/05](#) and [B60W 2552/10](#).

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

- 2552/10 . Number of lanes

**WARNING**

Groups [B60W 2552/10](#) – [B60W 2552/53](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 2552/00](#), [B60W 2552/05](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2552/15 . Road slope, i.e. the inclination of a road segment in the longitudinal direction  
2552/20 . Road profile, i.e. the change in elevation or curvature of a plurality of continuous road segments  
2552/25 . Road altitude  
2552/30 . Road curve radius  
2552/35 . Road bumpiness, e.g. potholes  
2552/40 . Coefficient of friction  
2552/45 . Pedestrian sidewalk  
2552/50 . Barriers  
2552/53 . Road markings, e.g. lane marker or crosswalk

**2554/00 Input parameters relating to objects****WARNING**

Group [B60W 2554/00](#) is incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

Group [B60W 2554/00](#) is also impacted by reclassification into groups [B60W 2554/20](#), [B60W 2554/40](#), [B60W 2554/402](#), [B60W 2554/4023](#), [B60W 2554/4026](#), [B60W 2554/4029](#), [B60W 2554/404](#), [B60W 2554/4041](#), [B60W 2554/4042](#), [B60W 2554/4043](#), [B60W 2554/4044](#), [B60W 2554/4045](#), [B60W 2554/4046](#), [B60W 2554/4047](#), [B60W 2554/4048](#), [B60W 2554/4049](#), [B60W 2554/406](#), [B60W 2554/408](#), [B60W 2554/60](#), [B60W 2554/80](#), [B60W 2554/801](#), [B60W 2554/802](#), [B60W 2554/803](#), [B60W 2554/804](#), [B60W 2554/805](#), and [B60W 2554/806](#).

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

- 2554/20 . Static objects

**WARNING**

Groups [B60W 2554/20](#) - [B60W 2554/60](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#), [B60K 2028/003](#), [B60K 2028/006](#), [B60K 28/02](#), [B60K 28/04](#), [B60K 28/06](#), [B60K 28/063](#), [B60K 28/066](#), [B60K 28/08](#), [B60K 28/10](#), [B60K 28/12](#), [B60K 28/14](#), [B60K 28/16](#), [B60K 28/165](#), [B60W 2554/00](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2554/40 . Dynamic objects, e.g. animals, windblown objects  
2554/402 . . Type  
2554/4023 . . . large-size vehicles, e.g. trucks  
2554/4026 . . . Cycles  
2554/4029 . . . Pedestrians  
2554/404 . . Characteristics  
2554/4041 . . . Position  
2554/4042 . . . Longitudinal speed  
2554/4043 . . . Lateral speed  
2554/4044 . . . Direction of movement, e.g. backwards  
2554/4045 . . . Intention, e.g. lane change or imminent movement  
2554/4046 . . . Behavior, e.g. aggressive or erratic  
2554/4047 . . . Attentiveness, e.g. distracted by mobile phone  
2554/4048 . . . Field of view, e.g. obstructed view or direction of gaze  
2554/4049 . . . Relationship among other objects, e.g. converging dynamic objects  
2554/406 . . Traffic density  
2554/408 . . Traffic behavior, e.g. swarm  
2554/60 . Traversable objects, e.g. speed bumps or curbs  
2554/80 . Spatial relation or speed relative to objects

**WARNING**

Group [B60W 2554/80](#) is incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 2554/00](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

Group [B60W 2554/80](#) is also impacted by reclassification into groups [B60W 2554/801](#), [B60W 2554/802](#), [B60W 2554/803](#), [B60W 2554/804](#), [B60W 2554/805](#), and [B60W 2554/806](#).

