B61L

GUIDING RAILWAY TRAFFIC; ENSURING THE SAFETY OF RAILWAY TRAFFIC (brakes or auxiliary equipment B61H, B61K; point or crossing construction E01B)

Definition statement

This place covers:

Means for controlling and safeguarding railway vehicle traffic, including apparatus and processes that are specially adapted, or intended to be utilised, for the following categories related to railway vehicle traffic:

- devices along the railway route which are controlled by or from the moving vehicle or train, such as signals, switches and gates;
- devices along the railway route which control devices on the moving vehicle or train, such as speed control and braking;
- devices along the railway route for controlling the movement of the train, such as switches and switching systems, train stop and speed control mechanisms (the devices may include safety means and be automatically actuated);
- operating mechanisms for devices along the railway route, such as switches, signals and scotch-blocks (the operating mechanisms can be directly or remotely controlled);
- safety devices used to prevent train accidents caused by mechanical or operator error, such as derailing switches and blocks;
- safety means for controlling railroad crossing traffic;
- signals and indicators, both visual and audible, for communicating information about the train, railway, train operator or railway equipment;
- illumination means specially adapted to illuminate railway points, form signals or gates.

All means for guiding railway vehicles through the railway network in a safe and efficient manner.

In particular it relates to:

- railway signalling in general, which includes for example traditional light and form signals, cab signalling, communication based train control and special train control systems as, e.g. the European Train Control System [ETCS] or the German continuous inductive train control "Linienzugbeeinflussung [LZB]". This section includes intermitted or continuous control of vehicles and means on the trackside along the rails or in control location or onboard railway vehicles;
- means on vehicles or on the railway track to control the speed and braking according to the signalling rules or information, e.g. braking curve calculation or supervision;
- optimization of the train running on the vehicle or in track side control centers;
- Railway guidance in regard to safe setting and release of routes through the network, e.g. interlocking devices, switch drives and control and all related field elements, also including train stops and means to control the speed of the train. This includes not only electrical elements, but also all mechanical or hydraulic parts to control the switch movements, position or locking;
- railway form or light signals along the track, also, e.g. with details on optical systems or monitoring functions;
- communication means in the above mentioned context, when it relates to railway safety and guidance, like, e.g. radio transmission systems between track and train, structure of radio communication networks if used in the railway signalling and guidance, traditional voice train radio to operators, Wi-Fi® or Bluetooth® technologies;
- communication means onboard a train also for other purposes, like passenger information, e.g. train bus systems, radio, Wi-Fi®;

- train and track diagnostics, also including the supervision of the track from the train or trackside with sensors being placed onboard the train on along the track, when related to the safety of railway traffic, e.g. broken rail detection, vibration sensors, brake pipe pressure detection;
- train data handling onboard a railway vehicle or in track side control centers;
- Control and supervision of yards or maintenance areas including hump controls, switching system for wagon classification yards etc;
- warning devices for warnings about train approach, e.g. at platforms or crossings;
- Railway traffic separation, including all blocking means, including fixed block or moving block techniques. It also comprises non-safe procedures like token systems or voice radio control procedures of trains;
- train positioning systems, both on the track or on the train, e.g. GPS navigation used for this purpose, track circuits or axle counters;
- railway guidance in general, which includes disposition or regulation means, time tables and their generation, supervision or optimization together with all means on the trackside or onboard the vehicles to implement guidance information, also for train crews;
- driverless train or people mover control or safety, also for maglev and mono-rail vehicles;
- railway crossing safety means, like barriers, warning lights or bells and their control or supervision.

