

APSX-PIM USER MANUAL

Plastic Injection Machine



APSX-PIM User Manual v3.0

ADVANCED PRODUCTION SYSTEMS

APSX, LLC.

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This equipment manual is intended to provide information for safe operation and maintenance. APSX reserves the right to make changes to equipment in an effort to continually improve the equipment, features, and/or performance. These changes may result in different and/or additional safety measures that are communicated to customers through bulletins as changes occur.

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General Information

Please schedule a call or video session through our website: <https://apsx.com/scheduling>

Phone Support Number: 1-513-716-5992 (10AM-3PM EST Weekdays)

For non-emergency questions you may also email to support@apsx.com

Please refer to www.apsx.com for the office locations.

Product Upgrades

Upgrades may be available that can improve your equipment. To see what upgrades are available for your machine please visit www.apsx.com or call support number.

Spare Parts

All spare parts for APSX-PIM can be ordered online at www.apsx.com.

Unauthorized Modifications

Under no circumstances should any changes or modifications be made to the electrical circuits, mechanical structures, or the safety devices to the machine and guarding on the mold without the prior, written permission of APSX LLC.



Table of Contents

| | |
|--|----|
| Injection Molding Process | 1 |
| Processing Characteristics | 1 |
| Example for Polypropylene | 1 |
| Some Terms for Injection Molding..... | 2 |
| Safety Precautions | 6 |
| Thermal effects: | 6 |
| Off-Gases Ventilation: | 6 |
| Slipping Hazards: | 6 |
| Physical Hazards: | 7 |
| Electrical Hazards: | 7 |
| Other Safeguards:..... | 7 |
| APSX-PIM Injection Molding Machine | 9 |
| Moving the APSX-PIM to Its Location..... | 10 |
| APSX-PIM Injection Molding Process..... | 12 |
| Preparing the Machine | 12 |
| Powering the Machine..... | 12 |
| System ON..... | 12 |
| Installing the Mold | 13 |
| APSX-PIM CYCLE: | 17 |
| Settings | 18 |
| APSX-PIM User Screen | 18 |
| Filling the Hopper | 24 |
| Start the Heat..... | 24 |
| Manual Controls | 24 |
| Purging..... | 24 |
| Start RUN..... | 25 |
| Stopping the Machine | 25 |
| Cleaning the Machine | 25 |
| Troubleshooting Guide | 26 |
| Wiring Diagram | 27 |
| Machine Specs..... | 29 |
| SUPPORT | 30 |
| SPARE PARTS | 30 |
| LIMITED WARRANTY | 30 |
| TRANSFERABILITY | 31 |
| TOOLS AND ACCESSORIES..... | 32 |



Injection Molding Process

It is a science but is also kind of art.

The injection molding of thermoplastic resins is a well-known and widely practiced application. It constitutes a significant processing technique for converting plastics into a variety of end-use products. The process involves heating the solid pellets to melt, then transferring it to a mold and holding it under pressure until it freezes or solidifies.

Plastic molding compounds represent a range of chemical types. Each type has its specific processing characteristics which must be considered and understood before it can be successfully molded.

Processing Characteristics

The physical and chemical properties of plastic dictate the way in which it must be molded. Among these are:

- Melting or softening temperature
- Energy content (specific heat and latent heat)
- Melt viscosity
- Stability and behavior at melt temperatures
- Freezing rate, crystallization rate, and cycle time
- Shrinkage



Example for Polypropylene

For example, the PP, which is a frequently used plastic, has physical, mechanical, impact, and thermal properties listed. Specific gravity, mass flow rate, tensile strength, izod impact, and deflection temperature under load are properties that make a difference when processing for injection molding.

Some Terms for Injection Molding

Alloy: A term used in the plastics industry to denote blends of polymers or copolymers with other polymers or elastomers. - i.e., ABS/Polycarbonate.

ASTM: Abbreviation for American Society for Testing and Materials.

Back Pressure: The resistance of the molten plastic material to forward flow. In molding, back pressure increases the temperature and contributes to better mixing of colors and homogeneity of the material. However, as backpressure increases, so does cycle time.

Barrel: The section of a molding machine containing the feed screw and the area where resin heating and mixing occurs.

Blushing: The tendency of a plastic article to turn white or chalky in highly stressed areas.

Bubbles: Air or gas pockets that have formed in the material of the component. Bubbles may vary in size.

Burned: Showing evidence of excessive heating during processing or use of plastic, as evidenced by blistering, discoloration, distortion, or destruction of the surface.

Cavity: A depression, or a set of matching recesses, in a plastics-forming mold that forms the outer surfaces of the molded articles.

Clamp: The part of an injection molding machine incorporating the platens that provide the force necessary to hold the mold closed during injection of the molten resin and open the mold to eject the molded part.

Clamping Area: The largest rated molding area an injection press can hold under full molding pressure.

Clamping Force: The force applied to the mold to keep it closed, in opposition to the compressed molding material's fluid pressure within the mold cavity and the runner system.

Cold Flow Lines: Imperfections within the part wall due to thickening or solidification of resin before full cavity fill.

