

Description

The invention relates to a connector assembly comprising a cover and a multipoint connector which comprises a block-shaped multipoint connector body with spaces in which contacts accessible from outside via apertures opening out in a lateral surface of the body are provided.

Such a connector assembly is known from EP-A2-0 215 577.

The invention also relates to the cover for cooperating with said connector assembly.

In vehicle technology multipoint connectors, electronic components and circuits are immersed in a protective lacquer. This lacquer protects the said parts and circuits against oxidation and salt solutions which can penetrate into the spaces in which these circuits and lower are arranged.

The said lacquer has the property of completely covering the multipoint connector bodies mounted on a printed circuit board. However, the disadvantage is produced that the protective lacquer penetrates through the apertures of the multipoint connector body and is deposited on the contact surfaces. As a result, the multipoint connectors are not reliable in use.

The object of the invention is to eliminate the said disadvantages.

This object is achieved in that the cover comprises an upper part and four lateral parts extending virtually perpendicularly to it and that those surfaces of the lateral parts of the cover which face the apertures of the multipoint connector body are provided with knobs which lie opposite the apertures when the cover has been placed on the multipoint connector body and the lower parts of the knobs rest against the lower edge of the respective apertures.

The said knobs cover the apertures of the multipoint connector body as good as possible, thus making it difficult for the lacquer to reach the contact surfaces.

If the inner surface of at least one of the apertures decreases in a pyramid-shape the edge of the latter from the lateral surface of the body, the corresponding knob has the shape of a truncated pyramid. Reliable sealing of the apertures is thereby achieved.

However, it is also possible that at least one of the apertures of the multipoint connector body has a rectangular or square cross-section and the connecting pin of the corresponding contact has been bent downwards virtually perpendicularly and lies in a slot in the aperture edge, the knob associated to the rectangular or square aperture being of dome-shaped design.

According to one embodiment of this knob, the dome is provided with a projection extending in the direction of the cover openings, in which the dome protrudes further from the inner face of the corresponding lateral part of the cover than the said projection. By virtue of this projection, the said slot of the multipoint connector body is sealed in an optimum manner.

In a preferred embodiment, the projection has a trapezoidal cross-section and has been bevelled at the free end, this projection being provided at its free end with a second projection extending in the direction of the cover opening and having a curved cross-section.

The upper part of the cover is preferably at a distance from the free end which is greater than the height of the multipoint connector body. It is advantageous here that the lateral parts of the cover have been rounded at the free edge.

As a result, when the cover is pressed onto the multipoint connector body, said cover is pressed outwards slightly and the projections rest very tightly against the connecting pins.

Furthermore, the invention relates to a cover for a multipoint connector in which the cover comprises an upper part and four lateral parts extending virtually perpendicularly to it and defining a cover opening between them, and that those surfaces of the lateral parts of the cover which face the apertures of the multipoint connector body are provided with knobs which lie opposite the apertures when the cover has been placed on the multipoint connector body and the lower parts of the knobs rest against the lower edge of the respective apertures.

Further embodiments of the cover according to the invention are disclosed in the subclaims.

This invention is explained below with reference to preferred embodiments of the invention, which are shown in the drawings, in which:

Figure 1 shows a section through a cover according to the invention;

Figure 2 shows a bottom view of this cover;

Figure 3 shows a section according to the line III-III;

Figure 4 shows a section along the line IV-IV;

Figure 5 shows a section through an optimum cover;

Figure 6 shows a section along the line VI-VI and

Figure 7 shows a section through the line VII-VII.

The cover 1 shown in figure 2 is provided at its lateral surface 2 with knobs 3. The knobs 3 are in the form of a truncated pyramid, the sloping surfaces resting sealingly against the likewise sloping surfaces of the pyramid-shaped apertures of the multipoint connector body 6. A contact 7 is accommodated in the interior of the multipoint connector body 6. This contact is provided with downward-bent connecting pins 8 and 9. It can be seen from Figure 4 that the lowermost sloping surface of the knob 3 rests sealingly against the connecting pin 8.