References

Limiting references

This place does not cover:

Railway vehicle brakes or other retarding apparatus	B61H
Derailing or re-railing blocks on the track, and for railway stops, scotch-blocks, track brakes or retarders fixed to the permanent way in general	B61K
Detectors indicating the overheating of railway vehicle axle bearings	B61K 9/04
Rail, switch, point or crossing construction	E01B
Railway switches construction	E01B 7/00
Rail joints	E01B 11/00
Electrically insulated rail joints	E01B 11/54
Cattle guards fixed to the permanent way	E01B 17/00

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Model railways	A63H 19/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Control of drive units	B60L 15/20
Control of multiple-unit electrically-propelled vehicles	B60L 15/32
Power supply lines for electrically propelled vehicles	B60M
Arrangement, mounting or supporting of signalling devices for vehicles in general	B60Q
Railway vehicle brakes	B60T 17/00
Control or regulation of multiple propelled vehicles within a train	B61C 17/12

Arrangement of signalling or lighting devices, the mounting or supporting thereof for rail vehicles	B61D
Conveyors	B65G
Elevators, lifts	B66B
Mechanical securing means	F16B
Illumination in general; illumination for signalling, marking or indicating; details of lighting devices or systems	F21
Non-portable lighting in general	F21S
Lighting devices specially adapted for vehicles	F21S 41/00, F21S 43/00
Details of lighting devices or systems	F21V
Measuring mechanical vibrations	G01H
Mechanical force measurements	G01L 5/00
Testing in railway vehicles	G01M 17/08
Speed measurements	G01P
Radio navigation	G01S
Error detection or correction by redundancy in hardware	G06F 11/16
Digital computing or data processing	G06F 17/00
Visible signaling arrangements in general	G08B 5/00
An alarm responsive to an abnormal condition in general	G08B 21/00, G08B 23/00
Electric signal transmission systems in general	G08C 19/00
Indicating arrangements for variable information	G09F 9/00
Control of indicating devices	G09G
Power supply	H02J
Data transmission	H04B
Digital data transmission	H04L
Telephone systems	H04M
Communication switching systems	H04Q
Electroluminescent light sources, e.g. LEDs	H05B 33/00
Combination of different illumination sources	H05B 35/00
Circuit arrangements for electric light sources in general	H05B 47/00
Semi-conductor light sources	H10H 20/00

Special rules of classification

CLASSIFICATION OF ADDITIONAL INFORMATION.

In many cases, the classification of additional information is very useful for retrieving the document, and is therefore very desirable in this subclass.

For example:

If a document discloses an ETCS train control system (covered by B61L 27/20) as invention information, where trains may use GPS information for localization, in a way which is per se not inventive (but nevertheless interesting for a search) classify:

- the train control system with central control in general (i.e. B61L 27/20).
- the ETCS as special train control system with breakdown Indexing Code (i.e. B61L 2027/202).
- the localization of a train in absolute position (i.e. B61L 25/025).
- the GPS being a satellite navigation system as special localization means with orthogonal Indexing Code (i.e. B61L 2205/04).

SUBGROUPS AND HEAD GROUP.

If a document concerns embodiments, which are covered by several subgroups (e.g. B61L 23/044 - B61L 23/048) dependent on a higher hierarchy group (in this case B61L 23/042), the following rules apply:

- if the specific technical information relevant for some of the subgroups is disclosed explicitly, then classify in all said relevant subgroups;
- analogously, if generic technical information common to all of the subgroups is disclosed and only schematic embodiments of the specific subgroup embodiments are represented, then the document is classified in the head group.

RADIO COMMUNICATION IN RAILWAYS.

Radio communication is only classified in B61L, when related to the application for railway use.

Radio communication in B61L is classified in different subgroups as follows:

Short range radio transmissions used for train control is classified in B61L 3/125 for intermittent control, when RFID tags, balise transmissions or the like is used.

Long range radio transmission for train control using conductor cables on the track, like wave guides or leaky feeders, can be found under B61L 3/227.

Long range radio transmission between a train and control center, is classified only under B61L 15/0027 for both, speech and continuous train control transmissions, as for example using GSM-R cell communication, when related to onboard systems.

However, long range radio transmission systems between a train and control center, when related to details of the trackside implementation, are covered under B61L 27/70.

This selection of special Indexing Codes is used in the subclass B61L in order to specify special railway signalling equipment with high occurrence and incorporating intrinsic features as well as orthogonal used features, which can occur in many different subclasses within B61L.

