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Sínjármű világító egység

Az európai szabadalom ellen, megadásának az Európai Szabadalmi Közlönyben való meghirdetésétől számított kilenc hónapon belül, felszólalást lehet benyújtani az Európai Szabadalmi Hivatalnál. (Európai Szabadalmi Egyezmény 99. cikk(1))

A fordítást a szabadalmas az 1995. évi XXXIII. törvény 84/H. §-a szerint nyújtotta be. A fordítás tartalmi helyességét a Szellemi Tulajdon Nemzeti Hivatala nem vizsgálta.

Rail vehicle light module

Technical field

The invention relates to a rail vehicle light module.

Prior art

The passenger compartment of rail vehicles is normally lit by means of strip lights in the region of the ceiling of the passenger compartment, these strip lights being composed of individual luminaires (light modules). Minimum values and uniformity values for luminosity are laid down for lighting in passenger compartments by means of standards (e.g. EN 13272).

Interior lighting in passenger rail vehicles is normally controlled by a central entity on a train or in an individual carriage. In this case the interior lighting is mostly switched on and off as a whole or in groups. In the compartments of long-distance carriages an individual lighting regime is generally provided for each compartment. In local transport, but in particular in underground railways with routes which take them both underground and overground, the interior lighting is normally kept switched on all the time. This ensures that the luminosity satisfies the requirements of the standard for railway operation at all times.

Normally the individual luminaires are assigned to different circuits, in order to achieve better redundancy in the event of failures. This assignment is mostly achieved by means of fixed wiring when installing the luminaires and can be changed retrospectively only at considerable expense.

Emergency lighting is more commonly provided by powering some (approx. 1/3) of the luminaires from a separate power supply, the emergency power supply, with the other luminaires being extinguished during emergency power operation. The result is a less uniform illumination of the passenger compartment during emergency power operation.

International patent application WO 2006/042050 A2 describes a vehicle reading luminaire with a user-operable switching function and a dimmer function, which can be fed from two separate power supplies. Observations on topics of standardisation of lighting in rail vehicles, in particular as regards reducing the amount of maintenance required, can be taken from the publication PERILSTEIN F M ED - WOLF E J ET AL: "Standardization of locomotive/railcar auxiliary devices", PROCEEDINGS OF THE 2000 ASME/IEEE JOINT RAILROAD CONFERENCE, NEWARK, NJ, APRIL 4-6, 2000; [PROCEEDINGS OF THE ASME/IEEE JOINT RAILROAD CONFERENCE], NEW YORK, NY.

Printed patent specification US 7 661 848 B2) discloses a built-in vehicle luminaire having a plurality of lighting means, it being possible for the direction of the emitted light to be influenced by selective activation thereof. Furthermore, this document describes a luminosity control system which includes an operating device integrated into the built-in vehicle luminaire.

Presentation of the invention

The object of the invention is therefore to specify a rail vehicle light module which can generate light with several predefinable levels of luminosity and which requires only minimum effort for the electrical installation and which can be easily adapted to different types of vehicle.

The object is achieved by a rail vehicle light module with the features of claim 1. Advantageous embodiments form the subject matter of subordinate claims.

According to the basic idea of the invention a rail vehicle light module is described which comprises at least one lamp, at least one input to the electrical energy feed, at least one electrical control input and a control facility, the signals present at the at least one control input being routed to the control facility and the control facility being designed such that luminosities of the at least one lamp which correspond to the respective control signal states can be set.

In this way a rail vehicle light module can advantageously be achieved which can emit several particular different luminosities, with only minimum circuitry arrangements being necessary for this on the vehicle. In particular it is advantageous that no power electronics need be provided on the vehicle. On the vehicle it is sufficient to conduct binary control signals to the inventive rail vehicle light module.

In a preferred embodiment of the invention one of the luminosity levels is provided as an off-position, in which the lamps emit no light. As a result it is advantageously possible to switch off a rail vehicle light module without having to interrupt the power supply. In any case, no switching facility is necessary for the frequent switching of the light modules during normal operation; at most, a facility for de-energising for maintenance purposes need be provided, e.g. a line safety switch.

One advantageous embodiment of the rail vehicle light module provides for a control input to be used as an emergency light control input. If a control signal is not applied to said emergency light control input, the control facility of the rail vehicle light module sets a particular luminosity, the emergency luminosity, the signals from all other control inputs being disregarded by the control facility of the rail vehicle light module.

