### B60L PROPELSION OF ELECTRICALLY-PROPELLED VEHICLES

**Arrangements or mounting of electrical propulsion units or of plural diverse prime-movers for mutual or common propulsion in vehicles B60K 1/00, B60K 6/20; arrangements or mounting of electrical gearing in vehicles B60K 17/12, B60K 17/14; preventing wheel slip by reducing power in rail vehicles B61C 15/08; dynamo-electric machines H02K; control or regulation of electric motors H02P; SUPPLYING ELECTRIC POWER FOR AUXILIARY EQUIPMENT OF ELECTRICALLY-PROPELLED VEHICLES (electric coupling devices combined with mechanical couplings of vehicles B60D 1/64; electric heating for vehicles B60H 1/00); ELECTRODYNAMIC BRAKE SYSTEMS FOR VEHICLES IN GENERAL (control or regulation of electric motors H02P); MAGNETIC SUSPENSION OR LEVITATION FOR VEHICLES; MONITORING OPERATING VARIABLES OF ELECTRICALLY-PROPELLED VEHICLES; ELECTRIC SAFETY DEVICES FOR ELECTRICALLY-PROPELLED VEHICLES**

#### NOTES

1. This subclass, subject to the above references, covers:
   - feeding of power to auxiliary circuits;
   - current collectors; arrangements thereof on rail or road vehicles or on vehicles in general
   - electrodynamic brake systems;
   - electric propulsion of vehicles; control and regulation therefor
2. In this subclass it is desirable to classify any "additional information" which is of interest for search.

#### WARNING

In this subclass non-limiting references (in the sense of paragraph 39 of the Guide to the IPC) may still be displayed in the scheme.

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General H01R 41/00

Current collectors for power supply lines of electrically-propelled vehicles (current collectors in general H01R 41/00)

5/045 . . . [with trolley wire finders]
5/04 . . . using rollers or sliding shoes in contact with trolley wire (B60L 5/40 takes precedence)
5/02 . . . with ice-removing device
5/005 . . . [without mechanical contact between the collector and the power supply line]
5/00 . . . Structure of the rollers or their carrying means
5/08 . . . Structure of the sliding shoes or their carrying means
5/085 . . . [with carbon contact members]
5/10 . . . Devices preventing the collector from jumping off
5/12 . . . Structural features of poles or their bases
5/14 . . . Devices for automatic lowering of a jumped-off collector
5/16 . . . Devices for lifting and resetting the collector (B60L 5/34 takes precedence)
5/18 . . . using bow-type collectors in contact with trolley wire
5/19 . . . using arrangements for effecting collector movement transverse to the direction of vehicle motion
5/20 . . . Details of contact bow
5/205 . . . [with carbon contact members]
5/22 . . . Supporting means for the contact bow
5/24 . . . Pantographs
5/26 . . . Half pantographs, e.g. using counter rocking beams
5/28 . . . Devices for lifting and resetting the collector
5/30 . . . . . . . . using springs
5/32 . . . . . . . . using fluid pressure
5/34 . . . . . . . . with devices to enable one vehicle to pass another one using the same power supply line
5/36 . . . . . . . . with means for collecting current simultaneously from more than one conductor, e.g. from more than one phase
5/38 . . . . . . . . for collecting current from conductor rails (B60L 5/40 takes precedence)
5/39 . . . . . . . . from third rail
5/40 . . . . . . . . for collecting current from lines in slotted conduits
5/42 . . . . . . . . for collecting current from individual contact pieces connected to the power supply line

