

## SECTION B — PERFORMING OPERATIONS; TRANSPORTING

### B60 VEHICLES IN GENERAL

**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** [4]

#### Subclass index

#### ELECTRIC PROPULSION

With external or internal supply.....8/00-11/00

For monorail vehicles, suspension vehicles or rack railways; Magnetic suspension or levitation for vehicles.....13/00

Control.....15/00

CURRENT-COLLECTORS.....5/00

ELECTRIC SUPPLY TO AUXILIARY EQUIPMENT.....1/00

SAFETY ARRANGEMENTS.....3/00

ELECTRODYNAMIC BRAKING.....7/00

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|------|--|------|--|
| 1/00 | <b>Supplying electric power to auxiliary equipment of electrically-propelled vehicles</b> (arrangement of signalling or lighting devices, the mounting or supporting thereof or circuits therefor, for vehicles in general B60Q) [6] | 5/08 | <ul style="list-style-type: none"> <li>• • Structure of the sliding shoes or their carrying means</li> </ul>   |
| 1/02 | <ul style="list-style-type: none"> <li>• to electric heating circuits</li> </ul>   | 5/10 | <ul style="list-style-type: none"> <li>• • Devices preventing the collector from jumping off</li> </ul>  |
| 1/04 | <ul style="list-style-type: none"> <li>• • fed by the power supply line</li> </ul>   | 5/12 | <ul style="list-style-type: none"> <li>• • Structural features of poles or their bases</li> </ul>  |
| 1/06 | <ul style="list-style-type: none"> <li>• • • using only one supply</li> </ul>  | 5/14 | <ul style="list-style-type: none"> <li>• • • Devices for automatic lowering of a jumped-off collector</li> </ul>   |
| 1/08 | <ul style="list-style-type: none"> <li>• • • • Methods or devices for control or regulation</li> </ul>   | 5/16 | <ul style="list-style-type: none"> <li>• • • Devices for lifting and resetting the collector (B60L 5/34 takes precedence)</li> </ul>                             |
| 1/10 | <ul style="list-style-type: none"> <li>• • • with provision for using different supplies</li> </ul>  | 5/18 | <ul style="list-style-type: none"> <li>• using bow-type collectors in contact with trolley wire</li> </ul>   |
| 1/12 | <ul style="list-style-type: none"> <li>• • • • Methods or devices for control or regulation</li> </ul>   | 5/19 | <ul style="list-style-type: none"> <li>• • using arrangements for effecting collector movement transverse to the direction of vehicle motion [3]</li> </ul>      |
| 1/14 | <ul style="list-style-type: none"> <li>• to electric lighting circuits</li> </ul>  | 5/20 | <ul style="list-style-type: none"> <li>• • Details of contact bow</li> </ul>   |
| 1/16 | <ul style="list-style-type: none"> <li>• • fed by the power supply line</li> </ul>   | 5/22 | <ul style="list-style-type: none"> <li>• • Supporting means for the contact bow</li> </ul>   |
| 3/00 | <b>Electric devices on electrically-propelled vehicles for safety purposes; Monitoring operating variables, e.g. speed, deceleration, power consumption</b>  | 5/24 | <ul style="list-style-type: none"> <li>• • • Pantographs</li> </ul>  |
| 3/02 | <ul style="list-style-type: none"> <li>• Dead-man's devices</li> </ul>   | 5/26 | <ul style="list-style-type: none"> <li>• • • Half-pantographs, e.g. using counter-rocking beams</li> </ul>   |
| 3/04 | <ul style="list-style-type: none"> <li>• Cutting-off the power supply under fault conditions</li> </ul>  | 5/28 | <ul style="list-style-type: none"> <li>• • • Devices for lifting and resetting the collector</li> </ul>  |
| 3/06 | <ul style="list-style-type: none"> <li>• Limiting the traction current under mechanical-overload conditions</li> </ul>   | 5/30 | <ul style="list-style-type: none"> <li>• • • • using springs</li> </ul>  |
| 3/08 | <ul style="list-style-type: none"> <li>• Means for preventing excessive speed of the vehicle</li> </ul>  | 5/32 | <ul style="list-style-type: none"> <li>• • • • using fluid pressure</li> </ul>   |
| 3/10 | <ul style="list-style-type: none"> <li>• Indicating wheel slip</li> </ul>  | 5/34 | <ul style="list-style-type: none"> <li>• with devices to enable one vehicle to pass another one using the same power supply line</li> </ul>                      |
| 3/12 | <ul style="list-style-type: none"> <li>• Recording operating variables</li> </ul>  | 5/36 | <ul style="list-style-type: none"> <li>• with means for collecting current simultaneously from more than one conductor, e.g. from more than one phase</li> </ul> |
| 5/00 | <b>Current-collectors for power supply lines of electrically-propelled vehicles</b>  | 5/38 | <ul style="list-style-type: none"> <li>• for collecting current from conductor rails (B60L 5/40 takes precedence)</li> </ul>                                     |
| 5/02 | <ul style="list-style-type: none"> <li>• with ice-removing device</li> </ul>   | 5/39 | <ul style="list-style-type: none"> <li>• • from third rail [3]</li> </ul>  |
| 5/04 | <ul style="list-style-type: none"> <li>• using rollers or sliding shoes in contact with trolley wire (B60L 5/40 takes precedence)</li> </ul>   | 5/40 | <ul style="list-style-type: none"> <li>• for collecting current from lines in slotted conduits</li> </ul>  |
| 5/06 | <ul style="list-style-type: none"> <li>• • Structure of the rollers or their carrying means</li> </ul>   | 5/42 | <ul style="list-style-type: none"> <li>• for collecting current from individual contact pieces connected to the power supply line</li> </ul>                     |

