Introducción a H2D

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Esta página es una introducción a los componentes principales de la impresora Bambu Lab H2D para que pueda tener una comprensión general de esta impresora.

¿Cómo funciona H2D?

La impresora de la serie H2D es una máquina que utiliza filamento plástico para crear objetos 3D.

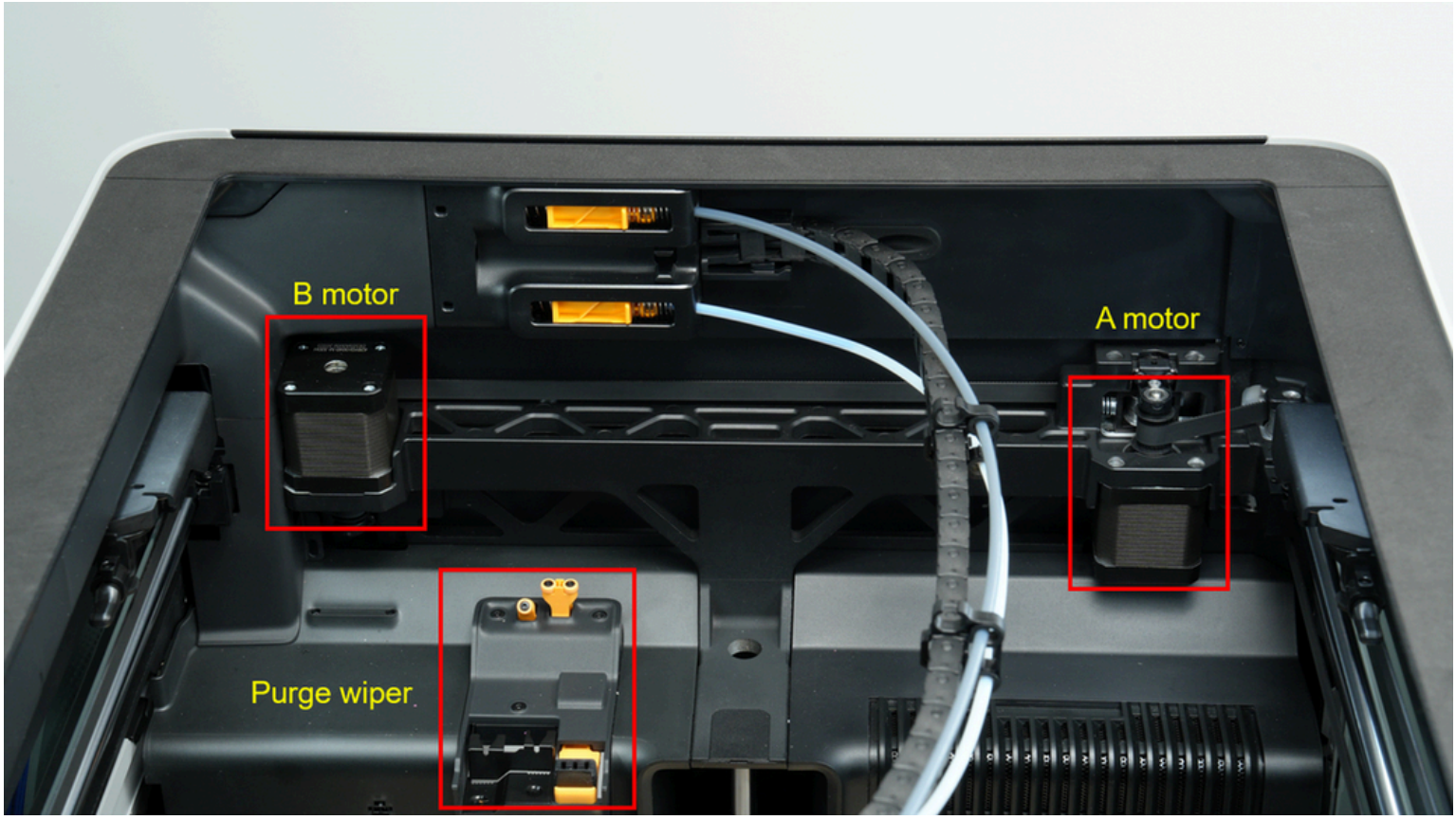
En la mayoría de los casos, H2D puede imprimir modelos 3D en formato STL, y el modelo de archivo debe procesarse previamente utilizando un software de corte antes de imprimir.

Tomando como ejemplo Bambu Studio, el software de corte divide el archivo STL en varias capas. La información de cada capa se convierte automáticamente a un lenguaje comprensible para la impresora, el cual se utiliza para guiar las trayectorias y velocidades de movimiento de cada eje durante el proceso de impresión.

Además, el software de corte también puede integrar una variedad de configuraciones de parámetros en el código generado, como la temperatura de impresión de los filamentos, la velocidad de extrusión de la impresora y generar soporte para ciertas partes del modelo impreso.

Sistema de movimiento Core XY

Bambu Lab H2D se basa en la arquitectura Core-XY, que contiene dos motores paso a paso y varios conjuntos de poleas tensoras en el plano XY. Cada motor paso a paso está conectado al cabezal de la herramienta mediante una correa de distribución independiente, y el movimiento y la posición del cabezal de la herramienta se controlan mediante la transmisión coordinada entre el motor y la correa de distribución.



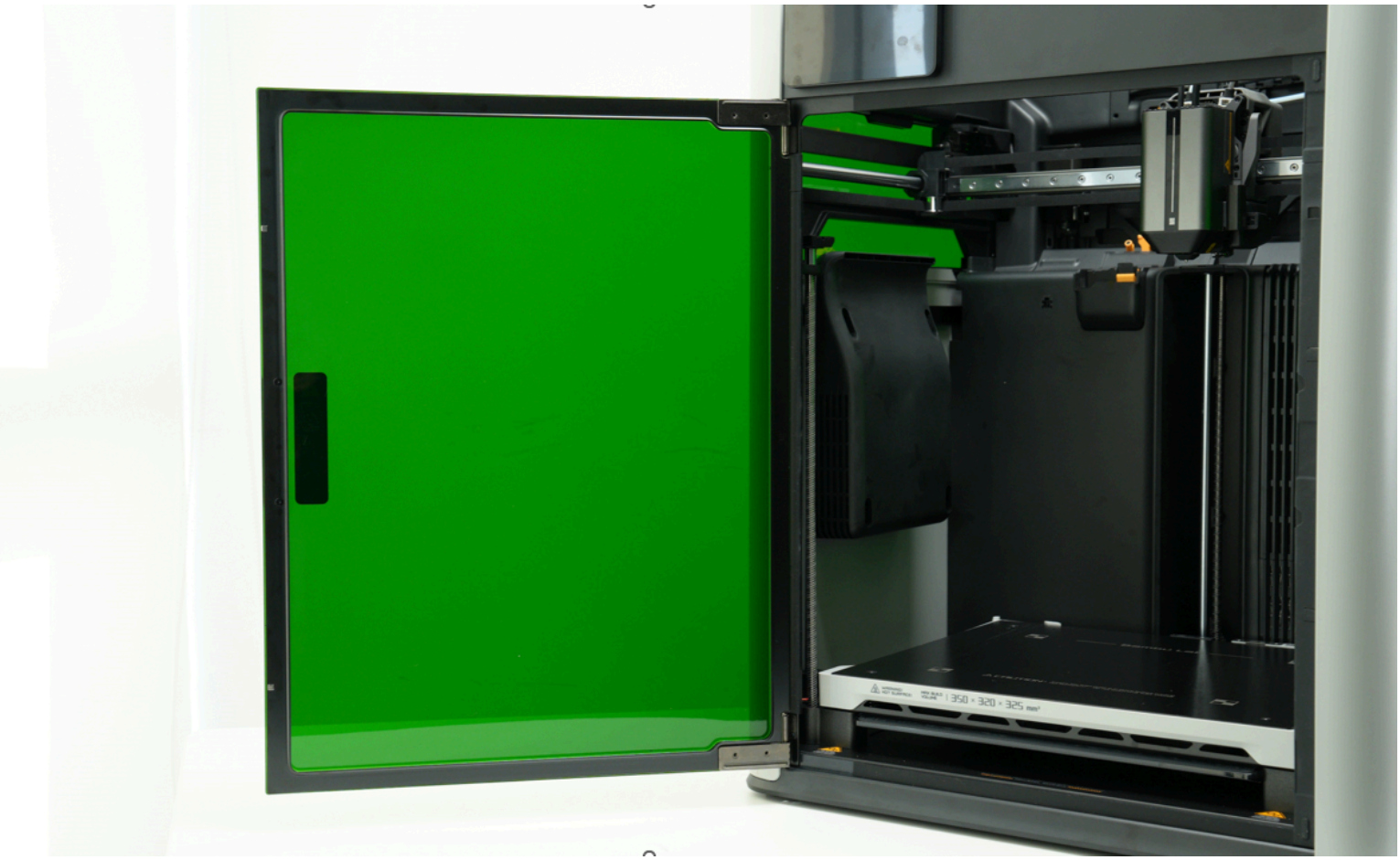
H2D imprime más rápido con el sistema de movimiento CoreXY que con las impresoras cartesianas tradicionales porque es más liviano, lo cual es importante para una impresión rápida.

Para obtener más información sobre el sistema de movimiento CoreXY, visita este enlace .

Eje Z

El eje Z de la impresora consta de 3 tornillos guía, que están conectados al motor paso a paso del eje Z a través de una correa.

H2D has been pre-calibrated for bed leveling at the factory. Before use, please follow the instructions to remove the 4 screws that fix the Z-axis to the base. Please keep these 4 screws. If the Z-axis lead screw is disassembled and maintained or the machine is transported later, these 4 screws need to be locked back.