Electrodynamic brake systems for vehicles in general

7/03 . . . [Dynamic electric braking by short circuiting the motor]
7/06 . . . [Dynamic electric braking by reversing current, i.e. plugging]
7/02 . . . Dynamic electric resistor braking (B60L 7/22 takes precedence)
7/04 . . . . . . . . for vehicles propelled by dc motors
7/06 . . . . . . . . for vehicles propelled by ac motors
7/08 . . . . . . . . Controlling the braking effect (B60L 7/04, B60L 7/06 take precedence)
7/10 . . . . . . . . Dynamic electric regenerative braking (B60L 7/22 takes precedence)
7/12 . . . . . . . . for vehicles propelled by dc motors
7/14 . . . . . . . . for vehicles propelled by ac motors
7/16 . . . . . . . . for vehicles comprising converters between the power source and the motor
7/18 . . . . . . . . Controlling the braking effect (B60L 7/12, B60L 7/14, B60L 7/16 take precedence)
7/20 . . . Braking by supplying regenerated power to the prime mover of vehicles comprising engine-driven generators
7/22 . . . Dynamic electric resistor braking, combined with dynamic electric regenerative braking
7/24 . . . with additional mechanical or electromagnetic braking
7/26 . . Controlling the braking effect
7/28 . . Eddy-current braking
8/00 Electric propulsion with power supply from forces of nature, e.g. sun or wind
8/003 . [Converting light into electric energy, e.g. by using photo-voltaic systems]
8/006 . [Converting flow of air into electric energy, e.g. by using wind turbines]
9/00 Electric propulsion with power supply external to the vehicle (electric propulsion for monorail vehicles, suspension vehicles or rack railways; B60L 13/00; in combination with batteries or fuel cells within the vehicle; B60L 50/53)
9/005 . [Interference suppression]
9/02 . . using dc motors
9/04 . . fed from dc supply lines
9/06 . . . with conversion by metadyne
9/08 . . fed from ac supply lines
9/10 . . . with rotary converters
9/12 . . . with static converters
9/14 . . fed from different kinds of power-supply lines
9/16 . . using ac induction motors
9/18 . . fed from dc supply lines
9/20 . . . single-phase motors
9/22 . . . polyphase motors
9/24 . . fed from ac supply lines
9/26 . . . single-phase motors
9/28 . . . polyphase motors
9/30 . . fed from different kinds of power-supply lines
9/32 . . using ac brush displacement motors
13/00 Electric propulsion for monorail vehicles, suspension vehicles or rack railways; Magnetic suspension or levitation for vehicles (tracks for Maglev-type trains; F01B 25/30; electromagnets per se H01F 7/06; linear motors per se H02K 41/00)
13/003 . [Crossings; Points]
13/006 . [Electric propulsion adapted for monorail vehicles, suspension vehicles or rack railways (B60L 13/03 takes precedence)]
13/03 . Electric propulsion by linear motors
13/035 . . [Suspension of the vehicle-borne motorparts]
13/04 . Magnetic suspension or levitation for vehicles
13/06 . . Means to sense or control vehicle position or attitude with respect to railway
13/08 . . . for the lateral position
13/10 . Combination of electric propulsion and magnetic suspension or levitation
15/00 Methods, circuits, or devices for controlling the traction-motor speed of electrically-propelled vehicles
15/002 . {for control of propulsion for monorail vehicles, suspension vehicles or rack railways; for control of magnetic suspension or levitation for vehicles for propulsion purposes}
15/005 . . {for control of propulsion for vehicles propelled by linear motors}
15/007 . {Physical arrangements or structures of drive train converters specially adapted for the propulsion motors of electric vehicles}
15/02 . . characterised by the form of the current used in the control circuit
15/025 . . {using field orientation; Vector control; Direct Torque Control [DTC]}
15/04 . . using dc
15/06 . . using substantially sinusoidal ac
15/08 . . using pulses
15/10 . . for automatic control superimposed on human control to limit the acceleration of the vehicle, e.g. to prevent excessive motor current (electric devices for safety purposes B60L 3/00)
15/12 . . with circuits controlled by relays or contactors
15/14 . . with main controller driven by a servomotor (B60L 15/18 takes precedence)
15/16 . . with main controller driven through a ratchet mechanism (B60L 15/18 takes precedence)
15/18 . . without contact making and breaking, e.g. using a transducer
15/20 . . for control of the vehicle or its driving motor to achieve a desired performance, e.g. speed, torque, programmed variation of speed
15/2009 . . . {for braking}
15/2018 . . . {for braking on a slope}
15/2027 . . . . {whilst maintaining constant speed}
15/2056 . . . . {Electric differentials, e.g. for supporting steering vehicles}
15/2045 . . . . {for optimising the use of energy}
15/2054 . . . . {by controlling transmissions or clutches}
15/2063 . . . . {for creeping}
15/2072 . . . . . {for drive off}
15/2081 . . . . . {for drive off on a slope}
15/209 . . . . . {for overtaking}
15/22 . . . with sequential operation of interdependent switches, e.g. relays, contactors, programme drum
15/24 . . . with main controller driven by a servomotor (B60L 15/28 takes precedence)
15/26 . . . with main controller driven through a ratchet mechanism (B60L 15/28 takes precedence)
15/28 . . . without contact making and breaking, e.g. using a transducer
15/30 . . . with means to change over to human control
15/32 . . . Control or regulation of multiple-unit electrically-propelled vehicles
15/34 . . . with human control of a setting device
15/36 . . . . with automatic control superimposed, e.g. to prevent excessive motor current
15/38 . . . with automatic control
15/40 . Adaptation of control equipment on vehicle for remote actuation from a stationary place (devices along the route for controlling devices on rail vehicles B60L 3/00; central rail-traffic control systems B60L 27/00)
15/42 . Adaptation of control equipment on vehicle for actuation from alternative parts of the vehicle or from alternative vehicles of the same vehicle train (B60L 15/32 takes precedence)
### 50/00 Electric propulsion with power supplied within the vehicle (with power supply from force of nature, e.g. sun or wind, B60L 8/00; for monorail vehicles, suspension vehicles or rack railways B60L 13/00)

