

ECLA**EUROPEAN CLASSIFICATION****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 [N0405] [C0805]****[N: 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 [B60W20/00](#) - [B60W50/00](#), 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 [B60W10/00](#), classification must also be made in groups [B60W20/00-B60W50/00](#) 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 [N: 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, [N: three or more vehicle sub-units for groups [B60W30/00-30/16](#)], so that the sub-units act together to solve a particular problem or in response to a particular driving condition, [N: 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 [N: by managing the global dynamics] of that vehicle in order to take certain actions [N: in order to improve stability, comfort or safety];
- "road vehicle" means a [N: 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: [N: 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, [N: and, particularly for hybrid vehicles,] energy storage means, fuel cells, or auxiliary equipment.

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B60W10/00

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 [B60L11/00](#)) [N0603]

Notes

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

B60W10/02

- . including control of driveline clutches [N0603]

B60W10/02B

- . . [N: Fluid clutches, e.g. torque converters] [N0804] [C0812]

B60W10/02D

- . . [N: Clutches for bridging a fluid gearing, e.g. lock-up] [N0804]

B60W10/04

- . including control of propulsion units [N0603]

- B60W10/06 . . including control of combustion engines [N0603]
- B60W10/08 . . including control of electric propulsion units, e.g. motors or generators [N0603]
- B60W10/10 . including control of change-speed gearings [N0603]
- B60W10/101 . . Infinitely variable gearings [N1202]
- B60W10/103 . . . of fluid type [N1202]
- B60W10/105 . . . of electric type [N1202]
- B60W10/107 . . . with endless flexible members [N1202]
- B60W10/108 . . . Friction gearings [N1202]
- B60W10/109 of the toroid type [N1202]
- B60W10/11 . . Stepped gearings [N1202]
- B60W10/111 . . . with separate change-speed gear trains arranged in series [N1202]
- B60W10/113 . . . with two input flow paths, e.g. double clutch transmission selection of one of the torque flow paths by the corresponding input clutch [N1202]
- B60W10/115 . . . with planetary gears [N1202]
- B60W10/119 . including control of all-wheel-driveline means, e.g. transfer gears or clutches for dividing torque between front and rear axle ([B60W10/14](#) takes precedence) [N1202]
- B60W10/12 . including control of differentials [N0603]
- B60W10/14 . . Central differentials for dividing torque between front and rear axles [N1202]
- B60W10/16 . . Axle differentials, e.g. for dividing torque between left and right wheels [N1202]
- B60W10/18 . including control of braking systems [N0603]
- B60W10/18P . . [N: including control of parking brakes] [N1202]
- B60W10/184 . . with wheel brakes [N1202]
- B60W10/188 . . . hydraulic brakes [N1202]
- [N: **WARNING** [N1202]
this group is not complete pending a reorganisation, see also [B60W10/184](#)
]
- B60W10/192 . . . electric brakes [N1202]
- [N: **WARNING** [N1202]
this group is not complete pending a reorganisation, see also [B60W10/184](#)
]
- B60W10/196 . . acting within the driveline, e.g. retarders [N1202]
- B60W10/198 . . with exhaust brakes [N1202]
- B60W10/20 . including control of steering systems [N0603]
- B60W10/22 . including control of suspension systems [N0603]
- B60W10/24 . including control of energy storage means [N0603]
- B60W10/26 . . for electrical energy, e.g. batteries or capacitors [N0603]
- B60W10/28 . including control of fuel cells [N0603]
- B60W10/30 . including control of auxiliary equipment, e.g. air-conditioning compressors or oil pumps

[N0603]

B60W20/00

Control systems specially adapted for hybrid vehicles, i.e. vehicles having two or more prime movers of more than one type, e.g. electrical and internal combustion motors, all used for propulsion of the vehicle [N0605]

[N: **Notes**

Classification is also made in [B60K6/04](#) for the different types of hybrid electric vehicles [N0605]
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B60W20/10

- [N: controlling the power contribution of each of the prime movers to meet required power demand] [N1208]

B60W20/102

- • [N: using model predictive control [MPC] strategies, i.e. control methods based on models predicting performance] [N1208]

B60W20/104

- • [N: using control strategies considering route information] [N1208]

B60W20/106

- • [N: in order to stay within battery power input and output limits or to prevent overcharging or over-discharging] [N1208]

B60W20/1062

- • • [N: in conjunction with braking regeneration] [N1208]

B60W20/108

- • [N: Special control strategies to achieve a particular effect] [N1208]

B60W20/1082

- • • [N: Control strategies to reduce engine exhaust emissions] [N1208]

B60W20/1084

- • • [N: Control strategies to reduce noise] [N1208]

B60W20/1086

- • • [N: Control strategies to avoid aging of fuel] [N1208]

B60W20/1088

- • • [N: Control strategies to achieve boost-effect] [N1208]

B60W20/20

- [N: Control strategies including selection of hybrid configuration, e.g. selection between series or parallel configuration] [N1208]

B60W20/30

- [N: Control strategies including selection of transmission gear ratio] [N1208]