The following special equipment is classified using the additional Indexing Code symbols ("Indexing Code subdivisions"):

The following features are classified using the "orthogonal" Indexing Code symbols:

B61L 2201/00	Control methods
B61L 2201/02	Fuzzy control
B61L 2205/00	Communication or navigation systems for railway traffic
B61L 2205/02	Global system for mobile communication - railways [GSM-R]
B61L 2205/04	Satellite navigation system e.g. GPS
B61L 2207/00	Communication or navigation systems for railway traffic
B61L 2207/02	Using light emission diodes [LEDs]

B61L 2210/00	Vehicle systems
B61L 2210/02	Single autonomous vehicles, e.g. SST
B61L 2210/04	Magnetic elevation vehicles

Glossary of terms

In this place, the following terms or expressions are used with the meaning indicated:

Axle counter	devices at single locations along the railway track which use the presence of vehicle wheels as detection means, e.g. by inductive influence
Balise	transponder
Cold movement detector	detectors for indicating that a movement of the vehicle occurred during shut-down mode
Hot box detector	detectors for indicating the overheating of axle bearings and the like
Railway switch, railway point	mechanical track construction allowing a change of track for running railway vehicles
Scotch-block	a wedge to prevent the movement of an opening switch rail of a set of points or of stationary vehicles
Track circuit	devices in the railway track with different types of electric current applied to the rails in defined sections of railway track which use the short-circuit by vehicle axles between both rails as detection means

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

CBTC	Communication based train control
ERTMS	European railway traffic management system
ESTW	"Elektronisches Stellwerk"; electronic interlocking
ETCS	European train control system
FFB	"Funkfahrbetrieb"; radio based operation, field elements are controlled directly by the train via radio
GPS	Global positioning system
GSM-R	Global system for mobile communication - Railway
INDUSI	"Induktive Zugsicherung"; inductive train protection, using permanent magnets with switchable electric coils connected to light signals
LED	Light emitting diode
LZB	"Linienzugbeeinflussung"; continuous inductive train control, applying double cable with cross-overs as track antenna
PTC	Positive train control
RFID	Radio-frequency identification
SST	"Selbsttätig signalgeführtes Triebfahrzeug"; driver-less signal controlled vehicle

B61L 1/00

Devices along the route controlled by interaction with the vehicle or train (detonators B61L 5/20; operation of points or signals by passage of the vehicle B61L 11/00, B61L 13/00; operation of gates, or gates and signals, by approaching vehicle B61L 29/18)

Definition statement

This place covers:

Devices along the track which are influenced by a rail vehicle e.g. to detect the passage or presence and where an action is then performed on the ground equipment.

Relationships with other classification places

When related to transmission of data to trains, track circuits for influencing devices on the train are classified in group B61L 3/24. Braking or train separation techniques for track blocks are classified in group B61L 23/16.

References

Limiting references

This place does not cover:

Detonators	B61L 5/20
Operation of points by passage of the vehicle	B61L 11/00
Operation of signals by passage of the vehicle	B61L 13/00
Operation of gates, or gates and signals, by approaching vehicle	B61L 29/18

Informative references

Attention is drawn to the following places, which may be of interest for search:

Devices along the track which influence equipment on the rail vehicle	B61L 3/00
Track circuits with data transmission to trains in general	B61L 3/24
Track circuits used for train separation with track blocks	B61L 23/16
Central traffic control systems controlled by train	B61L 27/04

Special rules of classification

Track circuit details and underlying principles have to be classified in group B61L 1/18.

B61L 1/16

Devices for counting axles; Devices for counting vehicles

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Counting moving objects in general	G06M

B61L 1/18

Railway track circuits (rail joints E01B 11/00, e.g. insulated rail joints E01B 11/54)

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Automatically-operated track circuits specially adapted for section blocking for controlling traffic	B61L 23/00

B61L 1/20

Safety arrangements for preventing or indicating malfunction of the device, e.g. by leakage current, by lightning

Relationships with other classification places

Detectors themselves are classified in B61K 9/00, e.g. hot box detectors in B61K 9/04. Any supervision to detect their malfunction is covered by group B61L 1/20.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Remote indicating means for abnormal operations conditions	G08B 21/00, G08B 23/00

B61L 3/00

Devices along the route for controlling devices on the vehicle or train, e.g. to release brake or to operate a warning signal