- **50/10** using propulsion power supplied by engine-driven generators, e.g. generators driven by combustion engines
- **50/11** using DC generators and DC motors
- **50/12** using AC generators and DC motors
- **50/13** using AC generators and AC motors
- **50/14** using DC generators and AC motors
- **50/15** with additional electric power supply (with capacitors charged by engine-driven generators B60L 50/40; with batteries charged by engine-driven generators B60L 50/61)
- **50/16** with provision for separate direct mechanical propulsion
- **50/20** using propulsion power generated by humans or animals
- **50/30** using propulsion power stored mechanically, e.g. in fly-wheels
- **50/40** using propulsion power supplied by capacitors
- **50/50** using propulsion power supplied by batteries or fuel cells

**WARNING**

Group **B60L 50/50** is impacted by reclassification into groups **B60L 50/60**, B60L 50/64, B60L 50/70, and B60L 50/75. All groups listed in this Warning should be considered in order to perform a complete search.

- **50/51** characterised by AC-motors
- **50/52** characterised by DC-motors
- **50/53** in combination with an external power supply, e.g. from overhead contact lines

**WARNING**

Group **B60L 50/53** is incomplete pending reclassification of documents from group B60L 9/00. Groups **B60L 9/00** and B60L 50/53 should be considered in order to perform a complete search.

- **50/56** using power supplied by batteries (in combination with fuel cells B60L 50/75)

**WARNING**

Group **B60L 50/56** is incomplete pending reclassification from group B60L 50/50. Groups **B60L 50/50** and B60L 50/75 should be considered in order to perform a complete search.

- **50/60** using power supplied by batteries (in combination with fuel cells B60L 50/75)

**WARNING**

Group **B60L 50/60** is incomplete pending reclassification from group B60L 50/50. All groups listed in this Warning should be considered in order to perform a complete search.

- **50/61** by batteries charged by engine-driven generators, e.g. series hybrid electric vehicles
- **50/62** charged by low-power generators primarily intended to support the batteries, e.g. range extenders

**NOTE**

This group covers adaptation of battery structures of electric vehicles, e.g. integration into control or safety systems, crash-resistant casings or vibration-damping means.

**WARNING**

Group **B60L 50/64** is incomplete pending reclassification of documents from group B60L 50/50. Groups **B60L 50/50** and B60L 50/64 should be considered in order to perform a complete search.

- **50/66** [Arrangements of batteries]
- **50/70** using power supplied by fuel cells (in combination with batteries B60L 50/75)

**WARNING**

Group **B60L 50/70** is incomplete pending reclassification from group B60L 50/50. All groups listed in this Warning should be considered in order to perform a complete search.

- **50/71** Arrangement of fuel cells within vehicles specially adapted for electric vehicles
- **50/72** Constructional details of fuel cells specially adapted for electric vehicles

**NOTE**

This group covers adaptation of fuel cell structures of electric vehicles, e.g. integration into control or safety systems, crash-resistant casings or vibration-damping means.