Conversions (Commonly Used in Injection Molding)

$$\text{BAR} = 14.50 \text{ psi}$$

$$^{\circ}\text{C} \times 1.8 + 32 = ^{\circ}\text{F}$$

$$\text{Liters/min} \times 0.2642 = \text{Gal/min}$$

Inches x 25.4 = mm

Flow rate = ((# of cavities) x (volume per cavity))/(injection time)

Cooling time: the elapsed time required for the melt to reach its Vicat softening temperature.

Core: A protrusion in a plastics forming mold that forms the inner surfaces of the molded articles.

Creep: Due to its viscoelastic nature, a plastic subjected to a load for some time tends to deform more than it would from the same load released immediately after application, and the degree of this deformation is dependent on the load duration.

Cycle Time: The time required by an injection molding system to mold a part and return to its original position/state.

Draft: A Slight taper in a mold wall designed to facilitate removing the molded object from the mold.

Drag Marks: A form of deep scratch or scratches on the surface of the component usually caused by the part's ejection.

Drooling: The leakage of molten resin from nozzle or nozzle sprue bushing area while filling or shooting the mold.

Ejection Pin: A rod, pin, or sleeve pushes a molded part off a core or out of a mold's cavity.

Ejector Rod: A bar that actuates the ejector assembly when the mold opens.

Family mold: A mold that produces non-identical parts simultaneously from multiple cavities.

Fill pressure: the injection pressure required to fill the cavity.

Fill Time (also known as Injection): Time required to fill the cavity or mold.

Flash: Any excess material formed with and attached to the component along a seam or mold parting line.

Flow (Fill) Rate: the volume of material passing a fixed point per unit time.

Gate: The channel through which the molten resin flows from the runner into the cavity.

Injection Molding Pressure: The pressure applied to the cross-sectional area of the molding cylinder.

Injection Molding: The method of forming objects from granular or powdered plastics, most often of the thermoplastic type, in which the materials are fed from a hopper to a heated chamber in which it is softened, after which a ram or screw forces the material into a mold. The pressure is maintained until the mass has hardened sufficiently for removal from the mold.

Insert Molding: Insert molding is the process of molding plastic around preformed metal inserts. This process is compatible with both thermoplastic and thermoset materials.

Insert: a removable part of the mold imparting increased resistance to wear, heat transferability, or changeable part shape to that area of the mold.

Machine Shot Capacity: Refers to the maximum volume of thermoplastic resin, which can be displaced or injected by the injection ram in a single stroke.

Material Safety Data Sheets: Documentation regarding the toxicity or hazards associated with contact with some substances. The manufacturer of the plastic prepares these datasheets.

Melt Flow Rate (MFR): A measure of the molten viscosity of a polymer determined by the weight of polymer extruded through an orifice under specified conditions of pressure and temperature. Particular conditions are dependent upon the type of polymer being tested.

Mold (n): A hollow form or matrix into which a plastic material is placed and imparts to the material its final shape as a finished article.

Mold (v): To impart shape to a plastic mass using a confining cavity or matrix.

Mold Temperature: the temperature at which the mold is maintained. The most important benefit of raising mold temperature is that it allows a slower injection rate without the plastic getting too cold.

Multi-Cavity Mold: A mold having two or more impressions for forming finished items in one machine cycle.

Nozzle: hollow metal hose screwed into the extrusion end of the heating cylinder of an injection machine designed to form a seal under pressure between the cylinder and the mold.

Packing: The filling of the mold cavity or cavities as full as possible without causing undue stress on the molds or causing the flash to appear on the finished parts. Over- or under-packing results in less than optimum fill.

Parting line: mark on the part indicating where the two halves of the mold met in closing.

Pellets: Tablets or granules of uniform size, consisting of resins or mixtures of resins with compounding additives, prepared for molding operations by extrusion and chopping into short segments.

Platens: The mounting plates of a press on which the mold halves are attached.

Purging: In extrusion or injection molding, the cleaning of one color or type of material from the machine by forcing it out with the new color or material to be used in subsequent production or with another compatible purging material.

Runner: In an injection mold, the feed channel, usually of circular cross-section, connects the sprue with the cavity gate. The term is also used for the plastic piece formed in this channel.

Shot Capacity: Generally based on polystyrene, this is the maximum weight of plastic that can be displaced or injected by a single injection stroke and generally expressed as ounces of polystyrene.

Shrinkage Allowance: The dimensional allowance must be made in molds to compensate for the shrinkage of the plastic compound on cooling.

Sink Mark: an indentation on the surface of the part due to significant local change in the wall section. The mark will occur in the thicker area.

Sprue: The feed opening provided in injection molding between the nozzle and cavity or runner system.

Tie-Bar Spacing: The space between the horizontal tie-bars on an injection molding machine. This measurement limits molds' size that can be placed between the tie-bars and into the molding machine.

Tool: In injection molding, the term is sometimes used to describe the mold.

Undercut: A protuberance or indentation that impedes withdrawal from a two-piece rigid mold.

Vent: A shallow channel or opening cut in the cavity to allow air or gases to escape as the melt fills the cavity.