B60W20/40

- [N: controlling the transition between prime movers, i.e. engaging or disengaging a prime mover] [N1208]

B60W20/50

- [N: Control strategies for fault diagnosis, failsafe operation or limp home mode] [N1208]

B60W30/00

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, [N: 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) [B60T8/00](#))] [N0605] [C0911]

B60W30/02

- Control of vehicle driving stability [N0603]

B60W30/02B

- • [N: related to comfort of drivers or passengers] [N0607]

B60W30/04

- • related to roll-over prevention [N0603]

B60W30/045

- • Improving turning performance [N1202]

[N: **WARNING** [N1202]

This group is not complete pending a reorganisation, see also [B60W30/02](#)
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- B60W30/06
 - . Automatic manoeuvring for parking ([controlling only the steering B62D15/02H6](#)) [N0603] [C1008]
 - [N: **WARNING** [N1008]
 - [B60W30/06](#) and subgroups are not complete pending a reorganisation; see provisionally also group [B62D15/02H6](#)]
- B60W30/08
 - . [N: Active safety systems] predicting or avoiding probable or impending collision [N: or attempting to minimise its consequences] [N0603] [C0911]
- B60W30/085
 - . . Taking automatic action to adjust vehicle attitude in preparation for collision, e.g. braking for nose dropping [N1202]
- B60W30/09
 - . . Taking automatic action to avoid collision, e.g. braking and steering [N1202]
- B60W30/095
 - . . Predicting travel path or likelihood of collision [N1202]
- B60W30/095B
 - . . . [N: the prediction being responsive to vehicle dynamic parameters] [N1202]
- B60W30/095D
 - . . . [N: the prediction being responsive to traffic or environmental parameters] [N1202]
- B60W30/10
 - . Path keeping [N: (cruise control for automatically following a preceding vehicle [B60W30/16B](#))] [N0603] [C0811]
- B60W30/12
 - . . Lane keeping [N0603]
- B60W30/14
 - . [N: Adaptive] cruise control [N0603] [C1202]
- B60W30/14B
 - . . [N: Speed control (B60W30/16 takes precedence)] [N0603]
- B60W30/14B2
 - . . . [N: Speed limiting] [N0603]
- B60W30/16
 - . . Control of distance between vehicles, e.g. keeping a distance to preceding vehicle [N0603]
- B60W30/16C
 - . . . [N: Speed limiting therefor] [N0911]
- B60W30/165
 - . . . Automatically following the path of a preceding lead vehicle, e.g. "electronic tow-bar" [N1202]
- B60W30/17
 - . . . with provision for special action when the preceding vehicle comes to a halt, e.g. stop and go [N1202]
- B60W30/18
 - . Propelling the vehicle [N0603]
 - [N: **WARNING**[C0711]
 - Subgroups of [B60W30/18](#) are not complete. Documents from [B60K41/00](#) and [B60W30/18](#) are in the process of being reorganised to the new groups]
- B60W30/18R
 - . . [N: related to particular drive situations] [N0607]
- B60W30/18R1
 - . . . [N: Start-stop drive, e.g. in a traffic jam] [N0607]
- B60W30/18R2
 - . . . [N: Drive off, accelerating from standstill] [N0607]
- B60W30/18R3
 - . . . [N: Reversing] [N0607]
- B60W30/18R3B
 - [N:Rocking, i.e. fast change between forward and reverse] [N0607]
- B60W30/18R4
 - . . . [N: at stand still, e.g. engine in idling state (hill holding B60W30/18R9B)] [N0710]
- B60W30/18R5
 - . . . [N: Creeping] [N0607]
- B60W30/18R6
 - . . . [N: Coasting] [N0804]