The further lateral surface 10 in the cover 1 is provided with dome-shaped knobs 11 which cover the apertures of the multipoint connector body 6 which are on the right in Figure 4.

An advantageous embodiment is indicated in Figures 5a, 6a and 7. Here, the dome 12 of the knob is provided with a projection 13 which is lower than the dome. This projection has a trapezoidal cross-section and has

been bevelled at its free end at 15. This first projection 13 is provided at its free end with a second projection 14, which has a curved cross-section.

The depth of the interior of the cover is greater than the corresponding dimension of the multipoint connector body 6. The cover is furthermore rounded at its opening or free end 16. By virtue of the special embodiment of the free end of this cover and the suitably selected depth of the cover, the free end of the cover is bent outwards to a certain extent when the cover is pressed onto a multipoint connector body arranged on a printed circuit board and, as a result, the knob rests against the connecting pin 9 over a surface area which is as great as possible. Thus the sealing is optimum.

An optimum embodiment is shown in Figures 5b and 6b. The second projection 14' does not extend as far as the edge of the cover and is shorter than that 14 in Figures 5a and 6a. With the cover pressed on, the edge of the cover rests clingly against the circuit board and is not lifted by the projections 14'. Accordingly, the sealing at the edge of the cover is optimum.

The inner surface of the upper part of the cover is in addition provided with longitudinal ribs.

Claims

1. Connector assembly comprising a cover (1) and a multipoint connector which comprises a block-shaped multipoint connector body (6) with spaces in which contacts (7) accessible from outside via apertures opening out in a lateral surface of the body are provided, **characterized** in that the cover (1) comprises an upper part (1) and four lateral parts (10) extending perpendicularly to said upper part (1) and defining a cover opening between them, and that those surfaces of the lateral parts (10) of the cover (1) which face the apertures of the multipoint connector body (6) are provided with knobs (3, 11) which lie opposite the apertures when the cover (1) has been placed on the multipoint connector body (6) and the lower parts of the knobs (3, 11) rest against the lower edge of the respective apertures.
2. Connector assembly according to claim 1, **characterized** in that the inner surface of at least one of the apertures of the multipoint connector body (6) decreases in a pyramid-shape at the edge of said apertures from the lateral surface of the multipoint connector body (6) and the corresponding knob (3) has the shape of a truncated pyramid.
3. Connector assembly according to claim 1 or 2, **characterized** in that at least one of the apertures of the multipoint connector body has a rectangular or square cross-section, the connecting pin (8,9) of the corresponding contact (7) has been bent perpendicularly to the connector body (6) and lying in a slot in the aperture edge, and the knob (11) associated to the rectangular or square aperture is dome (12) shaped.
4. Connector assembly according to claim 3, **characterized** in that the dome-shaped knob (11) is provided with a projection (13) which extends in the direction of the cover opening and that the dome-shaped knob (11) protrudes further from the inner face of the corresponding lateral part (10) of the cover than said projection (13).
5. Connector assembly according to claim 4, **characterized** in that the projection (13) has a trapezoidal cross-section and has been bevelled at its free end (15), this projection (13) being provided at said free end with a second projection (14) extending in the direction of the cover opening and having a curved cross-section.
6. Connector assembly according to claim 5, **characterized** in that the second projection (14) does not extend as far as the edge (16) of the cover.
7. Connector assembly according to one of the preceding claims, **characterized** in that the upper part of the cover (1) is at a distance from the free end (16) of the cover (1) which is greater than the height of the multipoint connector body (6).
8. Connector assembly according to one of the preceding claims, **characterized** in that the lateral parts (10) of the cover (1) have been rounded at the free edge (16).
9. Cover for corporation with the multipoint connector comprised in the assembly according to one of the preceding claims, **characterized** in that the cover (1) comprises an upper part (1) and four lateral parts (10) extending virtually perpendicularly to it and defining a cover opening between them, and the inner surface of at least one lateral part (10) of the cover (1) is provided with knobs (3, 11) protruding into the cover opening and located on a line parallel to the upper part of the cover.
10. Cover according to claim 9, **characterized** in that the knob (3) has the shape of a truncated pyramid.
11. Cover according to claim 9 or 10, **characterized** in that the knob (11) is dome (12) shaped.
12. Cover according to claim 11, **characterized** in that the dome-shaped knob (11) is provided with a projection (13) which extends in the direction of the cover opening and that the dome-shaped knob (11) protrudes further from the inner face of the corresponding lateral part (10) of the cover than said pro-