Virgin Material: Any plastic compound or resin that has not been subjected to use or processing other than that required for its original manufacture.

Warpage: Distortion caused by nonuniform internal stresses.

Weld Line: Where melted material flows together during molding to form a visible line or lines on a finished part that may cause weakening or break the component.

Safety Precautions

APSX-PIM is a small and low-pressure machine. However, the following safety precautions should be taken before and during the machines use.

Thermal effects:

Skin contact with molten plastic can inflict severe burns. This could happen when the machine under pressure ejects molten plastic through the nozzle.

To minimize the chance of an accident, potential hazards must be anticipated and eliminated or guarded correctly. Purging should be performed carefully with the guard gates closed. The trapped gas in the cylinder may cause splattering at the beginning of the purging process.

Molten plastic material can appear cold on the surface but remain **very hot inside. Wear personal protective equipment when handling hot plastic material.**

ALWAYS ASSUME GAS AT HIGH PRESSURE COULD BE TRAPPED BEHIND THE NOZZLE AND THAT IT COULD BE RELEASED UNEXPECTEDLY.

A face shield or safety goggles, heat resistant protective gloves, safety shoes, non-melting fiber pants, and long sleeve shirts should be worn at all times.

If molten polymer does contact the skin, cool the affected area immediately with cold water or an ice pack and get medical attention for a thermal burn. Do not attempt to peel the polymer from the skin.

The machine has multiple parts that have high-temperature levels that the user should never touch with bare hands. Those parts are electric motors, cylinder barrel, heater assembly, mold structure, and hopper assembly.

Off-Gases Ventilation:

During the molding, some amount of gas is released. As a general principle, local exhaust ventilation is recommended during the process of all plastic heating. Injection molding typically releases substantially less volatile material, so it requires less ventilation. But during purging, volatile releases are similar to that in extrusion. Extra care in avoiding the inhalation of fumes is recommended. Local exhaust ventilation should be used to convey such fumes outside the workplace.

Slipping Hazards:

Pellets of plastics are a slipping hazard if spilled on the floor. They are cylindrical in shape and have a low coefficient of friction. Any spills should be swept up or cleaned immediately. There should be a vacuum cleaner available to collect spilled pellets from the ground.

Physical Hazards:

The machine has multiple moving mechanical parts under load. Placing hands in between those moving parts such as springs, metal blocks, chains, and cylinders can be a cause of a severe injury. Never reach into the machine when it is going through its injection cycle.

The machine is too heavy for one person to move or lift. Never try to move or lift the machine without proper equipment. Do not exceed the rated capacity of the lifting equipment.

Electrical Hazards:

The machine uses 115VAC power. Touching it to uncovered electrical control panel parts can put you at risk of fatal injury.

NEVER UNPLUG THE MACHINE WHEN THE SPRING IS PRESSED OR WHEN THE RED LIGHT IS ON UNDER ELECTRONICS COVER!

The quality, rating, and insulation of electrical power wires and cables have been selected specifically for the requirements of this machine. Damaged wires must be replaced immediately with the same or higher quality cables than those specified for the machine.

Other Safeguards:

The machine should only be used for its intended purpose by an authorized and trained individual, as described in the manual.

Never leave the machine unattended without placing a warning sign around it for others not authorized to use the device.

Make sure the machine is securely placed on a safe table or bench before operating. Use the saddles provided to secure the machine on the bench. Place the machine shafts on the saddles on both edges of the machine.

During maintenance, always shut the power off.

Never try to inject the plastic until it has reached the proper operating temperature.

Never leave the heaters ON for any extended length of time when the machine is not being operated.

Only original APSX parts should be used for replacement.

Regularly inspect all assemblies and screws connecting different sections and parts.

Safety Alerts:

The **DANGER** safety alert indicates an imminently hazardous situation that if not avoided, could result in death or serious injury.

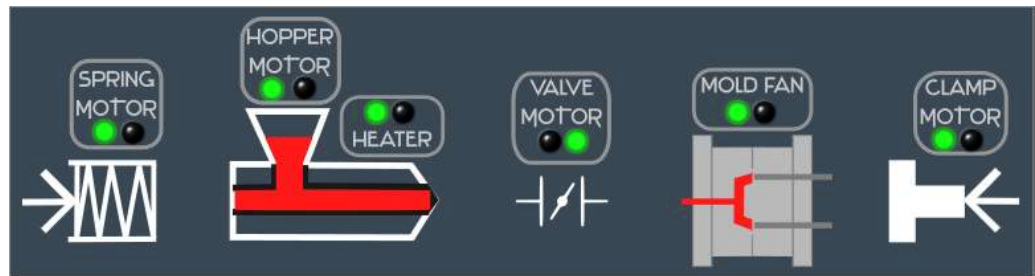
The **WARNING** safety alert indicates a potentially hazardous situation that if not avoided, could result in death or severe injury.

The **CAUTION** safety alert indicates a potentially hazardous situation that, if not avoided, could result in property damage.