B60W30/18R7	. . . [N: Preparing for stopping] [N0607]
B60W30/18R9	. . . [N: Braking] [N0607]
B60W30/18R9B [N: Hill holding] [N0607]
B60W30/18R9D [N: Regenerative braking] [N0607]
B60W30/18R9F [N: Engine braking] [N0607]
B60W30/18R10	. . . [N: Cornering] [N1202]
B60W30/18R11	. . . [N: Approaching an intersection] [N1202]
B60W30/18R12	. . . [N: Lane change; Overtaking manoeuvres] [N1202]
B60W30/18S	. . [N: Preventing, or responsive to skidding of wheels] [N0804]
B60W30/18W	. . [N: Propulsion control with common controlling member for different functions] [N0804]
B60W30/18Y	. . N: Propulsion control with control means using analogue circuits, relays or mechanical links] [N0804]
B60W30/182	. . Selecting between different operative modes, e.g. comfort and performance modes [N1202]
B60W30/184	. . Preventing damage resulting from overload or excessive wear of the driveline [N1202]
B60W30/184B	. . . [N: Overheating of driveline components (B60W30/186 takes precedence)] [N1202]
B60W30/184D	. . . [N: Preventing of breakage of drive line components, e.g. parts of the gearing] [N1202]
B60W30/186	. . . excessive wear or burn out of friction elements, e.g. clutches [N1202]
B60W30/188	. . Controlling power parameters of the driveline, e.g. determining the required power [N1202]
B60W30/188B	. . . [N: characterised by the working point of the engine, e.g. by using engine output chart] [N1202]
B60W30/188D	. . . [N: Avoiding stall or overspeed of the engine] [N1202]
B60W30/188F	. . . [N: Controlling power supply to auxiliary devices] [N1202]
B60W30/188F2 [N: Control of power take off (PTO)] [N1202]
B60W30/19	. . Improvement of gear change, e.g. by synchronisation or smoothing gear shift [N1202]
B60W30/192	. . Mitigating problems related to power-up or power-down of the driveline, e.g. start-up of a cold engine [N1202]
B60W30/194	. . . related to low temperature conditions, e.g. high viscosity of hydraulic fluid [N1202]
B60W30/20	. . Reducing vibrations in the driveline [N0603]
B60W40/00	Estimation or calculation of [N: non-directly measurable] driving parameters for road vehicle drive control systems not related to the control of a particular sub unit, [N: e.g. by using mathematical models] [N0605] [C0911]
B60W40/02	. related to ambient conditions [N0605]
B60W40/04	. . Traffic conditions [N0605]
B60W40/06	. . Road conditions [N0605]
B60W40/064	. . . Degree of grip [N1202]
B60W40/068	. . . Road friction coefficient [N1202]

- B60W40/072 . . . Curvature of the road [N1202]
- B60W40/076 . . . Slope angle of the road [N1202]
- B60W40/08 . related to drivers or passengers [N0605]
- B60W40/09 . . Driving style or behaviour [N1202]
- B60W40/10 . related to vehicle motion [N0605]
- B60W40/10B . . [N: Driving resistance] [N0804]
- B60W40/101 . . Side slip angle of tyre [N1202]
- B60W40/103 . . Side slip angle of vehicle body [N1202]
- B60W40/105 . . Speed [N1202]
- B60W40/107 . . Longitudinal acceleration [N1202]
- B60W40/109 . . Lateral acceleration [N1202]
- B60W40/11 . . Pitch movement [N1202]
- B60W40/112 . . Roll movement [N1202]
- B60W40/114 . . Yaw movement [N1202]
- B60W40/12 . related to parameters of the vehicle itself, [N: e.g. tyre models] [N0603] [C0911]
- B60W40/13 . . Load or weight [N1202]
- B60W50/00** **Details of control systems for road vehicle drive control not related to the control of a particular sub-unit, [N: e.g. process diagnostic or vehicle driver interfaces] [N0605] [C0911]**
- [N: **WARNING**
New subgroups of IPC8 are not yet complete. Documents from B60K, in particular [B60K41/00](#) and subgroups, are in the process of being reclassified to the new groups [N0605]
]
- B60W50/00F . [N: Predicting future conditions] [N1202]
- B60W50/00Z . [N: Details of control systems ensuring comfort, safety or stability not otherwise provided for] [N0911]
- B60W50/02 . Ensuring safety in case of control system failures, e.g. by diagnosing, circumventing or fixing failures [N0605]
- B60W50/02A . . [N: Diagnosing or detecting failures; Failure detection models] [N0911] [C1202]
- B60W50/02C . . [N: Failure correction strategy] [N0911]
- B60W50/023 . . Avoiding failures by using redundant parts [N1202]
- B60W50/029 . . Adapting to failures or work around with other constraints, e.g. circumvention by avoiding use of failed parts [N1202]
- B60W50/032 . . Fixing failures by repairing failed parts, e.g. loosening a sticking valve [N1202]
- B60W50/035 . . Bringing the control units into a predefined state, e.g. giving priority to particular actuators [N1202]
- B60W50/038 . . Limiting the input power, torque or speed [N1202]
- B60W50/04 . Monitoring the functioning of the control system [N0605] [C0911]

- B60W50/04B
 - . . [N: Monitoring control system parameters] [N0605]
- B60W50/06
 - . Improving the dynamic response of the control system, e.g. improving the speed of regulation or avoiding hunting or overshoot [N0605]
- B60W50/08
 - . Interaction between the driver and the control system [N0605]
- B60W50/08B
 - . . [N: Selecting or switching between different modes of propelling (for selection of different gear shift modes B60W30/18F)]
- B60W50/08F
 - . . [N: Changing the parameters of the control units, e.g. changing limit values, working points by control input] [N0606]
- B60W50/08M
 - . . [N: where the control system corrects or modifies a request from the driver] [N0911]
- B60W50/10
 - . . Interpretation of driver requests or demands [N1202]
- B60W50/12
 - . . Limiting control by the driver depending on vehicle state, e.g. interlocking means for the control input for preventing unsafe operation [N1202]
- B60W50/14
 - . . Means for informing the driver, warning the driver or prompting a driver intervention [N1202]
- B60W50/16
 - . . . Tactile feedback to the driver, e.g. vibration or force feedback to the driver on the steering wheel or the accelerator pedal [N1202]