CLAIMS

1. An electronic component processing apparatus (10) comprising:

an ejecting mechanism (11) that ejects an electronic component (W) affixed to a wafer sheet (H) in a first direction (J) perpendicular to the wafer sheet (H);

a pickup unit (13) having a component support section (12) that picks up the electronic component (W) ejected in the first direction (J) at a pickup position (P1) facing the wafer sheet (H);

a transport unit (16) that moves a component holding section (14) together with the electronic component (W) to a processing position (P7, P8, P9, P10, P11) by rotation of a rotating body (15) having the component holding section (14) attached thereto, the component holding section (14) picking up the electronic component (W) from the pickup unit (13) at a receiving position (P2);

a processing unit (17, 18, 19, 20, 21) that performs predetermined processing on the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a first drive mechanism (49) that moves the ejecting mechanism (11) along a first virtual plane parallel to the wafer sheet (H);

a second drive mechanism (27) that moves the pickup unit (13), which supports the electronic component (W) with the component support section (12), along a second virtual plane parallel to the wafer sheet (H);

a third drive mechanism (35) that moves the wafer sheet (H) within a third virtual plane including the wafer sheet (H);

a deviation derivation section (28a) that detects a deviation of the electronic component (W) picked up by the component support section (12) from a reference position and a reference orientation; and

a control section (57) that controls the first drive mechanism (49), the second drive mechanism (27), and the third drive mechanism (35) to adjust positions of the component support section (12) placed at the pickup position (P1), the electronic component (W) to be subsequently picked up by the component support section (12), and the ejecting mechanism (11), wherein

the pickup unit (13) includes

a rotating member (23) that rotates 180 degrees around a rotation axis (22) by one or more rotational operations, thereby moving the component support section (12)

placed at the pickup position (P1) to a transfer position (P3) facing the component holding section (14) placed at the receiving position (P2), and moving the component support section (12) placed at the transfer position (P3) to the pickup position (P1), and

a drive rotation section (56) that rotates the component support section (12) that has picked up the electronic component (W) around a virtual rotation axis (R) placed in the first direction (J) in a state where the component support section (12) is placed at the pickup position (P1), and

the control section (57) controls the second drive mechanism (27) and the drive rotation section (56) based on the deviation detected by the deviation derivation section (28a) such that the electronic component (W) is placed at the processing position (P7, P8, P9, P10, P11) in a predetermined position and orientation with respect to the processing unit (17, 18, 19, 20, 21).

2. The electronic component processing apparatus (10) according to claim 1, further comprising:

an imaging section (28) that captures an image of the electronic component (W) picked up by the component support section (12), wherein

the deviation derivation section (28a) detects the deviation based on the image captured by the imaging section (28).

3. An electronic component processing apparatus (10) comprising:

an ejecting mechanism (11) that ejects an electronic component (W) affixed to a wafer sheet (H) in a first direction (J) perpendicular to the wafer sheet (H);

a pickup unit (103) having a component support section (12) that picks up the electronic component (W) ejected in the first direction (J) at a pickup position (P1) facing the wafer sheet (H);

a transport unit (100) that moves a component holding section (101) together with the electronic component (W) to a processing position (P7, P8, P9, P10, P11) by rotation of a rotating body (15) having the component holding section (101) attached thereto, the component holding section (101) picking up the electronic component (W) from the pickup unit (13) at a receiving position (P2);

a processing unit (17, 18, 19, 20, 21) that performs predetermined processing on the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a first drive mechanism (49) that moves the ejecting mechanism (11) along a first virtual plane E parallel to the wafer sheet (H);

a second drive mechanism (27) that moves the pickup unit (103), which supports the electronic component (W) with the component support section (12), along a second virtual plane parallel to the wafer sheet (H);

a third drive mechanism (35) that moves the wafer sheet (H) within a third virtual plane including the wafer sheet (H);

a deviation derivation section (28a) that detects a deviation of the electronic component (W) picked up by the component support section (12) from a reference position and a reference orientation; and

a control section (57) that controls the first drive mechanism (49), the second drive mechanism (27), and the third drive mechanism (35) to adjust positions of the component support section (12) placed at the pickup position (P1), the electronic component (W) to be subsequently picked up by the component support section (12), and the ejecting mechanism (11), wherein