Another advantageous embodiment of the rail vehicle light module provides for a plurality of energy feeds, the rail vehicle light module comprising a switching facility by means of which it is possible to select the power source. When installing such a rail vehicle light module the switching facility is set so that the rail vehicle light module draws energy from an energy feed. In particular it is advantageous in this case that when rail vehicle light modules are arranged in series (strip lighting) it is easily possible to assign individual luminaires to particular power circuits and to alter this arrangement even without any wiring effort. Although the power supply for the rail vehicle light modules designed in this way is obtained from different power circuits, the luminosity (or the switching on/off and the control of the emergency lighting operation) is controlled by way of control lines common to all rail vehicle light modules.

It is recommended to design the rail vehicle light modules such that a plurality of modules can be combined to form one strip light, in particular can be plugged together. For this purpose a rail vehicle light module is to be fitted both on the power terminals and on the control terminals with a facility to forward said signals or energy feeds to a further rail vehicle light module. In this case these terminals are to be designed such that a plurality of modules can be joined to form one strip light. Said terminals can be designed to be detachable (plug-in connectors, screw connections, etc.) or non-detachable.

Another embodiment of the invention provides for the transition between different luminosity levels to be stepless. For this purpose corresponding circuitry parts are to be

provided in the control facility of a rail vehicle light module, which when a change in luminosity is predefined via the control signals enable said transition in luminosity to take place steplessly. Said transition in luminosity can take place in such fine steps that these individual luminosity steps are indistinguishable for the passengers or in larger graduations which are distinguishable for the passengers.

All lamps which are commonly used in rail vehicles and which are suitable for operation with different luminosities can be used as lamps. Besides the old-fashioned and generally no longer used incandescent lamps, fluorescent lamps and light emitting diodes (LED) are particularly suitable. Likewise the use of organic light emitting diodes (OLED) is advantageous. The respective circuit of a rail vehicle light module is to be designed as a function of the lamp used.

Another embodiment of the invention provides for the luminous colour of the lamps to be adjusted by means of the control input signals. Said adjustment of the luminous colour of the lamp can take place independently of the adjustment of the luminosity. In this case it is advantageous to provide some of the control signals intended for adjustment of the luminosity for adjustment of the luminous colour. Likewise it is advantageous to provide additional control signals for controlling the luminous colour. The advantage of this is that each luminous colour envisaged can be employed with each adjustable luminosity.

A further continuation of the invention provides for each adjustable luminous colour to be assigned a particular luminosity which is automatically adjusted by the control facility of the lamp module when a particular luminous colour is requested. The advantage of this is that particular so-called "mood lighting" can be set. For example, the lighting in the passenger compartment can have a different lighting situation (luminous colour and luminosity) in the morning hours than in the afternoon or evening hours.

Brief description of the drawings

These show by way of example:

Fig. 1 A rail vehicle light module.

Fig. 2 A circuit diagram of a rail vehicle light module.

Explanation of the invention

Fig. 1 shows by way of example and schematically a rail vehicle light module. A rail vehicle light module 100 is illustrated in conjunction with other modules. Said rail vehicle light modules 100 together represent a strip light. Electrical plug-in connectors 200 are provided, which electrically connect each rail vehicle light module 100 to the respective following module. Said electrical plug-in connectors 200 are multi-pole in design and transmit all signals and power supplies that are necessary for the operation of a rail vehicle light module 100.

Fig. 2 shows by way of example and schematically a circuit diagram of a rail vehicle light module. A rail vehicle light module 100 is illustrated which has a first electrical energy feed V1 and a second electrical energy feed V2. Said electrical energy feeds are conducted in each case to an associated energy output V1a, V2a, to which another rail vehicle light module 100 can be electrically connected. Furthermore, the rail vehicle light module 100 comprises three control inputs L1, L2, L3, the input signals of which are conducted in each case to corresponding control outputs L1a, L2a, L3a, to which another rail vehicle light module 100 can be electrically connected. Furthermore, an emergency light control input N is provided, the input signal of which is conducted to an emergency light control output Na, to which another rail vehicle light module 100 can be electrically connected. Said energy and control inputs V1, V2, L1, L2, L3, N and the energy and control outputs V1a, V2a, L1a, L2a, L3a, Na can in each case be designed separately or as a common plug-in connector.