Definition statement

This place covers:

Devices along the track are also understood to be remote control devices of locomotives with portable equipment, e.g. portable control devices for yard locomotives.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Devices along the track influenced by the passage of the rail vehicle which do not influence equipment on the rail vehicle	B61L 1/00
Track circuits details	B61L 1/18
Signals along the track giving instruction to the driver	B61L 5/12 - B61L 5/24
Indicators provided on the vehicle or vehicle train for signalling purposes; On-board control or communication systems	B61L 15/00
Track circuits used for train separation with track blocks	B61L 23/16

Optimisation where the calculations are not performed on board the train	B61L 27/16
Control or regulation of multiple-unit electrically-propelled vehicles	B60L 15/32
Arrangements for controlling locomotives from remote points in the train or when operating in multiple units	B61C 17/12

Special rules of classification

Intermittent control (B61L 3/02 - B61L 3/14) comprises not only beacons or the like, but also short loops at dedicated locations, whereas continuous control (B61L 3/16) comprises long loops along the whole track.

Radio used for train control, is only classified in B61L 3/125, if short range transmission for a single track using RFID tags, balise transmissions or the like is applied. Long range radio transmission for train control using conductor cables on the track, like wave guides or leaky feeders, can be found under B61L 3/227.

Track circuits for influencing devices on the train are classified under B61L 3/24, when related to transmission of data to trains. If otherwise related to braking or train separation techniques for track blocks, then B61L 23/16 takes precedence. Track circuit details and underlying principles have to be classified under B61L 1/18.

B61L 3/06

controlling by electromagnetic or particle radiation, e.g. by light beam

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Using radio waves	B61L 3/12

B61L 3/125

{using short-range radio transmission}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Long-range radio transmission	B61L 15/0027, B61L 27/70

B61L 5/00

Local operating mechanisms for points or track-mounted scotch-blocks; Visible or audible signals; Local operating mechanisms for visible or audible signals (B61L 11/00 takes precedence)

Definition statement

This place covers:

The equipment adjacent to the track which is actuating track equipment, especially railway switches, derailers or scotch blocks. In particular it covers all parts in order to move or control rails or scotch blocks, as well as detect their proper positions. In this regard, B61L 5/10 "Means for indicating the setting of points" has to be understood as means for the detection of the setting of the points.

This group further covers signals adjacent to the track giving indications for the driver of the rail vehicle, e.g. day light signals.

Relationships with other classification places

Signals along the railway track are classified in this group under B61L 5/18 only, but traffic lights for road traffic are found in G08G 1/095.

All control of switches and signals that are actuated from the vehicle are classified in B61L 11/00 in accordance with the precedence reference.

The indication of the actual switch positions to the train operator should be classified in B61L 9/00.

References

Limiting references

This place does not cover:

Operation of points from the vehicle or by the passage of the vehicle	B61L 11/00

Informative references

Attention is drawn to the following places, which may be of interest for search:

Track-mounted scotch-blocks per se	B61K
Derailers and scotch blocks in general	B61K 5/06
Light signals in general (non-railroad)	F21W 2111/00
Road traffic lights	G08G 1/095
Light Emitting Diodes (LED) as such	H05B 33/00
Control of light sources in general	H05B 47/00

Special rules of classification

B61L 5/02 should be used for all documents exclusively related to mechanical details of switch machines, even if they do not explicitly state a manual operation and said switch machines could theoretically operate electrically or hydraulically.

B61L 5/12

Visible signals

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Signalling means on the vehicle	B61L 15/00
Signalling means for classification yards, or the like, with multiple indicating means	B61L 17/023
Signalling means for road crossings	B61L 29/24

B61L 5/14

Form signals, e.g. semaphore arms

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Illumination for points, form signals	B61L 9/00

B61L 5/189

{using flashing light sources}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Visible signalling in general using flashing light sources	G08B 5/38
Thermal switches operating intermittently	H01H 61/06, H01H 61/08

B61L 7/00

Remote control of local operating means for points, signals, or track-mounted scotch-blocks (B61L 11/00, B61L 13/00 take precedence; interlocking arrangements B61L 19/00)

Definition statement

This place covers:

The transmission of control commands from the signal box or the like to the field equipment on the track to be operated.