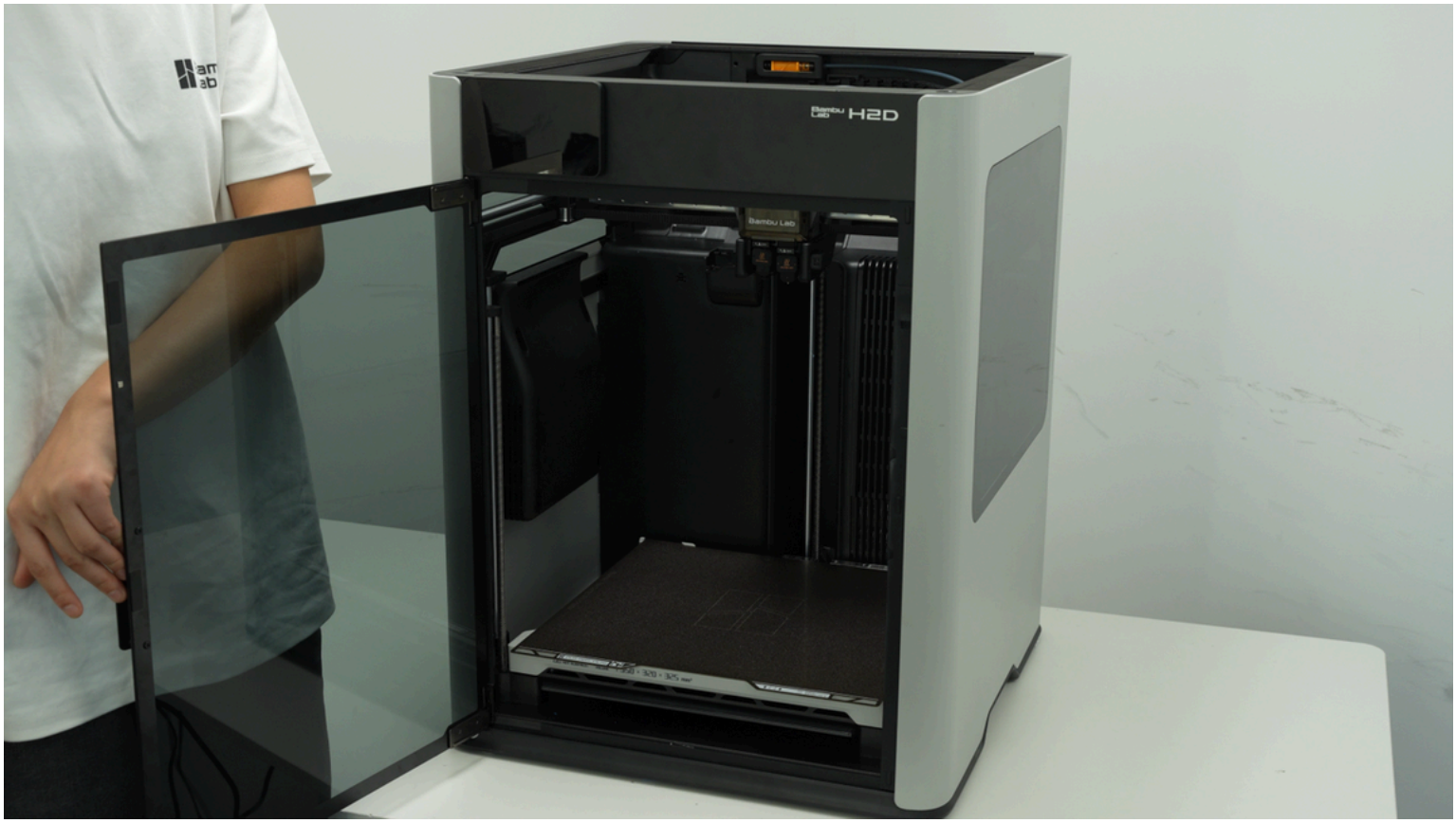


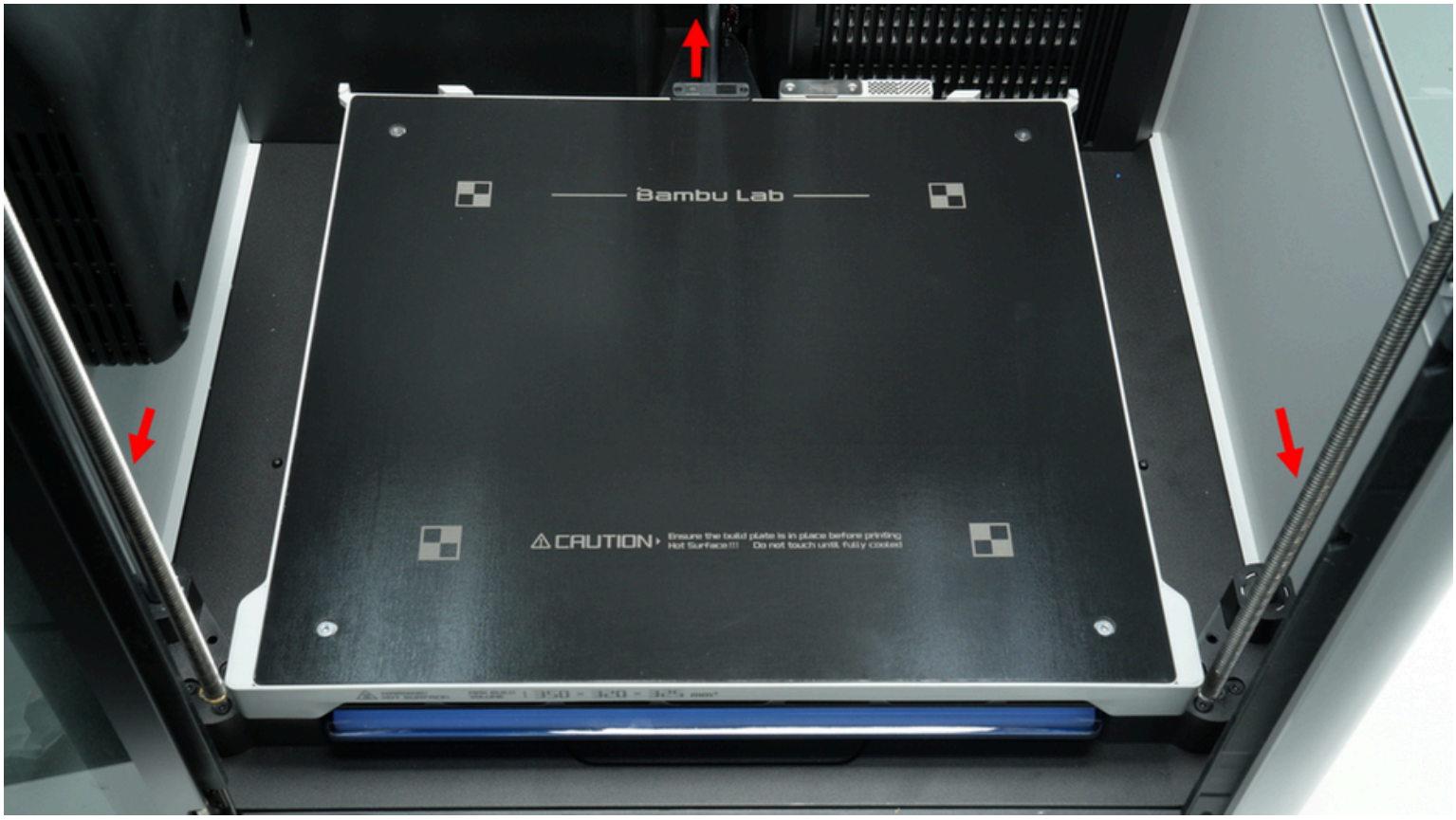
Printer Housing

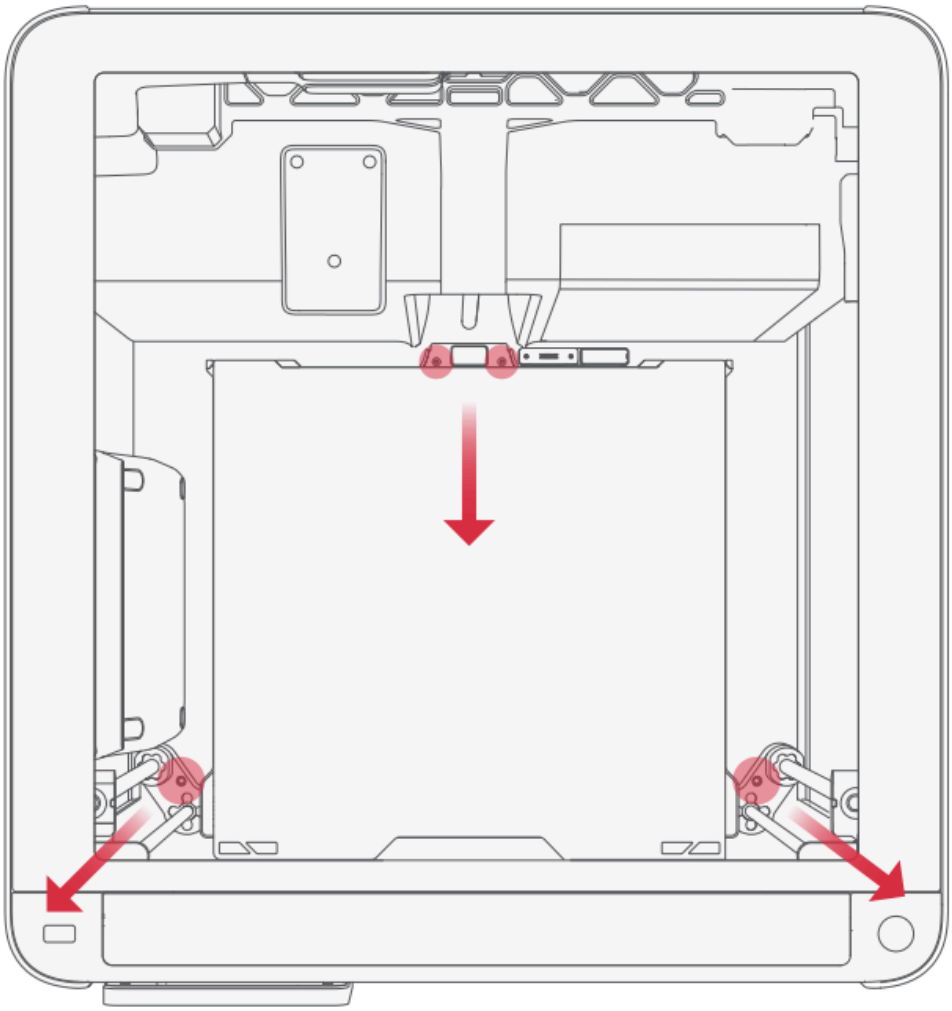
H2D printers offer two material options for the top cover, front door, and side panel windows: tempered glass version and laser safety version.

If you need to use a laser module, you must choose the laser safety glass the laser version of the printer comes pre-installed with the laser safety version, while the non-laser version requires a separate upgrade kit (available after the main unit's launch date), which includes a green PC front door and left and right windows, as well as a black top protective cover. Otherwise, the laser function will be forced to stop automatically.

H2D has equipped the top cover, front door, side panels, and side panel windows with an open door detection function. When it is detected that the "door" is opened, if a laser module is installed, the device will pop up a red error prompt and immediately suspend the task. If a non-laser function is used, the device will prompt "Open the door" in HMS and pop up an orange warning prompt, but will not suspend the task.


H2D

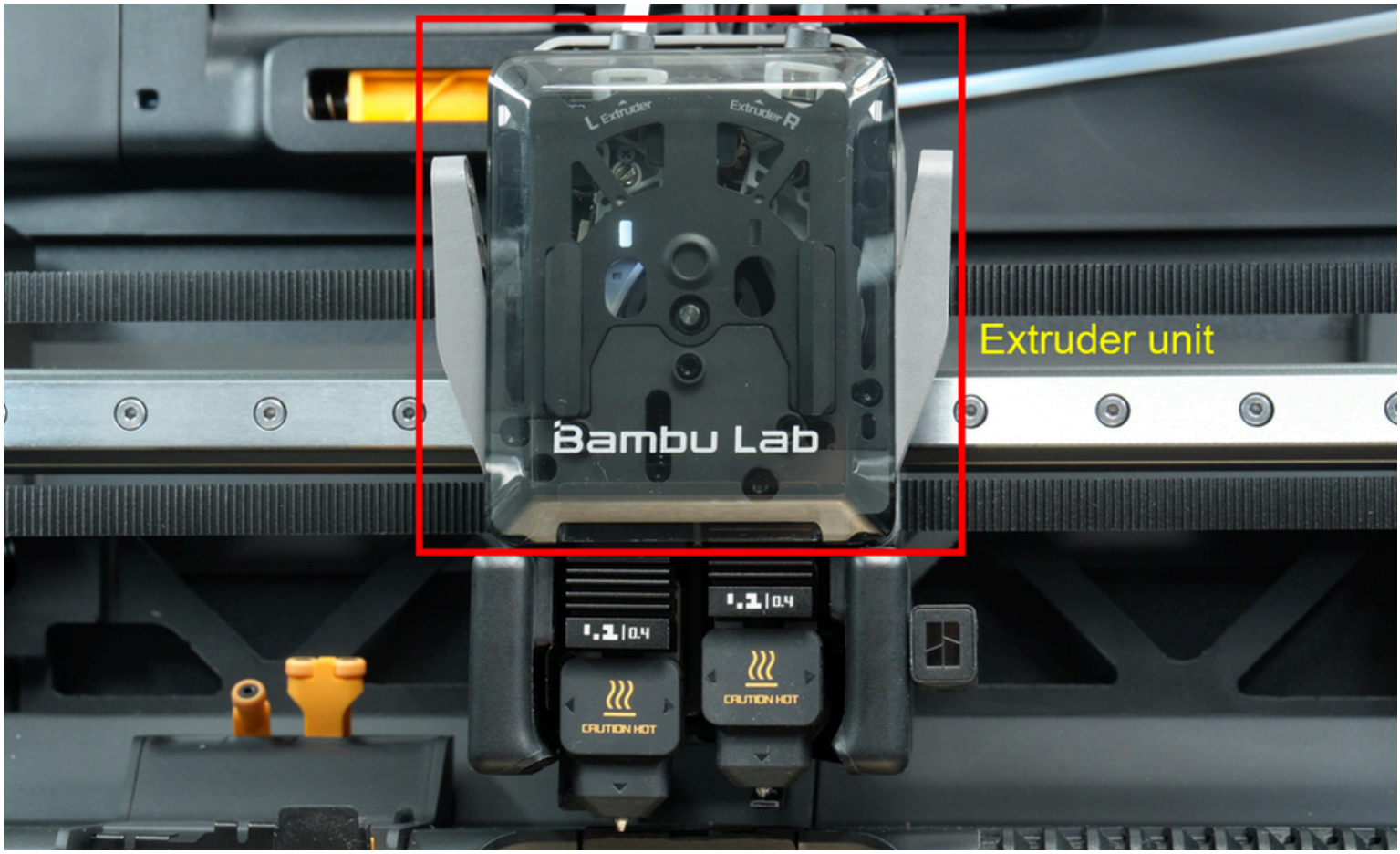

Bambu Lab
CAUTION
Ensure the build plate is in place before printing
Hot Surface!!!
Do not touch until fully cooled

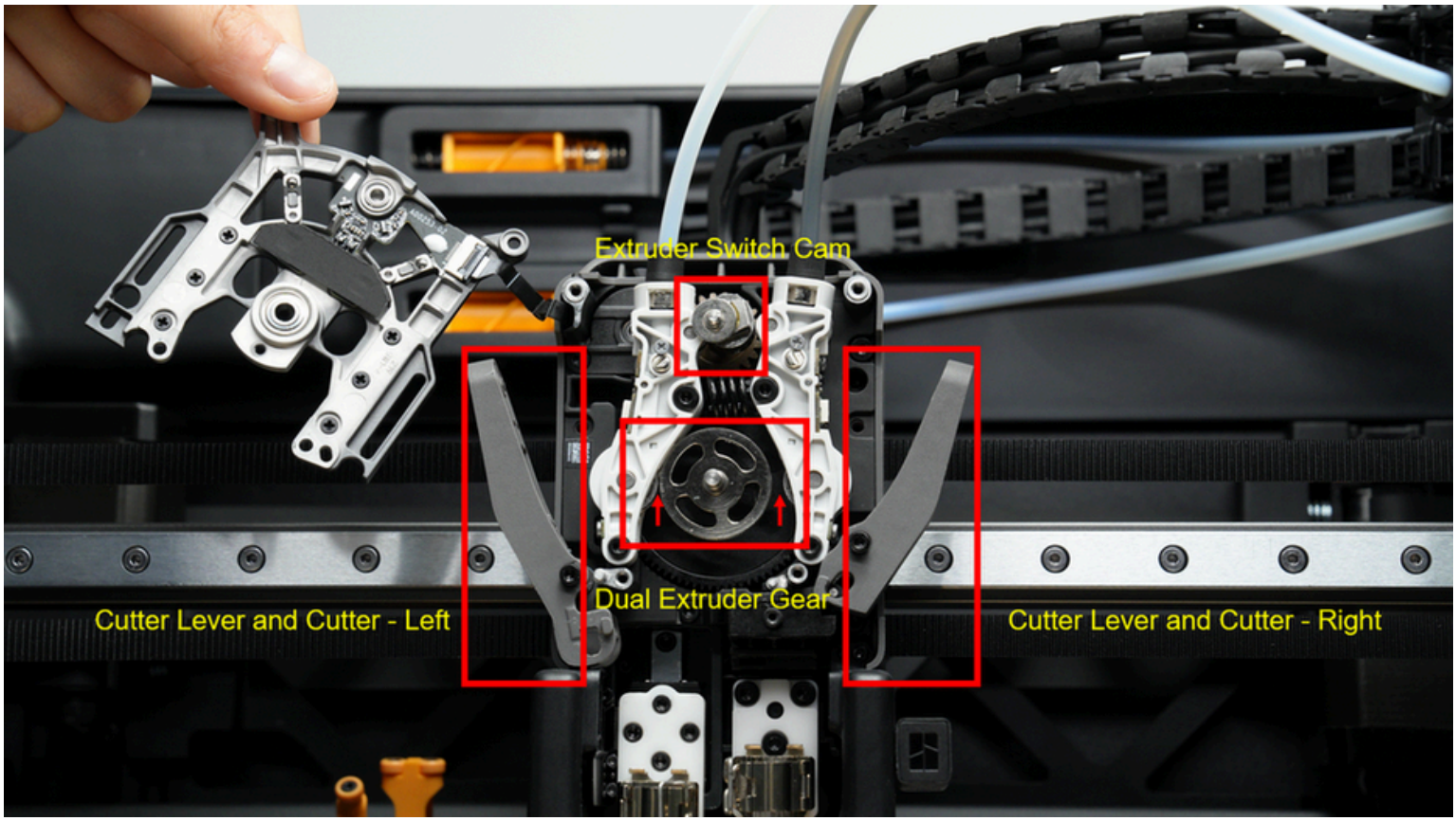


Extruder

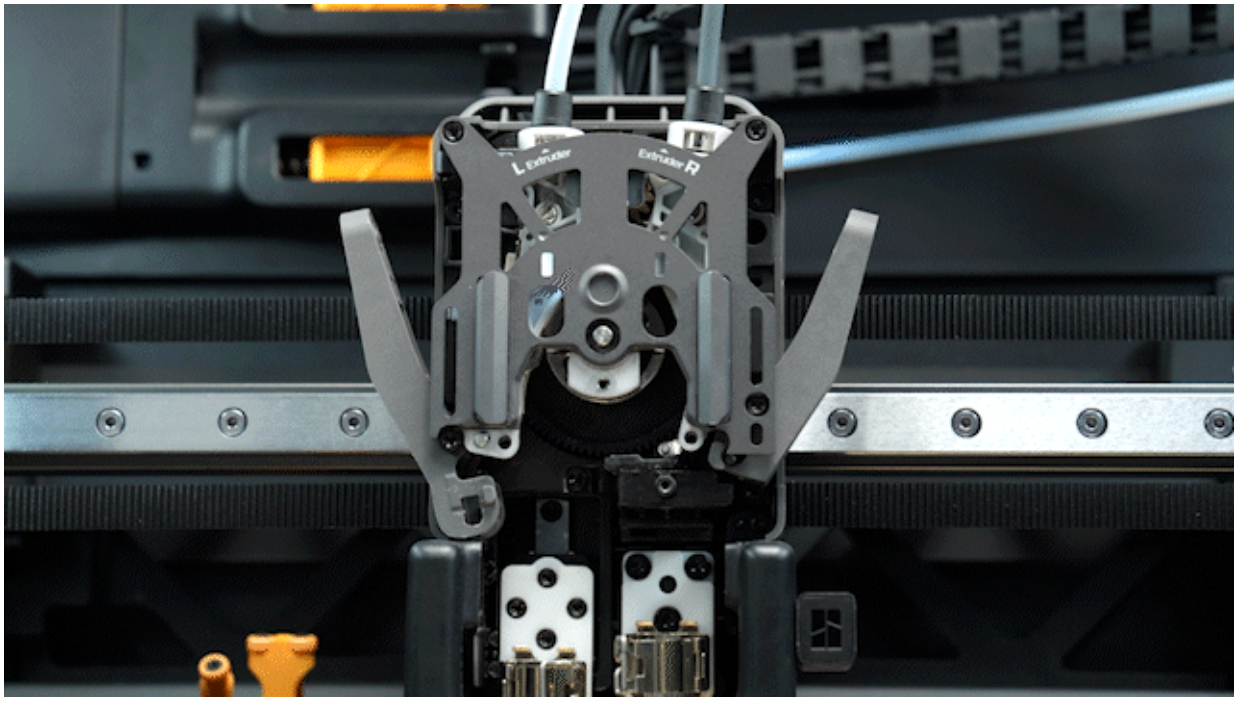
The extruder is responsible for pulling the filament out of the spool and feeding it into the hotend. After heating and melting, it is extruded through the nozzle to generate a printed model.