- **50/75** using propulsion power supplied by both fuel cells and batteries

**WARNING**

Group **B60L 50/75** is incomplete pending reclassification from group B60L 50/50. Groups **B60L 50/50** and B60L 50/75 should be considered in order to perform a complete search.

- **50/90** using propulsion power supplied by specific means not covered by groups B60L 50/10 - B60L 50/50, e.g. by direct conversion of thermal nuclear energy into electricity
Methods of charging batteries, specially adapted for electric vehicles; Charging stations or on-board charging equipment therefor; Exchange of energy storage elements in electric vehicles

**WARNING**

Group B60L 53/00 is impacted by reclassification into groups B60L 53/50, B60L 53/51, B60L 53/52, B60L 53/53, B60L 53/54, B60L 53/55, B60L 53/56, B60L 53/57, B60L 53/67, and B60L 53/68. All groups listed in this Warning should be considered in order to perform a complete search.

53/10 . . . characterised by the energy transfer between the charging station and the vehicle

**WARNING**

Group B60L 53/10 is incomplete pending reclassification of documents from group B60L 53/60. Groups B60L 53/60 and B60L 53/10 should be considered in order to perform a complete search.

53/11 . . . [DC charging controlled by the charging station, e.g. mode 4]

53/12 . . . Inductive energy transfer

**WARNING**

Group B60L 53/12 is impacted by reclassification into groups B60L 53/122, B60L 53/124, and B60L 53/126. All groups listed in this Warning should be considered in order to perform a complete search.

53/122 . . . Circuits or methods for driving the primary coil, e.g. supplying electric power to the coil

**WARNING**

Group B60L 53/122 is incomplete pending reclassification of documents from group B60L 53/12. Groups B60L 53/12 and B60L 53/122 should be considered in order to perform a complete search.

53/124 . . . Detection or removal of foreign bodies

**WARNING**

Group B60L 53/124 is incomplete pending reclassification of documents from group B60L 53/12. Groups B60L 53/12 and B60L 53/124 should be considered in order to perform a complete search.

53/126 . . . Methods for pairing a vehicle and a charging station, e.g. establishing a one-to-one relation between a wireless power transmitter and a wireless power receiver

**WARNING**

Group B60L 53/126 is incomplete pending reclassification of documents from group B60L 53/12. Groups B60L 53/12 and B60L 53/126 should be considered in order to perform a complete search.

53/14 . . . Conductive energy transfer

**WARNING**

Group B60L 53/14 is impacted by reclassification into group B60L 53/18. Groups B60L 53/14 and B60L 53/18 should be considered in order to perform a complete search.

53/16 . . . Connectors, e.g. plugs or sockets, specially adapted for charging electric vehicles

53/18 . . . Cables specially adapted for charging electric vehicles

**WARNING**

Group B60L 53/18 is incomplete pending reclassification of documents from group B60L 53/14. Groups B60L 53/14 and B60L 53/18 should be considered in order to perform a complete search.

53/20 . . . characterised by converters located in the vehicle

53/22 . . . Constructional details or arrangements of charging converters specially adapted for charging electric vehicles

53/24 . . . Using the vehicle's propulsion converter for charging

53/30 . . . Constructional details of charging stations

**WARNING**

Group B60L 53/30 is impacted by reclassification into groups B60L 53/302, B60L 53/305, B60L 53/34, B60L 53/67, and B60L 53/68. Groups B60L 53/30, B60L 53/302, B60L 53/305, B60L 53/34, B60L 53/67, and B60L 53/68 should be considered in order to perform a complete search.

53/302 . . . Cooling of charging equipment

**WARNING**

Group B60L 53/302 is incomplete pending reclassification of documents from group B60L 53/30. Groups B60L 53/30 and B60L 53/302 should be considered in order to perform a complete search.
53/305 . . {Communication interfaces}

**WARNING**

Group B60L 53/305 is incomplete pending reclassification of documents from group B60L 53/30.

Groups B60L 53/30 and B60L 53/305 should be considered in order to perform a complete search.

