CPC  COOPERATIVE PATENT CLASSIFICATION

B  PERFORMING OPERATIONS; TRANSPORTING
(NOTES omitted)

TRANSPORTING

B60  VEHICLES IN GENERAL
(NOTE omitted)

B60L  PROPULSION 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.

1/00  Supplying electric power to auxiliary equipment of vehicles (circuit arrangements for charging batteries H02J 7/00)

1/003  { to auxiliary motors, e.g. for pumps, compressors}
1/006  { to power outlets}
1/02  . to electric heating circuits
1/04  . fed by the power supply line
1/06  . . using only one supply
1/08  . . . Methods and devices for control or regulation
1/10  . . . with provision for using different supplies
1/12  . . . Methods and devices for control or regulation
1/14  . to electric lighting circuits
1/16  . . fed by the power supply line
1/20  . {Energy regeneration from auxiliary equipment}

3/00  Electric devices on electrically-propelled vehicles for safety purposes; Monitoring operating variables, e.g. speed, deceleration or energy consumption (methods or circuit arrangements for monitoring or controlling batteries or fuel cells B60L 58/00)

WARNING

Group B60L 3/00 is impacted by reclassification into groups B60L 58/00, B60L 58/10, B60L 58/12, B60L 58/13, B60L 58/14, B60L 58/15, B60L 58/16, B60L 58/18, B60L 58/19, B60L 58/20, B60L 58/21, B60L 58/22, B60L 58/24, B60L 58/25, B60L 58/26, B60L 58/27, B60L 58/30, B60L 58/31, B60L 58/32, B60L 58/33, B60L 58/34, and B60L 58/40.

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

3/0007  { Measures or means for preventing or attenuating collisions}
WARNING

Group B60L 3/0046 is impacted by reclassification into groups B60L 5/00, B60L 5/02, B60L 5/04, B60L 5/06, B60L 5/08, B60L 5/10, and B60L 5/12.

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

3/0053 . . . [relating to fuel cells]

WARNING

Group B60L 3/0053 is impacted by reclassification into groups B60L 5/00, B60L 5/02, B60L 5/04, B60L 5/06, B60L 5/08, B60L 5/10, and B60L 5/12.

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

3/0061 . . . [relating to electrical machines]
3/0069 . . . [relating to the isolation, e.g. ground fault or leak current]
3/0076 . . . [relating to braking]
3/0084 . . . [relating to control modules]
3/0092 . . . [with use of redundant elements for safety purposes]
3/02 . . . Dead-man's devices
3/04 . . . Cutting off the power supply under fault conditions (protective devices and circuit arrangements in general H01N; H02H)
3/06 . . . Limiting the traction current under mechanical overload conditions
3/08 . . . Means for preventing excessive speed of the vehicle
3/10 . . . Indicating wheel slip [; Correction of wheel slip]
3/102 . . . [of individual wheels]
3/104 . . . [by indirect measurement of vehicle speed]
3/106 . . . [for maintaining or recovering the adhesion of the drive wheels]
3/108 . . . [whilst braking, i.e. ABS]
3/12 . . . Recording operating variables [; Monitoring of operating variables]

5/00 Current collectors for power supply lines of electrically-propelled vehicles (current collectors in general H01R 41/00)
5/005 . . . [without mechanical contact between the collector and the power supply line]
5/02 . . . with ice-removing device
5/04 . . . using rollers or sliding shoes in contact with trolley wire (B60L 5/40 takes precedence)
5/045 . . . [with trolley wire finders]

5/06 . . . 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

7/00 Electrodynamic brake systems for vehicles in general
7/003 . . . [Dynamic electric braking by short circuiting the motor]
7/006 . . . [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
Electric propulsion with power supply from forces of nature, e.g. sun or wind

8/00

8/003 [Converting light into electric energy, e.g. by using photovoltaic systems]
8/006 [Converting flow of air into electric energy, e.g. by using wind turbines]

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

WARNING

Group B60L 9/00 is impacted by reclassification into group B60L 50/53. Groups B60L 9/00 and B60L 50/53 should be considered in order to perform a complete search.

