SOP: Assembly and Calibration of Machinery and Equipment

This SOP details the **assembly and calibration of machinery and equipment**, covering step-by-step procedures for proper setup, alignment, and adjustment to ensure optimal performance. It includes guidelines for verifying component integrity, safe handling practices, use of calibration tools, and documentation of calibration results. The objective is to maintain machinery accuracy, enhance operational efficiency, and prevent equipment malfunctions through standardized assembly and precise calibration techniques.

1. Purpose

To outline standardized procedures for assembly and calibration of machinery and equipment to guarantee safety, efficiency, and optimal operational performance.

2. Scope

This SOP applies to all personnel involved in the assembly, maintenance, and calibration of machinery and equipment in the facility.

3. Responsibilities

- **Technicians/Operators:** Follow assembly and calibration steps, adhere to safety instructions, and ensure proper documentation.
- **Supervisors/Engineers:** Provide necessary training, review completed documentation, and verify calibration results.
- **Quality Assurance:** Audit adherence to SOP and accuracy of calibration data.

4. Definitions

- **Calibration:** The process of adjusting and verifying the accuracy of equipment to produce results within specified limits.
- **Assembly:** Systematic combination of components to form a complete machine or equipment.

5. Procedure

5.1 Preparation

- Review equipment manual and assembly schemas.
- Gather required tools and verified calibration instruments.
- Inspect components for damage, corrosion, or defects.
- Ensure workspace is clean and well-lit.

5.2 Assembly of Machinery/Equipment

1. Identify and layout all components as per assembly diagram.
2. Assemble components sequentially, ensuring proper fit and alignment.
3. Tighten fasteners to manufacturer-recommended torque values.
4. Use appropriate PPE (personal protective equipment) and safe handling practices throughout process.
5. Verify all moving parts are free from obstruction and rotate/swing smoothly.

5.3 Calibration

1. Ensure calibration equipment is within its own valid calibration period.
2. Connect machine/equipment to power and initiate warm-up (if needed).
3. Follow manufacturer's instructions to perform calibration checks.
4. Adjust machine settings to achieve required accuracy and performance parameters.
5. Record calibration results for each test point or parameter.
6. Repeat calibration if results fall outside of permissible limits.

5.4 Post-Assembly/Calibration Verification

- Perform functional checks to confirm performance at specified standards.
- Inspect for loose or missing parts, leaks, or abnormal sounds.
- Document any non-conformances and corrective actions taken.

6. Documentation

- Complete the assembly and calibration checklist.
- Record calibration results and attach supporting data where applicable.
- Log all activities in equipment maintenance records.

Date	Equipment ID	Activity	Technician	Comments/Results	Reviewed by

7. Safety Precautions

- Use specified PPE (gloves, goggles, safety shoes) at all times during assembly and calibration.
- De-energize equipment before assembly or disassembly.
- Handle heavy or delicate components as per safe handling guidelines.
- Follow lockout/tagout procedures when applicable.

8. References

- Equipment manufacturer manuals and technical documents
- Calibration tool instructions
- Internal safety and quality management policies

9. Revision History

Revision	Date	Description	Author
1.0		Initial release	