~~CLAIMS~~

~~Vacuum~~**Claims**

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

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

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

~~4.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~6. The vacuum hold-down apparatus according to claim 1 and wherein said movable stage is an X-Y movable stage.

~~7.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~12. The vacuum hold-down apparatus according to claim 2 and wherein said movable stage is an X-Y movable stage.

~~13.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.~~ ~~Vacuum~~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.

~~Vacuum~~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.

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