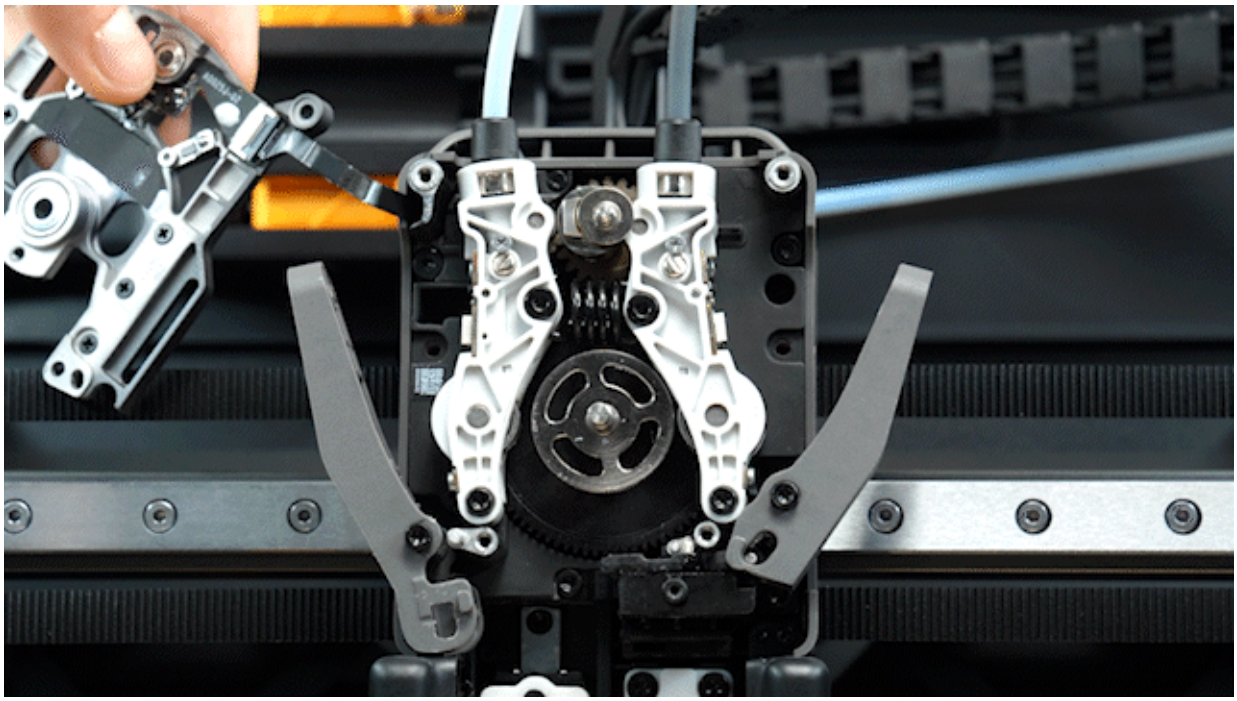
The extruder needs to accurately control the length of extrusion and retraction of the filament to ensure the dimensional accuracy and appearance quality of the printed model. It is one of the core components of a 3D printer.





H2D's extruder is mainly composed of a switching system, extrusion system, and cutter system:





The switching system uses a switching motor and drive system to drive the cam, which achieves the oscillating movement of the left and right driven wheel linkages (driven rods). Paired with the tension spring connecting the driven rods, one side's driven wheel presses against the extrusion driving wheel on the extrusion system to compress the filament, allowing the wheel to rotate and extrude the filament. Meanwhile, the driven wheel on the other side does not press against the filament, so the rotation of the active wheel does not cause any movement of the filament.

The extrusion motor drives the extrusion driving wheel to rotate clockwise or counterclockwise, which can drive the driven wheels on both sides to extrude the filament respectively, to achieve the effect of left or right extrusion with one extrusion driving wheel.

The cutter system cuts the filament between the extruder and the hotend, and the filament can be pulled back at this time. Combined with the filament cutter stopper and AMS, the printer can automatically cut and switch filaments to achieve multi-color or multi-material printing.

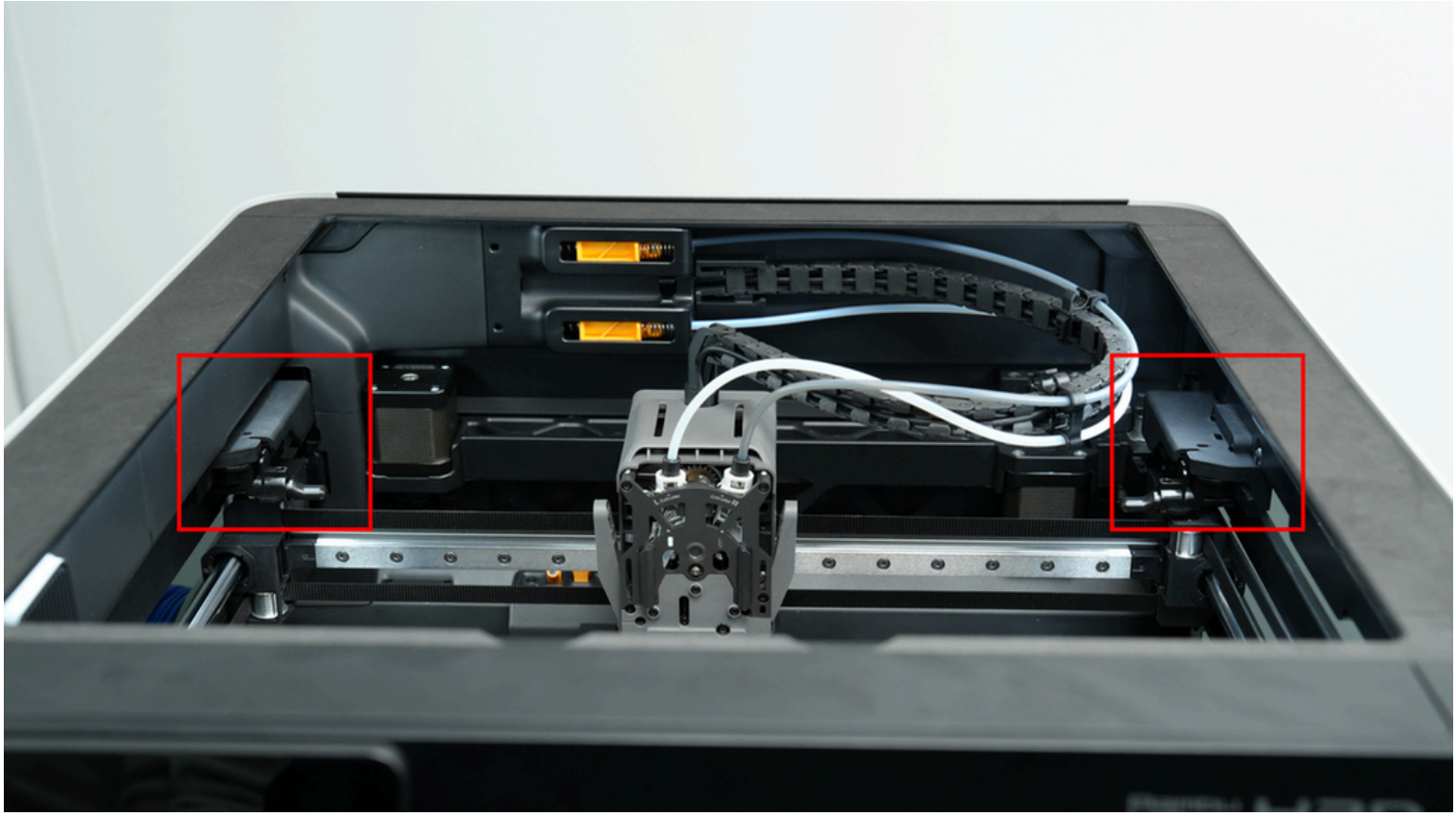
Filament Cutter Stopper

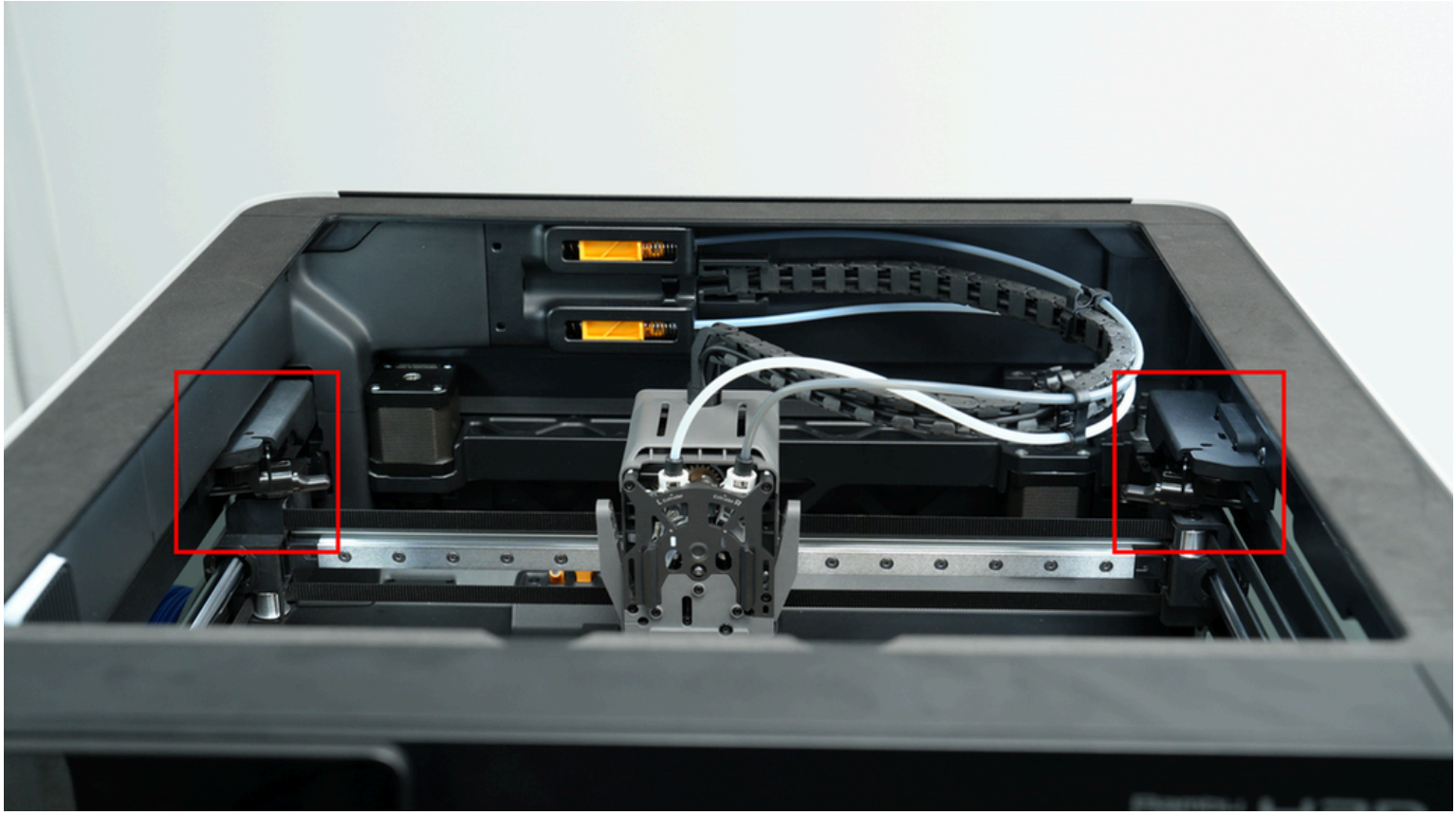
To ensure the normal operation of the left and right cutters, there is a foldable cutter stopper on each side of the H2D.

During the operation of the printer, the cutter stopper rod has 3 possible states: zero position, working position, and toolhead homing avoidance position.

- **Zero position:** Most of the time, the cutter stopper rod is in zero position, which does not affect any printing area.
- **Working position:** When the cutter needs to cut filament, the stopper rod will move to the working position.
- **Toolhead homing avoidance position:** To avoid affecting the accuracy of the Y-axis motor homing, the cutter push rod is in the avoidance position when the toolhead homes.

It should be noted that, unlike the X1 and P1 printers, the H2D's cutter stopper rod does not limit the toolhead's movement range, and the X-axis and Y-axis extreme printing ranges can be achieved without any special operations.





