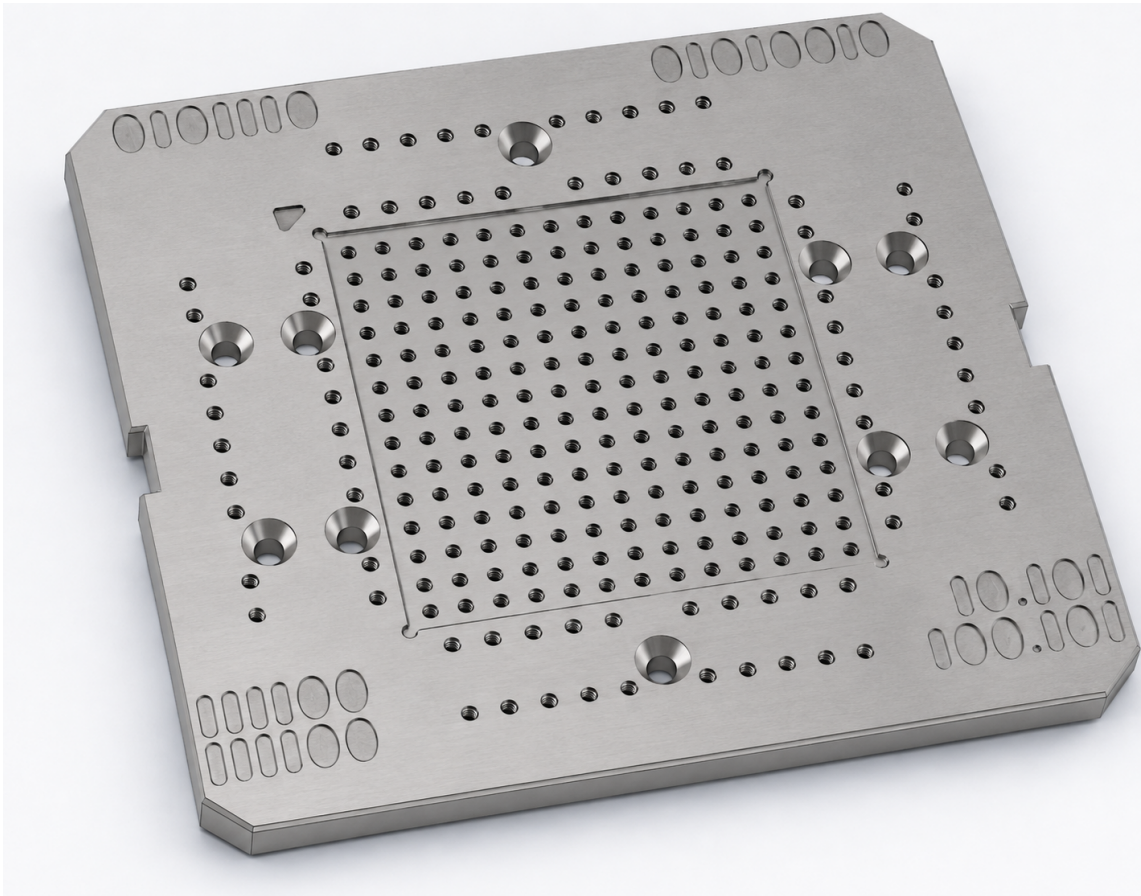


THERMAL VACUUM FIXTURE PLATE

User Manual - F&S 5600 Wire Bonder



6061 aluminum configurable thermal-vacuum workholding plate

Application	Configurable fixturing and vacuum hold-down for wire bonding
Machine Interface	Existing F&S 5600 heated vacuum work stage
Material	6061 aluminum
Central Fixture Grid	M2.5 threaded holes, 5 mm pitch in X and Y
Accessory Mounting	Peripheral M3 blind threaded holes
Stage Attachment	M3 countersunk through holes for flat-head screws
Upper Vacuum Region	0.5 mm recessed region with precision alignment edges

Purpose. The Thermal Vacuum Fixture Plate mounts to the existing heated vacuum stage of the F&S 5600 wire bonder and provides a reusable, configurable interface for positioning, heating, vacuum holding, and mechanically fixturing devices, substrates, carriers, and custom hardware.

1. Overview

The fixture plate expands the capabilities of the standard F&S 5600 work stage without requiring modification of the existing stage. It combines a dense threaded fixture grid, accessory mounting points, distributed vacuum hold-down, precision alignment surfaces, and conductive thermal coupling to the original heated stage.

The plate is intended for laboratory use with flat substrates, device carriers, packages, small circuit assemblies, custom clamps, stops, and application-specific fixtures used during wire-bonding operations.