Relationships with other classification places

All drives, control and monitoring of railway point locks are classified in B61L 5/10.

All operation of local operating means from the vehicle or by the passage of the vehicle are classified in B61L 5/16.

References

Limiting references

This place does not cover:

Operation of points from the vehicle or by the passage of the vehicle	B61L 11/00
Operation of signals from the vehicle or by the passage of the vehicle	B61L 13/00
Interlocking arrangements	B61L 19/00

B61L 9/00

Illumination specially adapted for points, form signals, or gates

Definition statement

This place covers:

The illumination of field elements on the track for the train operator.

Relationships with other classification places

All railway light signals as such are classified in B61L 5/18.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Indicating or recording the setting of track apparatus, e.g. of points, of signals	B61L 25/06
Lighting in general	F21S, F21V

B61L 11/00

Operation of points from the vehicle or by the passage of the vehicle

Definition statement

This place covers:

The local operation of switches by actuation from the vehicle or by the vehicle. It comprises systems like the radio-based train operation (FFB), where field elements are controlled directly by the train via radio. It also comprises local operating mechanism like pedals and the like. It further covers trailable point locks for railway switches.

Relationships with other classification places

All drives, control and monitoring of railway point locks are classified in B61L 5/10.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Non-trailable point locks for railway switches	B61L 5/10

Operation of signals from the vehicle or by the passage of the vehicle	B61L 13/00

B61L 13/00

Operation of signals from the vehicle or by the passage of the vehicle

Definition statement

This place covers:

The local operation of signals by actuation from the vehicle or by the vehicle. It comprises local operating mechanism like pedals and the like.

References

Limiting references

This place does not cover:

Operation of signals and gates at level crossings	B61L 29/08

Informative references

Attention is drawn to the following places, which may be of interest for search:

Operation of points from the vehicle or by the passage of the vehicle	B61L 11/00

B61L 15/00

Indicators provided on the vehicle or train for signalling purposes

Definition statement

This place covers:

This group comprises systems onboard the train for indication, communication and data handling. In particular it comprises:

- Start- and stop- signals provided in the cab for the driver, e.g. including forced emergency braking signals.
- Communication links on the train from one vehicle to the other by cable, radio, optical or other links.
- Communication from the trackside control centre to the train, when transmitted over long distances, including both, speech and control data.
- Indicators in or on the train, which display further information for passengers, like e.g. train number and destination.
- End-of-Train (EOT) detection devices, which ensure the completeness and integrity of the train.
- Multiple systems on board, which include redundant or fault tolerant systems or subsystems, e.g. 2-out-of-3 processors or multiple signalling equipment for migration or multi-national use.
- Train data handling and diagnosis onboard the train, which manage all necessary data on the train to operate the train properly. This includes also operator identification and log-in functionalities for security reasons on the locomotive or train.
- Display devices onboard the train for e.g. giving the train operator in the cab information on safety and train routing issues, speed indications etc. on a screen or giving passengers further information about the actual position of the train, delays, etc. in passenger vehicles.
- Head and end tail lights provided at the front or rear end of the train or vehicle for indicating the moving direction of the train or vehicle.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Remote control of locomotives from track-side devices	B61L 3/127
Horns and bells on board the vehicles	B61L 23/00
Multiple systems on track side implementations, which include redundant or fault tolerant systems or subsystems, e.g. 2-out-of-3 processors or multiple signalling equipment for migration or multi-national use	B61L 27/30
Dead man devices	B60L 3/02
Control or regulation of multiple-unit electrically-propelled vehicles	B60L 15/32
Head and tail lights for vehicles other than railway vehicles	B60Q 1/26
Arrangements for controlling locomotives from remote points in the train or when operating in multiple units	B61C 17/12
Warning concerning the opening and closing of doors	B61D 19/026
Indicators on platforms in stations for indicating departure times, destinations or the like	G09F

B61L 15/0018

{Communication with or on the vehicle or train}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Line transmission systems	H04B 3/00

B61L 15/0045

{Destination indicators, identification panels or distinguishing signs on the vehicles}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Displaying in general	G09F

B61L 15/0058

{On-board optimisation of vehicle or vehicle train operation}

Special rules of classification

Optimisation of train running is classified under B61L 15/0058 only if links to signalling system, actual position of the train, braking curves, grades of the track, time tables or the like are present

in the disclosure. Otherwise, without said links, general optimisation of multi-drive trains is found in B60L 15/32.