been bevelled at its free end at 15. This first projection 13 is provided at its free end with a second projection 14, which has a curved cross-section.

The depth of the interior of the cover is greater than the corresponding dimension of the multipoint connector body 6. The cover is furthermore rounded at its opening or free end 16. By virtue of the special embodiment of the free end of this cover and the suitably selected depth of the cover, the free end of the cover is bent outwards to a certain extent when the cover is pressed onto a multipoint connector body arranged on a printed circuit board and, as a result, the knob rests against the connecting pin 9 over a surface area which is as great as possible. Thus the sealing is optimum.

An optimum embodiment is shown in Figures 5b and 6b. The second projection 14' does not extend as far as the edge of the cover and is shorter than that 14 in Figures 5a and 6a. With the cover pressed on, the edge of the cover rests clingingly against the circuit board and is not lifted by the projections 14'. Accordingly, the sealing at the edge of the cover is optimum.

The inner surface of the upper part of the cover is in addition provided with longitudinal ribs.

Claims

1. Connector assembly comprising a cover (1) and a multipoint connector which comprises a block-shaped multipoint connector body (6) with spaces in which contacts (7) accessible from outside via apertures opening out in a lateral surface of the body are provided, **characterized** in that the cover (1) comprises an upper part (1) and four lateral parts (10) extending perpendicularly to said upper part (1) and defining a cover opening between them, and that those surfaces of the lateral parts (10) of the cover (1) which face the apertures of the multipoint connector body (6) are provided with knobs (3, 11) which lie opposite the apertures when the cover (1) has been placed on the multipoint connector body (6) and the lower parts of the knobs (3, 11) rest against the lower edge of the respective apertures.
2. Connector assembly according to claim 1, **characterized** in that the inner surface of at least one of the apertures of the multipoint connector body (6) decreases in a pyramid-shape at the edge of said apertures from the lateral surface of the multipoint connector body (6) and the corresponding knob (3) has the shape of a truncated pyramid.
3. Connector assembly according to claim 1 or 2, **characterized** in that at least one of the apertures of the multipoint connector body has a rectangular or square cross-section, the connecting pin (8,9) of the corresponding contact (7) has been bent perpendicularly to the connector body (6) and lying in a slot in the aperture edge, and the knob (11) associated to the rectangular or square aperture is dome (12) shaped.
4. Connector assembly according to claim 3, **characterized** in that the dome-shaped knob (11) is provided with a projection (13) which extends in the direction of the cover opening and that the dome-shaped knob (11) protrudes further from the inner face of the corresponding lateral part (10) of the cover than said projection (13).
5. Connector assembly according to claim 4, **characterized** in that the projection (13) has a trapezoidal cross-section and has been bevelled at its free end (15), this projection (13) being provided at said free end with a second projection (14) extending in the direction of the cover opening and having a curved cross-section.
6. Connector assembly according to claim 5, **characterized** in that the second projection (14) does not extend as far as the edge (16) of the cover.
7. Connector assembly according to one of the preceding claims, **characterized** in that the upper part of the cover (1) is at a distance from the free end (16) of the cover (1) which is greater than the height of the multipoint connector body (6).
8. Connector assembly according to one of the preceding claims, **characterized** in that the lateral parts (10) of the cover (1) have been rounded at the free edge (16).
9. Cover for corporation with the multipoint connector comprised in the assembly according to one of the preceding claims, **characterized** in that the cover (1) comprises an upper part (1) and four lateral parts (10) extending virtually perpendicularly to it and defining a cover opening between them, and the inner surface of at least one lateral part (10) of the cover (1) is provided with knobs (3, 11) protruding into the cover opening and located on a line parallel to the upper part of the cover.
10. Cover according to claim 9, **characterized** in that the knob (3) has the shape of a truncated pyramid.
11. Cover according to claim 9 or 10, **characterized** in that the knob (11) is dome (12) shaped.
12. Cover according to claim 11, **characterized** in that the dome-shaped knob (11) is provided with a projection (13) which extends in the direction of the cover opening and that the dome-shaped knob (11) protrudes further from the inner face of the corresponding lateral part (10) of the cover than said pro-