53/31 . . Charging columns specially adapted for electric vehicles

53/32 . . {by charging in short intervals along the itinerary, e.g. during short stops}

53/34 . . Plug-like or socket-like devices specially adapted for contactless inductive charging of electric vehicles (positioning means for charging devices using inductive energy transfer B60L 53/38)

**WARNING**

Group B60L 53/34 is incomplete pending reclassification of documents from group B60L 53/30.

Groups B60L 53/30 and B60L 53/34 should be considered in order to perform a complete search.

53/35 . . Means for automatically adjusting the relative position of charging devices and vehicles

53/36 . . by positioning the vehicle

53/37 . . using optical position determination, e.g. using cameras

53/38 . . specially adapted for charging by inductive energy transfer

53/39 . . with position-responsive activation of primary coils

53/50 . . Charging stations characterised by energy-storage or power-generation means

**WARNING**

Groups B60L 53/50 - B60L 53/57 are incomplete pending reclassification of documents from group B60L 53/00.

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

53/51 . . Photovoltaic means

53/52 . . Wind-driven generators

53/53 . . Batteries

53/54 . . Fuel cells

53/55 . . Capacitors

53/56 . . Mechanical storage means, e.g. fly wheels

53/57 . . Charging stations without connection to power networks

53/60 . . Monitoring or controlling charging stations

**WARNING**

Group B60L 53/60 is impacted by reclassification into groups B60L 53/10, B60L 53/62, B60L 53/66, B60L 53/67, and B60L 53/68.

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

53/62 . . in response to charging parameters, e.g. current, voltage or electrical charge

**WARNING**

Group B60L 53/62 is incomplete pending reclassification of documents from groups B60L 53/60.

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

53/63 . . in response to network capacity

53/64 . . Optimising energy costs, e.g. responding to electricity rates

53/65 . . involving identification of vehicles

53/66 . . Data transfer between charging stations and vehicles

**WARNING**

Group B60L 53/66 is incomplete pending reclassification of documents from group B60L 53/60.

Groups B60L 53/60 and B60L 53/66 should be considered in order to perform a complete search.

53/67 . . Controlling two or more charging stations

**WARNING**

Group B60L 53/67 is incomplete pending reclassification of documents from groups B60L 53/00, B60L 53/30, and B60L 53/60.

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

53/68 . . Off-site monitoring or control, e.g. remote control

**WARNING**

Group B60L 53/68 is incomplete pending reclassification of documents from groups B60L 53/00, B60L 53/30, and B60L 53/60.

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

53/80 . . Exchanging energy storage elements, e.g. removable batteries

**WARNING**

Group B60L 53/80 is incomplete pending reclassification of documents from groups B60K 1/04 and B60S 5/06.

Groups B60K 1/04, B60S 5/06, and B60L 53/80 should be considered in order to perform a complete search.

55/00 Arrangements for supplying energy stored within a vehicle to a power network, i.e. vehicle-to-grid [V2G] arrangements
Methods or circuit arrangements for monitoring or controlling batteries or fuel cells, specially adapted for electric vehicles

NOTE
This group covers the monitoring of the operating state of batteries or fuel cells in combination with controlling the propulsion in response to the detected variables of the state.

WARNING
Group B60L 58/00 is incomplete pending reclassification of documents from groups B60L 3/00, B60L 3/0046, B60L 3/0053, B60L 50/60, and B60L 50/70. All groups listed in this Warning should be considered in order to perform a complete search.

58/10 . . . for monitoring or controlling batteries

WARNING
Group B60L 58/10 is incomplete pending reclassification of documents from groups B60L 3/00, B60L 3/0046, and B60L 50/60.
All groups listed in this Warning should be considered in order to perform a complete search.

58/12 . . . responding to state of charge [SoC]

WARNING
Group B60L 58/12 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.
Group B60L 58/12 is also impacted by reclassification into group B60L 58/15.
All groups listed in this Warning should be considered in order to perform a complete search.

58/13 . . . Maintaining the SoC within a determined range

WARNING
Group B60L 58/13 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.
Group B60L 58/13 is also impacted by reclassification into group B60L 58/15.
All groups listed in this Warning should be considered in order to perform a complete search.

58/14 . . . Preventing excessive discharging

WARNING
Group B60L 58/14 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.
Group B60L 58/14 is also impacted by reclassification into group B60L 58/15.
All groups listed in this Warning should be considered in order to perform a complete search.