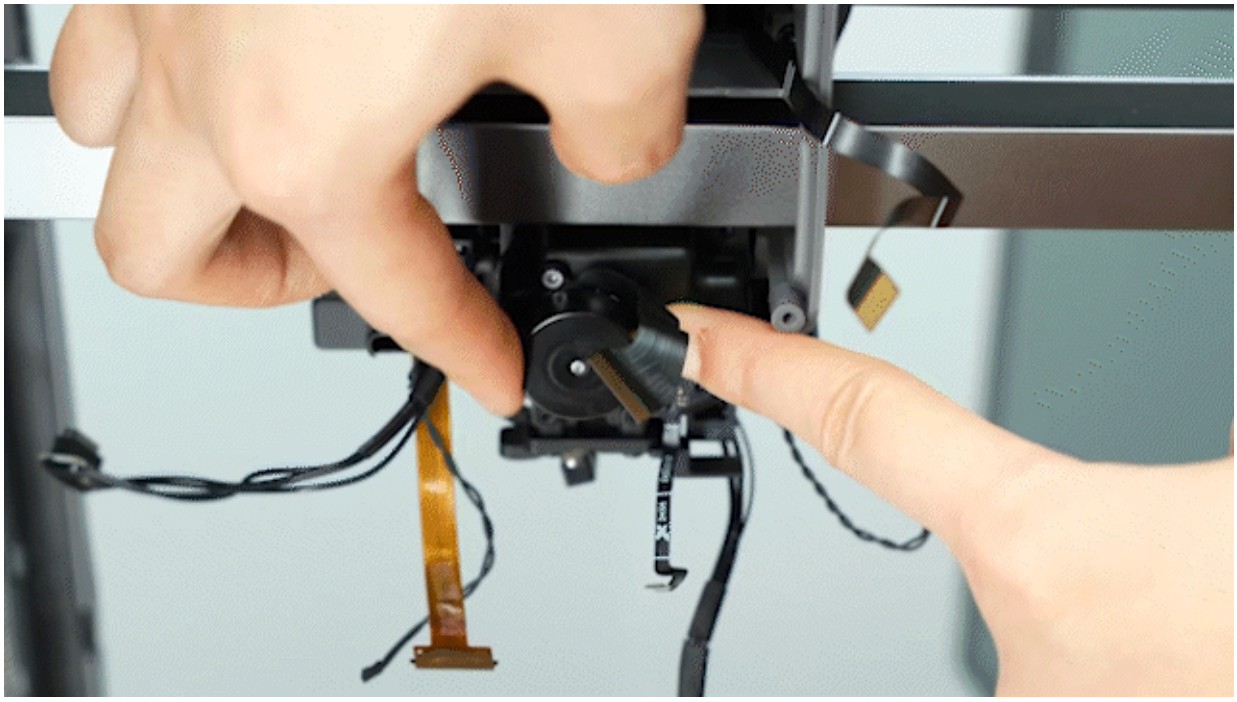
Hotend

The hotend assembly is the toolhead module's core component, consisting of a hotend heating assembly, a hotend (with nozzle, heat blocker, and heat sink), and a hotend silicone sock. The maximum supported heating temperature is 350°C. The hotend assembly heats the filament to a specified temperature, and the melted filament is deposited in the form of a thin layer to generate a model.

Different filaments often require different heating temperatures. For example, PLA materials are printed at lower temperatures around 210-220°C, while PPA materials need to be printed at higher temperatures around 300~320°C. Like the A1 series, the

Bambu Lab H2D printer fixes the hotend heater and NTC temperature sensor to the heating base without unplugging and plugging tiny terminals or using a screwdriver. The hotend is fixed with a quick-lock buckle to ensure heat conduction and melting of the filaments. At the same time, based on the A1 hotend, the H2D design enhances flow by increasing the heating power and melt zone. In terms of material, it incorporates a zirconia ceramic insulating base and a copper heat-conducting base to improve insulation performance.

The principle and function of the left hotend rising and falling



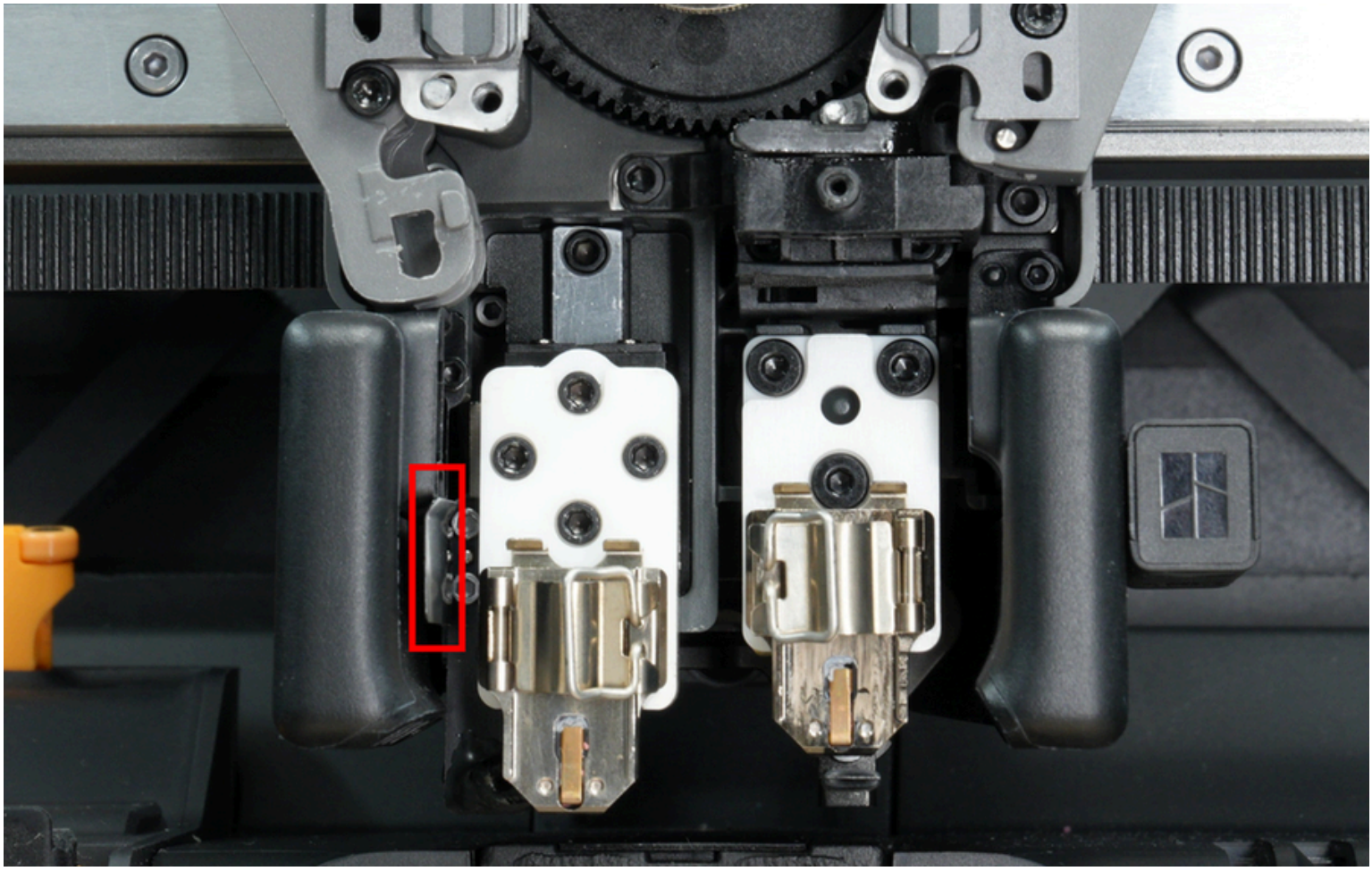
When the lifting motor rotates, the transmission mechanism drives the left hotend to rise and fall, and at the same time drives the flow blocker to swing left and right. There is a linkage relationship between the left hotend and the flow blocker. When the left hotend descends, the flow blocker will move to the right hotend to block the right nozzle; when the left hotend rises, the flow blocker will move to the left hotend to block the left nozzle, thereby preventing the hotend from leaking when not printing.

Note:

1. The function of the flow blocker is to block the non-working nozzle to prevent leakage. If there is a slight slight left-right tilt, it can be used normally as long as it does not affect the block function. If you find that the flow blocker does not press the nozzle, you can move the flow blocker connecting rod to the position between the two nozzles, try to manually bend the flow blocker upwards, and then manually switch the left and right nozzles on the screen to confirm that the flow blocker can block the nozzle normally and can move normally.

2. The flow blocker is located below the nozzle and is relatively fragile. In abnormal printing, the flow blocker may be deformed by abnormal protrusions. In this case, it is recommended to replace the flow blocker. The wind blocker is a thin steel sheet. When disassembling the hotend silicone sock or hotend, the wind blocker may be deformed. If the deformation is not serious, you can straighten it manually. If it is seriously deformed, it is recommended to replace the wind blocker.

At the same time, a wind blocker is installed next to the left hotend, which rises and falls with the left hotend, so that the wind blowing out of the air duct is concentrated on the heat sink of the hotend as much as possible, improving the heat dissipation efficiency and reducing the risk of blockage.



Recommendations for materials used for the left and right hotends

1. If you only print monochrome materials, it is recommended to use the right hotend for printing.
2. If you need to work with AMS for multi-color printing, it is recommended to connect AMS to the right hotend.

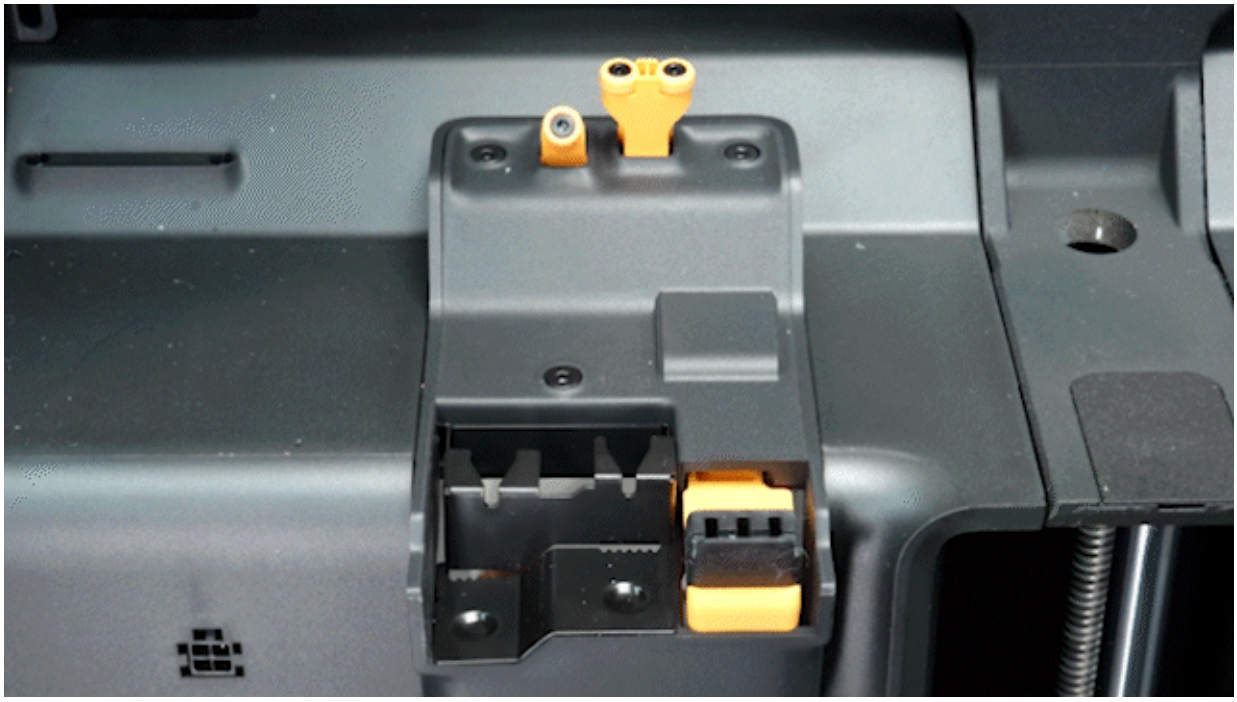
3. If you want to use the second hotend to print support materials, it is recommended to use the lifting hotend for printing.
4. TPU is only suitable for the right hotend.

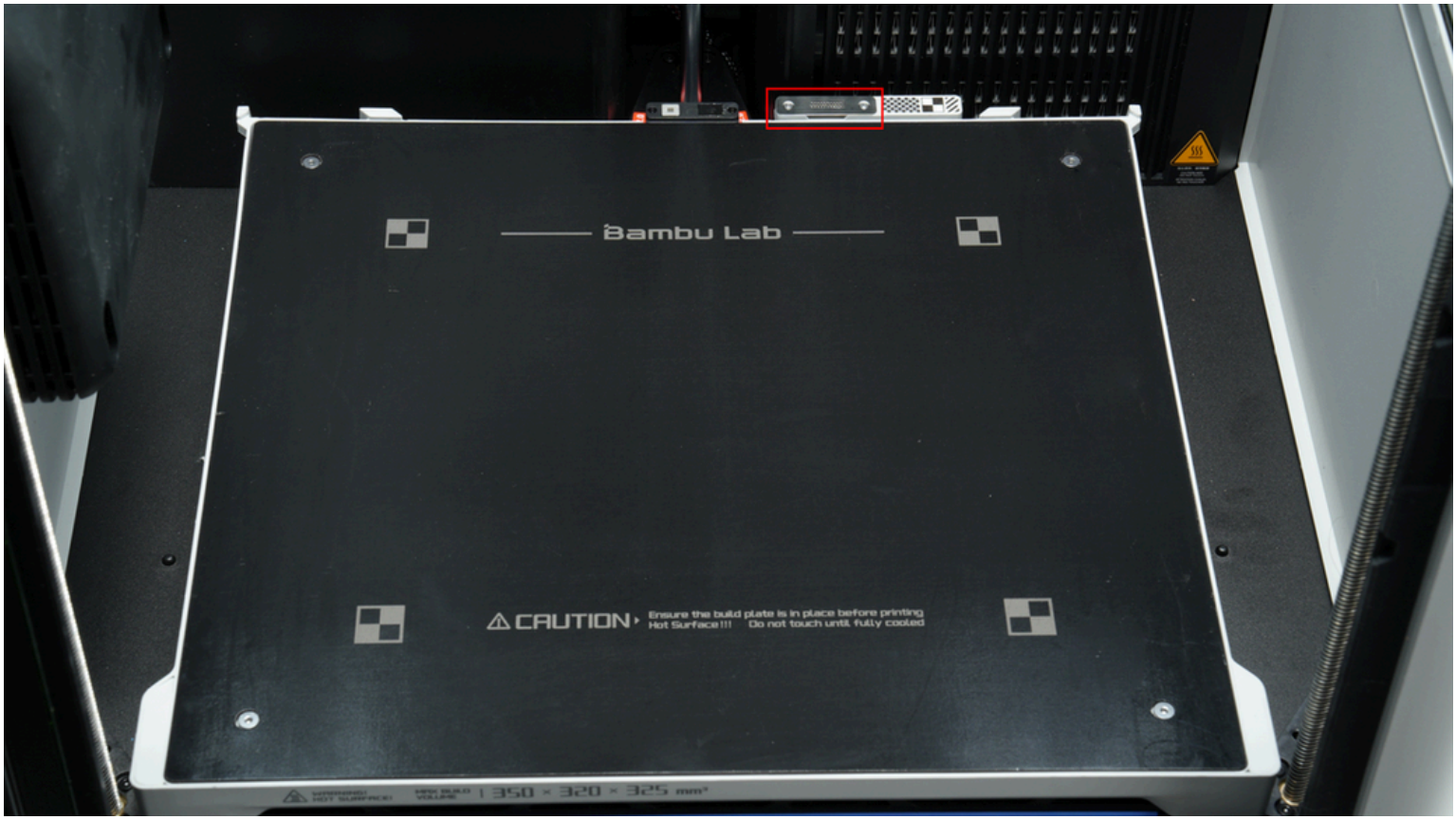
Purge Wiper

The purge wiper of H2D includes a purge wiper part and a nozzle wiper part (rough wiping), wherein the purge wiper part is composed of a pushing plate and a receiving plate, and the nozzle wiper part is composed of a pushing rod and a wiping nozzle connecting rod.