APSX-PIM Injection Molding Machine

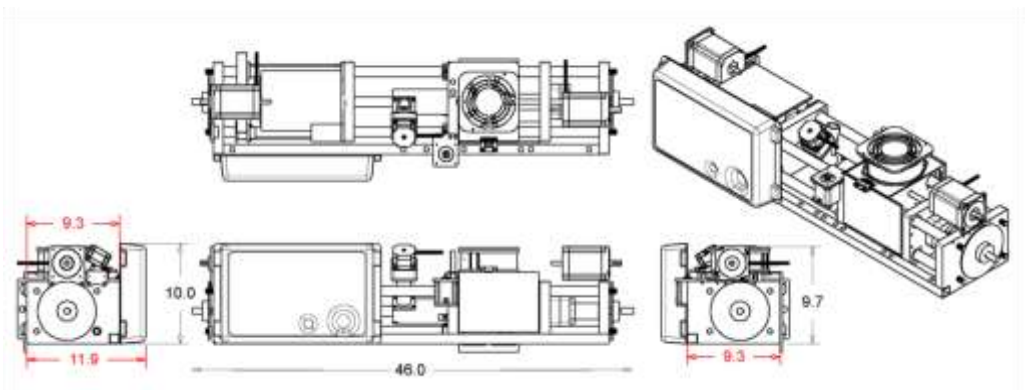
APSX-PIM is a fully automatic electric desktop injection molding machine. It runs with 115VAC power with no water or hydraulic connection required. It can generate 5 tons of clamp force and can inject 30 cu-cm of plastic at a time up to **315 C** degrees. The standard mold size is 6” (H) by 4.8” (W).

APSX-PIM consists of multiple small sections. The machine is controlled by electric motors and precise sensors. The user has a touch screen PC attached to the machine for setup and operational controls.



The main sections are listed below:

- Plasticizing section
- Pre-plasticizing section
- Injection section
- Injection valve section
- Clamping section
- User interface section



Moving the APSX-PIM to Its Location

Please be aware of the following precautions when moving the APSX-PIM to another location or carrying it out from the shipping crate.



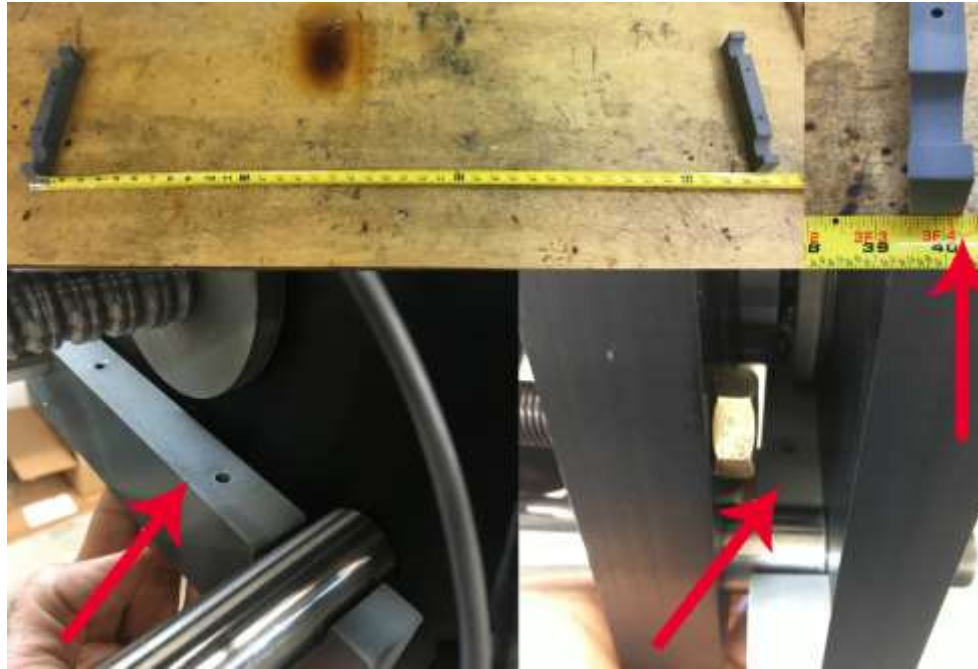
1 – Always use the chain hook holes located on the clamp motor and injection motor mounts. They are designed specifically for lifting. You can use a small size hydraulic lift or a similar tool.

2 – Never use the cable rail as your carrying point since it is not designed to hold much force. It is also very sensitive to bending and pushing movements because it carries multiple sensors that control the machine.

3 – Never use the tablet holder as your carrying point. It is only for holding the tablet PC.

