

Claims

1. Lens inspection module (1) for the inspection of ophthalmic lenses, in particular contact lenses such as soft contact lenses, comprising:

- a lens insertion station (10) for the insertion of the ophthalmic lenses to be inspected into inspection cuvettes,
- at least one lens inspection station (11, 12) for the inspection of the inserted ophthalmic lenses in the inspection cuvettes,
- a lens removal station (13) for removal of the inspected ophthalmic lenses from the inspection cuvettes,
- a closed-loop transportation rail (6) extending in a plane (X, Y), with the lens insertion station (10), the at least one lens inspection station (11, 12) and the lens removal station (13) being arranged along the closed-loop transportation rail (6),
- a cuvette transportation shuttle (5) arranged on the closed-loop transportation rail (6), the cuvette transportation shuttle (5) having a plurality of inspection cuvettes (2) arranged thereon, for transportation of the plurality of inspection cuvettes (2) in a transportation direction (T) along the closed-loop transportation rail (6) from the lens insertion station (10) to the at least one lens inspection station (11, 12), from there to the lens removal station (13), and back to the lens insertion station (10), and
- a self-driving cleaning shuttle (7) for cleaning the closed-loop transportation rail (6), the self-driving cleaning shuttle (7) being arranged on the closed-loop transportation rail (6) and comprising a driving unit (70) for moving the self-driving cleaning shuttle (7) along the closed-loop transportation rail (6) in the transportation direction (T), and further comprising a cleaning head (71), a suction unit (72), and a tube (73) connecting the cleaning head (71) and the suction unit (72),

the cleaning head (71) being arranged spaced apart from the suction unit (72) and the driving unit (70) in the transportation direction (T), and being pivotally arranged about a pivot axis (710) extending perpendicular to the plane (X, Y) in which the closed-loop transportation rail (6) extends, the cleaning head (71) comprising at least one suction opening (714) arranged to face the closed-loop transportation rail (6) for removing debris from the closed-loop transportation rail (6) and for transporting the debris to the suction unit (72) through the tube (73), wherein either the cleaning head (71) or the driving unit (72) or both comprise a

distance sensor (711) for detecting the distance between the self-driving cleaning shuttle (7) and the cuvette transportation shuttle (5), the distance sensor (711) being connected to the driving unit (70) for providing a signal to the driving unit (70) representing the distance between the self-driving cleaning shuttle (7) and the cuvette transportation shuttle (5),

and wherein the driving unit (70) is configured to change the speed of the self-driving cleaning shuttle (7) when the distance between the self-driving cleaning shuttle (7) and the cuvette transportation shuttle (5) is shorter than a predetermined threshold distance.

2. Lens inspection module according to claim 1, wherein the self-driving cleaning shuttle (7) further comprises a platform (74) having a first end (741) and a second end (742), the first end (741) of the platform (74) being pivotally connected to the cleaning head (71) and the second end (742) of the platform being pivotally mounted to the driving unit (70).

3. Lens inspection module according to any one of the preceding claims, wherein the self-driving cleaning shuttle (7) is arranged on the closed-loop transportation rail (6) with the cleaning head (71) arranged at a leading end and with the driving unit (70) arranged at a trailing end of the self-driving cleaning shuttle (7) when viewed in the transportation direction (T).

4. Lens inspection module according to any one of the preceding claims, wherein the tube (73) has a first end (731) and a second end (732), and wherein the first end (731) of the tube (73) is pivotally connected to the cleaning head (71) about an axis (730) which is parallel to the pivot axis (710) which the cleaning head (71) is pivotable about, and wherein the second end (732) of the tube (73) is fixedly connected to the suction unit (72).

5. Lens inspection module according to claim 3 or claim 4, wherein the self-driving cleaning shuttle (5) is arranged on the closed-loop transportation rail (6) such that the cleaning head (71) arranged at the leading end of the self-driving shuttle (7) is arranged behind a trailing end of the cuvette transportation shuttle (5), and wherein

the distance sensor (711) for providing a signal to the driving unit (70) representing the distance between the self-driving cleaning shuttle (7) and the cuvette transportation shuttle (5) is arranged at a front end of the cleaning head (71).