MODULAR JIG SYSTEM

User Manual — Digital Edition (Rev A.1)

APEX DESIGN — Professional Fabrication Tools

Table of Contents

1. Introduction

The Apex Design Modular Jig System is a professional-grade fixturing platform designed to position and support workpieces on welding tables during fabrication, alignment, and tack welding operations. The system is intended for experienced fabricators and assumes familiarity with welding table fixturing, external clamps, and standard shop practices.

2. Safety

Follow standard fabrication and welding safety practices at all times. Verify that all adjustable interfaces are fully locked before applying load or performing welding operations. Ensure workpieces are adequately supported and do not rely on a single jig assembly where opposing support is required.

3. Kit Contents

- Four (4) identical jig assemblies
- Telescoping tube sets: 2 in and 4 in (interchangeable)
- Magnetic bases (one per jig assembly)
- Installed hardware

4. System Architecture

The Modular Jig System consists of a base that establishes the datum to the welding table, a telescoping tube assembly that provides adjustable offset, an end junction that defines the arm interface, and an arm that accepts external welding table clamps. Each component serves a single structural or adjustment role to minimize compound setup error. Primary load is transferred from the external clamp through the arm, end junction, telescoping tubes, and into the base.

5. Assembly Reference

Assembly proceeds from the base upward. The base establishes the reference for all subsequent components. Once installed, lower components remain fixed while upper components provide adjustment. Refer to the assembly schematic for component identification and interface relationships.

6. Adjustment & Kinematics

The Modular Jig System provides three degrees of freedom: linear adjustment via the telescoping tube assembly, rotational adjustment via the telescoping tube assembly, and independent rotational adjustment at the arm-to-end junction interface. Telescoping tube adjustments are intended for coarse positioning, while arm clocking is intended for fine orientation. For maximum rigidity, adjust telescoping height and rotation first, lock the telescoping clamp, then perform arm clocking and lock using the M8 jam nuts.

7. Thread & Interface Reference

Base: (4×) M8 × 1.25 circumferential, (1×) M8 × 1.25 bottom, 16 mm boss. End Junction: (4×) M8 × 1.25 circumferential, (1×) M8 × 1.25 top. Arm: 1/2-13 lower circumference, M10 × 1.5 upper circumference, (2×) M8 × 1.25 sides, (1×) M8 × 1.25 bottom. All threads are standard right-hand.

8. Quick Start

- Mount the base to the welding table or magnetic base.
- Install telescoping tubes and select the required tube length.
- Adjust telescoping height and rotation to achieve coarse positioning.
- Lock the telescoping tube clamp.

- Install and clock the arm to the desired orientation.
- Lock arm orientation using the M8 jam nuts.
- Install external welding table clamps and secure the workpiece.
- Verify rigidity before welding.

9. Application Examples

Multiple jig assemblies may be used together to support complex or asymmetric workpieces. Using opposing jig pairs improves stability and reduces reliance on a single support point.

10. Materials & Manufacturing

The base, end junction, and arm are manufactured from DMLS-printed aluminum alloy. Telescoping tubes are aluminum. The telescoping tube locking clamp is ABS plastic. Fasteners and jam nuts are steel.

11. Maintenance

Clean components after welding operations. Inspect threads periodically for debris or damage. Verify proper operation of the telescoping clamp before use.

12. Troubleshooting

Loss of rigidity is typically caused by an unlocked telescoping clamp or incomplete jam nut engagement. Unintended rotation may indicate that coarse rotation was not locked prior to arm clocking.

13. Specifications

Thread sizes and interface types are listed in the Thread & Interface Reference. Tube sizes and adjustment ranges depend on selected tube sets.

14. Warranty & Support

This product is covered by a limited warranty. Contact Apex Design for support or replacement components.

Appendix A — Quick Reference

Telescoping clamp locks linear and rotational tube adjustment. Arm jam nuts lock independent rotational adjustment. External clamps provide all clamping force.