

**FORM 2**

THE PATENTS ACT, 1970  
(39 of 1970)  
AND  
THE PATENTS RULES, 2003

**COMPLETE  
SPECIFICATION**

(See Section 10; rule 13)

TITLE OF THE INVENTION

“AIRBAG CONNECTOR SYSTEM”

**APPLICANT**

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The following specification particularly describes  
the invention and the manner in which  
it is to be performed

## Claims

1. Electrical connector system comprising an electrical connector (100; 100'; 100'') adapted to be mated with a corresponding socket (400), the electrical connector (100; 100'; 100'') comprising a connector housing (101; 101'; 101'') with a connection tube (103; 103'; 103'') which is provided with at least one reversed locking arm (105; 105'; 105'') adapted to lock the electrical connector (100; 100'; 100'') to the socket (400),  
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10 **characterized in that**  
the reversed locking arm (105; 105'; 105'') extends from a flexible deformable element (106; 106'; 106'') provided at an insertion sided end (102; 102'; 102'') of the connection tube (103; 103'; 103'') in a direction essentially opposing the insertion direction (600) of the electrical connector (100; 100'; 100'') into the socket (400), whereby the flexible deformable element (106; 106'; 106'') is adapted to deform and thereby enable a deflection of the reversed locking arm (105; 105'; 105'') upon insertion of the electrical connector (100; 100'; 100'') into the socket (400).  
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2. Electrical connector system according to claim 1, characterized in that said deflection of the reversed locking arm (105; 105'; 105'') causes the flexible deformable element (106; 106'; 106'') to deform inwardly towards a center of the connection tube (103; 103'; 103'').  
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3. Electrical connector system according to any one of the preceding claims, characterized in that the flexible deformable element (106; 106'; 106'') is formed as an integral part of a base ring (104; 104') at the insertion sided end (102; 102'; 102'') of the connection tube (103; 103'; 103''), whereby upon said deflection of the reversed locking arm (105; 105'; 105'') the flexible deformable element (106; 106'; 106'') is adapted to perform a  
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torsion movement essentially around a circumferential line (601) of the base ring (104; 104').

4. Electrical connector system according to any one of the preceding claims, characterized in that upon insertion of the electrical connector (100; 100'; 100'') into the socket (400) the base ring (104; 104') deforms such that the flexible deformable element (106; 106'; 106'') is moved inwardly towards the center of the connection tube (103; 103'; 103'').
5. Electrical connector system according to any one of the preceding claims, characterized in that upon insertion of the electrical connector (100; 100'; 100'') into the socket (400) the flexible deformable element (106; 106'; 106'') is subject to a total deformation of at least 0.01 mm, preferably by at least 0.02 mm, more preferably by at least 0.03 mm, even more preferably by at least 0.04 mm, yet even more preferably by at least 0.05 mm, and most preferably by at least 0.06 mm.
6. Electrical connector system according to any one of the preceding claims, characterized in that the reversed locking arm (105; 105'; 105'') is integrally formed with the connector housing (101; 101'; 101'').
7. Electrical connector system according to any one of the preceding claims, characterized in that the reversed locking arm (105; 105'; 105'') is not made from metal and preferably made from non-conductive material.
8. Electrical connector system according to any one of the preceding claims, characterized in that the flexible deformable element (106; 106'; 106'') is provided at the insertion sided end (102; 102'; 102'') within a lower half of the connection tube (103; 103'; 103''), preferably within a lower third of the connection tube (103; 103';

103"), more preferably within a lower quarter of the connection tube (103; 103'; 103'') and most preferably on the lower edge of the connection tube (103; 103'; 103'').