jection (13).

13. Cover according to claim 12, **characterized** in that the projection (13) has a trapezoidal cross-section and has been bevelled at its free end (15), this projection (13) being provided at said free end with a second projection (14) extending in the direction of the cover opening and having a curved cross-section.
14. Cover according to one of the claims 9-13, **characterized** in that the lateral parts (10) of the cover (1) have been rounded at the free edge (16).

Revendications

1. Assemblage de connecteur comprenant un couvercle (1) et un connecteur multibroches comprenant un corps de connecteur multibroches en forme de bloc (6) présentant des espaces munis de contacts (7) accessibles de l'extérieur via des ouvertures qui débouchent à une surface latérale du corps, caractérisé en ce que le couvercle (1) comprend une partie supérieure (1) et quatre parties latérales (10) qui s'étendent perpendiculairement à ladite partie supérieure (1) en définissant entre elles une ouverture du couvercle, et en ce que celles des surfaces des parties latérales (10) du couvercle faisant face aux ouvertures du corps de connecteur multibroches (6) sont munies de boutons (3,11) qui viennent se placer en face des ouvertures après l'introduction du couvercle (1) sur le corps de connecteur multibroches (6) les parties inférieures des boutons (3,11) appuyant contre le bord inférieur des ouvertures respectives.
2. Assemblage de connecteur selon la revendication 1, caractérisé en ce que la surface intérieure d'au moins une des ouvertures du corps du connecteur multibroches (6) diminue en prenant la forme de pyramide au bord desdites ouvertures en partant de la surface latérale du corps de connecteur multibroches (6) et en ce que le bouton correspondant (3) présente la forme d'une pyramide tronquée.
3. Assemblage de connecteur selon la revendication 1 ou 2, caractérisé en ce qu'au moins une des ouvertures du corps de connecteur multibroches présente une section transversale de forme rectangulaire ou carrée, la broche de raccordement (8,9) du contact correspondant (7) ayant été repliée perpendiculairement au corps de connecteur (6) en étant située dans une fente du bord de l'ouverture, le bouton (11) associé à l'ouverture de forme rectangulaire ou carrée étant en forme d'un dôme (12).
4. Assemblage de connecteur selon la revendication

3, caractérisé en ce que le bouton en forme de dôme (11) est muni d'une partie en saillie (13) qui s'étend selon la direction de l'ouverture du couvercle, et en ce que le bouton en forme de dôme (11) s'étend plus loin à partir de la face intérieure de la partie latérale correspondante (10) du couvercle, que ladite partie en saillie (13).

5. Assemblage de connecteur selon la revendication 4, caractérisé en ce que la partie en saillie (13) présente une section transversale de forme trapézoïdale, son extrémité libre (15) ayant été biseautée, cette partie en saillie (13) comportant, à ladite extrémité libre, une deuxième partie en saillie (14) qui s'étend selon la direction de l'ouverture du couvercle et qui présente une section transversale de forme incurvée.

6. Assemblage de connecteur selon la revendication 5, caractérisé en ce que la deuxième partie en saillie (14) ne s'étend pas jusqu'au bord (16) du couvercle.

7. Assemblage de connecteur selon l'une des revendications précédentes, caractérisé en ce que la distance séparant la partie supérieure du couvercle (1) de l'extrémité libre (16) du couvercle (1) est supérieure à la hauteur du corps de connecteur multibroches (6).

