CLAIMS

1. A method for calibrating lens grippers (40) for ophthalmic lenses, preferably contact lenses, prior to use of the lens grippers (40) in a lens manufacturing line, the method comprising the steps of:

a) providing a remote gripper calibration tool (1) not being part of a lens manufacturing line but being located separately, the remote gripper calibration tool comprising an assembly plate (10) and a Z-directional position sensor (12);

b) providing a master gripper (30) having a length dimension terminating in a tip (32), the length dimension being predetermined to match a desired final extension length of a lens gripper (40);

c) mounting the master gripper (30) to the assembly plate (10);

d) measuring the Z-directional position of the tip (32) of the master gripper (30) with the Z-directional position sensor (12);

e) unmounting the master gripper (30) from the assembly plate (10);

f) mounting a lens gripper (40) to be calibrated to the assembly plate (10), the lens gripper having a tip (42), and calibrating the lens gripper (40) by adjusting the final extension length of the tip (42) of the lens gripper (40) to a predetermined position relative to the measured Z-directional position of the tip (32) of the master gripper (30) to match the desired final extension length of the lens gripper or to be within an acceptable distance.

2. The method according to claim 1, wherein the predetermined position of the tip (42) of the lens gripper (40) is within 300 microns of the measured Z-directional position of the tip (32) of the master gripper (30).

3. The method according to any one of claims 1 or 2, the remote gripper calibration tool (1) further comprising an X-directional position sensor (14) and a Y-directional position sensor (16), wherein step d) further comprises measuring the X- and Y-directional positions of the master gripper (30) with the respective X- and Y-directional position sensors (14, 16), and wherein step f) further comprises measuring the X- and Y-directional positions of the lens gripper (40) with the respective X- and Y-directional

position sensors (14, 16) to determine proper orientation and centration of the lens gripper (40).

4. The method according to claim 3, wherein the lens gripper (40) is properly centered if the measured X- and Y-directional positions of the lens gripper (40) are independently within 300 microns of the measured X- and Y-directional positions of the master gripper (30).

5. The method according to any one of the preceding claims, wherein the remote gripper calibration tool (1) further comprises a vacuum connector (20) and a pneumatic pressure connector (22), and wherein step f) further comprises connecting the lens gripper (40) to the vacuum connector (20) and the pneumatic pressure connector (22) to test proper vacuum and pressure function.

6. The method according to any one of the preceding claims, further comprising providing a lens receptacle carrier plate (50) and mounting an adapter (52) thereon, the adapter (52) comprising a plurality of raised target studs (54) having an upper surface (56), and in a lens manufacturing line having a lens receptacle transport system and a gripper mounting plate comprising a plurality of lens gripper (40) mounting positions, further comprising the steps of mounting the lens receptacle carrier plate (50) onto the lens receptacle transport system, mounting the master gripper (30) to the gripper mounting plate at at least a first and second of the plurality of lens gripper (40) mounting positions, measuring the distance between the tip (32) of the master gripper (30) and the upper surface (56) of the raised target studs (54), and adjusting the Z-directional position of the tip (32) of the master gripper (30) by adjusting the gripper mounting plate to achieve a desired predetermined distance between the upper surface (56) of the raised target studs (54) and the tip (32) of the master gripper (30) at at least the first and second of the plurality of lens gripper (40) mounting positions.

7. The method according to claim 6, wherein the desired predetermined distance between the upper surface (56) of the raised target studs (54) and the tip (32) of the master gripper (30) is measured using a feeler gauge or a laser measurement device.

8. The method according to any one of claims 6 or 7, wherein the desired pre-determined distance between the upper surface (56) of the raised target studs (54) and the tip (32) of the master gripper (30) is from about 400 microns to about 1000 microns, and particularly about 700 microns.

9. The method according to any one of claims 6 to 8, wherein the lens receptacle carrier plate (50) is configured for mounting lens inspection cuvettes (60) thereon instead of the adapter (52) comprising the raised target studs (54), each lens inspection cuvette having a cuvette bottom for an ophthalmic lens to rest on, and wherein the method further comprises mounting the lens inspection cuvettes (60) to the receptacle carrier plate (50) with the cuvette bottoms arranged at a level corresponding to a level of the upper surfaces (56) of the raised target studs (54).

10. The method according to any one of claims 6 to 8, wherein the lens receptacle carrier plate (50) is configured to carry lens mold halves arranged thereon instead of the adapter (52) comprising the raised target studs (54), each lens mold half comprising a surface to be gripped by the lens gripper, and wherein the method further comprises arranging the lens mold halves on the lens receptacle carrier plate (5) with the surfaces to be gripped arranged at a level corresponding to a level of the upper surfaces (56) of the raised target studs (54).

11. The method according to any one of claims 6 to 8, wherein the lens receptacle carrier plate (50) is configured to carry lens blister packages arranged thereon instead of the adapter (52) comprising the raised target studs (54), each lens blister package comprising a surface to be gripped by the lens gripper, and wherein the method further comprises arranging the lens blister packages with the surfaces to be gripped arranged at a level corresponding to a level of the upper surfaces (56) of the raised target studs (54).

12. An apparatus for calibrating lens grippers (40) for ophthalmic lenses, preferably contact lenses, prior to use of the lens grippers (40) in a lens manufacturing line, the apparatus comprising a remote gripper calibration tool (1) not being part of a lens manufacturing line but being located separately, the remote gripper calibration tool comprising an assembly plate (10) and a Z-directional position sensor (12) configured to measure a predetermined range of Z-directional positions, and further comprising a master gripper (30) configured to be mounted to the assembly plate (10), the master gripper (30) having a length dimension terminating in a tip (32), the length dimension being predetermined to match a desired final extension length of a lens gripper (40) to be calibrated, wherein the Z-directional position sensor (12) is arranged relative to the assembly plate (10) at a location at which the tip (32) of the master gripper (30) mounted to the assembly plate (10) is arranged at a Z-directional tip position within the predetermined range of Z-directional positions of the Z-directional position sensor, the Z-directional tip position being spaced by at least 300 microns from an upper end as well as from a lower end of the predetermined range of Z-directional positions, so that the final extension length of the lens gripper to be calibrated, when mounted to the assembly plate, matches the desired final extension length or is within an acceptable distance when a tip of the lens gripper is arranged within the predetermined range of Z-directional positions of the Z-directional position sensor.

13. The apparatus according to claim 12, the remote gripper calibration tool further comprising an X-directional position sensor (14) and a Y-directional position sensor (16), the X-directional position sensor (14) and the Y-directional position sensor (16) being configured and arranged to measure the X-directional and Y-directional positions of the master gripper and of the lens gripper.

14. The apparatus according to any one of claim 12 or 13, the remote gripper calibration tool (1) further comprising a vacuum connector (20) and a pneumatic pressure connector (22) configured and arranged to test proper vacuum and pressure function of a lens gripper (40) to be calibrated.