58/15 . . . Preventing overcharging

WARNING
Group B60L 58/15 is incomplete pending reclassification of documents from groups B60L 3/00, B60L 3/0046, B60L 58/12, B60L 58/13, and B60L 58/14.
All groups listed in this Warning should be considered in order to perform a complete search.

58/16 . . . responding to battery ageing, e.g. to the number of charging cycles or the state of health [SoH]

WARNING
Group B60L 58/16 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.
All groups listed in this Warning should be considered in order to perform a complete search.

58/18 . . . of two or more battery modules

WARNING
Group B60L 58/18 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.
All groups listed in this Warning should be considered in order to perform a complete search.

58/19 . . . Switching between serial connection and parallel connection of battery modules

WARNING
Group B60L 58/19 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.
All groups listed in this Warning should be considered in order to perform a complete search.

58/20 . . . having different nominal voltages

WARNING
Group B60L 58/20 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.
All groups listed in this Warning should be considered in order to perform a complete search.

58/21 . . . having the same nominal voltage

WARNING
Group B60L 58/21 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.
All groups listed in this Warning should be considered in order to perform a complete search.
58/22 . . . Balancing the charge of battery modules

**WARNING**

Group B60L 58/22 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.

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

58/24 . . . for controlling the temperature of batteries

**WARNING**

Group B60L 58/24 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.

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

58/25 . . . by controlling the electric load

**WARNING**

Group B60L 58/25 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.

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

58/26 . . . by cooling

**WARNING**

Group B60L 58/26 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.

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

58/27 . . . by heating

**WARNING**

Group B60L 58/27 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0046.

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

58/30 . . . for monitoring or controlling fuel cells

**WARNING**

Group B60L 58/30 is incomplete pending reclassification of documents from groups B60L 3/00, B60L 3/0053, and B60L 50/70.

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

58/31 . . . for starting of fuel cells

**WARNING**

Group B60L 58/31 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0053.

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

58/32 . . . for controlling the temperature of fuel cells, e.g. by controlling the electric load

**WARNING**

Group B60L 58/32 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0053.

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

58/33 . . . by cooling

**WARNING**

Group B60L 58/33 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0053.

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

58/34 . . . by heating

**WARNING**

Group B60L 58/34 is incomplete pending reclassification of documents from groups B60L 3/00 and B60L 3/0053.

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

58/40 . . . for controlling a combination of batteries and fuel cells

**WARNING**

Group B60L 58/40 is incomplete pending reclassification of documents from groups B60L 3/00, B60L 3/0046, B60L 3/0053, and B60L 50/75.

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

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Type of vehicles

- 2200/00
  - 2200/10 . Air crafts
  - 2200/12 . Bikes
  - 2200/14 . Vehicles with one wheel only
  - 2200/16 . Single-axle vehicles
  - 2200/18 . Buses
  - 2200/20 . Vehicles specially adapted for children, e.g. toy vehicles
  - 2200/22 . Microcars, e.g. golf cars
  - 2200/24 . Personal mobility vehicles
  - 2200/26 . Rail vehicles
  - 2200/28 . Trailers
  - 2200/30 . Trolleys
Waterborne vessels
Wheel chairs
Vehicles designed to transport cargo, e.g. trucks
Working vehicles
Fork lift trucks
Industrial trucks or floor conveyors
Vehicles with auxiliary ad-on propulsions, e.g. add-on electric motor kits for bicycles

**Converter types**

DC to DC converters
Buck converters
Boost converters
AC to AC converters
without intermediate conversion to DC
AC to DC converters
DC to AC converters
Voltage source inverters
Current source inverters
with more than three phases

**Electrical machine types; Structures or applications thereof**

Electrical machine types
Induction machines
Synchronous machines
DC brushless machines
Reluctance machines
DC electrical machines
Universal machines
Electrical machine applications
Wheel Hub motors, i.e. integrated in the wheel hub
Wheel motors, i.e. motor connected to only one wheel
Structural details of electrical machines
Clutch motors
Windings for different functions
with switched windings
with more than three phases