8. Assemblage de connecteur selon l'une des revendications précédentes, caractérisé en ce que les parties latérales (10) du couvercle (1) présente une extrémité libre (16) arrondie.

9. Un couvercle destiné à coopérer avec le connecteur multibroches compris dans l'assemblage selon l'une des revendications précédentes, caractérisé en ce que le couvercle (1) comprend une partie supérieure (1) et quatre parties latérales (10) qui s'étendent de façon pratiquement perpendiculaire à cette partie supérieure en définissant entre elles une ouverture de couvercle, la surface intérieure d'au moins une partie latérale (10) du couvercle (1) étant munie de boutons (3,11) faisant saillie à l'intérieur de l'ouverture de couvercle et étant situés sur une ligne parallèle à la partie supérieure du couvercle.

10. Couvercle selon la revendication 9, caractérisé en ce que le bouton (3) présente la forme d'une pyramide tronquée.

11. Couvercle selon la revendication 9 ou 10, caractérisé en ce que le bouton (11) présente la forme d'un dôme (12).

12. Couvercle selon la revendication 11, caractérisé en ce que le bouton en forme de dôme (11) est muni d'une partie en saillie (13) qui s'étend selon la direc-



tion de l'ouverture de couvercle et en ce que le bouton en forme de dôme (11) s'étend plus loin, à partir de la face intérieure de la partie latérale correspondante (10) du couvercle, de ladite partie en saillie (13).

13. Couvercle selon la revendication 12, caractérisé en ce que la partie en saillie 13, présente une section transversale de forme trapézoïdale, son extrémité libre (15) ayant été biseautée, cette partie en saillie (13) étant munie à ladite extrémité libre, d'une deuxième partie en saillie (14) qui s'étend selon la direction de l'ouverture de couvercle et qui présente une section transversale de forme incurvée.
14. Couvercle selon la revendication 9 à 13, caractérisé en ce que les parties latérales (10) du couvercle (1) présente une extrémité libre (16) arrondie.

Patentansprüche

1. Steckeranordnung, mit einer Abdeckung (1) und einem Mehrpunktstecker, der einen blockförmig gestalteten Mehrpunkt-Steckerkörper (6) umfaßt mit Räumen, in denen Kontakte (7) vorgesehen sind, die von außerhalb über Öffnungen zugänglich sind und in einer Seitenfläche des Steckerkörpers nach außen münden, **dadurch gekennzeichnet**, daß die Abdeckung (1) einen oberen Teil (1) und vier Seitenteile (10) aufweist, die sich senkrecht zu dem oberen Teil (1) erstrecken und zwischen sich eine Abdeckungsöffnung festlegen, und daß diejenigen Flächen der Seitenteile (10) der Abdeckung (1), die zu den Öffnungen des Mehrpunkt-Steckerkörpers (6) hinweisen, mit Knöpfen (3, 11) ausgestattet sind, die gegenüber den Öffnungen liegen, wenn die Abdeckung (1) auf den Mehrpunkt-Steckerkörper (6) aufgelegt worden ist, und wobei die unteren Abschnitte der Knöpfe (3, 11) gegen die untere Kante der jeweiligen Öffnung anstehen.
2. Steckeranordnung nach Anspruch 1, **dadurch gekennzeichnet**, daß die Innenfläche von wenigstens einer der Öffnungen des Mehrpunkt-Steckerkörpers (6) in einer pyramidenförmigen Gestalt an der Kante der Öffnungen von der Seitenfläche des Mehrpunkt-Steckerkörpers (6) kleiner wird, und daß der entsprechende Knopf (3) die Gestalt eines Pyramidenstumpfes hat.
3. Steckeranordnung nach Anspruch 1 oder 2, **dadurch gekennzeichnet**, daß wenigstens eine der Öffnungen des Mehrpunkt-Steckerkörpers einen rechteckförmigen oder quadratischen Querschnitt besitzt, und daß der Anschlußstift (8, 9) des entsprechenden Kontaktes (7) senkrecht zu dem Steckerkörper (6) umgebogen ist und in einem

Schlitz in der Öffnungskante liegt, und daß der Knopf (11), der der rechteckförmigen oder quadratischen Öffnung zugeordnet ist, domförmig (12) gestaltet ist.