APSX-PIM PLASTIC INJECTION MACHINE

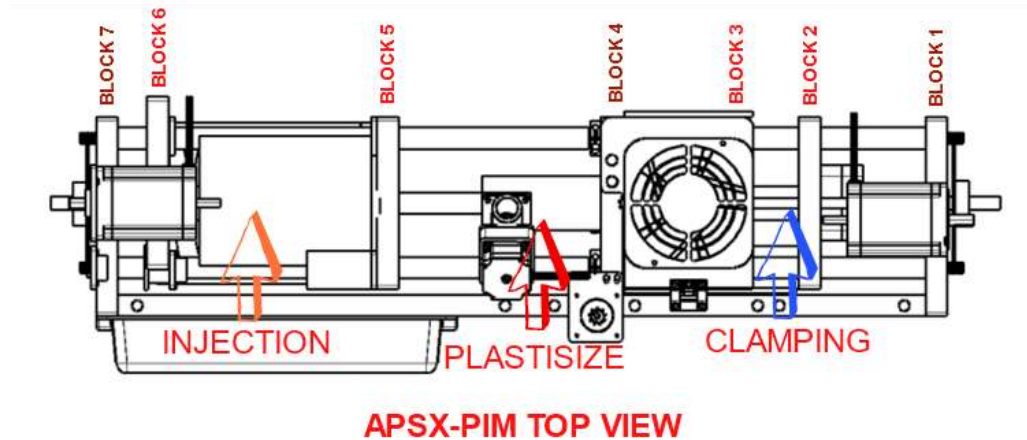
4 – Place the saddles provided on the bench and mount them 40.25” apart (outer-to-outer) by using four appropriate screws. Place the machine on the saddles. Alternatively, you can buy the steel frame stand designed explicitly for APSX-PIM online at apsx.com.



5 – Assemble the tablet PC provided on the machine. Take the screws off, then mount the tablet PC on the machine.



APSX-PIM Injection Molding Process



Preparing the Machine

The user must check if the machine hopper and hopper feeder pipes are cleaned, and there are no obstructions from the previous injection session. Otherwise, the hopper system may not be able to feed the barrel with enough plastic pellets.

Powering the Machine

There is a particular power-up process that needs to be performed in order.

The user powers the machine from a regular 110VAC wall outlet THEN connects the USB cable to the tablet.

Using a voltmeter display (Kill-A-Watt) on the connection can help to monitor voltage fluctuations to ensure your machine is operating within its specified limits. When the machine has multiple motors and heaters are turned on, the VAC value should not drop below 114VAC. Otherwise, the machine would not have 100% power, and processes may take longer or may never be completed.

System ON

The user pushes the SYSTEM button to turn on the main components such as motors and sensors.

Installing the Mold

In this step, the user places and secures the injection mold kit and adjusts the ejector pins on the mold for a perfect ejection process if the automatic multi-injection mode is intended for use.

NOTE: ALWAYS USE A MOLD WITH THE TOTAL THICKNESS GREATER THAN 2 INCHES. OTHERWISE, THE MACHINE WILL NOT CLAMP PROPERLY.

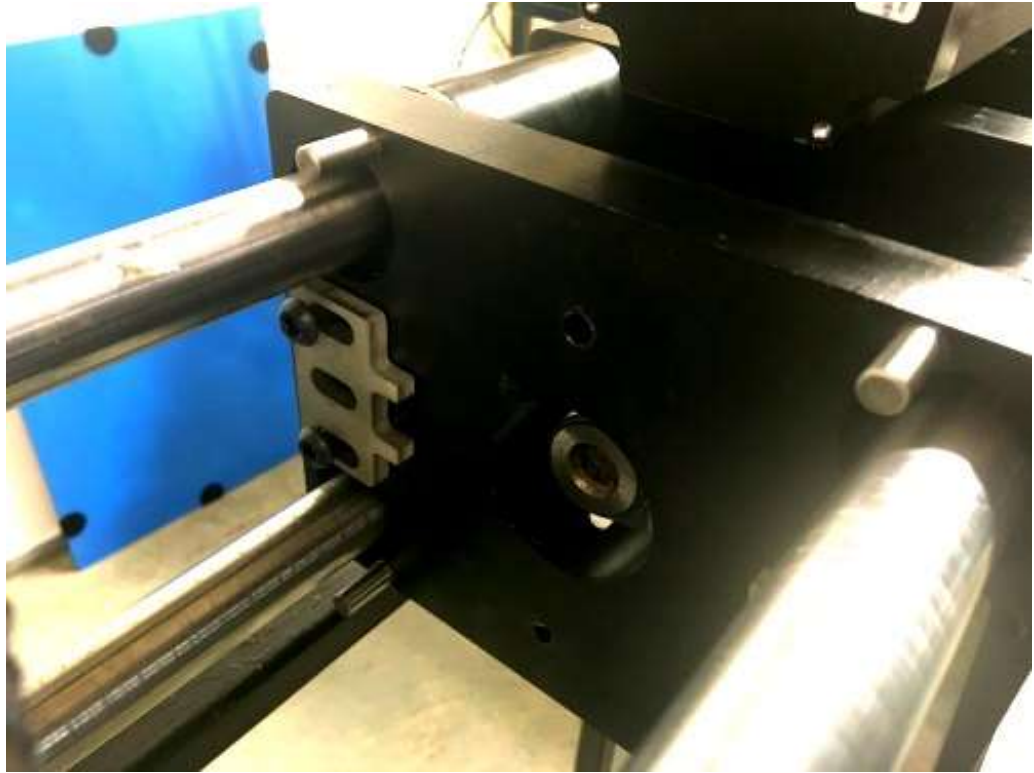
Set Clamp Switch location so that the ejector rod is at the right place at home clamp position.