**Control parameters of input or output; Target parameters**

Vehicle control parameters
Speed
Acceleration
longitudinal
lateral
angular
Yaw angle
Steering angle
Vehicle weight
Door position
Parking brake position
Driving direction
Cabin temperature
Temperature of vehicle components or parts
Drive Train control parameters
related to electric machines
Speed
Torque
Temperature

**Driver interactions**

by alarm
by confirmation, e.g. of the input
by input of vehicle departure time
by display
by enquiring driving style
by driver identification
by presence detection
by lever actuation
by pedal actuation
Accelerator pedal thresholds
by voice

**Operating Modes**

Temporary overload
of combustion engines
of transmissions
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2260/16</td>
<td>of electrical drive trains</td>
</tr>
<tr>
<td>2260/162</td>
<td>of electrical cells or capacitors</td>
</tr>
<tr>
<td>2260/165</td>
<td>of converters</td>
</tr>
<tr>
<td>2260/167</td>
<td>of motors or generators</td>
</tr>
<tr>
<td>2260/20</td>
<td>Drive modes; Transition between modes</td>
</tr>
<tr>
<td>2260/22</td>
<td>Standstill, e.g. zero speed</td>
</tr>
<tr>
<td>2260/24</td>
<td>Coasting mode</td>
</tr>
<tr>
<td>2260/26</td>
<td>Transition between different drive modes</td>
</tr>
<tr>
<td>2260/28</td>
<td>Four wheel or all wheel drive</td>
</tr>
<tr>
<td>2260/30</td>
<td>Engine braking emulation</td>
</tr>
<tr>
<td>2260/32</td>
<td>Auto pilot mode</td>
</tr>
<tr>
<td>2260/34</td>
<td>Stabilising upright position of vehicles, e.g. of single axle vehicles</td>
</tr>
<tr>
<td>2260/40</td>
<td>Control modes</td>
</tr>
<tr>
<td>2260/42</td>
<td>by adaptive correction</td>
</tr>
<tr>
<td>2260/44</td>
<td>by parameter estimation</td>
</tr>
<tr>
<td>2260/46</td>
<td>by self learning</td>
</tr>
<tr>
<td>2260/48</td>
<td>by fuzzy logic</td>
</tr>
<tr>
<td>2260/50</td>
<td>by future state prediction</td>
</tr>
<tr>
<td>2260/52</td>
<td>drive range estimation, e.g. of estimation of available travel distance</td>
</tr>
<tr>
<td>2260/54</td>
<td>Energy consumption estimation</td>
</tr>
<tr>
<td>2260/56</td>
<td>Temperature prediction, e.g. for pre-cooling</td>
</tr>
<tr>
<td>2260/58</td>
<td>Departure time prediction</td>
</tr>
</tbody>
</table>

**2270/00 Problem solutions or means not otherwise provided for**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2270/10</td>
<td>Emission reduction</td>
</tr>
<tr>
<td>2270/12</td>
<td>of exhaust</td>
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<tr>
<td>2270/14</td>
<td>of noise</td>
</tr>
<tr>
<td>2270/142</td>
<td>acoustic</td>
</tr>
<tr>
<td>2270/145</td>
<td>Structure borne vibrations</td>
</tr>
<tr>
<td>2270/147</td>
<td>electro magnetic [EMI]</td>
</tr>
<tr>
<td>2270/20</td>
<td>Inrush current reduction, i.e. avoiding high currents when connecting the battery</td>
</tr>
<tr>
<td>2270/30</td>
<td>Preventing theft during charging</td>
</tr>
<tr>
<td>2270/32</td>
<td>of electricity</td>
</tr>
<tr>
<td>2270/34</td>
<td>of parts</td>
</tr>
<tr>
<td>2270/36</td>
<td>of vehicles</td>
</tr>
<tr>
<td>2270/38</td>
<td>of data</td>
</tr>
<tr>
<td>2270/40</td>
<td>related to technical updates when adding new parts or software</td>
</tr>
<tr>
<td>2270/42</td>
<td>Means to improve acoustic vehicle detection by humans</td>
</tr>
<tr>
<td>2270/44</td>
<td>Heat storages, e.g. for cabin heating</td>
</tr>
<tr>
<td>2270/46</td>
<td>Heat pumps, e.g. for cabin heating</td>
</tr>
</tbody>
</table>