B61L 15/0063

{Multiple on-board control systems, e.g. "2 out of 3"-systems}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Trackside multiple control systems	B61L 27/30

B61L 15/0072

{On-board train data handling}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Trackside train data handling	B61L 27/40

B61L 15/0081

{On-board diagnosis or maintenance}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Trackside diagnosis or maintenance	B61L 27/50

B61L 17/00

Switching systems for classification yards

Definition statement

This place covers:

The systems classified here are railway installations used for forming new trains in yards or maintenance areas, possibly also including at least one classification hump.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Indicating panels for route settings	B61L 25/06
Marshalling systems	B61B 1/005
Rail brakes	B61K

Details on track brakes	B61K 7/02

Special rules of classification

Many different techniques are covered here. This classification has to be given whenever the invention is related to activities in yards or maintenance areas. As a consequence, only in very rare cases a document will be given a single classification in the main group only. Typically, also other classifications regarding localisation, serialisation or data handling of trains have to be assigned to documents additionally.

Synonyms and Keywords

In patent documents, the following words/expressions are often used as synonyms:

- "classification yard", and "marshalling yard"

B61L 19/00

Arrangements for interlocking between points and signals by means of a single interlocking device {, e.g. central control}

Definition statement

This place covers:

All systems and field elements for setting the routes through the network, including local or central interlocking equipment.

Relationships with other classification places

This main group predominantly deals with the devices and systems of interlocking equipment. B61L 21/00 relates more to the functional aspects of station blocking like route setting or departure signal authorisations, etc.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Railway switch operation and control	B61L 5/02 - B61L 5/10
Railway light signal operation and control	B61L 5/18
Remote control of local operating means for points, signals or track mounted scotch-blocks	B61L 7/00
Systems specially adapted for classification/marshalling yards	B61L 17/00
Blocking arrangements	B61L 21/00, B61L 23/08, B61L 23/22
Electrical route setting and release	B61L 21/04
Transmission of train numbers	B61L 25/04
Indicating panels for route settings	B61L 25/06
Displaying of information in general	G09F

Special rules of classification

For modern central interlockings, which comprise electronic interlocking equipment, additionally B61L 2019/065 "electronic central interlocking" should be assigned to relevant documents.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

ESTW	"Elektronisches Stellwerk"; electronic interlocking
PRCI	"Poste d'aiguillage à relais à commande informatique"; electronic interlocking
RSTW	"Relaisstellwerk"; relay interlocking

In patent documents, the following words/expressions are often used as synonyms:

- "central interlocking" and "signal box"

B61L 21/00

Station blocking between signal boxes in one yard

Definition statement

This place covers:

Setting of routes within a signal box, communication between different signal boxes for route setting and release, departure order transmission and moving block systems.

Relationships with other classification places

While this main group deals more with the functional aspects like route setting or departure signal authorisations, etc., B61L 19/00 relates more to the devices and systems of interlocking equipment.

Moving block systems shall be classified under B61L 21/10 and not in B61L 23/18 nor B61L 23/34. The latter subgroup shall only be used when a train is following closely the preceding train by direct distance measurement, e.g. like a joined, virtually coupled train. B61L 23/18 is used when fixed blocks are subdivided or shortened. Instead, when a kind of control center is controlling the follower train even in relative braking distance B61L 21/10 shall be used.