PLEASE NOTE: Remember this is a critical step; the clamp switch stops the machine when the clamp side is homed. If it does not work correctly or is placed too far from the mold, it will not stop where it is supposed to and can damage the machine and the mold. For example, the ejector bearing will hit the mold plate when homing and may damage the mold or the ballscrew if the clamp switch is not positioned correctly. Adjust the clamp switch collar location located on the steel frame bar between Block 1 and Block 2 by sliding it according to the ejector rod location while referencing the mold geometry. Watch for the **CLAMP SWITCH check box** at the bottom of the user screen.

WATCH THE VIDEO ON YOUTUBE: How to Swap Molds on APSX-PIM Injection Machine 2020

Press the “Home Clamp” button on the tablet until the movable platen stops. Disassemble and put aside the mold fan assembly by unscrewing the two nuts located on the fixed platen at Block 4.

Move the ejector rod (if needed) back out of the moving mold platen at Block 3 to create enough space for the mold piece to slide down.

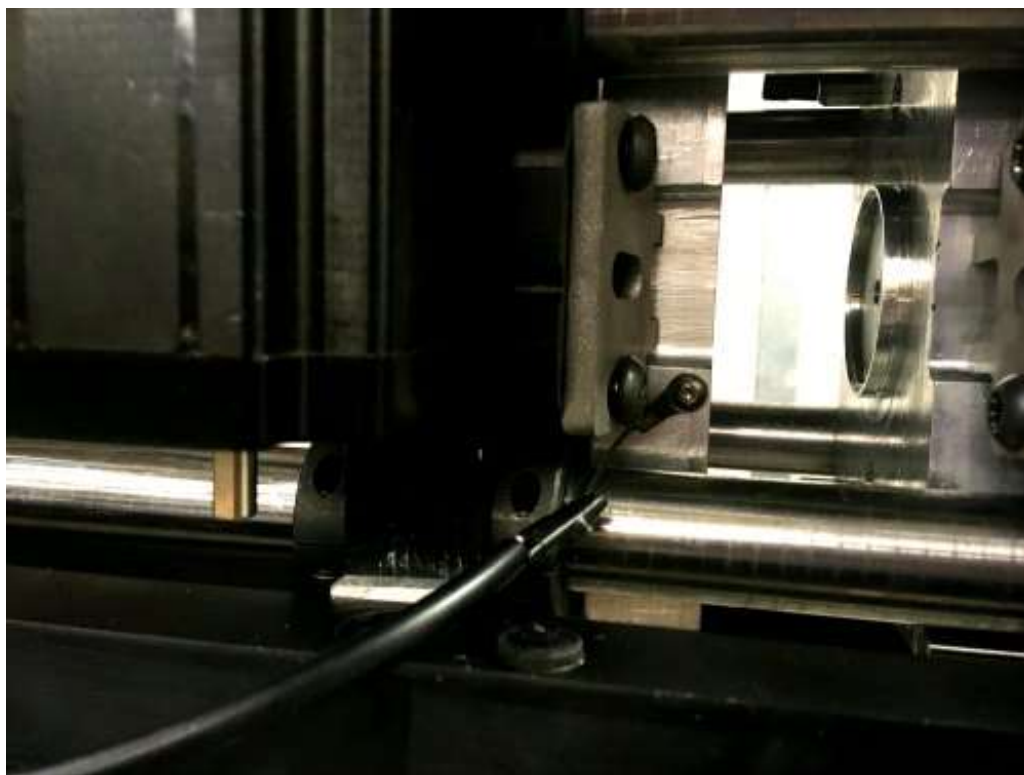


While holding the mold by hand, lower it slowly until the top edges of Block 3 and the mold are aligned properly.

Tighten the mold clamps (2 on each side) on the moving platen with bolts and release your hands.

Mount the other side of the mold on the mold holder plate by using four shoulder bolts.

Connect the mold temperature sensor by using the screw on the mold.



Place the mold fan assembly back to its place by tightening the two nuts located on the fixed platen (Block 4).



APSX-PIM PLASTIC INJECTION MACHINE

Securely close the front and back doors on the mold fan assembly as shown below.

