

Swiss Automatic Screw Machine Operator & Set-Up 600.280.034

The following schedule of work experience is intended as a guide. It need not be followed in any particular sequence, and it is understood that some adjustments may be necessary in the hours allotted for different work experience. In all cases, the apprentice is to receive sufficient experience to become fully competent and use good workmanship in all work processes which are a part of the trade. The apprentice will be fully instructed in safety and OSHA requirements.

A. INSPECTION, GAGING & MEASURING (700 Hours)

1. Use of micrometer, microscope, comparators, radius & angle charts
2. Use of drill gages, slot gages, depth gages, and other gaging devices
3. Checking and adjustment for accuracy of micrometers each week using gage blocks. (Johannson, Brown & Sharpe)
4. Blueprint reading instruction; explanation of different views; front, side, sectional views; explanation of fractions decimal equivalents, tolerances, and blueprint terminology

B. MACHINING OPERATIONS (2800 Hours)

Working under guidance & close supervision of Journeyman Mechanic in diminishing degrees of supervision as the skill of the apprentice increases with training during the term of apprenticeship.

1. Remove old machined bar stock.
2. Reload with new bar stock.
3. Machining with preliminary adjustment.
4. Lateral adjustment.
5. Vertical adjustment.
6. Adjust drill depths.
7. Adjust center boring tool.
8. Adjust set screws on headstock.
9. Adjust set screws on tool machining slides.
10. Adjust boring tool - vertical & lateral.
11. Chip breaking grooves & clearances.
12. Safety instructions.
13. Grinding tools (carbide-tipped) with diamond wheels.
14. Remounting tools in proper order back into the machine.

C. SET UP OF MACHINES (600 Hours)

1. Remove old cams - remount new cams.
2. Determine spindle speeds.
3. Understand spindle speed charts.
4. Set spindle speed.
5. Set cycle speed.
6. Insert chuck or collet.
7. Position all cams.

8. Determine headstock ratio.
9. Adjust tool ratio.

D. TOOL ADJUSTMENT (400 Hours)

1. Length.
2. Diameter.
3. Drill length.
4. Center boring tool.
5. Headstock.
6. Boring tools - vertical & lateral.
7. Micrometer adjustment of machine slides.
8. Chip control - Grinding tools with proper chip breaker.
9. Grinding carbide-tipped cutting tool with proper cutting clearances for metal to be machined.
10. Mounting tools back on machine to proper machining order as required.

E. CAMS (200 Hours)

1. Explanation layout lines on cams used for proper timing.
2. Timing instructions to conform with proper sequence of machining cycle - range from 4 to 6 slides, and from 1 to 3 spindle combination attachments depending on the specific type of Swiss Automatic Machine.
3. Types of cams - explanation of how cams function & their applications & position in proper order.
4. Lead cams.
5. Rocker cams.
6. Overhead cams.
7. Drilling cams.
8. Shift over & spindle change cams.

F. MAINTENANCE (500 Hours)

1. Grind cam follower.
2. Replacement worn belts - (V-Belts & flat belts).
3. Adjustment of belt tension.
4. Adjustment of recoil springs.
5. Adjustment of push rods for proper bar ends.
6. Clean & adjust chuck.
7. Adjust or replace bobbing fingers.
8. Oil & grease machine properly, keeping machines clean & in good running order.
9. Check spindle & cam shaft play.
10. Check bar slides & rocker arm play.
11. Check tool slides.

G. TROUBLESHOOTING (400 Hours)

1. Causes of tape machining.
2. Causes of diameter variations.
3. Causes of Hole depth variations.
4. Improve machining finishes.
5. Cures for chatter mark machining.
6. Remedy steps on shoulders & corners.
7. Flat spots on radiuses.

H. RELATED INSTRUCTION TO BE GIVEN ON FOLLOWING: (400 Hours)

1. Use of Belcher Machine detail charts showing functions & operations in detail. Each detail is individually marked, and explanation is to be given in full detail.
2. Blueprint reading (all views & trade terminology).
3. Theory of Speed & Feeds, theory & explanation of plug and thread gages.
4. Abrasive diamond wheels - carbide tools - brazing of carbide tips.
5. Functions of cams, explanation of how each particular cam applies to machining cycle.
6. Classifications of threads - (American Standard & other types).
7. Metallurgy - familiarization of different types of metals such as brass, bronze, cold-rotted steel, stainless steel, etc., and thorough explanation of proper cutting angles & clearances for each type of steel or metal.

TOTAL - 6000 Hours

WAGE SCHEDULE

0 - 1000	Hours	_____
1001 - 2000	Hours	_____
2001 - 3000	Hours	_____
3001 - 4000	Hours	_____
4001 - 5000	Hours	_____
5001 - 6000	Hours	_____
Journeyman	Rate	_____