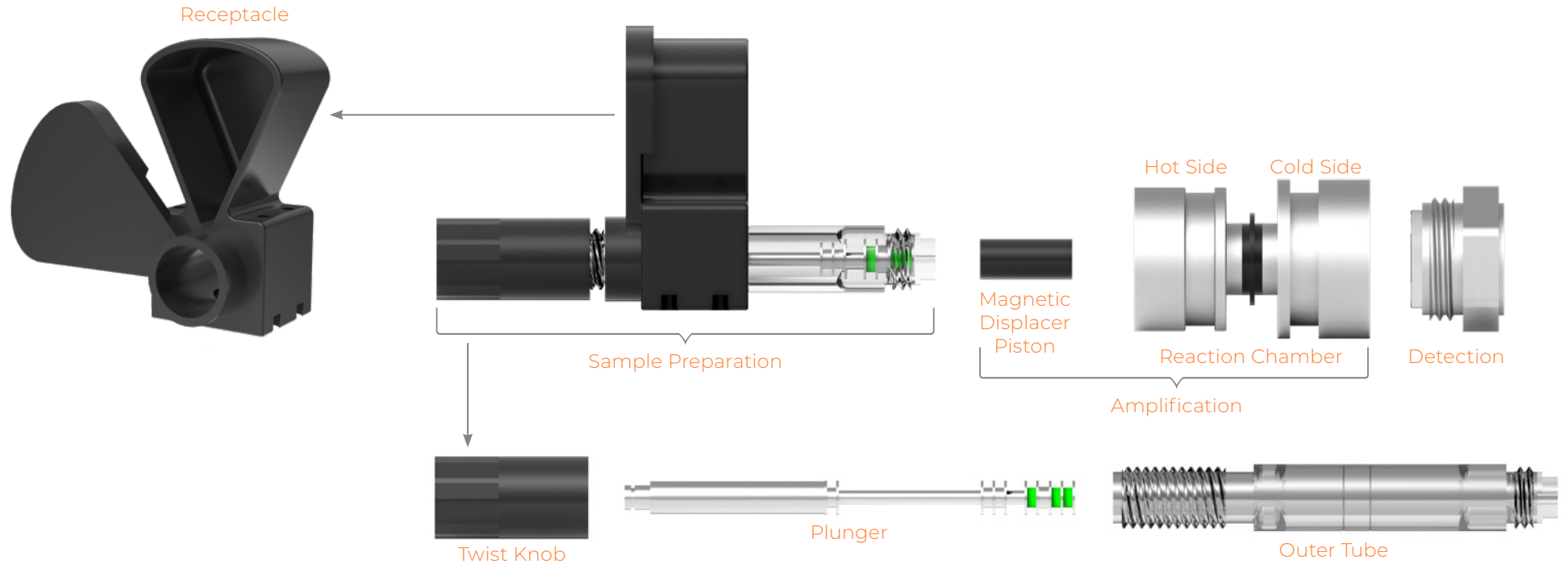


NUCLEIN™ HAND-HELD PCR TEST MECHANISM



How it works

1. A user provides a sample directly into the receptacle of the Nuclein™ Hand-Held PCR Test.
2. On activation, a plunger moves forward within the outer tube and in one motion, a vacuum in the reaction chamber draws the sample in, mixes it in the correct ratio with a shelf-stable liquid, delivers it into the reaction chamber in the correct volume, and seals it.
3. Inside the reaction chamber are a lyophilized lysis pellet, the magnetic displacer piston, and a lyophilized PCR pellet.
4. The lysis pellet is heated to break down the sample and then the piston mixes it with the PCR pellet, which stops the lysis and starts the PCR reaction.
5. The two sides of the reaction chamber (hot and cold) are maintained at the correct temperatures for PCR thermocycling. When the magnetic piston, which is driven by a coil and controlled by a small microprocessor, moves in one direction, it forces the liquid to move around it in the opposite direction, where it rapidly heats or cools to the correct temperature.
6. The detection element is able to observe the fluid contents of the reaction chamber throughout the thermocycling process. It uses simplified optics to take fluorescence readings by shining an LED into the chamber and monitoring the reaction through photodiodes.
7. These same steps and processes occur in expensive, benchtop PCR machines, but the Nuclein™ Hand-Held PCR Test simplifies them for use in a rapid, hand-held, disposable, all-in-one test for infectious disease diagnosis without the need for a mail-in sample.