the pickup unit (103) includes a rotating member (23) that rotates 180 degrees around a rotation axis (22) by one or more rotational operations, thereby moving the component support section (12) placed at the pickup position (P1) to a transfer position (P3) facing the component holding section (101) placed at the receiving position (P2), and moving the component support section (12) placed at the transfer position (P3) to the pickup position (P1),

the transport unit (100) includes a driving rotation mechanism (102) that rotates the component holding section (101) to adjust an orientation of the electronic component (W) picked up by the component holding section (101) with respect to the transport unit (100), and

the control section (57) controls the second drive mechanism (27) and the driving rotation mechanism (102) based on the deviation detected by the deviation derivation section (28a) such that the electronic component (W) is placed at the processing position (P7, P8, P9, P10, P11) in a predetermined position and orientation with respect to the processing unit (17, 18, 19, 20, 21).

4. The electronic component processing apparatus (10) according to claim 3, further comprising:

an imaging section (28) that captures an image of the electronic component (W)

picked up by the component support section (12), wherein

the deviation derivation section (28a) detects the deviation based on the image captured by the imaging section (28).

5. An electronic component processing apparatus (70) comprising:

an ejecting mechanism (11) that ejects an electronic component (W) affixed to a wafer sheet (H) in a first direction (J) perpendicular to the wafer sheet (H);

a pickup unit (13) having a component support section (12) that picks up the electronic component (W) ejected in the first direction (J) at a pickup position (P1) facing the wafer sheet (H);

a transport unit (16) that moves a component holding section (14) together with the electronic component (W) to a processing position (P7, P8, P9, P10, P11) by rotation of a rotating body (15) having the component holding section (14) attached thereto, the component holding section (14) picking up the electronic component (W) from the pickup unit (13) at a receiving position (P2);

a processing unit (17, 18, 19, 20, 21) that performs predetermined processing on the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a first driver (81) that moves the ejecting mechanism (11) in a second direction parallel to the wafer sheet (H) or in a direction opposite to the second direction;

a second driver (77) that moves the pickup unit (13) supporting the electronic component (W) with the component support section (12) in the second direction or in the direction opposite to the second direction;

a third driver (80) that moves the wafer sheet (H) within a third virtual plane including the wafer sheet (H);

a fourth driver (87, 88, 89, 90, 91) that moves the processing unit (17, 18, 19, 20, 21) in a third direction (K) perpendicular to a direction of position adjustment of the electronic component (W) performed by movement of the pickup unit (13) or in a direction opposite to the third direction (K), thereby adjusting a position of the processing unit (17, 18, 19, 20, 21) in the third direction (K) with respect to the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a deviation derivation section (28a) that detects a deviation of the electronic component (W) picked up by the component support section (12) with respect to a reference position and a reference orientation; and

a control section (57) that controls the first driver (81), the second driver (77), and the third driver (80) to adjust the positions of the component support section (12) placed at the pickup position (P1), the electronic component (W) to be subsequently picked up by the component support section (12) and the ejecting mechanism (11), wherein

the pickup unit (13) includes a drive rotation section (56) that rotates the component support section (12) that has picked up the electronic component (W) around a virtual rotation axis (R) placed in the first direction (J) in a state where the component support section (12) is placed at the pickup position (P1), and

the control section (57) controls the second driver (77), the fourth driver (87, 88, 89, 90, 91), and the drive rotation section (56) based on the deviation detected by the deviation derivation section (28a) such that the electronic component (W) is placed at a predetermined position and orientation with respect to the processing unit (17, 18, 19, 20, 21) at the processing position (P7, P8, P9, P10, P11).

6. The electronic component processing apparatus (70) according to claim 5, wherein

when viewed along a rotation axis of the rotating body (15), the second direction is perpendicular to a second virtual line passing through a rotation center of the rotating body (15) and the receiving position (P2), and the third direction (K) is a direction along a first virtual line (M) passing through the rotation center of the rotating body (15) and the processing position (P7, P8, P9, P10, P11).

7. The electronic component processing apparatus (70) according to claim 5, further comprising:

an imaging section (28) that captures an image of the electronic component (W) picked up by the component support section (12), wherein

the deviation derivation section (28a) detects the deviation based on the image captured by the imaging section (28).