- 5        9.        Electrical connector system according to any one of the preceding claims, characterized in that the reversed locking arm (105; 105'; 105'') is provided with a locking protrusion (107; 107'; 107'') which extends outwardly from the reversed locking arm (105; 105'; 105'') and which has a non-symmetric essentially  
10        trapezoidal cross-section and which is adapted to enable a self-locking function of the electrical connector (100; 100'; 100'').
10.        Electrical connector system according to any one of the preceding claims, further comprising an airbag squib retainer (300; 300'')  
15        adapted to be inserted into the socket (400) and adapted to receive the electrical connector (100; 100'; 100''), whereby the airbag squib retainer (300; 300'') is provided with at least one locking tongue (301) to lock the airbag squib retainer (300; 300'') to the socket (400).
- 20        11.        Electrical connector system according claim 10, characterized in that the airbag squib retainer has an essentially cylindrical shape and is provided with an essentially cylindrical base portion (303) and has at least one cutout (307; 307''), whereby an overall height  
25        of the retainer  $h_{\text{retainer}}$  and a height of the retainer cutout (301)  $h_{\text{cutout}}$  are dimensioned to facilitate said deflection of the reversed locking arm (105; 105'; 105'') when the electrical connector (100; 100'; 100'') is mated with the socket (400), and whereby the ratio  
30         $h_{\text{retainer}}/h_{\text{cutout}}$  is less than 3, preferably less than 2, more preferably less than 1.75 and most preferably less than 1.1.
12.        Electrical connector system according claim 11, characterized in that the ratio  $h_{\text{retainer}}/h_{\text{cutout}}$  equals 1, i.e. the cutout (307'') is cut along the entire height of the retainer.

13. Electrical connector system according to any one of the preceding claims, further comprising a secondary locking device (200) assigned to the connector housing (100; 100'; 100'') being  
5 movable between an open and a closed position, whereby the secondary locking device (200) is provided with a locking surface (206) which is adapted to abut a corresponding blocking surface (117) of the reversed locking arm (105; 105'; 105'') to prevent an inward deflection of the reversed locking arm (105; 105'; 105'')  
10 when the secondary locking device (200) is placed in the closed position and whereby the secondary locking device (200) can only be moved into the closed position when the electrical connector (100; 100'; 100'') is inserted into the socket (400).
- 15 14. Electrical connector system according claim 12, characterized in that the secondary locking device (200) is provided with at least one holding arm (205) with at least one stop projection (209) and the connector housing (101) is provided with at least one stop protrusion (113), whereby the stop projection (209) engages the  
20 stop protrusion (113) when the secondary locking device (200) is placed in the open position, thereby preventing a movement of the secondary locking device (200) towards the closed position as long as the electrical connector (100; 100'; 100'') is not mated with the socket (400).
- 25 15. Electrical connector system according any one of claims 12 or 13, characterized in that the airbag squib retainer (300; 300'') is provided with at least one release surface (302) and the holding arm (205) of the secondary locking device (200) is provided with  
30 at least one deflection surface (208) which is adapted to engage the release surface (302) upon mounting the electrical connector (100; 100'; 100'') to the airbag squib retainer (300; 300''), thereby causing a deflection of the holding arm (205) to release

said engagement between the stop projection (209 and the stop protrusion (113).

- 5           16.    Electrical connector system according to any one of the preceding claims, whereby the airbag connector system is not provided with electrical shorting members.
- 10           17.    Electrical connector system according to any one of the preceding claims, whereby the reversed locking arm (105; 105'; 105'') is adapted to lock the electrical connector (100; 100'; 100'') directly to the socket (400).
- 15           18.    Electrical connector system according to any one of the preceding claims, characterized in that the electrical connector (100; 100'; 100'') does not comprise a rectangular step portion (151<sup>Pa</sup>) onto which the reversed locking arm (105; 105'; 105'') is mounted.
- 20           19.    Electrical connector system according to any one of the preceding claims, characterized in that the connector housing is made from injection molded plastics.
- 25           20.    Electrical connector system according to any one of the preceding claims, characterized in that as material for the connector housing Polyamide (PA) is used, in particular Polyamide comprising glass fibres.
- 30           21.    Electrical connector system according to any one of the preceding claims, characterized in that the connector housing comprises one or more ferrite choke(s) adapted to reduce electromagnetic inferences.
22.    Electrical connector system according to any one of the preceding claims comprising the socket (400).

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