Claims

1. Handler device for handling substrates during semiconductor production, such as wafers, comprising a handling unit having a substrate facing side to be directed to the substrate to be handled, said handling unit being provided with at least three substrate edge grippers protruding from the substrate facing side of the handling unit, wherein the substrate edge grippers are configured to grip the edge of a substrate to be handled,
characterised in that the at least three substrate edge grippers comprise:

- at least two controlled moveable positioning grippers for gripping the edge of the substrate at two controlled positions; and
- at least one clamping gripper for exerting a controlled clamping force onto the edge of the substrate at least partially directed towards the positioning grippers,

and **in that** the handler further comprises:
at least one mechanical positioning element for orienting the handler to the environment; and
individually controllable actuators connected to the handling unit for independent control of each of the controlled moveable positioning grippers to correct positioning and maintaining a substrate relative to the handler device, wherein at least one individually controllable actuator is connected to at least one controlled moveable positioning gripper; and
wherein at least one of the substrate edge grippers, and in particular the at least one clamping gripper, comprises a sensor configured for determining the position of said at least one substrate edge gripper relative to at least one of the other substrate edge grippers, and in particular at least one of the positioning grippers.

2. The handler according to claim 1, **characterised in that** the handler comprises a controller configured for determining the position of the substrate, comparing the position of the substrate to a predefined reference position and controlling at least one of the individually controllable actuators based on the position of the substrate relative to the predefined reference position.

3. The handler according to claim 1, **characterised in that** the handler comprises at least three mechanical positioning elements for orienting the handler to the environment.

4. The handler according to claim 1, **characterised in that** at least one of the mechanical positioning elements for orienting the handler to the environment is constructed with limited thermal dependency.

5. The handler according to claim 1, **characterised in that** the handling unit is provided with a heater.

6. The handler according to claim 1, **characterised in that** the handling unit holding the moveable positioning grippers and the at least one clamping gripper is swivelable connected to a holding frame.

7. The handler according to claim 1, **characterised in that** the individually controllable actuators comprise a servomotor.

8. The handler according to claim 1, **characterised in that** the clamping gripper comprises at least one controllable actuator.

9. The handler according to claim 8, **characterised in that** the at least one controllable actuator comprises a pneumatic cylinder.

10. The handler according to claim 1, **characterised in that** the handling unit is provided with at least two safety grippers protruding from the substrate facing side of the handling unit, said safety grippers extend beyond the substrate edge grippers.

11. The handler according to claim 1, **characterised in that** at least one of the substrate edge grippers consist of at least one single edge contact point.

12. The handler according to claim 1, **characterised in that** a clamping gripper is positioned opposite each of the controlled moveable positioning grippers.

13. The handler according to claim 1, **characterised in that** the handler comprises sensors for determining the position of a substrate carried by the at least three substrate edge grippers.

14. An assembly comprising the handler according to claim 1 and a substrate table, wherein the table is provided with a least one mechanical counter-positioning element for cooperation with the positioning element of the handler orienting the handler to the environment.

15. A method for handling substrates during semiconductor production, such as wafers, comprising the steps of:

a) providing a substrate; and

b) gripping the edge of the substrate provided in step a) between the at least three substrate edge grippers of the handler according to claim 1,

characterised in that, after step b), the method further comprises the step of:

c) controlling the position of the substrate gripped by the substrate edge grippers, comprising the steps of:

c1) determining the position of the substrate;

c2) determining the position of the at least one substrate edge gripper relative to at least one of the other substrate edge grippers

c3) comparing the position determined in step c1) compensated for the position determined in step c2) to a pre-defined reference position; and

c4) in case the position of the substrate deviates from the pre-defined reference position, re-positioning the substrate by adjusting the position of at least one of the controlled moveable positioning grippers and maintaining a desired clamping force exerted by the clamping gripper onto the edge of the substrate at least partially directed towards the controlled moveable positioning grippers.

16. The method according to claim 15, **characterised in that** the method comprises the step of, after step c), applying a low pressure to the surface of the substrate gripped by the substrate edge grippers.

17. The method according to claim 15, **characterised in that** the method comprises the step of, after step c), bringing at least two safety grippers of the

handling unit into a position to receive the substrate gripped by the handler in case the substrate is accidentally released from its gripped position.

18. The method according to claim 15, **characterised in that** step c) is performed during handling of the substrate gripped by the substrate edge grippers.

19. The handler according to claim 1, wherein the at least one individually controllable actuator is connected to the at least one controlled moveable positioning gripper by a spindle and a floating joint.