- **Purge wiper part:** It's used to efficiently handle the waste filaments ejected from the nozzle. Its functions include collecting and transporting waste filaments to ensure that the waste is properly disposed of to ensure a smooth and continuous printing process. The device plays an important role in multiple printing processes, including printer preparation, pausing and resuming printing, loading and unloading filaments, and the swapping of the filament and flushing process during multi-color printing.
- **Nozzle wiper part:** It's used to clean the nozzle before starting a print task. Each time a print task is started, the cleaning action is performed automatically without manual intervention. It should be noted that replacing the silicone nozzle wiper is part of the regular maintenance procedure. If the silicone nozzle wiper is damaged, you can purchase a replacement part in the official store.

Cleaning the nozzle before printing includes rough wiping and fine wiping. Rough wiping is mainly used to remove residual waste from the nozzle, while fine wiping ensures the smoothness of the nozzle surface. The nozzle wiper part mentioned here is used for rough wiping, and fine wiping means that the nozzle is rubbed down 1~2 mm at nozzle wiper steel sheet of the hotbed to achieve a better cleaning effect.

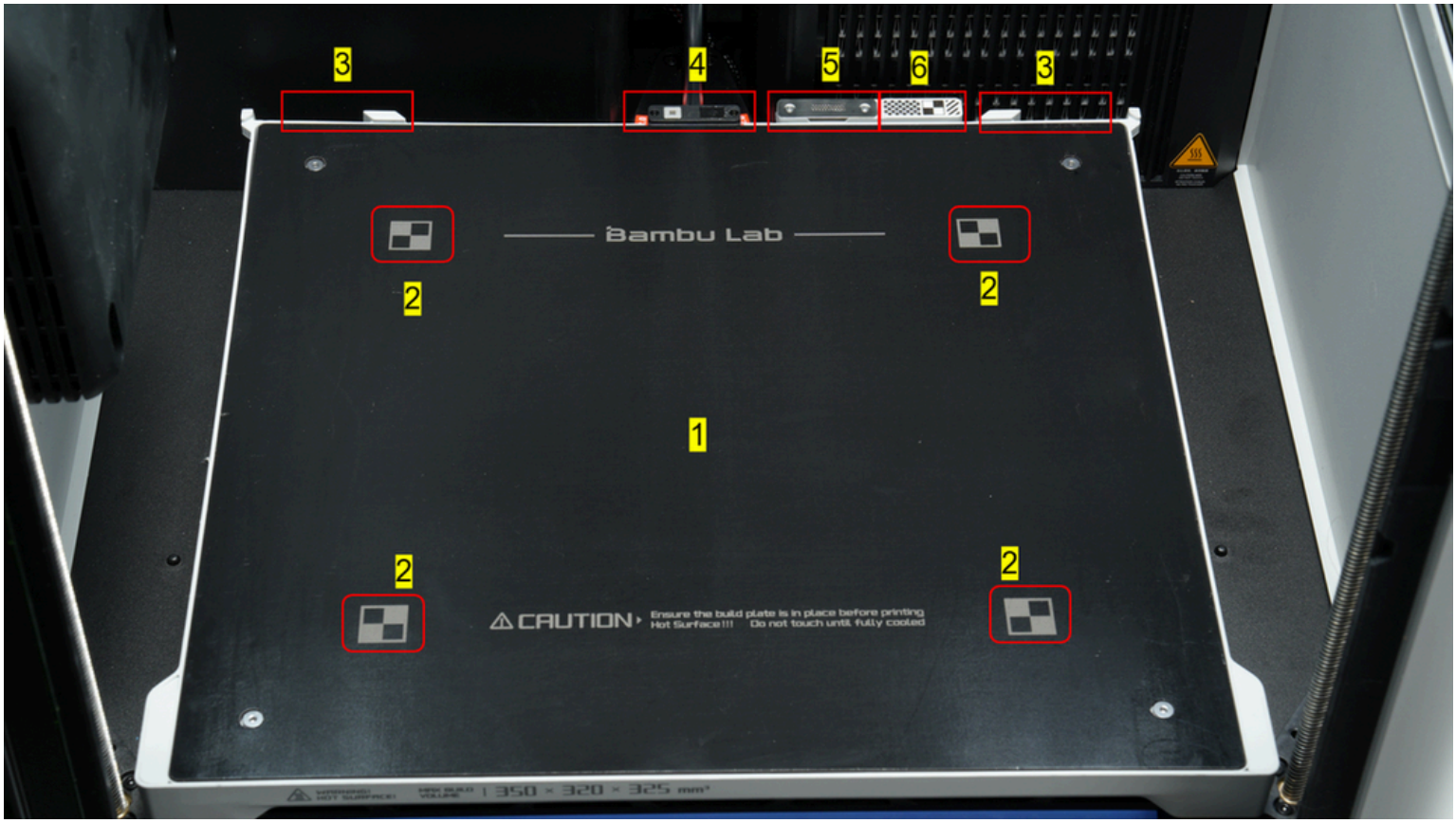




Heatbed

The heatbed is used to heat the printing surface to help the printed layers adhere better to the build plate. If the printing surface is not heated, the deposited filament will cool quickly and the tension between the layers will cause it to warp. During the printing process, the H2D printer will adjust the heating temperature of the heatbed according to the type of material used, up to 120°C. For example, when using PLA material, setting the heatbed temperature to 35-45°C when printing on a Bambu Cool Plate can effectively avoid warping. For materials such as ABS and PC, to prevent warping, the heatbed temperature needs to be set between 100-110°C for printing.

The maximum printing area of the heatbed surface is 350 x 320 mm². The actual printing area depends on the nozzle used; for more details, refer to [Introduction to the printable range of H2D dual nozzles](#).



The heatbed of the H2D printer consists of the following parts:

Module name	1 Heating area	2 Marker on the magnet surface	3 Build plate positioning parallel block	4 Nozzle offset calibration coil
Function	Heating surface	Calibrate the BirdsEye camera and live camera	Easy to place the build plate accurately	Used to calibrate the left and right hotend offsets to ensure that the positioning of the two hotends is exactly the same.

Module name	1 Heating area	2 Marker on the magnet surface	3 Build plate positioning parallel block	4 Nozzle offset calibration coil
Note	Avoid scratching the soft magnetic sticker with sharp objects.	Avoid scratching the soft magnetic sticker with sharp objects.	When placing the build plate, you can tilt it slightly and slide it inwards, and put it down when it reaches the limit position.	If you find that the model has an obvious layer shift after switching the nozzle during printing, it is recommended to perform a nozzle offset calibration.

Module name	5 Nozzle wiper steel sheet	6 Calibration sticker	7 Status Indicator
Function	Clean the nozzle and ensure the nozzle face remains smooth	For calibrating the toolhead camera	Used to indicate the printer's health status and printing task status.
Note	It can be removed and replaced after severe wear.	Avoid scratching the sticker with sharp objects.	

Build Plate

The H2D series printer comes with a Textured PEI Plate.

Please check the [Introduction to the Build Plates Wiki](#) for more information about our build plates.

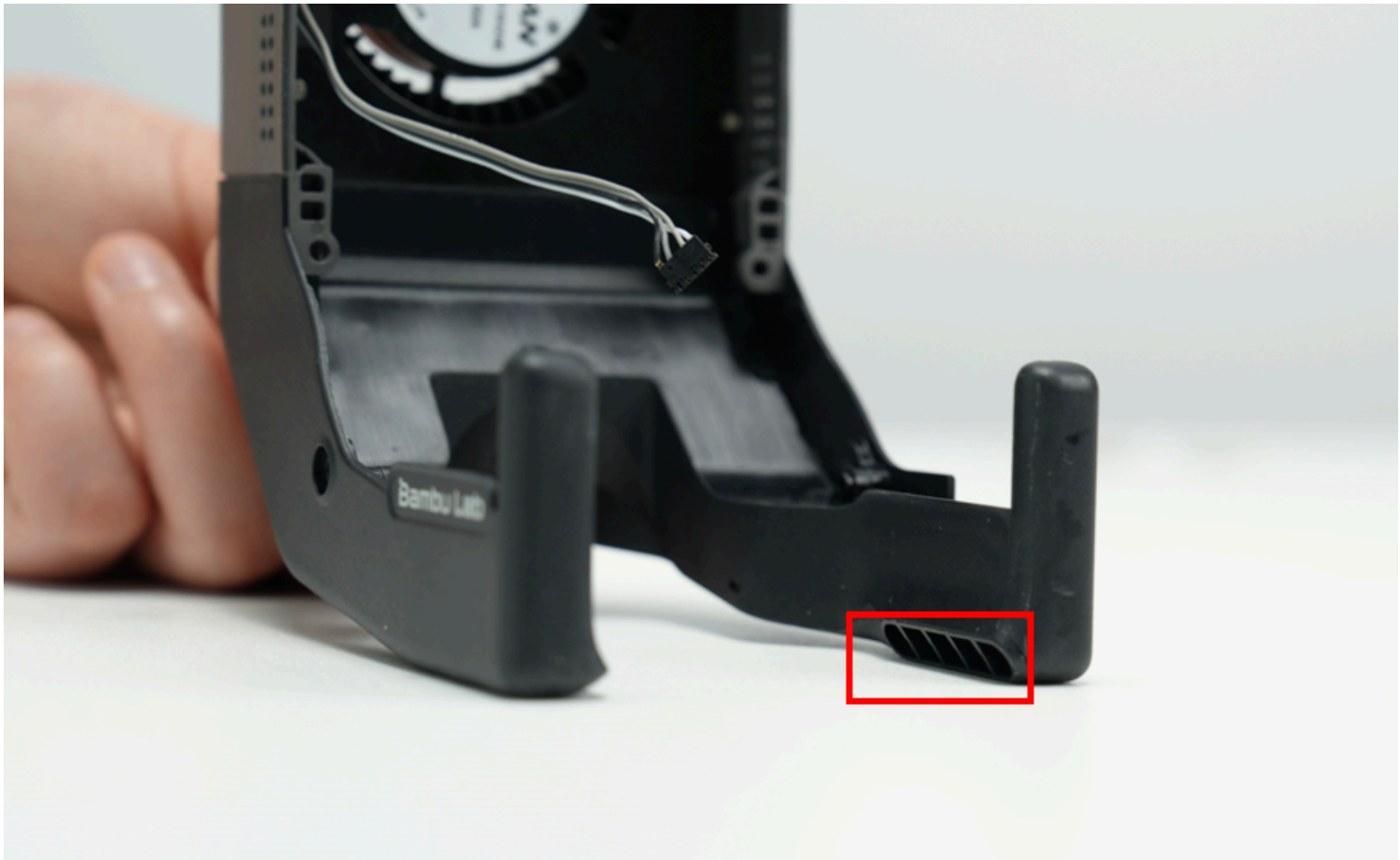
Cooling System and Heating System

Part cooling fan and air duct

Fast printing requires good cooling of the printed parts. H2D is equipped with a customized 5015 centrifugal fan and air duct. The cooling air blown out by the fan will be blown to the vicinity of the left and right hotends through the air duct, thereby ensuring fast cooling of the printed parts on the left and right hotends.

SNOWFAN
MODEL YY70TH2H8
DC 24V 0.50A


SNOWFAN
Bambu Lab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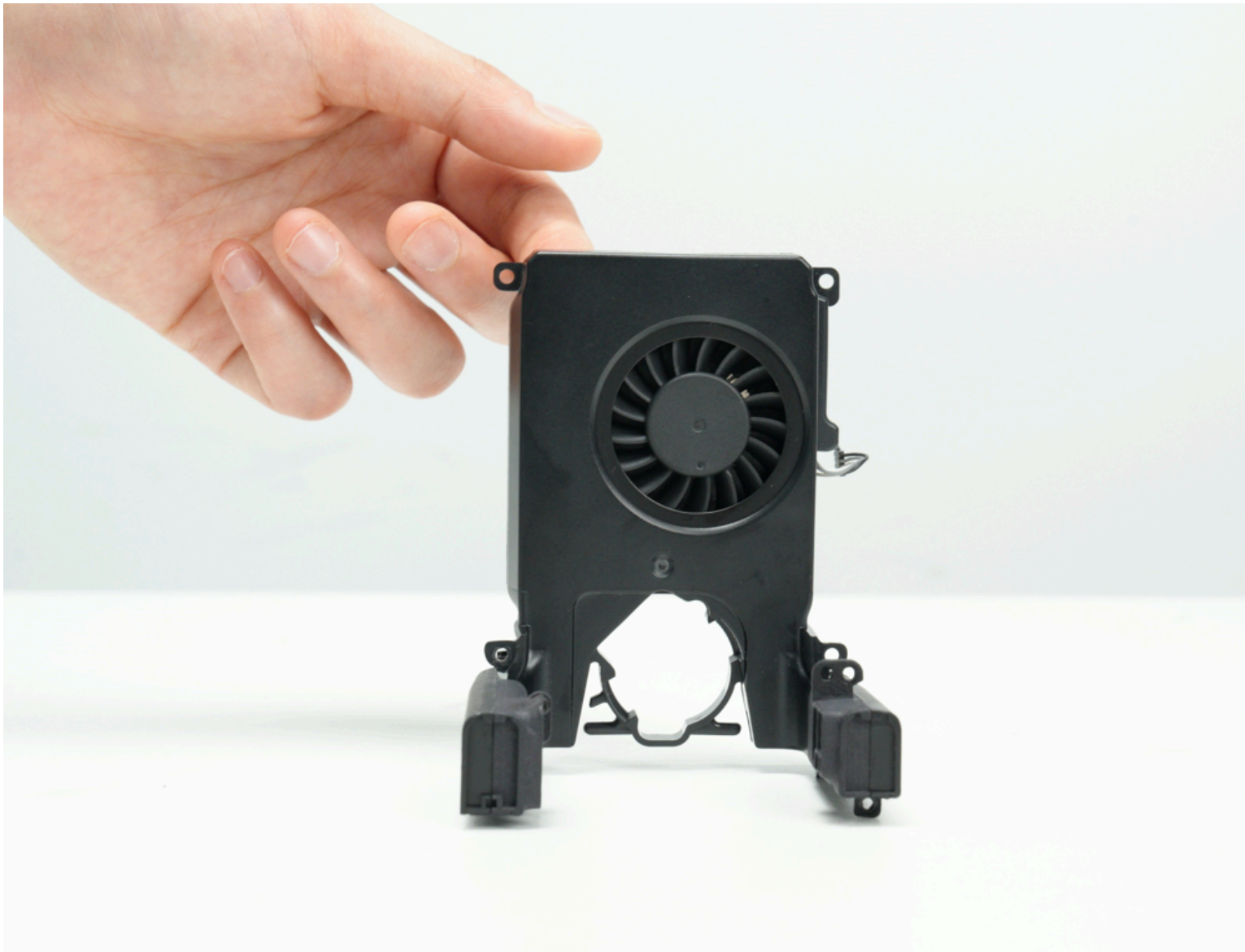
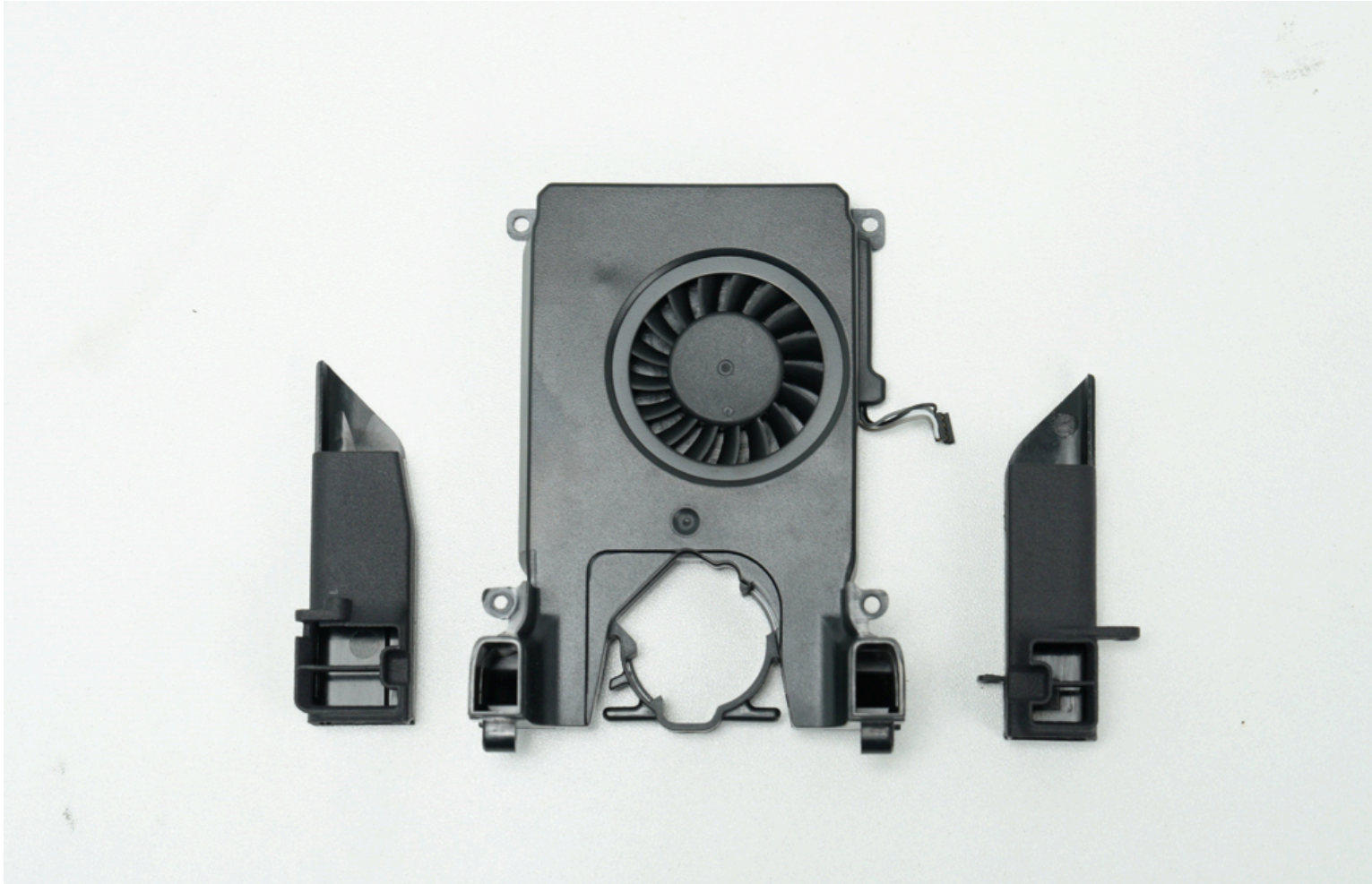
Cooling fan for hotend and air duct