The signals of the control inputs L1, L2, L3, N are fed to a lamp unit L. The lamp unit L comprises the circuits required to operate one or more lamps, in particular circuits which detect the state of the binary control inputs L1, L2, L3 and of the emergency light control input N and as a function of the respective signal levels of these inputs adjust the luminosity of the lamps. For this purpose a control facility is provided in the lamp unit L. The power supply of the lamp unit L is provided alternatively from the first electrical power supply V1 or the second electrical power supply V2. To switch the power supply between these two sources a switching facility S is provided.

List of reference characters

100	Rail vehicle light module
L	Lamp unit
V1	First electrical energy feed
V2	Second electrical energy feed
V1a	First electrical energy feed output
V2a	Second electrical energy feed output
S	Switching facility
N	Emergency light control input
Na	Emergency light control output
L1	Control input 1
L2	Control input 2
L3	Control input 3
L1a	Control output 1
L2a	Control output 2
L3a	Control output 3
200	Electrical plug-in connector

Szabadalmi igénypontok

1. Sínjármű világító egység (100), amely tartalmaz legalább egy világítóelemet (L), egy első bemenetet egy első villamos energiabevezetéshez (V1), egy második bemenetet egy második villamos energiabevezetéshez (V2), egy vezérlőberendezést, egy vészvilágítási vezérlőbemenetet (N) és legalább egy villamos vezérlőbemenetet (L1, L2, L3), ahol a vészvilágítási vezérlőbemenet (N) és a legalább egy vezérlőbemenet vezérlőjelek fogadására alkalmasan van kialakítva, azzal jellemezve, hogy a sínjármű világító egység (100) ezenkívül egy kapcsolószerkezetet (S) is tartalmaz, amely kialakításánál fogva képes a sínjármű világító egység (100) energiaellátását az első villamos energiabevezetés (V1) és a második villamos energiabevezetés (V2) között átkapcsolni,

ahol a vezérlőberendezés a vészvilágítási vezérlőbemeneten (N) és a legalább egy vezérlőbemeneten (L1, L2, L3) jelenlévő vezérlőjeleknek és az adott vezérlőjelállapotoknak megfelelő fényerőt állít be a legalább egy világítóelemen, és ahol abban az esetben, amikor a vészvilágítási vezérlőbemenetre (N) nem érkezik vezérlőjel, a vezérlőberendezés egy meghatározott vészvilágítási fényerőt állít be és a vezérlőjelek a további vezérlőbemeneteken (L1, L2, L3) nem lényegesek.

2. Az 1. igénypont szerinti sínjármű világító egység (100), azzal jellemezve, hogy az első bemenet egy első villamos energiabevezetéshez (V1), a második bemenet egy második villamos energiabevezetéshez (V2), azaz az első villamos energiabevezetés és a második villamos energiabevezetés kimeneteihez (V1a, V2a) van csatlakoztatva, továbbá a vészvilágítási vezérlőbemenet (N) és a legalább egy vezérlőbemenet (L1, L2, L3) egy-egy vezérlőkimenetre (Na, L1a, L2a, L3a) van kötve.

3. A 2. igénypont szerinti sínjármű világító egység (100), azzal jellemezve, hogy a sínjármű világító egység (100) egy további sínjármű világító egységhez (100) csatlakoztathatóan van kialakítva.

4. Az 1 - 3. igénypontok bármelyike szerinti sínjármű világító egység (100), azzal jellemezve, hogy világítóelemként legalább egy fénykibocsátó diódát alkalmazunk.

5. Az 1 - 3. igénypontok bármelyike szerinti sínjármű világító egység (100), azzal jellemezve, hogy világítóelemként legalább egy szerves fénykibocsátó diódát alkalmazunk.

FIG 1

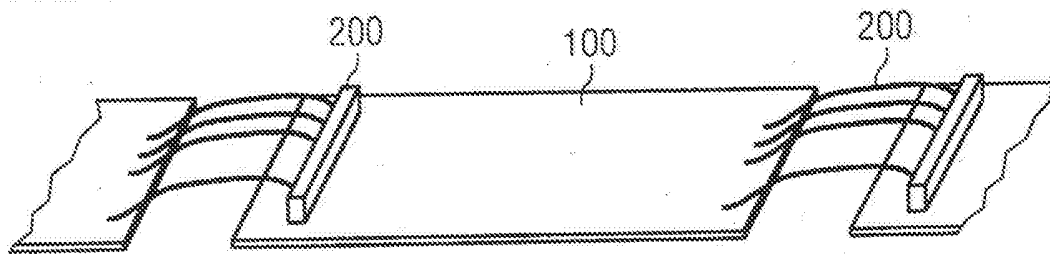


FIG 2