2. Plate Features

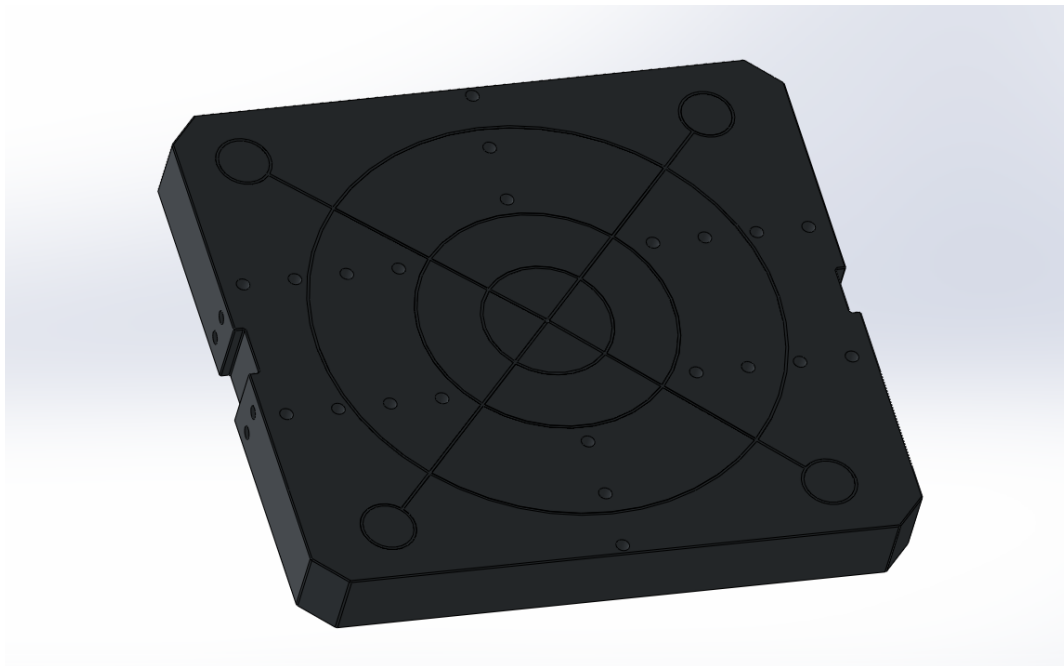
Central M2.5 fixture grid. The central work area contains M2.5 threaded holes arranged on a 5 mm x 5 mm pitch. The regular grid provides flexible attachment locations for clamps, stops, brackets, carriers, and custom fixtures.

Peripheral M3 mounting holes. Blind M3 threaded holes surrounding the central region are provided for mounting additional fixture hardware and accessories.

M3 stage-mounting holes. 90-degree countersunk through holes accept M3 x 0.5 mm flat-head screws used to secure the fixture plate to the existing F&S work stage. The countersinks allow the screw heads to seat flush with or below the upper surface.

0.5 mm recessed vacuum/alignment region. The central upper work region is recessed 0.5 mm. Vacuum holes open into this region to provide distributed suction. The straight sides of the recess also provide precision mechanical reference edges for repeatable positioning of substrates, carriers, or fixtures.

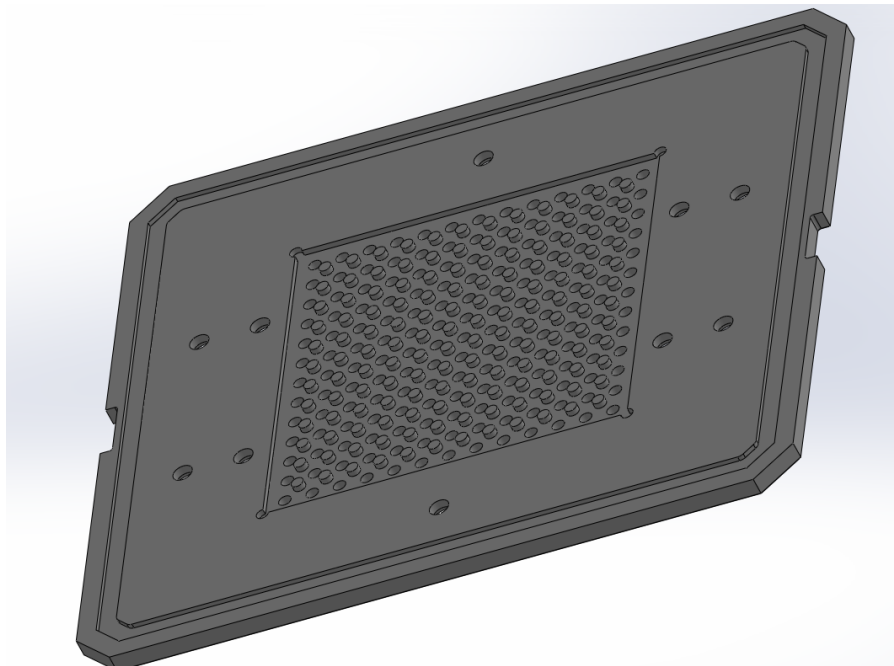
3. Existing F&S Vacuum Interface



Existing F&S 5600 work stage. The central vacuum port feeds the machined distribution-channel pattern.

The existing F&S work stage contains a central vacuum port and machined distribution troughs. When the custom fixture plate is installed, the original stage supplies both vacuum and heat to the new work surface.

4. Underside Construction



Underside of the custom plate showing the recessed vacuum plenum, perimeter seal region, and central support-pillar array.