<b>7/00</b>	<b>Electrodynamic brake systems for vehicles in general [4]</b>	11/18	• using power supplied from primary cells, secondary cells, or fuel cells
7/02	• Dynamic electric resistor braking (B60L 7/22 takes precedence)	<b>13/00</b>	<b>Electric propulsion for monorail vehicles, suspension vehicles or rack railways; Magnetic suspension or levitation for vehicles [4, 6]</b>
7/04	• • for vehicles propelled by dc motors	13/03	• Electric propulsion by linear motors [6]
7/06	• • for vehicles propelled by ac motors	13/04	• Magnetic suspension or levitation for vehicles [4]
7/08	• • Controlling the braking effect (B60L 7/04, B60L 7/06 take precedence)	13/06	• • Means to sense or control vehicle position or attitude with respect to railway [4]
7/10	• Dynamic electric regenerative braking (B60L 7/22 takes precedence)	13/08	• • • for the lateral position [4]
7/12	• • for vehicles propelled by dc motors	13/10	• Combination of electric propulsion and magnetic suspension or levitation [4]
7/14	• • for vehicles propelled by ac motors	<b>15/00</b>	<b>Methods, circuits or devices for controlling the propulsion of electrically-propelled vehicles, e.g. their traction-motor speed, to achieve a desired performance; Adaptation of control equipment on electrically-propelled vehicles for remote actuation from a stationary place, from alternative parts of the vehicle or from alternative vehicles of the same vehicle train</b>
7/16	• • for vehicles comprising converters between the power source and the motor	15/02	• characterised by the form of the current used in the control circuit
7/18	• • Controlling the braking effect (B60L 7/12, B60L 7/14, B60L 7/16 take precedence)	15/04	• • using dc
7/20	• Braking by supplying regenerated power to the prime mover of vehicles comprising engine-driven generators	15/06	• • using substantially-sinusoidal ac
7/22	• Dynamic electric resistor braking, combined with dynamic electric regenerative braking	15/08	• • using pulses
7/24	• with additional mechanical or electromagnetic braking	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)
7/26	• • Controlling the braking effect	15/12	• • with circuits controlled by relays or contactors
7/28	• Eddy-current braking	15/14	• • with main controller driven by a servomotor (B60L 15/18 takes precedence)
<b>8/00</b>	<b>Electric propulsion with power supply from force of nature, e.g. sun, wind [5]</b>	15/16	• • with main controller driven through a ratchet mechanism (B60L 15/18 takes precedence)
<b>9/00</b>	<b>Electric propulsion with power supply external to vehicle (B60L 8/00, B60L 13/00 take precedence) [5, 6]</b>	15/18	• • without contact-making and breaking, e.g. using a transducer
9/02	• using dc motors	15/20	• for control of the vehicle or its driving motor to achieve a desired performance, e.g. speed, torque, programmed variation of speed
9/04	• • fed from dc supply lines	15/22	• • with sequential operation of interdependent switches, e.g. relays, contactors, programme drum
9/06	• • • with conversion by metadyne	15/24	• • with main controller driven by a servomotor (B60L 15/28 takes precedence)
9/08	• • fed from ac supply lines	15/26	• • with main controller driven through a ratchet mechanism (B60L 15/28 takes precedence)
9/10	• • • with rotary converters	15/28	• • without contact-making and breaking, e.g. using a transducer
9/12	• • • with static converters	15/30	• • with means to change-over to human control
9/14	• • fed from different kinds of power supply lines	15/32	• Control or regulation of multiple-unit electrically-propelled vehicles
9/16	• using ac induction motors	15/34	• • with human control of a setting device
9/18	• • fed from dc supply lines	15/36	• • • with automatic control superimposed, e.g. to prevent excessive motor current
9/20	• • • single-phase motors	15/38	• • with automatic control
9/22	• • • polyphase motors	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)
9/24	• • fed from ac supply lines	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)
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		
<b>11/00</b>	<b>Electric propulsion with power supplied within the vehicle (B60L 8/00, B60L 13/00 take precedence; arrangements or mounting of prime-movers consisting of electric motors and internal combustion engines for mutual or common propulsion B60K 6/20) [5, 6, 2006.01]</b>		
11/02	• using engine-driven generators		
11/04	• • using dc generators and motors		
11/06	• • using ac generators and dc motors		
11/08	• • using ac generators and motors		
11/10	• • using dc generators and ac motors		
11/12	• • with additional electric power supply, e.g. accumulator		
11/14	• • with provision for direct mechanical propulsion		
11/16	• using power stored mechanically, e.g. in flywheel		