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

2554/801 . . Lateral distance

#### **WARNING**

Groups [B60W 2554/801](#) - [B60W 2554/806](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#), [B60K 2028/003](#), [B60K 2028/006](#), [B60K 28/02](#), [B60K 28/04](#), [B60K 28/06](#), [B60K 28/063](#), [B60K 28/066](#), [B60K 28/08](#), [B60K 28/10](#), [B60K 28/12](#), [B60K 28/14](#), [B60K 28/16](#), [B60K 28/165](#), [B60W 2554/00](#), [B60W 2554/80](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

2554/802 . . Longitudinal distance

2554/803 . . Relative lateral speed

2554/804 . . Relative longitudinal speed

2554/805 . . Azimuth angle

2554/806 . . Relative heading

**2555/00** **Input parameters relating to exterior conditions, not covered by groups [B60W 2552/00](#), [B60W 2554/00](#)**

#### **WARNING**

Groups [B60W 2555/00](#) - [B60W 2555/80](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

2555/20 . Ambient conditions, e.g. wind or rain

2555/40 . Altitude

2555/60 . Traffic rules, e.g. speed limits or right of way

2555/80 . . Country specific, e.g. driver age limits or right hand drive

**2556/00** **Input parameters relating to data**

#### **WARNING**

Groups [B60W 2556/00](#) – [B60W 2556/40](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 30/12](#), [B60W 30/16](#), [B60W 30/162](#), [B60W 30/165](#), [B60W 30/17](#), [B60W 30/182](#), [B60W 50/082](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

2556/05 . Big data

2556/10 . Historical data

2556/15 . Data age

2556/20 . Data confidence level

2556/25 . Data precision

2556/30 . Data update rate

2556/35 . Data fusion

2556/40 . High definition maps

2556/45 . External transmission of data to or from the vehicle

#### **WARNING**

Groups [B60W 2556/45](#) - [B60W 2556/65](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [B60W 30/12](#), [B60W 30/16](#), [B60W 30/162](#), [B60W 30/165](#), [B60W 30/17](#), [B60W 30/182](#), [B60W 50/082](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

2556/50 . . of positioning data, e.g. GPS [Global Positioning System] data

2556/55 . . using telemetry

2556/65 . . Data transmitted between vehicles

**2710/00** **Output or target parameters relating to a particular sub-units**

#### **WARNING**

Groups [B60W 2710/00](#) - [B60W 2710/305](#) are incomplete pending reclassification of documents from groups [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