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4. Steckeranordnung nach Anspruch 3, **dadurch gekennzeichnet**, daß der domförmig gestaltete Knopf (11) mit einem Vorsprung (13) ausgestattet ist, der sich in der Richtung der Abdeckungsöffnung erstreckt, und daß der domförmige Knopf (11) weiter von der Innenfläche des entsprechenden Seitenteiles (10) der Abdeckung vorragt als der Vorsprung (13).

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5. Steckeranordnung nach Anspruch 4, **dadurch gekennzeichnet**, daß der Vorsprung (13) einen trapezförmigen Querschnitt besitzt und an seinem freien Ende (15) abgeschrägt ist, und daß der Vorsprung (13) an seinem freien Ende mit einem zweiten Vorsprung (14) ausgestattet ist, der sich in der Richtung der Abdeckungsöffnung erstreckt und einen gebogenen Querschnitt besitzt.

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6. Steckeranordnung nach Anspruch 5, **dadurch gekennzeichnet**, daß der zweite Vorsprung (14) sich nicht so weit wie die Kante (16) der Abdeckung erstreckt.

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7. Steckeranordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß der obere Abschnitt der Abdeckung (1) sich in einem Abstand von dem freien Ende (16) der Abdeckung (1) befindet, der größer ist als die Höhe des Mehrpunkt-Steckerkörpers (6).

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8. Steckeranordnung nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet**, daß die Seitenteile (10) der Abdeckung (1) an der freien Kante (16) abgerundet sind.

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9. Abdeckung für einen Mehrpunktstecker, der in der Steckeranordnung nach einem der vorhergehenden Ansprüche enthalten ist, **dadurch gekennzeichnet**, daß die Abdeckung (1) einen oberen Abschnitt (1) und vier Seitenteile (10) aufweist, die sich im wesentlichen senkrecht zu diesem erstrecken und eine Abdeckungsöffnung zwischen sich festlegen, und daß die Innenfläche von wenigstens einem seitlichen Teile (10) der Abdeckung (1) mit Knöpfen (3, 11) ausgestattet ist, welche in die Abdeckungsöffnung ragen und auf einer Linie parallel zu dem oberen Abschnitt der Abdeckung gelegen sind.

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10. Abdeckung nach Anspruch 9, **dadurch gekennzeichnet**, daß der Knopf (3) die Gestalt eines Pyramidenstumpfes hat.

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11. Abdeckung nach Anspruch 9 oder 10, **dadurch**



gekennzeichnet, daß der Knopf (11) domförmig (12) gestaltet ist.

12. Abdeckung nach Anspruch 11, **dadurch gekennzeichnet**, daß der domförmig gestaltete Knopf (11) mit einem Vorsprung (13) ausgestattet ist, der sich in Richtung der Abdeckungsöffnung erstreckt, und daß der domförmig gestaltete Knopf (11) weiter von der Innenfläche des entsprechenden Seitenteils (10) der Abdeckung vorragt als der Vorsprung (13).
13. Abdeckung nach Anspruch 12, **dadurch gekennzeichnet**, daß der Vorsprung (13) einen trapezförmigen Querschnitt besitzt und an seinem freien Ende (15) abgeschrägt ist, wobei dieser Vorsprung (13) an dem genannten freien Ende mit einem zweiten Vorsprung (14) ausgestattet ist, der sich in Richtung der Abdeckungsöffnung erstreckt und der einen gebogenen Querschnitt besitzt.
14. Abdeckung nach einem der Ansprüche 9 bis 13, **dadurch gekennzeichnet**, daß die Seitenabteile (10) der Abdeckung (1) an der freien Kante (16) abgerundet sind.

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