

Description

Chassis

5 Technical field

The invention relates to a chassis for subassemblies which can be inserted on guide racks into a mounting space from the front side and/or rear side, wherein the guide racks form opposing delimiting walls of the mounting space and include contact and connection devices on the chassis in each case.

Prior art

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Chassis for accommodating electrical and/or electronic subassemblies are known in various embodiments. In the simplest embodiment, chassis of 19" construction consist of two lateral delimiting walls and four module rails which are screwed onto the inner surfaces of the delimiting walls on the front side. The printed circuit boards are pushed into guide rails, which in turn are fastened to module rails. In the case of multi-pin plug connections, the printed circuit board must be guided very precisely when it is being plugged in.

In the case of multi-pin plug connections, high levels of plug-in force and withdrawal force must be applied accordingly, and therefore push and pull handles are attached to the front plate of the subassembly, thereby facilitating the installation and removal of a subassembly. In its inserted position, the subassembly is fastened by means of screws to a strip of threaded holes, which normally sits in a groove in the forward module rail, said groove being open to the front side of the chassis.

In general, the construction of these 19" chassis is predetermined by the standard EN 60297. This gives measurement specifications for the implementation of various functional entities, such as e.g. the guiding and fastening of the printed circuit boards, the coding of the slots, and the
5 contact entities for protecting a subassembly against electrostatic discharges.

However, the standard also specifies structural details of the functional units, in respect of both the functional units on the chassis and functional units on the subassembly. Conventional chassis extensively follow
10 the implementation details that are contained in the standard. This results in chassis in which the profile structure and guide structure is costly. Only limited use can be made of ready-made assemblies during manufacturing. The chassis consists in structure of a multiplicity of individual components, which are not just problematic with regard to
15 manufacturing, but are also detrimental to effective HF screening.

A screened chassis is disclosed in DE 196 44 414, for example. In order to allow improved screening of high-frequency interference fields when the area of the front plate is penetrated, contact spring strips featuring
20 contact claws are proposed, thereby creating a low-resistance and reliable contact resistance to the module rail of the chassis. In order to comply with narrow assembly tolerances, particularly in the case of highly polar connectors, DE 196 44 419 proposes a special structure of the fastening screws for fastening the module rail and the side parts.

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Statement of the invention

The invention addresses the problem of proposing a chassis which has fewer component parts and is easier to manufacture.

5 In accordance with the invention, this problem is solved by a chassis which is of the type cited at the beginning and has the features in Patent Claim 1. The dependent claims refer to advantageous configurations of the invention.

10 The invention proposes that functional units, such as those which are predetermined for entities on the chassis in the standard EN 60297, be extensively integrated into the guide rack structure. The chassis therefore consists of few component parts. Since component parts are omitted, ohmic contact resistances between the component parts are also eliminated. As a result, the functional unit which protects the subassembly
15 against electrostatic discharge can be implemented more reliably. In accordance with the invention, the guide racks are developed as unitary parts. They have a profiling whose projections extend into the mounting space. Projections are arranged in the area of the insertion opening in such a way that they extend transversely to the direction of insertion.
20 These projections are provided with cutouts and holes which are used for contacting and fastening the subassembly in the chassis. In the area of the edges of the printed circuit board, the profiling is designed in such a way that projections form a longitudinal guide for the printed circuit board in a parallel orientation.

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The guide rack is constructed in a modular manner, wherein a projection is assigned to a slot of a subassembly in each case, said projection having the following cutouts:

- 30 - a circular hole which forms a seat for a cylindrical contact/guide pin on the subassembly when the subassembly is in its plugged-in position,
- a rectangular perforation which is designed as a coding slot and, when plugging in, interacts with a subassembly coding in such a way that subassemblies are assigned to functionally specified slots,
- 35 - a cutout which is open towards the subassembly and contacts a discharge conductor strip of the printed circuit board when the subassembly is pushed in and before the engagement of the plug

connector pin, thereby protecting the subassembly against electrostatic discharges.

5 In an advantageous configuration, the guide rack is continued on the insertion side by means of an L-shaped angle strip, wherein a limb which is on a plane with the insertion opening forms a stop for the front plate of the subassembly. The front plate can be directly screwed onto this L-shaped angle strip by means of a setscrew. An inserted threaded strip is
10 not required. This eliminates the associated contact resistance, thereby improving the screening efficiency in the case of a screened embodiment. In this context, it is also advantageous if the angle strip limb which extends in the direction of insertion features cutouts into which a push and pull handle of the subassembly engages when it is in its plugged-in
15 position. The slide-in unit can thus be locked into the chassis in a simple manner.

A guide rack which is integral and materially uniform can be produced at low cost from steel sheet metal as a bent stamped part. Depending on the
20 place of use, it can be advantageous to protect the stamped guide rack against corrosion by means of a coating.

Brief description of the drawing

25 In order to explain the invention further, reference is made to the drawing. In simplified format, the single figure in the drawing illustrates an embodiment in accordance with the invention, by means of a magnified illustration of the right hand guide rack in the area of the insertion
30 opening.

Embodiment of the invention

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As shown by the magnified illustration in the figure, the chassis has a guide rack 1 with a profiling 3 on which projections 4 and 7 extend into the mounting space.