8. An electronic component processing apparatus (70) comprising:

an ejecting mechanism (11) that ejects an electronic component (W) affixed to a wafer sheet (H) in a first direction (J) perpendicular to the wafer sheet (H);

a pickup unit (103) having a component support section (12) that picks up the electronic component (W) ejected in the first direction (J) at a pickup position (P1) facing the

wafer sheet (H);

a transport unit (100) that moves a component holding section (101) together with the electronic component (W) to a processing position (P7, P8, P9, P10, P11) by rotation of a rotating body (15) having the component holding section (101) attached thereto, the component holding section (101) picking up the electronic component (W) from the pickup unit at a receiving position (P2);

a processing unit (17, 18, 19, 20, 21) that performs predetermined processing on the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a first driver (81) that moves the ejecting mechanism (11) in a second direction parallel to the wafer sheet (H) or in a direction opposite to the second direction;

a second driver (77) that moves the pickup unit (103) supporting the electronic component (W) with the component support section (12) in the second direction or in a direction opposite to the second direction;

a third driver (80) that moves the wafer sheet (H) within a third virtual plane including the wafer sheet (H);

a fourth driver (87, 88, 89, 90, 91) that moves the processing unit (17, 18, 19, 20, 21) in a third direction (K) perpendicular to a direction of position adjustment of the electronic component (W) performed by movement of the pickup unit (103) or in a direction opposite to the third direction (K), thereby adjusting a position of the processing unit (17, 18, 19, 20, 21) in the third direction (K) with respect to the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a deviation derivation section (28a) that detects a deviation of the electronic component (W) picked up by the component support section (12) with respect to a reference position and a reference orientation; and

a control section (57) that controls the first driver (81), the second driver (77), and the third driver (80) to adjust the positions of the component support section (12) placed at the pickup position (P1), the electronic component (W) to be subsequently picked up by the component support section (12) and the ejecting mechanism (11), wherein

the transport unit (100) includes a driving rotation mechanism (102) that rotates the component holding section (12) to adjust an orientation of the electronic component (W) picked up by the component holding section (101) with respect to the transport unit (100), and

the control section (57) controls the second driver (77), the fourth driver (87, 88, 89, 90, 91), and the driving rotation mechanism (102) based on the deviation detected by the

deviation derivation section (28a) such that the electronic component (W) is placed at a predetermined position and orientation with respect to the processing unit (17, 18, 19, 20, 21) at the processing position (P7, P8, P9, P10, P11).

9. The electronic component processing apparatus (70) according to claim 8, wherein

when viewed along a rotation axis of the rotating body (15), the second direction is perpendicular to a second virtual line passing through a rotation center of the rotating body (15) and the receiving position (P2), and the third direction (K) is a direction along a first virtual line (M) passing through the rotation center of the rotating body (15) and the processing position (P7, P8, P9, P10, P11).

10. The electronic component processing apparatus (70) according to claim 8, further comprising:

an imaging section (28) that captures an image of the electronic component (W) picked up by the component support section (12), wherein

the deviation derivation section (28a) detects the deviation based on the image captured by the imaging section (28).

11. An electronic component processing apparatus (10) comprising:

an ejecting mechanism (11) that ejects an electronic component (W) affixed to a wafer sheet (H) in a first direction (J) perpendicular to the wafer sheet (H);

a pickup unit (103) having a component support section (12) that picks up the electronic component (W) ejected in the first direction (J) at a pickup position (P1) facing the wafer sheet (H);

a transport unit (100) that moves a component holding section (101) together with the electronic component (W) to a processing position (P7, P8, P9, P10, P11) by rotation of a rotating body (15) having the component holding section (101) attached thereto, the component holding section (101) picking up the electronic component (W) from the pickup unit (103) at a receiving position (P2);

a processing unit (17, 18, 19, 20, 21) that performs predetermined processing on the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a first drive mechanism (49) that moves the ejecting mechanism (11) along a first virtual plane parallel to the wafer sheet (H);

a second drive mechanism (27) that moves the pickup unit (103), which supports the electronic component (W) with the component support section (12), along a second virtual plane parallel to the wafer sheet (H);

a third drive mechanism (35) that moves the wafer sheet (H) within a third virtual plane including the wafer sheet (H);

a deviation derivation section (28a) that detects a deviation of the electronic component (W) picked up by the component support section (12) from a reference position and a reference orientation; and

