

# *HGD-10*

## *Graphite Digestion Robot*



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- HGD series graphite digestion robot is mainly used for the wet digestion of samples. It adopts the surrounding three-dimensional heating method. In the same digestion tube, it realizes "one-stop" automatic digestion through automatic acid adding, shaking, temperature control, acid driving, volume fixing and recording. It is an ideal pretreatment equipment for analytical instruments such as AFS, AAS, ICP-MS, etc. The digestion method of this system conforms to EPA, national standards and industry standards.

## Functions of the whole machine

- The instrument is composed of reagent selection system, reagent addition system, graphite heating system, lifting and shaking system, SCARA robot transmission system, over-temperature protection system, instrument control and data transmission systems. It can fully automatic complete the operation of reagent addition, sample mixing, temperature control, sample cooling and volume fixing.
- The instrument is designed for corrosion resistance. The overall frame is made of aluminum alloy, the key special parts are made of titanium alloy, the heating system is made of corrosion-resistant graphite with high thermal conductivity, the sample tube is made of PTFE, and the inside and outside of the whole machine are sprayed with multi-layer Teflon. All transmission parts are not exposed, which can withstand all kinds of strong acid and alkali corrosion for a long time.
- The transmission system adopts the industrial-grade heavy-duty anticorrosive robot SCARA, which has high positioning accuracy, and the transmission parts are not exposed, and the service life is long.
- The digestion tube is made of PTFE, which can withstand all kinds of strong acids and alkalis. After digestion, it can complete the constant volume directly without changing the container. The digestion and volume are completed in the same container, which simplifies the experimental procedure.
- Instrument size is small, with the overall size of less than 720mm\*500mm\*720mm, which can be placed directly in the standard fume hood use.

## Liquid adding unit

- There are 6 reagent channels, with the function of automatic switching of various reagents. Each reagent channel is controlled independently and does not affect each other. The instrument automatically switches and selects to add reagents.
- The high-precision corrosion-resistant syringe pump is used to add power to the reagent, and the accuracy is better than 1%. The syringe pump is integrated with the host, which does not occupy additional space. The reagent adding speed can be adjusted by the software (0~5mL/s).
- The instrument adopts SCARA robot positioning, and completes the liquid adding, volume fixing, cleaning and other operations of samples according to the experimental requirements.

- The liquid level in the digestion tube is monitored by a high-precision ultrasonic sensor to realize the automatic constant volume function. It supports automatic constant volume of 1~42 positions, and the constant volume accuracy is better than 1%. The ultrasonic sensor can be calibrated when necessary.
- It adopts single liquid adding and single constant volume design.

## Digestion unit

- The eccentric shaft rotation method is adopted to achieve the mixing of the sample, which is non-contact with the sample to avoid cross contamination and loss of the sample. The instrument can perform shaking action in each link such as adding liquid, digestion, cooling, and constant volume.
- The one-piece graphite block is used for three-dimensional heating, providing a uniform and rapid heating environment for sample digestion.
- It has a 42-position 55mL digestion unit, which can realize the simultaneous digestion of 42 position samples. The heating depth of the sample tube completely falling into the graphite body is greater than 40mm, and the three-dimensional heating makes the digestion faster.
- The temperature is controlled by PID, and the temperature control range is room temperature to 230°C. The temperature difference between holes is less than 1°C, and the temperature uniformity is  $\leq 2^\circ\text{C}$ .
- The digestion unit can be separated from the liquid adding unit and become an independent digestion module for use. The software is used to realize the functions of lifting, shaking, and temperature control of the digestion tube. It can also be combined with microwave digestion instrument to drive acid, so as to realize multi-purpose of one machine.

## Communication method

- Adopt network communication protocol and support WiFi connection mode.
- Tablet PC(PAD) client control system: The operating status of the instrument can be viewed and controlled remotely through the pad client.
- Powerful software functions: the instrument control software adopts the full Chinese operation interface, graphical and building block programming, which can set the digestion steps arbitrarily, store the digestion method in an unlimited amount, and automatically record the digestion process. The software can be upgraded for free and detect faults remotely. Reserved ports can be seamlessly connected with LIMS (laboratory management system).
- Offline operation function: the instrument can support offline operation. After the digestion method is sent, the instrument can disconnect from the software and continue to run. It can be connected again when needed, and the software automatically reads the current running method and state.