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Description



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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
10 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
20 screwed onto the inner surfaces of the delimiting walls on the front side. The printed circuit boards are pushed into guide rails and brought into engagement with plug connector pins on a backplane or intermediate plane card of the chassis. In the case of plug connectors with a high number of
25 plug connector pins the printed circuit board must be guided very precisely when it is being inserted and accordingly high injection and extraction forces must be applied, for which reason a push and pull handle mechanism is usually attached to the front plate of the subassembly, which mechanism
30 facilitates the insertion and extraction of a subassembly. In its inserted position the subassembly is typically fastened by means of screws to a strip of threaded holes. Said strip of threaded holes is normally installed in a groove in a forward module rail, said groove being open to the front side
35 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 contact entities for protecting a subassembly against electrostatic discharge.

However, the standard also specifies structural details of the functional units, in respect of both the functional units on the chassis and the functional units on the subassembly. Conventional chassis largely follow the implementation details that are contained in the standard. The result is a complex and costly profile and guide structure, consisting of a plurality of individual component parts. Only limited use can be made of ready-made assemblies during manufacturing. This makes the manufacturing process time-consuming and expensive. The ohmic contact resistances between the individual component parts can prove problematic with regard to effective HF screening.

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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 contact claws are proposed, thereby creating a low-resistance and reliable contact resistance to the module rail of the chassis.

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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 object of the invention is to propose a chassis which has fewer individual component parts and is easier to
5 manufacture.

This object is achieved according to the invention by a chassis which is of the type cited at the beginning and has the features recited in patent claim 1. The dependent claims
10 refer to advantageous embodiments of the invention.

The invention proposes that functional units, such as those which are predetermined for entities on the chassis in the EN 60297 standard, be extensively integrated into the guide rack
15 structure. The chassis therefore consists of few individual component parts. Since individual component parts are omitted, ohmic contact resistances between the individual component parts are also eliminated. As a result, the functional unit which protects the subassembly against
20 electrostatic discharge can be implemented more reliably. In accordance with the invention, the guide racks are developed as unitary parts with an integral profiling. The profiling has projections which extend into the mounting space. Disposed in the area of the insertion opening are first
25 projections that extend transversely to the direction of insertion. These first projections are provided with cutouts and holes which are used for contacting and fastening the subassembly in the chassis.

30 Said first projections are usefully arranged in alignment in the area of the insertion opening.

A preferred embodiment of the invention is characterized in that a first projection is assigned in each case to a slot of
35 a subassembly in each guide rack.

In a preferred form of construction a projection is assigned to a slot of a subassembly in each case, said projection having the following cutouts:

- 5 - a centering hole which forms a seat for a cylindrical contact/guide pin on the subassembly when the subassembly is in its plugged-in position,
- rectangular perforations which are designed as coding slots and, when subassemblies are plugged in, interact with a subassembly coding in such a way that
10 subassemblies are assigned to functionally specified slots,
- a cutout which is open toward the subassembly and contacts a discharge conductor strip of the printed circuit board when the subassembly is pushed in and
15 before the engagement of the plug connector pin, thereby protecting the subassembly against electrostatic discharges.

This system of construction ensures that the contact and guide pin establishes an electrical contact with the chassis
20 already during the insertion operation, that is to say before the engagement of the plug connector of the backplane or intermediate plane printed circuit board. The associated potential equalization between subassembly and chassis reduces the risk of an undesirable electrostatic discharge
25 which could damage electronic components on the printed circuit board of the subassembly. The key-lock mechanism of the coding slots ensures that a subassembly can only be plugged in at an assigned slot.

30 A further advantageous embodiment of the invention is characterized in that the profiling has second projections which extend in the direction of insertion. Said second projections form a longitudinal guide which facilitates the insertion of the subassembly.

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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 setscrews. Since conventional threaded
5 strips are not required, the associated contact resistances are also eliminated, thereby improving the screening efficiency in the case of a screened embodiment of a chassis.

Also preferred is an embodiment in which the angle strip limb
10 which extends in the direction of insertion has perforations into which a push and pull handle mechanism of the subassembly engages when it is in its plugged-in position. The slide-in unit can thus be locked into the chassis in a simple manner.

15 A guide rack which is formed from a single piece and is materially uniform can be produced at low cost from steel sheet metal as a bent stamped part. Depending on the place of use, it can be advantageous to protect the stamped guide rack
20 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. The single figure of the drawing shows an embodiment according to the invention in an enlarged view of the right-hand guide rack in the area of the insertion opening.

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Embodiment of the invention

35 The figure shows a chassis which is designed to accommodate subassemblies installed in a horizontal position and in the lateral guide rack 1 of which different functional units of

the entities of the EC/EN/DIN 60297 standard are integrated. Viewed looking into the insertion opening 18, the illustration shows a section of the right-hand guide rack 1 having a profiling 3. The profiling 3 has first projections 4 and second projections 7. The projections 4 and 7 stand proud of the plane of the guide rack and project into the mounting space 11. The guide rack is a bent stamped part which has been shaped and stamped from sheet metal.