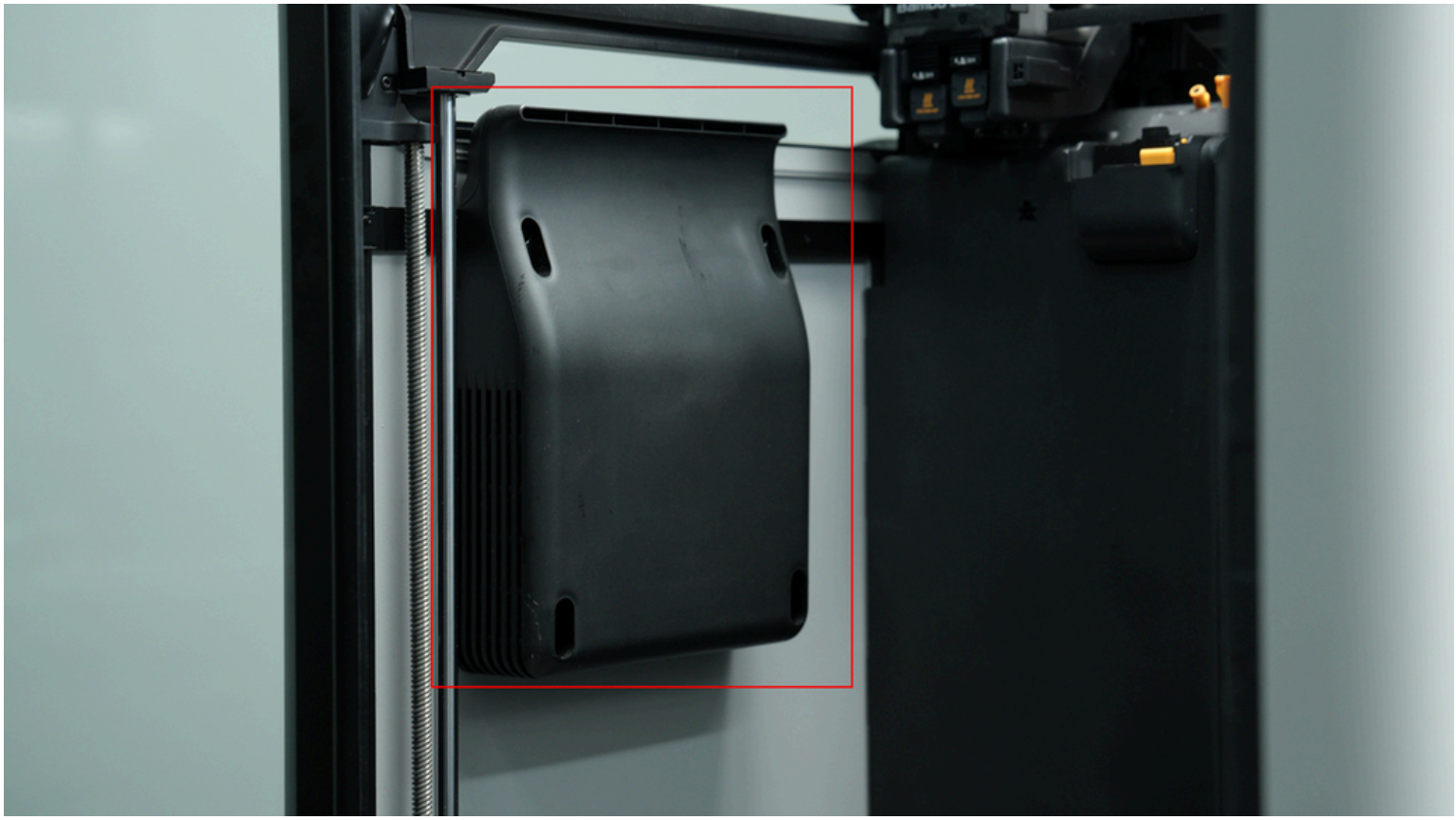
H2D is equipped with a cooling fan for hotend and air duct. The cooling air blown by the fan is directed to the heat sinks of the left and right hotends through the air duct to keep the hotend temperature stable and prevent overheating, thereby improving print quality and reducing clogging problems. In addition, the left hotend is also equipped with a wind blocker. For specific details about the wind blocker, please refer to the principle and function of the left hotend rising and falling.





Auxiliary part cooling fan

H2D is equipped with an additional cooling fan on the left side of the chamber. For some filaments (such as PLA), good heat dissipation helps improve printing results. Turning on the fan will form an "airflow layer" on the print, which helps to cure the print layer as quickly as possible.



Chamber cooling system

When the printer starts the external exhaust fan, the automatic top vent and the active chamber exhaust on the back of the printer will automatically open to accurately control the chamber temperature or control the airflow in the chamber. The automatic top vent acts as an air inlet and cooperates with the active chamber exhaust at the air outlet to provide sufficient air intake for the system while ensuring that the airflow in the chamber is as expected and controllable.

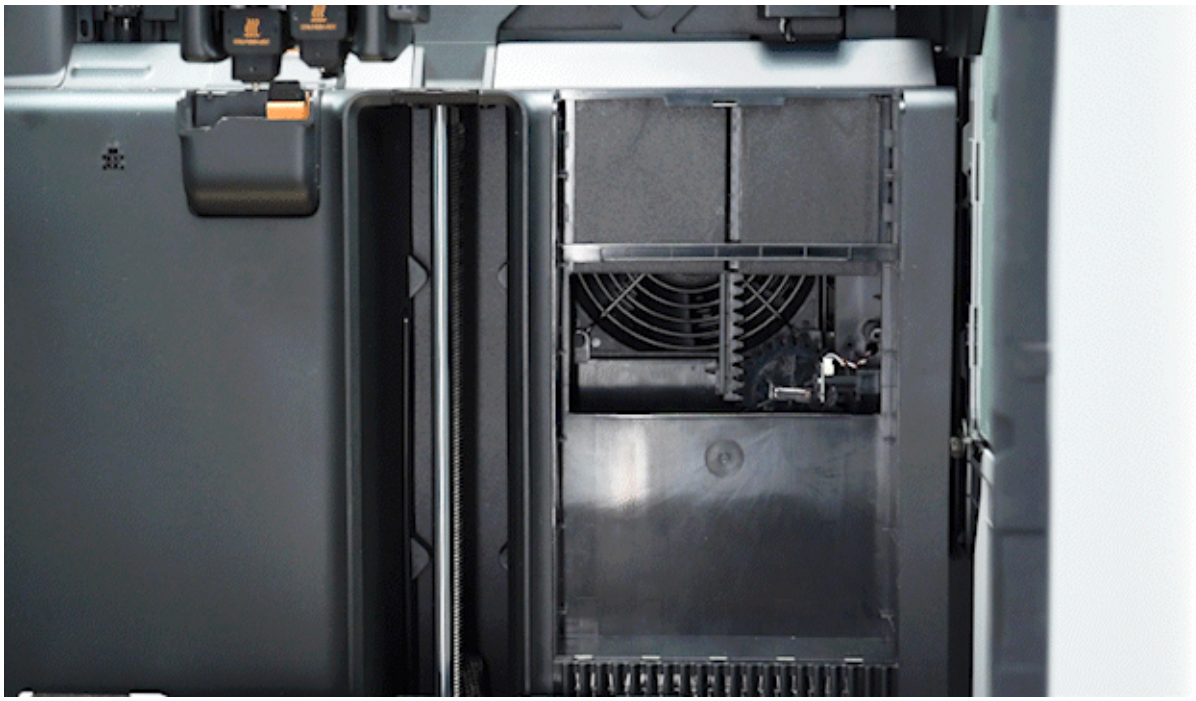
When the printer is idle or during printing, if the chamber temperature heating is not activated, the printer is in cooling mode.

In cooling mode:

1. The filter switch flap remains open;
2. The active chamber exhaust and automatic top vent will open along with the chamber exhaust fan to ensure air circulation between the printer chamber and the outside world and reduce the temperature inside the cavity.

In order to balance the noise and cooling effect, the speed of the chamber exhaust fan will increase as the chamber temperature rises during printing. When the chamber temperature of the printer is low and the cooling demand is not strong, the chamber exhaust fan will reduce its speed to 30%.


Bambu Lab
H2D

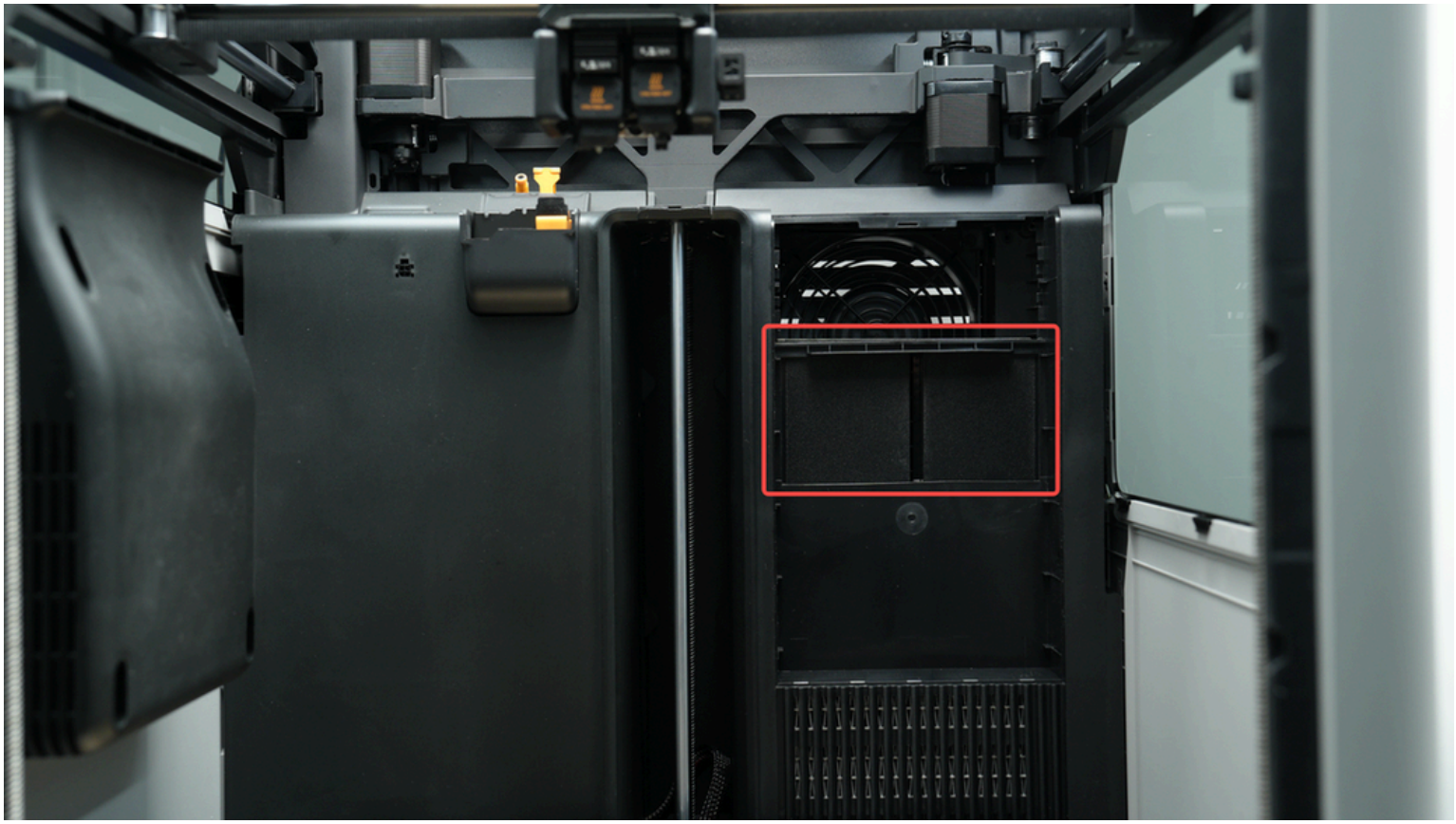


In summary, the automatic top vent and active chamber exhaust have the following two main functions:

1. During 3D printing, the system will automatically control the opening and closing and ventilation according to the type of filaments being printed and the detection of the chamber temperature to achieve precise control of the chamber temperature;
2. When the laser module is working, sufficient air intake should be provided to help the exhaust gas and particles generated by the laser operation to be fully filtered by the filter element before being discharged outside the machine to reduce pollution. At the same time, the opening angle of the vent has been carefully designed to ensure sufficient air intake and avoid direct laser exposure to the outside of the equipment, thereby reducing potential harm to the human body.