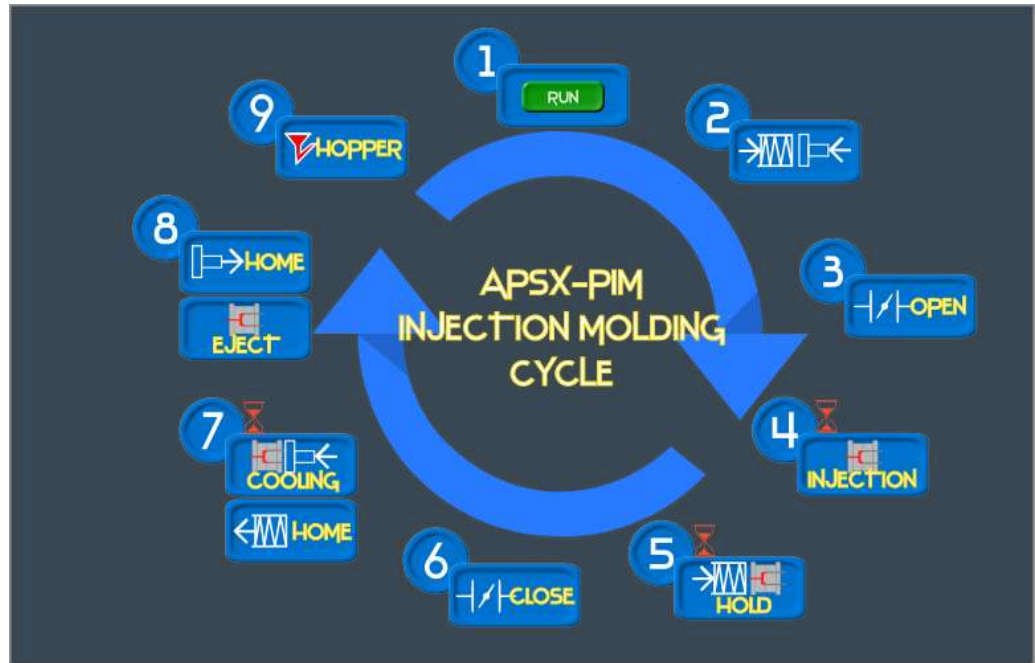


Perform the ejection system's final test on MANUAL CONTROL mode and fine-tune it after each try. Manual controls are for fine-tuning the machine for each mold. **They are NOT for performing injection molding “manually”.**



APSX-PIM CYCLE:

The machine performs the injection molding functions of plasticizing, clamping, injection, and ejection accordingly and completes the job as set by the user. These automatic steps are for one single injection cycle.



Settings

The user interface on the tablet PC is connected to the machine via USB cable is ready for the setup process. The user sets the desired injection temperature, shot size, timings, and other operational parameters on the tablet PC screen. The user screen shows the actual and target settings for each parameter.

APSX-PIM User Screen



MAIN DASHBOARD



Status Message – Informs the user which step of the injection cycle is in process.

STAND BY: Ready for the operation command.

CLAMPING: Clamp (Block 2 & 3) is approaching the mold area. Be cautious and do not stand too close to the machine.

INJECTING: The nozzle opens, and plastic is injected into the mold cavity between Block 4 & 3.

HOLDING: The pressure drops to the holding pressure level to secure a 100% fill rate.

COOLING: The machine is waiting for the injected plastic to cool enough to be ejected.

HOMING: Clamp (Block 2 & 3) and injection sides (Block 5&6) travel to their home locations for the next injection cycle.

SYSTEM Button – The button to turn ON or OFF the APSX-PIM system components such as motors and sensors.

HEAT Button – The button to turn ON or OFF the heat on the barrel.

PLEASE DO NOT LEAVE THE MACHINE IDLE ABOVE MELTING TEMPERATURE MORE THAN 30 MINUTES. THIS MAY CAUSE DETERIORATION OF THE PLASTIC PELLETS.

Temperature Display – The current temperature of plastic in the barrel

RUN Button – The button to start or stop the APSX-PIM injection cycle

Cycle Timer – The timer that shows each cycle time in seconds

Part Counter – The cycle count for each session. Press once to reset.

Single/Multi Modes – Machine stops once it completes one cycle at single mode. Hit Run to start another cycle. Machine continues to run without stopping at multi mode. **Never use that multi mode if you do not have an ejection mechanism on mold.**

SETTINGS



This section is to set the temperature, pressure, force, time, and part characteristics. At the same time, the actual real-time readings are shown where possible.

The + and - buttons can be used to change the settings. The user can OPEN or SAVE a “settings profile”. Settings “1” comes with the machine and is used for the Test Mold installed on the machine with provided PP pellets. To change the settings number from 1, the plus button can be used. Then you can save your profile as “2”.

The X1 button on top is to change the multiple of the increase or decrease action. When it is on X10, the parameters change with more significant steps than one by one increment.

TEMPERATURES

Barrel Temperature – The current and set temperatures of the plastic in the heated barrel.

Mold Temperature – The current and set temperatures of the mold block. Mold can be kept at about 55C-60C minimum at room temperature by using the default fan system. A cooling method will be required if mold has to be at much lower temperatures.

Minimum Temperature – The set minimum temperature required to run the injection machine. If the temperature drops below that threshold, it will wait to reach that temperature before running to protect the machine from getting damaged. It should be set higher than material's melt temp at least.

PRESSURES / FORCES

Injection Pressure – The current and set pressures that are applied to the plastic **in the barrel**. Almost 90% of the part volume is injected at this high pressure. Each plastic material has a unique “suggested” injection pressure as a guideline.

Hold Pressure – The current and set holding pressures that are applied to the plastic **in the mold**. The rest of the part will be injected to complete at this pressure.

Clamp Force – The current and set forces applied to the **closed mold** when it is clamped. For higher values, the machine aborts the cycle if it cannot reach that value.