a control section (57) that controls the first drive mechanism (49), the second drive mechanism (27), and the third drive mechanism (35) to adjust positions of the component support section (12) placed at the pickup position (P1), the electronic component (W) to be subsequently picked up by the component support section (12), and the ejecting mechanism (11), wherein

the pickup unit (103) includes a rotating member (23) that moves the component support section (12) placed at the pickup position (P1) to a transfer position (13) facing the component holding section (101) placed at the receiving position (P2) by one or more rotational operations,

the transport unit (100) includes a driving rotation mechanism (102) that rotates the component holding section (101) to adjust an orientation of the electronic component (W) picked up by the component holding section (101) with respect to the transport unit (100), and

the control section (57) controls the second drive mechanism (27) and the driving rotation mechanism (102) based on the deviation detected by the deviation derivation section (28a) such that the electronic component (W) is placed at the processing position (P7, P8, P9, P10, P11) in a predetermined position and orientation with respect to the processing unit (17, 18, 19, 20, 21).

12. The electronic component processing apparatus (10) according to claim 11, further comprising:

an imaging section (28) that captures an image of the electronic component (W) picked up by the component support section (12), wherein

the deviation derivation section (28a) detects the deviation based on the image captured by the imaging section (28).

13. An electronic component processing apparatus (70) comprising:

an ejecting mechanism (11) that ejects an electronic component (W) affixed to a wafer sheet (H) in a first direction (J) perpendicular to the wafer sheet (H);

a pickup unit (103) having a component support section (12) that picks up the electronic component (W) ejected in the first direction (J) at a pickup position facing the wafer sheet (H);

a transport unit (100) that moves a component holding section (101) together with the electronic component (W) to a processing position (P7, P8, P9, P10, P11) by rotation of a rotating body (15) having the component holding section (101) attached thereto, the component holding section (101) picking up the electronic component (W) from the pickup unit (103) at a receiving position (P2);

a processing unit (17, 18, 19, 20, 21) that performs predetermined processing on the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a pickup unit driver (77) that moves the pickup unit (103) supporting the electronic component (W) with the component support section (12) in a second direction parallel to the wafer sheet (H) or in a direction opposite to the second direction;

a wafer sheet driver (80) that moves the wafer sheet (H) within a third virtual plane including the wafer sheet (H);

a processing unit driver (87, 88, 89, 90, 91) that moves the processing unit (17, 18, 19, 20, 21) in a third direction (K) perpendicular to a direction of position adjustment of the electronic component (W) performed by movement of the pickup unit (103) or in a direction opposite to the third direction (K), thereby adjusting a position of the processing unit (17, 18, 19, 20, 21) in the third direction (K) with respect to the electronic component (W) placed at the processing position (P7, P8, P9, P10, P11);

a deviation derivation section (28a) that detects a deviation of the electronic component (W) picked up by the component support section (12) with respect to a reference position and a reference orientation; and

a control section (57) that controls the pickup unit driver (77) and the wafer sheet driver (80) to adjust the position of the component support section (12) placed at the pickup position (P1), and the electronic component (W) to be subsequently picked up by the component support section (12), wherein

the transport unit (100) includes a driving rotation mechanism (102) that rotates the component holding section (101) to adjust an orientation of the electronic component (W)

picked up by the component holding section (101) with respect to the transport unit (100), and

the control section (57) controls the pickup unit driver (77), the processing unit driver (87, 88, 89, 90, 91), and the driving rotation mechanism (102) based on the deviation detected by the deviation derivation section (28a) such that the electronic component (W) is placed at a predetermined position and orientation with respect to the processing unit (17, 18, 19, 20, 21) at the processing position (P7, P8, P9, P10, P11).

14. The electronic component processing apparatus (70) according to claim 13, wherein

when viewed along a rotation axis of the rotating body (15), the second direction is perpendicular to a second virtual line passing through a rotation center of the rotating body (15) and the receiving position (P2), and the third direction (K) is a direction along a first virtual line (M) passing through the rotation center of the rotating body (15) and the processing position (P7, P8, P9, P10, P11).

15. The electronic component processing apparatus (70) according to claim 13, further comprising:

an imaging section (28) that captures an image of the electronic component (W) picked up by the component support section (12), wherein

the deviation derivation section (28a) detects the deviation based on an image captured by the imaging section (28).