Reference will be made first to a part of the profile 3, specifically to the first projections 4. Said first projections 4 are arranged in alignment in the perimeter area of the insertion opening 18 and run transversely in relation to the direction of insertion 15, from top to bottom in the drawing. A projection 4 is assigned to each plug-in slot. Each projection 4 has a row of cutouts and holes 5, 6, 8. It is clearly visible from the figure that the cutouts and holes 5, 6, 8 in the projections 4 are identical in each case. The hole distance between adjacent projections 4 essentially corresponds to the distance between the slide-in units.

The cutout 5 is embodied as a centering hole. During the insertion of the subassembly, which is not shown in the drawing, the centering hole 5 forms a seat for a guide and contact pin of the subassembly. When the subassembly is inserted, the lateral surface of the guide and contact pin of the subassembly comes into contact with the inner surface of the centering hole 5 before the plug connection of the backplane or, as the case may be, intermediate plane printed circuit board engages. Said leading contacting protects sensitive electronic components on the printed circuit board of the slide-in unit from electrostatic effects.

The cutouts 6 are rectangular and form coding slots (not shown in further detail in the drawing). The coding slots allow a subassembly to be inserted into a slot only if the key-lock configuration matches.

In addition, a cutaway 8 is stamped out at each of the projections 4, said cutaway being opened toward the subassembly. Said cutaway 8 is part of a contact entity. Said
5 contact entity, which is not shown in further detail in the drawing, can be implemented for example by means of a bow contact spring which is latched on into the cutout. When a subassembly is inserted, the contact entity establishes an electrical contact between a discharge conductor strip on the
10 printed circuit board and the subassembly. This potential equalization extends the protection for the electronic components on the printed circuit board, since even in the case of the printed circuit board becoming electrostatically charged, the electrical charge can be conducted away in a
15 controlled manner.

Another part of the profiling 3 is formed by projections 7 which run in parallel in the direction of insertion 15. Said projections 7 extend into the mounting space 11. Projections
20 7 arranged opposite one another in pairs in each case in the interior 11 form a longitudinal guide for the subassembly, thus facilitating the insertion and plugging-in of said subassembly.

25 The guide rack 1 continues to the front in an angle strip 12. A limb 13 of the angle strip 12 forms a stop surface 14 for the inner surface of the front plate when a subassembly is in the inserted position. The front plate itself is not shown in the drawing. Threaded holes 10 are provided in the limb 13
30 for fastening screws, by means of which the front plate can be screwed onto the chassis. A centering hole 5 is assigned to each threaded hole 10 and, in conjunction with the above-mentioned guide and contact pin on the subassembly, ensures pre-centering when the subassembly is plugged in. As a result
35 the subassembly is in a precise plug-in position during insertion, before an electrical contact is established between plug connector pins on the backplane or intermediate

plane printed circuit board and the printed circuit board of the subassembly.

5 The limb 16 which extends in an opposite direction to the direction of insertion 15 is provided with perforations 17. The push and pull handle mechanism of the inserted subassembly engages in said perforations 17 in order to secure the subassembly in the insertion position or, as the case may be, to extract it from the insertion position.

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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 individual structural elements that were separate from the chassis. By virtue of the design according to the invention, 15 said contact and connection device 2 is now an integral part of the guide rack. From the manufacturing standpoint the claimed design is very advantageous because production and assembly are possible with comparatively little outlay.

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In order to take heat away from the subassemblies, provision is made in the guide rack 1 for openings 9 which form through-passages for cooling air.

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List of reference numerals

	1	Guide rack
5	2	Contact and connection device (on subassembly side)
	3	Profiling
	4	First projections (transverse to direction of insertion)
10	5	Cutout (centering hole)
	6	Cutout (coding slot)
	7	Second projections (longitudinal guide in direction of insertion)
	8	Cutaway
15	9	Opening
	10	Threaded hole
	11	Mounting space
	12	Angle strip
	13	Limb
20	14	Stop surface
	15	Direction of insertion
	16	Limb in direction of insertion
	17	Perforation
	18	Insertion opening
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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 have contact and connection devices on the chassis in each case, characterized by the following features,

- the guide racks (1) are embodied as unitary parts and have an integrated profiling (3) which extends into the mounting space (11) and has 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 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 (18) are arranged in alignment.

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 (1).

4. The chassis as claimed in claim 3, characterized in that each projection (4) of a slot has the following cutouts:

- a centering hole (5) which forms a seat for a cylindrical contact pin on the subassembly when the subassembly is in its plugged-in position,
- rectangular perforations (6) which are implemented as coding slots and, when subassemblies are plugged in, interact with a subassembly coding in such a way that

subassemblies are assigned to functionally specified slots,

- a cutout (8) which is open toward 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, in order to protect the subassembly against electrostatic discharges.

5. The chassis as claimed in one of the preceding claims, characterized in that the profiling (3) has second projections (7) which extend longitudinally in the direction of insertion (15) and which are embodied in such a way that they guide the subassembly laterally when it is being plugged in.

6. The chassis as claimed in one of the preceding claims, characterized in that each guide rack (1) 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 (18) forms a stop surface (14) for the front plate of the subassembly, and a limb (16) which extends in the direction of insertion (15) has cutouts (17) 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, characterized in that the stop surface (14) has threaded holes (10) for fastening screws of the subassembly.

8. The chassis as claimed in one of the preceding claims, characterized in that the guide racks (1) are formed from sheet metal as bent stamped parts which are integral and materially uniform.

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

the guide racks (1) are manufactured from a sheet metal which is protected against corrosion.