Claims

1. A vacuum hold-down apparatus suitable for retaining a wafer in a desired position and orientation, the apparatus comprising:

   i. a vacuum chuck assembly defining a vacuum chuck surface having a vacuum communication aperture that extends to the vacuum chuck surface, wherein the vacuum chuck surface is configured to contact said wafer;

   ii. a venturi vacuum generator fixed with respect to said vacuum chuck assembly and communicating with said vacuum chuck surface via said vacuum communication aperture; and

   iii. a positive pressure fluid line communicating with said venturi vacuum generator.

2. The vacuum hold-down apparatus according to claim 1 and wherein said vacuum chuck assembly and said venturi vacuum generator are both mounted on a movable stage.

3. The vacuum hold-down apparatus according to claim 2 and wherein said positive pressure fluid line is a flexible fluid line.

4. The vacuum hold-down apparatus according to claim 3 and also comprising a fixed positive pressure fluid source which is coupled via said positive pressure fluid line to said venturi vacuum generator mounted on said movable stage.

5. The vacuum hold-down apparatus according to claim 1 and wherein said vacuum chuck surface is rotatable relative to said vacuum chuck assembly.

6. The vacuum hold-down apparatus according to claim 1 and wherein said movable stage is an X-Y movable stage.

7. The vacuum hold-down apparatus according to claim 1 and wherein said vacuum chuck assembly includes a vacuum chuck surface defining element which is rotatable relative to said venturi vacuum generator.

8. The vacuum hold-down apparatus according to claim 7 and wherein said venturi vacuum generator is coupled to said vacuum chuck surface of said vacuum chuck surface defining element via a central vacuum manifold and conduit assembly having a rotatable vacuum connection to said vacuum chuck surface defining element.

9. The vacuum hold-down apparatus according to claim 8 and wherein said venturi vacuum generator is coupled to said vacuum chuck surface of said vacuum chuck surface defining element via a plurality of vacuum ports and a plurality of vacuum conduits, which are connected to a plurality of corresponding vacuum input ports of said central vacuum manifold and conduit assembly.

10. The vacuum hold-down apparatus according to claim 9 and wherein said central vacuum manifold and conduit assembly comprises a manifold, which is connected to said vacuum input ports and includes a single vacuum output conduit portion, which is coupled to said rotatable vacuum connection.

11. The vacuum hold-down apparatus according to claim 2 and wherein said vacuum chuck surface is rotatable relative to said vacuum chuck assembly.

12. The vacuum hold-down apparatus according to claim 2 and wherein said movable stage is an X-Y movable stage.

13. The vacuum hold-down apparatus according to claim 2 and wherein said vacuum chuck assembly includes a vacuum chuck surface defining element which is rotatable relative to said venturi vacuum generator.

14. The vacuum hold-down apparatus according to claim 13 and wherein said venturi vacuum generator is coupled to said vacuum chuck surface of said vacuum chuck surface defining element via a central vacuum manifold and conduit assembly having a rotatable vacuum connection to said vacuum chuck surface defining element.

15. The vacuum hold-down apparatus according to claim 14 and wherein said venturi vacuum generator is coupled to said vacuum chuck surface of said vacuum chuck surface defining element via a plurality of vacuum ports and a plurality of vacuum conduits, which are connected to a plurality of corresponding vacuum input ports of said central vacuum manifold and conduit assembly.

16. The vacuum hold-down apparatus according to claim 15 and wherein said central vacuum manifold and conduit assembly comprises a manifold, which is connected to said vacuum input ports and includes a single vacuum output conduit portion, which is coupled to said rotatable vacuum connection.

17. The vacuum hold-down apparatus according to claim 1 and also comprising an additional vacuum connection communicating with said vacuum chuck surface via said vacuum communication aperture.

18. The vacuum hold-down apparatus according to claim 17 and wherein said vacuum hold-down apparatus is operative to selectively supply vacuum to said vacuum chuck assembly from either said venturi vacuum generator or from said additional vacuum connection.

19. The vacuum hold-down apparatus according to claim 2 and also comprising an additional vacuum generator communicating with said vacuum chuck surface via said vacuum communication aperture and wherein said additional vacuum generator is mounted on said movable stage.

20. The vacuum hold-down apparatus according to claim 19 and wherein said vacuum hold-down apparatus is operative to selectively supply vacuum to said vacuum chuck assembly from either said venturi vacuum generator or from said additional vacuum generator.