Chamber heating system

When the chamber is heated, the printer's circulation system switches to heating mode, and the active chamber exhaust and the automatic top vent are closed. To increase airflow and speed up the temperature rise during the chamber temperature rise stage, the filter switch flap is opened; while in the chamber temperature maintenance stage, the filter switch flap is closed to ensure the filtering effect.

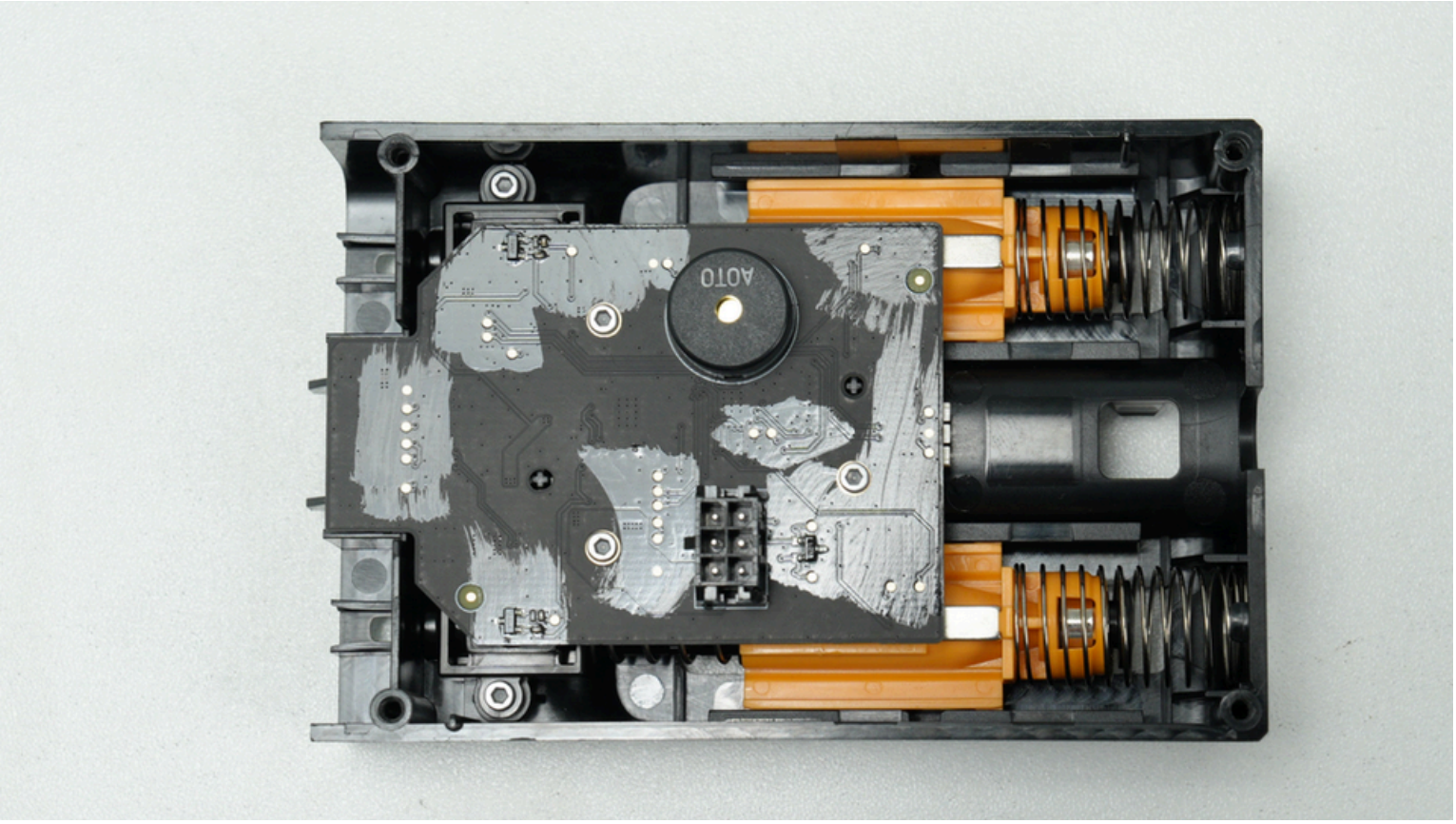


When the chamber temperature is set on the screen, or heating mode is selected, or chamber temperature heating is configured in the slicing file, the printer enters heating mode (but the chamber heater may not necessarily be in a heating state).

The chamber temperature is set on the screen, Bambu Studio or Bambu Handy, the printer will automatically switch to heating mode and the chamber heater will start working.

The chamber heater consists of a PTC heating plate and a chamber heat circulation fan. After the chamber temperature is set, the PTC will heat at full power and the chamber heat fan will run at maximum speed. When the chamber temperature reaches the set value, the speed of the chamber heat fan remains unchanged, and the power of the PTC will decrease to maintain the chamber temperature at a constant value.

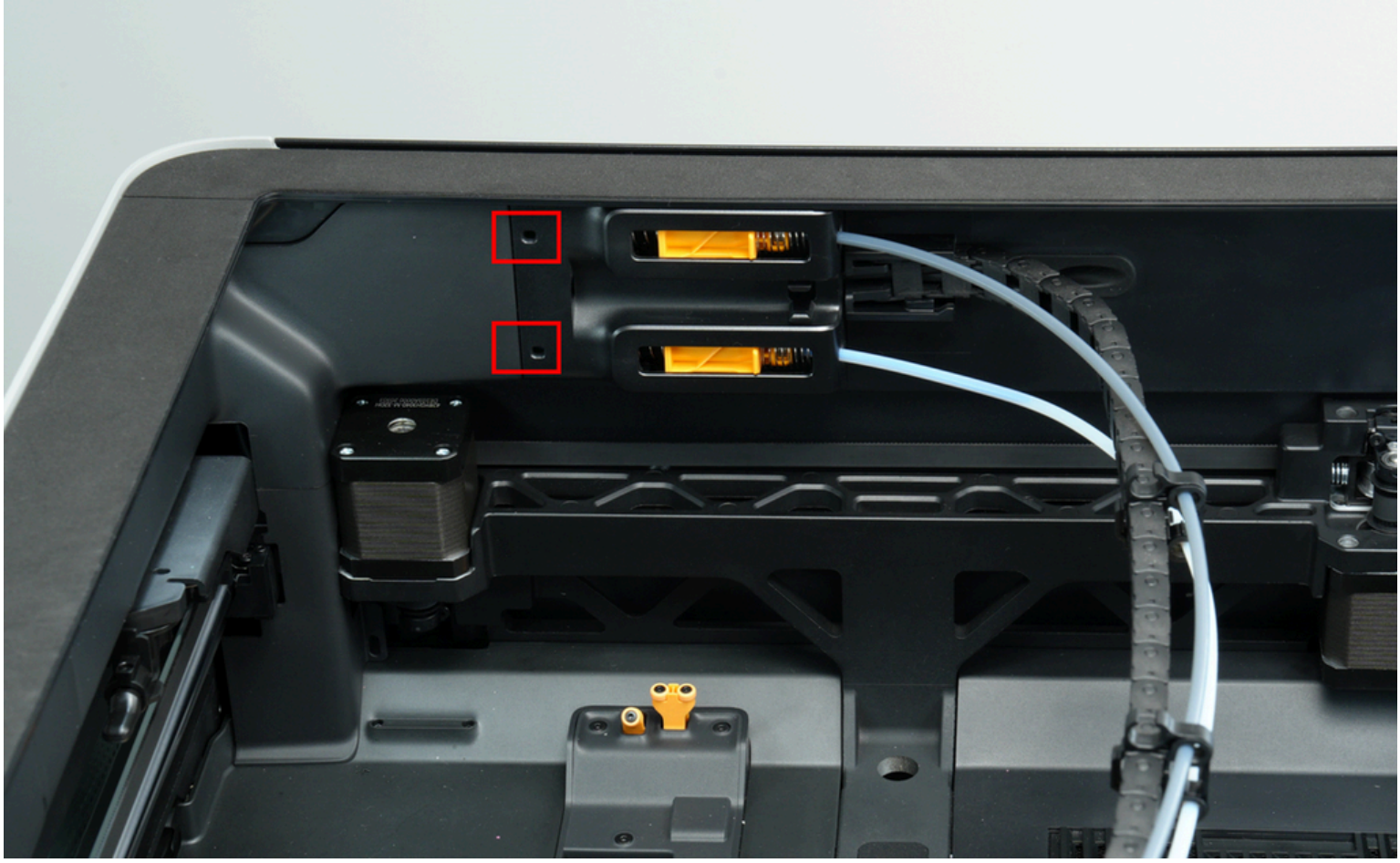
Filament Buffer



It has two filament channels, corresponding to the two hotends respectively. The upper channel of the buffer is connected to the right hotend, and the lower channel is connected to the left hotend. Combined with the standard length tube that comes

standard with the factory, the resistance during the feeding process can be reduced as much as possible.

Al usar el tampón, primero debe insertar el tubo de PTFE desde el soporte en la parte posterior de la impresora. Tenga en cuenta que debe insertarse completamente y no puede insertarse más profundamente. Puede ver que el tubo de PTFE está en su lugar desde la abertura en la parte frontal del tampón. Durante el proceso, se ha diseñado una guía en la cubierta de la placa AP para asegurar que el tubo se inserte sin problemas. Cabe destacar que la guía en la cubierta de la placa AP solo permite el paso del tubo de PTFE para guiar los filamentos hacia el tampón. Si el tubo de PTFE no está insertado y los filamentos se insertan directamente, es casi imposible enviarlos correctamente al tampón.



Cada canal se divide en una sección de amortiguación y una sección de detección de filamento. La sección de amortiguación incluye principalmente un deslizador, un imán, dos resortes y un sensor Hall; la sección de detección de filamento incluye

principalmente un imán, un resorte y un sensor Hall.

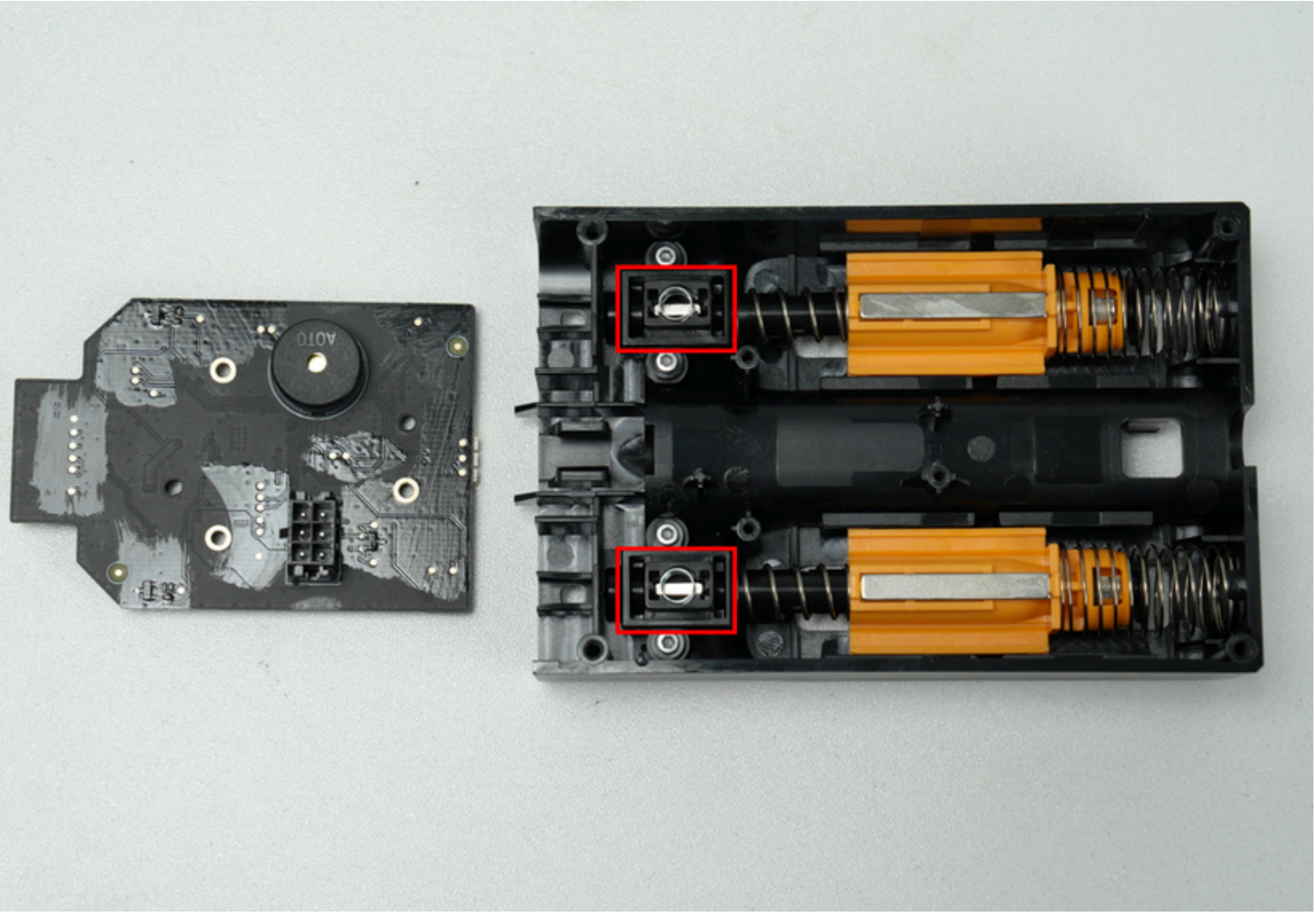
Parte del amortiguador

El principio básico de funcionamiento del búfer es que, cuando el AMS introduce el filamento en el extrusor del cabezal de la herramienta, la presión del filamento desplaza el deslizador hacia la derecha y almacena una pequeña sección del filamento en el búfer. Cuando el extrusor consume el filamento del búfer, el deslizador regresa a la izquierda. El sensor detecta la posición del deslizador y la envía al AMS y a la impresora para ajustar la velocidad de alimentación.