- Integrated vacuum plenum.** The large recessed region on the underside forms an enclosed vacuum chamber when the plate is bolted to the F&S stage. Vacuum from the existing stage distributes through this plenum and is drawn through the vacuum-hole array to the workpiece.
- PTFE perimeter gasket.** A PTFE gasket seals the perimeter between the custom plate and existing work stage, preventing leakage and forcing the supplied vacuum through the intended vacuum-hole array.
- Thermal support pillars.** Integral pillars beneath the central work region contact the heated F&S stage. They provide direct conductive thermal paths while leaving interconnected open volume for vacuum distribution, and support the central region against atmospheric loading to reduce deflection.

5. Vacuum and Thermal Operating Principle

Workpiece
0.5 mm recessed vacuum / alignment region
Vacuum-hole array and 6061 fixture plate
Underside vacuum plenum + thermal support pillars
Existing F&S vacuum distribution channels
Central F&S vacuum port / heated stage

The PTFE gasket provides the vacuum seal, while the support pillars provide rigid mechanical contact and additional thermal conduction. Vacuum flows through the existing F&S stage into the sealed underside plenum and then through the fixture-plate vacuum-hole array.

6. Installation

1. Ensure the existing F&S work stage, PTFE gasket, and underside of the fixture plate are clean and free of debris.
2. Position the PTFE perimeter gasket so that it forms a continuous seal around the vacuum plenum.
3. Place the fixture plate onto the existing stage and align the countersunk mounting holes.
4. Install the M3 x 0.5 mm flat-head mounting screws through the 90-degree countersinks and tighten them evenly. Use only enough torque to seat the plate securely and establish a uniform gasket seal.
5. Confirm that the plate sits flat and does not rock. The support pillars should provide stable contact with the existing stage.
6. Enable the F&S vacuum supply and verify that vacuum is available at the upper vacuum-hole array.
7. Check for excessive leakage around the plate perimeter before installing the workpiece.

7. Configuring Workholding

Position the workpiece so the intended bonding area remains accessible to the bonding head. Flat workpieces may be retained directly by vacuum, while the M2.5 grid and M3 accessory holes can be used for mechanical clamps, stops, carriers, or custom fixtures.

For repeatable positioning, a workpiece or fixture may be referenced against one or two straight sides of the 0.5 mm recessed region before vacuum is applied or mechanical hardware is tightened.

Verify that all screws, clamps, fixtures, hoses, and workpieces remain clear of the bonding head and machine travel. Use only the clamping force required to securely retain the workpiece.

8. Heated Operation

The 6061 aluminum plate conducts heat from the existing F&S heated stage to the work area. The underside support pillars improve direct conductive coupling beneath the central region.

Because the fixture plate, gasket, workpiece, and any secondary fixture add thermal mass and interfaces, the actual workpiece temperature may differ from the stage-controller indication. Allow sufficient time for the assembly to reach thermal equilibrium. For temperature-critical processes, independently verify the workpiece temperature.

9. Normal Operating Procedure

1. Install and verify the fixture plate.
2. Install and align the workpiece or custom fixture.
3. Apply vacuum if required and verify secure retention.
4. Set the desired stage temperature and allow the assembly to stabilize.
5. Perform the normal F&S 5600 setup and bonding procedure.
6. After bonding, disable heating as appropriate, allow hot components to cool, release vacuum, and remove the workpiece.

10. Safety and Handling

Hot surfaces: The fixture plate, fasteners, fixtures, and workpieces can become hot during normal operation. Treat the assembly as a hot surface whenever stage heating has been used.

Machine clearance: Before bonding, verify that all fixture components are clear of the bonding head and other moving machine components.

Fasteners: Do not overtighten screws into the aluminum plate. Excessive torque may damage threads, distort fixtures, or damage the workpiece.

Vacuum: Verify adequate holding force before bonding. Vacuum should not be relied upon when workpiece geometry, surface condition, leakage, or sealing area prevents secure retention.

11. Cleaning and Maintenance

Keep the top work surface, vacuum holes, underside plenum, support pillars, gasket interface, and F&S stage free of wire fragments, bonding debris, adhesive residue, and other contamination.

Pay particular attention to the underside contact surfaces and support pillars. Debris trapped between the fixture plate and F&S stage can reduce thermal transfer or prevent the plate from seating flat.

Inspect the PTFE gasket periodically for damage, deformation, contamination, or discontinuities that could cause vacuum leakage. Replace the gasket when it can no longer provide a reliable perimeter seal.

Avoid aggressive cleaning methods that could damage precision surfaces, threads, the alignment edges of the recessed region, or the flatness of the plate.

12. Storage

When not installed, store the fixture plate in a clean, dry location. Protect the upper work surface, underside support pillars, gasket interface, and stage-contact surfaces from scratches, dents, and contamination.

Lab-use note: This fixture is an accessory for the F&S 5600 and does not replace the operating and safety procedures for the wire bonder itself. Users should follow the established laboratory procedures for operation of the F&S 5600.