5 The chassis is implemented for subassemblies in a horizontal installation position. The guide racks are shaped and stamped as sheet metal bent stamped parts in such a way that different functional units of the entities of the standard EC/EN/DIN 60297 are integrated into the guide rack.

10 Reference is first made to the projections 4 on a part of the profile, which run from top to bottom and transversely in relation to the direction of insertion 15 in the drawing. Said projections are arranged in alignment in the perimeter area of the insertion opening. A projection 4 is assigned to each plug-in slot. A range of cutouts and holes are stamped into each of the projections 4. It is clearly visible from the
15 figure that the cutouts and holes in the projections 4 are identical in each case. The hole distance between adjacent projections corresponds exactly to that of the slide-in units. The rectangular perforation having the reference sign 4 is designed as a coding slot which is not shown in greater detail. By virtue of the coding, a subassembly can only be
20 plugged into a slot if the key-lock configuration matches. The hole 5 of a projection 4 forms a seat for the guide and grounding pin which is fastened to the subassembly. In addition, a cutaway 8 is stamped out at each of the projections 4, said cutaway being opened towards the subassembly. This cutaway 8 is designed as a contact entity which contacts a discharge
25 conductor strip on the printed circuit board during insertion, thereby protecting the elements of the printed circuit board against electrostatic discharges. The contact entity is not illustrated in further detail in the figure.

30 Another part of the profiling is formed by parallel projections 7 which extend in the direction of insertion and form a guiding groove for the printed circuit boards when the subassembly is inserted.

The guide rack 1 continues into the external space in an angle strip 12.
35 A limb 13 of the angle strip 12 forms a stop surface 14 for the inner surface of the front plate of an inserted subassembly. Threaded holes 13 are provided in the limb 13 for fastening screws, by means of which the

front plate is screwed onto the chassis. A centering hole 5 is assigned to each threaded hole 10 and, in conjunction with a centering pin on the subassembly, ensures pre-centering when the subassembly is plugged in. Before an electrical contact is created with the plug connector, there-
5 fore, the subassembly is in a precise plug-in position. The limb 16 which extends in an opposite direction to the direction of insertion 15 features perforations 17 which form an engagement for the push and pull handle of the inserted subassembly.

10 The angle strip 12 and the row of projections 4 form the contact and connection device 2 on the chassis, wherein said contact and connection device formerly consisted of different structural elements that were separate from the chassis. By virtue of the claimed structure, said contact and connection device is an integral part of the guide rack.

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In order to take heat away from the subassemblies, provision is made in the guide rack for openings 9, which form through-passages for the cool air.

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Patent claims

1. A chassis for subassemblies which can be inserted on guide racks into a mounting space from the front side and/or rear side, wherein the guide racks form opposing delimiting walls of the mounting space and include
5 contact and connection devices on the chassis in each case, characterized by the following features,
- the guide racks (1) are developed as unitary parts and have an integrated profiling (3) which extends into the mounting space and includes
10 first projections (4) that extend transversely to the direction of insertion (15),
 - seen from the direction of insertion (15), the first projections (4) are perforated by a row of cutouts and holes (5, 6, 8) into which a contact and connection device on the subassembly engages when a subassembly
15 is in its plugged-in position.
2. The chassis as claimed in Claim 1, characterized in that the first projections (4) in the area of the insertion opening are arranged in alignment.
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3. The chassis as claimed in Claim 1 or 2, characterized in that a first projection (4) is assigned in each case to a slot of a subassembly in each guide rack.
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4. The chassis as claimed in Claim 3, characterized in that each projection (4) of a slot has the following cutouts:
- 30 - a circular hole which forms a seat for a cylindrical contact pin on the subassembly when the subassembly is in its plugged-in position,
 - three rectangular perforations which are designed as coding slots and, when plugging in, interact with a subassembly coding in such a way that subassemblies are assigned to functionally specified slots,
 - 35 - a cutout (8) which is open towards the subassembly and contacts a discharge conductor strip of the printed circuit board when the subassem-

bly is pushed in and before the engagement of the plug connector pin, in order to protect the subassembly against electrostatic discharges.

5. The chassis as claimed in one of the preceding claims,
5 characterized in that

the profiling includes second projections which extend longitudinally in the direction of insertion, and which are designed in such a way that the subassembly is guided from the side when it is being plugged in.

10 6. The chassis as claimed in one of the preceding claims,
characterized in that

each guide rack is continued on the insertion side by means of an L-shaped angle strip, wherein a limb which is on a plane with the insertion opening forms a stop for the front plate of the subassembly, and a limb
15 which extends in the direction of insertion features cutouts into which a push and pull handle of the subassembly engages when it is in its plugged-in position.

7. The chassis as claimed in Claim 6,
20 characterized in that

the stop surface features threaded holes for fastening screws of the subassembly.

8. The chassis as claimed in one of the preceding claims,
25 characterized in that

the guide racks are formed from sheet metal as a bent stamped part which is integral and materially uniform.

9. The chassis as claimed in one of the preceding claims,
30 characterized in that

the guide racks are manufactured from a sheet metal which is protected against corrosion.