



Automated Pattern Assembly System – APAS Frequently Asked Questions

- Q. How many pattern assembly jobs are eliminated by automating pattern assembly?**
A. All pattern assembly personnel are replaced with machine operators. The APAS machine operator does not require the skilled labor needed for manual pattern assembly.
- Q. Can this machine be used for Low volume jobs?**
A. Yes. The APAS machine can be changed over from one setup to another in 15 minutes or less.
- Q. What is the cycle time of the machine?**
A. The actual cycle time of the machine is pattern dependant. A typical cycle time for the machine welding a 2 sided – 4 bar runner is 6 minutes. This produces 10 assemblies per hour.
- Q. Where do I purchase Patten tooling for the APAS machine?**
A. Tooling for the APAS machine can be supplied by MPI.
- Q. What is availability for the Pattern tooling if purchased from MPI?**
A. MPI can design and manufacture holders for an average pattern in 4-8 weeks.
- Q. What information is required for ordering Pattern tooling?**
A. Tooling for the machine is created from 3D Solid model files.
- Q. Can the APAS machine pick up any pattern?**
A. The APAS machine has been designed to pick up patterns by the use of vacuum or by grippers. In general terms, the APAS machine can pick up any pattern that can be lifted by a human hand.
- Q. What determines the orientation of wax patterns on a runner?**
A. The placement of wax patterns is controlled by the design of the pattern tooling. The tooling can be designed to match the current hand applied pattern configurations or the pattern density can be increased due to the accurate repeatable robot placement.
- Q. What is the Maximum number of patterns that can be assembled to a runner?**
A. The placement of the wax patterns can be designed to match the current hand applied pattern assembly configurations or the patterns can be placed closer together due to the accurate repeatable robot placement.
- Q. What type of runners does the APAS machine support?**
A. The APAS machine supports 2 sided, 4 sided, and round runners as standard. Other shape runners are available as special order.
- Q. Does the machine require flat runners?**
A. The machine will operate with runners that are not flat; however, the runner flatness does have an effect on the overall machine cycle time.



Q. What is the maximum size of a complete runner assembly?

A. Refer to the Model 20-10 APAS specification sheet: MPI can customize the 20-10 APAS to meet other customer needs.

Q. What are Runner locating features?

A. These are design features that are added to the runner which allow each runner to be held in the same location when loaded into the Model 20-10 APAS machine.

Q. Does the runner assembly require a metal extension rod or handle?

A. The Model 20-10 machine design allows room for the existing extension rod used for the shell process. The extension rod is not required for operation; but it is recommended for the best handling of the assembly, preventing wax pattern damage.

Q. What is the operating temperature of the Pattern Welding Device?

A. The average operating temperature of the pattern-welding device is 300°F to 350°F (150°F to 177°C). The accurate PID temperature control of the welding device produces repeatable high quality welds without any smoke.

Q. What is temperature variation of the Pattern Welding Device?

A. The hot knife actual temperature is accurate to within $\pm 3^{\circ}\text{F}$. ($\pm 1.5^{\circ}\text{C}$) of the controller preset value.

Q. What is a conformal Pattern Welding Device?

A. The bottom side of the welding device has raised machined areas that are conformal to the shape of the wax pattern gate. It is used for applying heat to the runner only in the area required for welding.

Q. Can patterns be inserted into a tray incorrectly?

A. The pattern tray design prevents this.

Q. What types of waxes can be used on this machine?

A. The machine supports all pattern waxes and reclaimed waxes that are currently being used for hand welding assemblies. MPI can test and approve specific waxes.

Q. Is there any provision to prevent collision damage to the Pattern tooling?

A. Yes. Robot position collision detection and prevention has been designed into the machine.

Q. Does the Model 20-10 APAS machine require special cooling?

A. The Model 20-10 APAS does not require additional cooling. The machine operates best at room temperature of 72°F to 78°F (22°C to 25°C).

Q. Is the machine supplied with Password protection?

A. The operator interface terminal is supplied with 10 operator groups, each group consisting of individual users. Individual users can be created with their own unique password protection.

Q. Is the Model 20-10 process Patented?

A. Yes, there are 3 patents and 2 patents pending.