

## Calibration Checklist

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### 1 | Camera

The camera should have a minimum resolution of 640 x 480 pixels and be able to take clear images while the printer is moving. Cameras that support 1080p or larger quality are preferred. The camera may be manually focused or have an auto-focus feature. Note: if using an auto-focus camera, ensure that the camera is not placed in a location such that the bed or any moving part will come into the near-field of the camera and cause it to auto-focus on that part. Linked [here](#) is a list of suggested cameras.

- 640 x 480 pixel resolution

### 2 | Position + Orientation

The camera should be positioned such that the 3D printer's bed fills up most of the frame, with the center of the camera pointed at where the extruder head will spend most of the time. Try to eliminate all noise from the background by enclosing the printer or placing the printer in such an orientation that a back wall fills the remainder of the frame. Do not place any other 3D printers in the frame, the AI will detect defects on that second printer and think they are on the printer currently running the AI. The best locations are on the corners of the printer, looking at the extruder at a 45 degree angle from the X axis and directly in front of the printer. In typical applications it is preferable for the camera to be looking down to the print bed, however, when printing complicated items with complicated infill patterns, it is best to place the camera more parallel with the print bed since the complicated patterns may be mistaken for defects.

- Print bed fills the frame
- Background does not contain junk or other noise
- Background does not contain another printer
- Camera placed on corner or directly in front of print bed
- Camera looking slightly down on the print or parallel with bed

### 3 | Lighting

The print bed area should be well-lit and any items on it should be well-visible. If the camera cannot see the defect, then the AI model cannot reliably detect any defects. The print bed should also not be over-exposed. Over-exposure happens when an area is too well-lit and may begin reflecting light. Experiment with direct and indirect light and preview the camera feed to decide if the print bed is well-lit and not over-exposed.

- Print bed is visible
- Print bed is well-lit
- Print bed is not over-exposed

4 | Camera Focus

The camera should be focused on the main print area. If using a manual-focus camera, focus the camera on the extruder head in the center position where most of the printing will occur. The frame should be crisp and clear. If using an auto-focus camera, ensure the camera is not located in a location where moving parts will come in the near-field and cause the auto-focus to snap onto that moving part. This most commonly happens when the print bed moves into the near-field of a high-fov auto-focus camera.

- Print bed is crisp and clearly visible
- Auto-focus camera will not be obstructed by moving parts