WHAT IS CLAIMED IS:

1. A nucleic acid analysis apparatus with isothermal based amplification, comprising:

a chamber comprising a cartridge mounted therein;

a fluid delivery unit connected with the chamber and adapted to transport reagents within the cartridge for sample purification and/or nucleic acid extraction, wherein the fluid delivery unit comprises a plurality of microchannels for connecting with the cartridge and a pump adapted to provide pneumatic force to transport the reagents stored within the cartridge;

a thermal unit disposed in the chamber and comprising a heater to provide a predefined temperature for nucleic acid amplification;

a rotational driven unit connected with the chamber and comprising a motor, a driven shaft, and a motion control unit mounted on the driven shaft, wherein the motion control unit comprises a sliding shell and at least one clamping pin protruded out of a bottom surface of the sliding shell, wherein the driven shaft drives the rotation of the clamping pin to clamp and rotate the cartridge, and drives the sliding shell to move downwardly or upwardly to push down or lift up the cartridge, so that the motion control unit is capable of pressing the cartridge during sample purification and/or nucleic acid extraction and rotating the cartridge with a predefined program during nucleic acid amplification and/or detection; and

at least one optical unit disposed on the chamber and comprising at least one light source and at least one optical detector for detection.

2. The nucleic acid analysis apparatus according to claim 1, wherein the chamber is able to be opened and comprises a top chamber and a bottom chamber.

3. The nucleic acid analysis apparatus according to claim 2, wherein the cartridge is mounted in a cavity of the bottom chamber.

4. The nucleic acid analysis apparatus according to claim 1, wherein a rotation of the driven shaft drives the sliding shell to move downwardly and push the cartridge in contact with the fluid delivery unit.

5. The nucleic acid analysis apparatus according to claim 4, wherein the cartridge comprises at least one trench and at least one recess structure matching the clamping pin at one end of the trench, and when the sliding shell moves downwardly, the clamping pin works in conjunction with the recess structure so as to clamp the cartridge.

6. The nucleic acid analysis apparatus according to claim 5, wherein a reverse rotation of the driven shaft drives the sliding shell to move upwardly and lift the cartridge away from the fluid delivery unit.

7. The nucleic acid analysis apparatus according to claim 4, wherein the motion control unit comprises a fixed part and at least one protrusion, the fixed part is mounted on the driven shaft at a fixed position, and the protrusion is protruded out of the fixed part and inserted into a groove on the sliding shell.

8. The nucleic acid analysis apparatus according to claim 7, wherein the motion control unit comprises a spring disposed between the fixed part and the sliding shell.

9. The nucleic acid analysis apparatus according to claim 1, wherein the cartridge comprises a reaction chip and a cartridge body, and the reaction chip is disposed on one side of the cartridge body.

10. The nucleic acid analysis apparatus according to claim 9, wherein the reaction chip is a planar fluidic chip and comprises a plurality of detection wells and at least one microchannel connected with the detection wells.

11. The nucleic acid analysis apparatus according to claim 10, wherein each of the detection wells has at least one planar surface.

12. The nucleic acid analysis apparatus according to claim 9, wherein the shape of the reaction chip is substantially a regular polygon.

13. The nucleic acid analysis apparatus according to claim 9, wherein the chamber further comprises at least one positioning pin, and the reaction chip comprises at least one alignment slot capable of being aligned with the at least one positioning pin on the chamber.

14. The nucleic acid analysis apparatus according to claim 9, wherein the cartridge body comprises a plurality of chambers used to store reagents for sample purification and nucleic acid extraction.

15. The nucleic acid analysis apparatus according to claim 9, wherein the reaction chip further comprises at least one sample loading hole at a top surface of the reaction chip for adding sample into the cartridge.

16. The nucleic acid analysis apparatus according to claim 9, wherein the thermal unit surrounds the cartridge body and carries the reaction chip thereon to provide contact heating.

17. The nucleic acid analysis apparatus according to claim 1, wherein the rotational driven unit comprises a step motor to rotate the cartridge at a predefined angle.

18. The nucleic acid analysis apparatus according to claim 1, wherein the nucleic acid analysis apparatus comprises multiple optical units, and each optical unit offers a unique wavelength of illumination to detect multiple targets.