Displays for indication track settings, routes, vehicle positions or numbers are likewise classified under B61L 21/06 and B61L 25/06 since the different information is usually displayed together and because the used techniques are normally the same.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Railway switch operation and control	B61L 5/02 - B61L 5/10
Railway light signal operation and control	B61L 5/18
Systems specially adapted for classification/marshalling yards	B61L 17/00
Interlocking systems and devices	B61L 19/00
Track block length adaption	B61L 23/18
Controlling the distance between trains	B61L 23/34
Transmission of train numbers	B61L 25/04
Displaying track settings	B61L 25/06
Displaying of information in general	G09F

B61L 23/00

Control, warning or like safety means along the route or between vehicles or trains

Definition statement

This place covers:

Warning devices of different kinds related to safety as well as track blocking or train separation.

In particular it covers:

monitoring of the track, including broken rail detection, track movements or the like;

detection of obstacles on or near the track, also on platforms or in tunnels;

warning systems of working men on the track;

track block techniques for separation train traffic, also with integration of track circuits;

token systems for controlling railway traffic;

systems for virtually coupled trains and train joining and splitting in relation to distance measurements between trains.

Relationships with other classification places

The monitoring of the track would preferably be classified in B61L 23/04, when it has a link to the railway signalling system or when mainly trackside elements are used. Otherwise, B61K 9/08 can also be given for mainly onboard systems without a link to the railway signalling system. In practice, both groups B61L 23/04 and B61K 9/08 are often given simultaneously to the same document.

Crossings with road traffic are to be classified in group B61L 29/00.

Track circuits for influencing devices on the train are classified in group B61L 3/24, when related to transmission of data to trains. If otherwise related to braking or train separation techniques for track blocks, then B61L 23/16 takes precedence. Track circuit details and underlying principles have to be classified in group B61L 1/18.

Moving block systems shall be classified in group B61L 21/10 and not in B61L 23/18 nor B61L 23/34. The latter subgroup shall only be used when a train is closely following the preceding train by direct distance measurement, e.g. like a joined, virtually coupled train. B61L 23/18 is used when fixed blocks are subdivided or shortened. Instead, when a control center is controlling the follower train even in relative braking distance, B61L 21/10 shall be used.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Track circuits details	B61L 1/18
Track circuits with data transmission to trains in general	B61L 3/24
Arrangements for trains closely following each other	B61L 21/10
Crossings of railway tracks with road traffic	B61L 29/00
Equipment mounted on board of vehicles for surveying the track	B61K 9/08

Special rules of classification

B61L 23/007 relates only to crossings of two different railway tracks.

B61L 23/041 comprises also the monitoring of platforms to detect whether there is a person or obstacle too close to the track or even on the track.

B61L 23/24 comprises also systems with "electronic tokens".

B61L 23/002

{Control or safety means for heart-points and crossings of aerial railways, funicular rack-railway}

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Points or safety systems for model railways	A63H
Points, crossings or hearts for aerial railway, funicular rack railway	E01B 25/12

B61L 23/08

for controlling traffic in one direction only

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Station blocking between signal boxes in one yard	B61L 21/00

B61L 23/22

for controlling traffic in two directions over the same pair of rails

References

Application-oriented references

Examples of places where the subject matter of this place is covered when specially adapted, used for a particular purpose, or incorporated in a larger system:

Station blocking between signal boxes in one yard	B61L 21/00

B61L 25/00

Recording or indicating positions or identities of vehicles or trains or setting of track apparatus

Definition statement

This place covers:

- vehicle localization systems which provide position information in absolute values, like geographic coordinates by GPS receivers
- vehicle localization systems which provide position information in relative values, like distance from fixed points or distance travelled from odometer
- vehicle speed and acceleration measurements
- vehicle identification and numbering
- display panels for indication of train routes, positions and track element status

Relationships with other classification places

General measurement techniques are found in many different other classes, but all applications concerning railway technology should preferably classified under B61L.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

Displaying vehicle positions or routes	B61L 21/06
General measurement techniques of e.g. position, distance, velocity, speed	G01S, G01C

Special rules of classification

All cameras based systems for detecting of trains identities are classified under B61L 25/041 even when there is no special reflective tag on the train.

For absolute localization by satellite navigation systems, additionally the Indexing Code B61L 2205/04 shall be given.

Displays for indication track settings, routes, vehicle positions or numbers were likewise classified under B61L 21/06 and B61L 25/06, since the different information is usually displayed together and because the used techniques are normally the same. Thus, a search for these technologies should cover these subgroups. However, B61L 25/06 shall take precedence for classification from January 2011 on for classification.