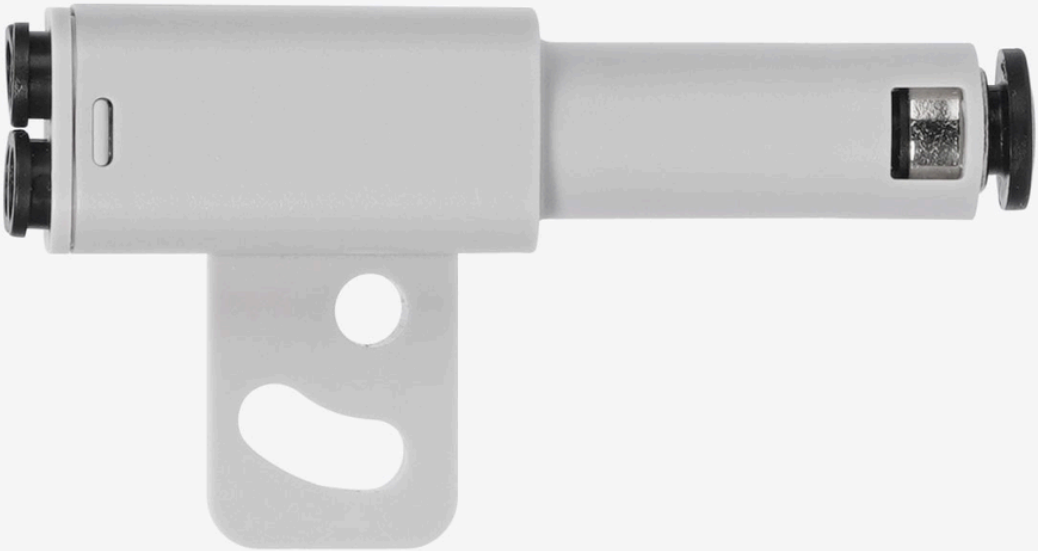
Además, al imprimir con una bobina externa, el búfer cuenta con una función de detección de enredos de material, que detecta si la bobina externa está enredada. A diferencia del búfer de las series X1/P1, la H2D cuenta con un resorte de enredos de filamento en el otro lado. Cuando el filamento entra en la impresora, la resistencia aumenta (por ejemplo, si el filamento está enredado), y el cabezal de la herramienta sigue extruyendo, el control deslizante se mueve hacia la izquierda. Tras un cierto desplazamiento, el valor de retorno del sensor Hall supera el umbral, lo que indica que el filamento está enredado. La impresora mostrará un mensaje de HMS para informar al usuario que debe actuar, activando así la función de detección de enredos de filamento.

Parte de detección de filamentos

El H2D cuenta con una función de detección de filamento en el búfer. Al usarlo con el puerto de expansión de tubos oficial, permite que un solo hotend funcione con hasta cuatro unidades AMS, eliminando así el concentrador AMS necesario para X1/P1.



Hay un imán en la parte de detección de filamento. Cuando no hay filamento, el imán es presionado por el resorte a una posición alejada del sensor Hall. Cuando hay filamento, el imán es elevado por este y se acerca al sensor Hall, realizando la función de detección de filamento.



Tensor de correa

El H2D cuenta con un tensor de correa ajustable en la parte trasera. El Monitor de Tensión de Correa (BTM) monitoriza la tensión de la correa y le proporciona información para ajustarla y optimizar su rendimiento.

Componentes eléctricos

El H2D contiene numerosos componentes electrónicos. A continuación, se presenta una introducción a algunos de los más importantes:

Placa de control principal

H2D tiene dos tipos de placas de control principales, una es responsable del procesamiento lógico interactivo y la otra es responsable del procesamiento de control de toda la unidad de movimiento de la máquina.

Placa base AP Logic

La placa base lógica contiene una CPU de cuatro núcleos y las conexiones necesarias para los diferentes medios electrónicos conectados a la impresora.

La CPU maneja las funciones inteligentes de la H2D (incluida la detección de IA, la calibración del flujo y la compensación de vibraciones) y la conexión entre el software de corte/aplicación móvil y la impresora.

Placa de control de movimiento MC

La placa de control de movimiento contiene un MCU de núcleo M4 doble, un MCU de núcleo M7 único y controladores paso a paso y conexiones a los diferentes componentes electrónicos de movimiento de la impresora, lo que proporciona: control de movimiento xyz, control de temperatura de la cámara, control de temperatura de la base calefactada, detección del estado de la cámara (puerta, cubierta superior, interruptor del panel lateral y detección del tipo de vidrio) y control del sistema de circulación (circulación de aire y control del canal de flujo).

La MCU controla el movimiento real y el estado general de la impresora después de obtener el flujo de código G de la CPU.

Interfaz de almacenamiento USB

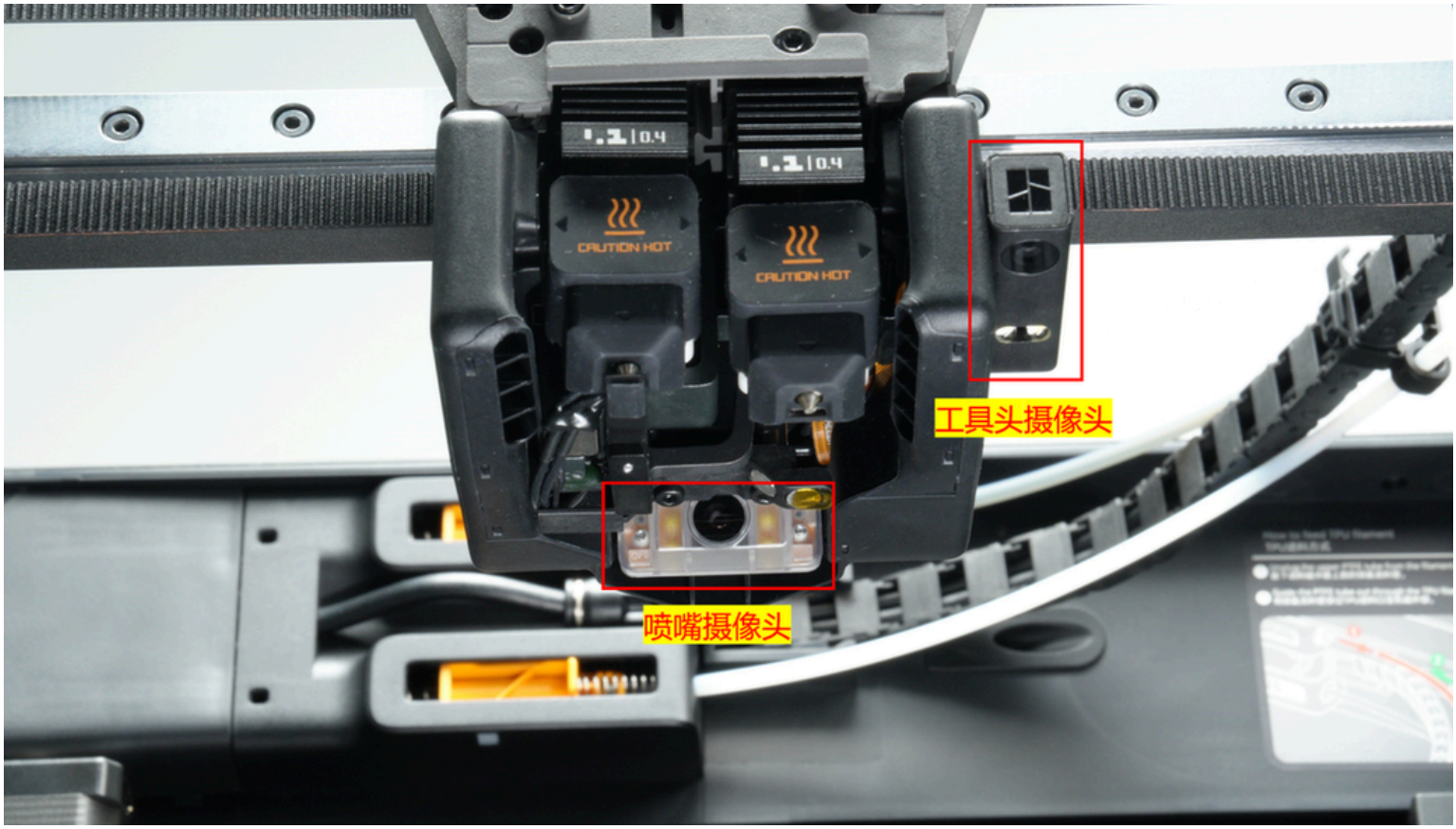
H2D tiene una interfaz USBA común que admite el protocolo USB2.0, que se puede utilizar para iniciar la impresión y el almacenamiento sin conexión de archivos de video de lapso de tiempo desde una unidad flash USB.

Pantalla

El H2D está equipado con una pantalla táctil de 5 pulgadas y 1280 x 720, combinada con una interfaz de usuario más fluida para proporcionar una experiencia operativa perfecta.

Cámara de boquilla

La H2D cuenta con una cámara de boquilla que admite 1080p 10 fps (hasta 30 fps), que puede detectar aglutinación del hotend, impresión de aire, detección de espaguetis y calibración de la posición del bote de basura.

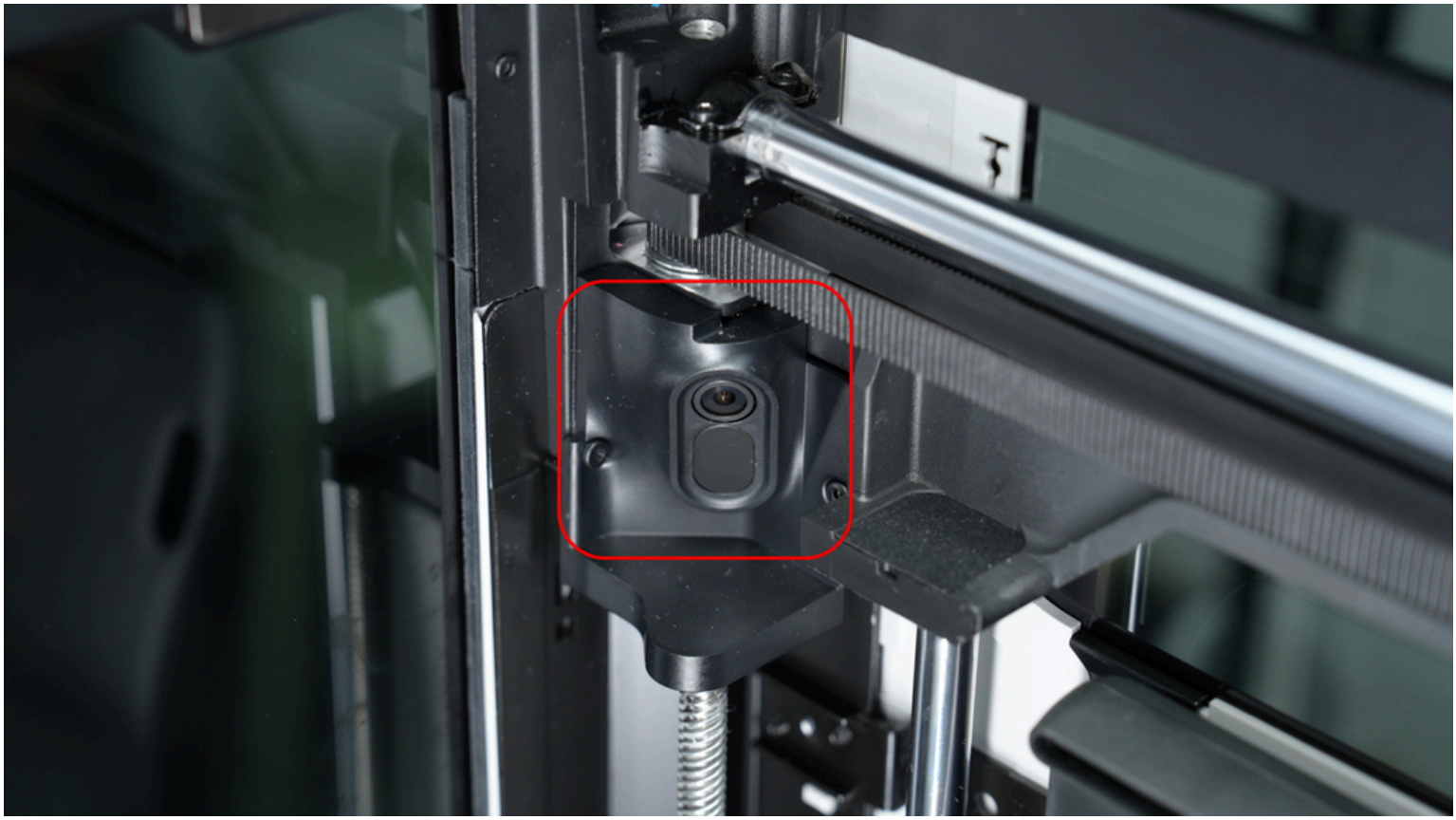


Cámara de cabezal de herramientas

El H2D cuenta con una cámara de cabezal de herramientas que admite 1080p 30 fps y se puede usar para calibración de precisión de movimiento, calibración de desplazamiento de boquilla de alta precisión, placa de construcción y reconocimiento de código de identificación de plataforma láser.

Cámara en vivo

La H2D cuenta con una cámara en vivo que admite 1080p 30 fps, lo que permite visualización en vivo dentro de la cámara de la impresora, lapso de tiempo y funciones de detección de IA necesarias.



Cámara BirdsEye (opcional en el módulo de impresión y necesaria en el láser)

El H2D puede equiparse opcionalmente con una cámara BirdsEye 4K, máximo 15 fps para cumplir con las funciones de detección y reconocimiento inteligente en los escenarios extendidos de láser y corte.

Luz LED

Los haces izquierdo y derecho del H2D están equipados con una barra de luz LED para garantizar una iluminación adecuada en la cámara.

Botón de inicio/pausa

Las tareas láser requieren supervisión. Por lo tanto, tras enviar una tarea de trabajo láser o de troquelado al software de preprocesamiento, el operador debe pulsar el botón de inicio situado en la esquina superior derecha de la impresora para iniciarla.

El botón de inicio también admite funciones de pausa para tareas del módulo láser, tareas del módulo de corte e impresión 3D (la función de pausa para la impresión 3D requiere una actualización de firmware, que se espera que esté disponible a fines de agosto de 2025).

Llave de seguridad

Para garantizar el cumplimiento de las normas de seguridad pertinentes, la impresora H2D está equipada con un conector de llave de seguridad, que debe insertarse con una llave de seguridad (módulo de impresión y corte) o con un botón de parada de emergencia con llave de seguridad (módulo láser) para activar la alimentación. Si la impresora no se enciende correctamente después de conectarla a la fuente de alimentación y encenderla, asegúrese de comprobarlo.

Botón de parada de emergencia (opcional en el módulo de impresión y corte, y necesario en el módulo láser)

Si necesita utilizar la función láser, debe instalar un botón de parada de emergencia con una llave de seguridad e insertar el enchufe del botón de parada de emergencia en la ranura de la llave de seguridad en la parte posterior de la impresora.

Alguien debe supervisar la tarea del láser durante todo el proceso y presionar el botón de parada de emergencia a tiempo para cortar el suministro de energía en caso de emergencia y prepararse para posibles emergencias en cualquier momento.

Consejos : La impresora cuenta con una llave de seguridad preinstalada en la parte posterior y un botón de parada de emergencia. Consérvelo en un lugar seguro después de retirar la llave de seguridad de la parte posterior.

Notas finales

Esperamos que la guía detallada proporcionada haya sido útil e informativa.

Si esta guía no resuelve su problema, *envíe un* [ticket técnico] . Responderemos a sus preguntas y le brindaremos asistencia.

Si tiene alguna sugerencia o comentario sobre esta wiki, deje un mensaje en la sección de comentarios. ¡Gracias por su apoyo y atención!