Claims

1. Drive unit for a joint being arranged between two arm members of a manipulator of a robotic system, the drive unit being intended for the rotatory drive of the one arm member in relation to the other arm member, having a motor (7), which drives a drive shaft (8), and having an output element (3,4), which is connected to the one arm member and which is directly or indirectly set into rotation by means of the drive shaft (8), comprising a circuit board (13), on which a sensor device (18) with respect to the drive as provided by the drive shaft (8) and a sensor device (22) with respect to the output as provided by the output element (3,4) are arranged at opposite sides of the circuit board, in which the output element (3,4) is rotationally fixedly connected to a sensor shaft (16), which traverses the drive shaft (8) with a radial distance and which extends up to the circuit board (13), and in which a sensor ring (20) is arranged at the face-side axial end of the sensor shaft (16) above the circuit board (13), which sensor ring (20) cooperates with the sensor device (22) for the output,
characterized by
a sensor ring (17) being arranged at the face-side axial end of the drive shaft (8), which end faces the circuit board (13), which sensor ring (17) cooperates with the sensor device (18) for the drive.

2. Drive unit according to claim 1, in which a sliding guide (23) for the sensor ring (20) is arranged on the circuit board (13).

3. Drive unit according to claim 2, in which a housing of the sliding guide (23) comprises means for fixation of wiring components.

4. Drive unit according to one of claims 1 to 3, in which the sensor shaft (16) is formed as a hollow shaft for receiving of wiring components.

5. Drive unit according to one of claims 1 to 4, in which the drive shaft (8) extends up to the circuit board (13), wherein the sensor device (18) for the drive is arranged at the side of the circuit board (13), which faces the motor (7).

6. Drive unit according to one of claims 1 to 5, in which the drive shaft (8) is supported by an axial bearing (10), which is arranged as close as possible to the sensor ring (17).

7. Drive unit according to one of claims 1 to 6, in which the sensor ring (17) for the drive and the sensor ring (20) for the output are located opposite to each other at both sides of the circuit board (13) in a congruent manner.

8. Drive unit according to claim 7, in which the sensor device (22) being associated to the sensor ring (20) for the output and the sensor device (18) being associated to the sensor ring (17) for the drive are located diametrically opposite to each other at both sides of the circuit board (13).

9. Drive unit according to claim 7 or 8, in which the circuit board (13) comprises connecting elements (12) which are configured to cooperate with a housing (6) of the motor (7) in such a way that the circuit board (13) can be arranged in an exact parallel orientation with respect to the sensor rings (17,20).

10. Drive unit according to one of claims 1 to 9, in which the drive unit comprises a second drive module (M2) being rotationally fixedly connected with the one arm member of the manipulator and a first drive module (M1) being rotationally fixedly connected with the other arm member, in which a housing (4) of the second drive module (M2) is rotatably supported against a housing (2) of the first drive module (M1).

11. Drive unit according to claim 10, in which the first drive module (M1) contains a gear (1), and in which a third drive module (M3) is fixed to the first drive module (M1), which third drive module (M3) comprises the motor (7), and in which a fourth drive module (M4) is fixed to the third drive module (M3), which fourth drive module (M4) comprises the circuit board (13).

12. Drive unit according to claim 11, in which the first drive module (M1), the second drive module (M2), the third drive module (M3) and the fourth drive module (M4) are configured to be functionally cooperating and engaging with each other along an axial orientation.

13. Drive unit according to claim 12, in which the first drive module (M1), the second drive module (M2), the third drive module (M3) and the fourth drive module (M4) are configured to be singularly exchangeable.

14. Robot having a manipulator consisting of several arm members and comprising a drive unit according to one of claims 1 to 13 in at least one joint being arranged between arm members of the manipulator.