2710/02 . Clutches

2710/021 . . Clutch engagement state

2710/022 . . . Clutch actuator position

2710/023 . . . Clutch engagement rate

2710/024 . . . of torque converter lock-up clutch

2710/025 . . Clutch slip, i.e. difference between input and output speeds

2710/026 . . . Slip change rate

2710/027 . . Clutch torque

2710/028 . . Clutch input shaft speed

2710/029 . . Clutch temperature

2710/06 . Combustion engines, Gas turbines

2710/0605 . . Throttle position

2710/0611 . . . Throttle change rate

2710/0616 . . Position of fuel or air injector

2710/0622 . . . Air-fuel ratio

2710/0627 . . . Fuel flow rate

2710/0633 . . . Inlet air flow rate

2710/0638 . . Turbocharger state

2710/0644 . . Engine speed

2710/065 . . . Idle condition

2710/0655 . . . Coasting condition

2710/0661 . . . Speed change rate

2710/0666 . . Engine torque

2710/0672 . . . Torque change rate

2710/0677 . . Engine power

2710/0683 . . Engine manifold pressure

2710/0688 . . Engine temperature

2710/0694 . . Engine exhaust temperature

2710/08 . Electric propulsion units

2710/081 . . Speed

2710/082 . . . Speed change rate

2710/083	. . Torque	2720/103	. . Speed profile
2710/085	. . . Torque change rate	2720/106	. . Longitudinal acceleration
2710/086	. . Power	2720/12	. Lateral speed
2710/087	. . . Power change rate	2720/125	. . Lateral acceleration
2710/088	. . Temperature	2720/14	. Yaw
2710/09	. Other types of propulsion units, e.g. fluid motors, or type not specified	2720/16	. Pitch
2710/10	. Change speed gears	2720/18	. Roll
2710/1005	. . Transmission ratio engaged	2720/20	. Sideslip angle
2710/1011	. . Input shaft speed, e.g. turbine speed	2720/22	. Articulation angle, e.g. between tractor and trailer
2710/1016	. . . Input speed change rate	2720/24	. Direction of travel
2710/1022	. . Input torque	2720/26	. Wheel slip
2710/1027	. . . Input torque change rate	2720/263	. . Slip values between front and rear axle
2710/1033	. . Input power	2720/266	. . Slip values between left and right wheel
2710/1038	. . Output speed	2720/28	. Wheel speed
2710/1044	. . . Output speed change rate	2720/30	. Wheel torque
2710/105	. . Output torque	2720/40	. Torque distribution
2710/1055	. . . Output torque change rate	2720/403	. . between front and rear axle
2710/1061	. . Output power	2720/406	. . between left and right wheel
2710/1066	. . . Transmission of zero torque		
2710/1072	. . Temperature	<b>2754/00</b>	<b>Output or target parameters relating to objects</b>
2710/1077	. . fluid pressure, e.g. oil pressure		<b>WARNING</b>
2710/1083	. . . pressure of control fluid		Group <a href="#">B60W 2754/00</a> is incomplete pending reclassification of documents from groups <a href="#">B60K 28/00</a> - <a href="#">B60K 28/165</a> , <a href="#">G05D 1/0061</a> , <a href="#">G05D 1/0088</a> , <a href="#">G05D 1/021</a> , <a href="#">G05D 1/0214</a> , <a href="#">G05D 1/0221</a> , and <a href="#">G05D 1/0223</a> .
2710/1088	. . . pressure of working fluid		All groups listed in this Warning should be considered in order to perform a complete search.
2710/1094	. . Direction of power flow		
2710/12	. Differentials		
2710/125	. . Locking status	2754/10	. Spatial relation or speed relative to objects
2710/18	. Braking system		<b>WARNING</b>
2710/182	. . Brake pressure, e.g. of fluid or between pad and disc		Groups <a href="#">B60W 2754/10</a> is incomplete pending reclassification of documents from groups <a href="#">B60K 28/00</a> , <a href="#">B60K 2028/003</a> , <a href="#">B60K 2028/006</a> , <a href="#">B60K 28/02</a> , <a href="#">B60K 28/04</a> , <a href="#">B60K 28/06</a> , <a href="#">B60K 28/063</a> , <a href="#">B60K 28/066</a> , <a href="#">B60K 28/08</a> , <a href="#">B60K 28/10</a> , <a href="#">B60K 28/12</a> , <a href="#">B60K 28/14</a> , <a href="#">B60K 28/16</a> , <a href="#">B60K 28/165</a> , <a href="#">G05D 1/0061</a> , <a href="#">G05D 1/0088</a> , <a href="#">G05D 1/021</a> , <a href="#">G05D 1/0214</a> , <a href="#">G05D 1/0221</a> , and <a href="#">G05D 1/0223</a> .
2710/184	. . Brake temperature, e.g. of fluid, pads or discs		Group <a href="#">B60W 2754/10</a> is also impacted by reclassification into groups <a href="#">B60W 2754/20</a> , <a href="#">B60W 2754/30</a> , <a href="#">B60W 2754/40</a> , <a href="#">B60W 2754/50</a> , <a href="#">B60W 2754/60</a> , and <a href="#">B60W 2754/70</a> .
2710/186	. . Status of parking brakes		All groups listed in this Warning should be considered in order to perform a complete search.
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		
<b>2720/00</b>	<b>Output or target parameters relating to overall vehicle dynamics</b>		
	<b>WARNING</b>		
	Groups <a href="#">B60W 2720/00</a> - <a href="#">B60W 2720/406</a> are incomplete pending reclassification of documents from groups <a href="#">G05D 1/0061</a> , <a href="#">G05D 1/0088</a> , <a href="#">G05D 1/021</a> , <a href="#">G05D 1/0214</a> , <a href="#">G05D 1/0221</a> , and <a href="#">G05D 1/0223</a> .		
	All groups listed in this Warning should be considered in order to perform a complete search.		
2720/10	. Longitudinal speed	2754/30	. . Longitudinal distance
		2754/40	. . Relative lateral speed



- 2754/50 . . Relative longitudinal speed
- 2754/60 . . Azimuth angle
- 2754/70 . . Relative heading

**2756/00 Output or target parameters relating to data****WARNING**

Group [B60W 2756/00](#) - [B60W 2756/10](#) are incomplete pending reclassification of documents from groups [B60K 28/00](#) - [B60K 28/165](#), [G05D 1/0061](#), [G05D 1/0088](#), [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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

- 2756/10 . 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](#)****WARNING**

Group [B60W 2900/00](#) is incomplete pending reclassification of documents from groups [G05D 1/021](#), [G05D 1/0214](#), [G05D 1/0221](#), and [G05D 1/0223](#).

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