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

Gps	global positioning system

In patent documents, the following words/expressions are often used as synonyms:

- "wheel sensor", "wheel tachomete" and "odometer"

B61L 27/00

Central railway traffic control systems; Trackside control; Communication systems specially adapted therefor

Definition statement

This place covers:

- trackside details of communication systems used in railways, e.g. network arrangements, handover from radio block centres and the like.
- dispatching and regulation systems for generating, monitoring and optimising train schedules and time tables, or supervising the railway traffic in areas.
- support systems for organising crew changes.
- train control systems using a control centre.
- test and simulation systems in the context of railway safety and guidance.
- multiple systems on trackside implementations, which include redundant or fault tolerant systems or subsystems, e.g. 2-out-of-3 processors or multiple signalling equipment for migration or multi-national use.
- data handling and diagnosis of vehicles or trains, which manage all necessary data on the train to operate the train properly, when implemented on trackside. This includes also the collection of position reports of vehicles or trains.
- trackside implementations for diagnosis of vehicle or trains as well as field elements, interlockings or the like.
- automatic driverless systems for guiding trains through the railway network.

Relationships with other classification places

Test and simulation systems for railway signalling equipment or operation are also classified under B61L 27/60 in addition to other groups of B61L when local, portable devices or onboard systems are disclosed without necessarily using a control centre.

"Automatic systems" in B61L 27/04 not only means driverless systems, but also where the operator purely monitors the functioning and health of the system as, for example, on maglev trains. Automatic train operation systems where driving of the train is taken over by an automatic system but route reservation or permission to travel are carried out by a centralised controller are classified in B61L 27/04. By contrast, fully autonomous vehicles not under the control of a centralised controller are classified in B61L 99/002.

References

Informative references

Attention is drawn to the following places, which may be of interest for search:

On-board optimisation of vehicle or vehicle train operation	B61L 15/0058
On-board target speed calculation or supervision	B61L 15/0062
Multiple systems on board, which include redundant or fault tolerant systems or subsystems, e.g. 2-out-of-3 processors or multiple signalling equipment for migration or multi-national use	B61L 15/0063
Onboard equipment for collecting and managing vehicle data	B61L 15/0072
Onboard equipment for diagnosis	B61L 15/0081
Localisation means for railway	B61L 25/02

Synonyms and Keywords

In patent documents, the following abbreviations are often used:

Maglev	magnetic elevation trains

In patent documents, the following words/expressions are often used as synonyms:

- "dispatching" and "scheduling"
- "time table", "mission plan" and "schedule"

B61L 29/00

Safety means for rail/road crossing traffic

Definition statement

This place covers:

All safety equipment for ensuring the safety of crossings between road or pedestrian and rail traffic.

References

Limiting references

This place does not cover:

Crossings between railway tracks	B61L 23/007

Informative references

Attention is drawn to the following places, which may be of interest for search:

Camera monitoring also of level crossings	B61L 23/041
Barriers as such not particularly for rail/road crossings	E01F 13/00

Special rules of classification

B61L 29/08 - B61L 29/228 describe the operation of barriers whereas B61L 29/24 - B61L 29/32 describe the aspect for warning the road users.

The detection of trains independent of the activation of level crossing should be classified under B61L 1/16 or B61L 1/18 respectively.

Although gates (B61L 29/04) can be seen as guards (B61L 29/02) in a broader sense, the gates are classified exclusively under B61L 29/04.

B61L 99/00

Subject matter not provided for in other groups of this subclass

Definition statement

This place covers:

This group covers subject-matter containing additional information other than technical, e.g. management decisions, politics etc. in regard to railway signalling, control and guiding, which cannot be used for search.

B61L 99/002

{Autonomous vehicles, i.e. under distributed traffic control}

Relationships with other classification places

Automatic train operation systems, where driving of the train is taken over by an automatic system but route reservation and/or permission to travel are carried out by a centralised controller, are classified in B61L 27/04. By contrast, fully autonomous vehicles not under the control of a centralised controller are classified in B61L 99/002.