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

Electric propulsion for monorail vehicles, suspension vehicles or rack railways; Magnetic suspension or levitation for vehicles (tracks for Maglev-type trains E01B 25/30; electromagnets per se H01F 70/06; linear motors per se H02K 41/00)

13/00

13/003 [Crossings; Points]
13/006 (Electric propulsion adapted for monorail vehicles, suspension vehicles or rack railways (B60L 13/03 takes precedence))

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

Methods, circuits, or devices for controlling the traction-motor speed of electrically-propelled vehicles

15/000 [for control of propulsion for monorail vehicles, suspension vehicles or rack railways; for control of magnetic suspension or levitation for vehicles for propulsion purposes]
15/002

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
15/209 . [for braking]
15/209 . [for braking on a slope]
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 B61L 3/00; central rail-traffic control systems B61L 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)
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
50/15 . . 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.

50/60 . . 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

50/64 . . . Constructional details of batteries specially adapted for electric vehicles

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 groups B60L 50/50 and B60L 58/40. All groups listed in this Warning 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 53/306**, **B60L 53/67**, and **B60L 53/68**.

Groups **B60L 53/30**, **B60L 53/302**, **B60L 53/305**, **B60L 53/306**, **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 automatic or assisted adjustment of 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 or their battery types

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.

53/665 . . [Methods related to measuring, billing or payment]

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.

**NOTE**
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.

**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.

**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.

**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.
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.

---

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.

---

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.

---

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.

---

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.

---

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.

---

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.

---

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.

---

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.

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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 50/70.

Group B60L 58/40 is also impacted by reclassification into group 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**

<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>2200/00</td>
<td><strong>Air crafts</strong></td>
</tr>
<tr>
<td>2200/10</td>
<td>Bikes</td>
</tr>
<tr>
<td>2200/14</td>
<td>Vehicles with one wheel only</td>
</tr>
<tr>
<td>2200/16</td>
<td>Single-axle vehicles</td>
</tr>
<tr>
<td>2200/18</td>
<td>Buses</td>
</tr>
<tr>
<td>2200/20</td>
<td>Vehicles specially adapted for children, e.g. toy vehicles</td>
</tr>
<tr>
<td>2200/22</td>
<td>Microcars, e.g. golf cars</td>
</tr>
<tr>
<td>2200/24</td>
<td>Personal mobility vehicles</td>
</tr>
<tr>
<td>2200/26</td>
<td>Rail vehicles</td>
</tr>
<tr>
<td>2200/28</td>
<td>Trailers</td>
</tr>
</tbody>
</table>
- 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 propulsion, e.g. add-on electric motor kits for bicycles

**2210/00 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

**2220/00 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
- with use of more than one motor
- 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

**2240/00 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

**2250/00 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

**2260/00 Operating Modes**
- Temporary overload
- of combustion engines
| 2260/14 | . . of transmissions  |
| 2260/16 | . . of electrical drive trains  |
| 2260/162 | . . . of electrical cells or capacitors  |
| 2260/165 | . . . of converters  |
| 2260/167 | . . . of motors or generators  |
| 2260/20 | . Drive modes; Transition between modes  |
| 2260/22 | . Standstill, e.g. zero speed  |
| 2260/24 | . Coasting mode  |
| 2260/26 | . Transition between different drive modes  |
| 2260/28 | . Four wheel or all wheel drive  |
| 2260/30 | . Engine braking emulation  |
| 2260/32 | . Auto pilot mode  |
| 2260/34 | . Stabilising upright position of vehicles, e.g. of single axle vehicles  |
| 2260/40 | . Control modes  |
| 2260/42 | . . by adaptive correction  |
| 2260/44 | . . by parameter estimation  |
| 2260/46 | . . by self learning  |
| 2260/48 | . . by fuzzy logic  |
| 2260/50 | . . by future state prediction  |
| 2260/52 | . . . drive range estimation, e.g. of estimation of available travel distance  |
| 2260/54 | . . . Energy consumption estimation  |
| 2260/56 | . . . Temperature prediction, e.g. for pre-cooling  |
| 2260/58 | . . . Departure time prediction  |

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

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