TIMES

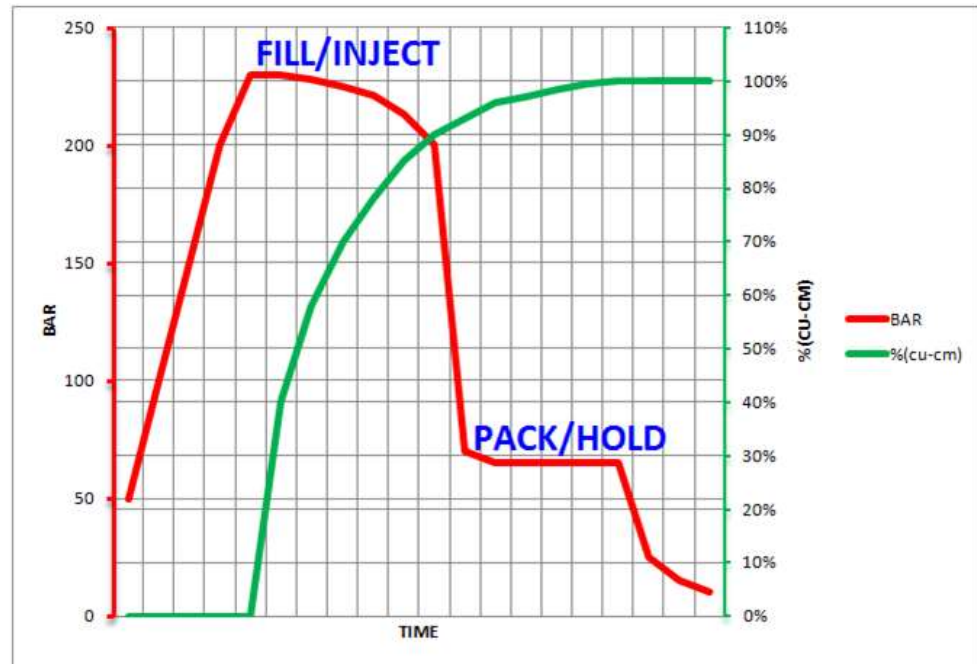
Holding time – The time in msec set to keep holding pressure.

Cooling Time – The time in msec set to keep plastic in the mold after holding pressure.

Heater Boost – The additional full power time in sec applied to heaters to keep the set temperature when the temperature drops below the minimum temperature set for multi mode.

Clamp Time – The time in msec set to move the clamp at its fastest speed towards the mold before slowing down for clamping. Please start low to not bang to the clamp on the mold.

PART CHARACTERISTICS



Cut off Amount – The amount that the machine stops injection. It can be used as a safety threshold. Typically it is higher than the First Stage value.

First Stage – The switch over the volume that the machine uses to decrease the pressure from high pressure (injection pressure) to low pressure (holding pressure). APSX recommends this number to be set at 90% of the total part volume. *For example, if your total part volume, including the sprue, is 10cu-cm, then set the fill amount to 9cu-cm.*

Valve First/Second Position – This adjusts the angle of the valve pin when it is opened. 200 is fully open. Valve pin turns 90 degrees.

Hopper Multiplier –Set this amount depending on the injection cycle results achieved. If the part being injected is missing plastic, the user can increase the hopper multiplier. If the discharge tube discharges too much plastic per cycle, the user can decrease the hopper multiplier.

Hopper Speed –Set this amount depending on the pellet size and type to change how fast the hopper motor spins.

MANUAL CONTROLS



Manual controls help to fine-tune the machine for each mold but not **perform the injection cycle “manually”**. If the user wants to run the injection cycle manually instead of on automatic mode, this section has control buttons that can be used very carefully. In general, the **standard APSX-PIM injection cycle should be used**. These control buttons can also be used for testing the movements of the machine components. To stop the action, please press the HALT button.

Home Injection –Sends the injection spring back to its home location

Injection Pressure – Triggers the spring movement to generate the injection pressure up to the set level – do not use until barrel temp reaches to set temp.

NEVER UNPLUG THE MACHINE WHEN THE SPRING IS PRESSED OR WHEN THE RED LIGHT IS ON UNDER ELECTRONICS COVER!

Hold Pressure – Moves the spring to the position which keeps its pressure at the set holding pressure – do not use until barrel temp reaches to set temp.

Run Hopper – Moves plastic pellets to the barrel – STOP HOPPER to stop– do not use until barrel temp reaches to set temp.

Open Valve – Opens the injection nozzle valve 100% to let the under-pressure hot plastic flow into the mold cavity– do not use until barrel temp reaches to set temp.

Close Valve – Closes the valve keeping under-pressure hot plastic in the barrel

Home Clamp – Moves the clamp mechanism back to its home base, the clamp switch collar location is set by the user and determines the clamp home location. Use Slow first, then Fast. - HALT to stop

Engage Clamp – Triggers the clamp mechanism movement in fast speed mode towards the mold area. Use SLOW for the actual clamping action. - HALT to stop

HALT – When performing manual functions, halt stops any motor in its current position. Press halt in RUN mode to stop the cycle in progress and home all motors.

E-STOP ON THE PANEL – Turns off all motors, shuts the SYSTEM off, and disables HEAT.

STATUS INDICATORS

The checkboxes at the bottom of the screen indicate when the switches are on or off. USB status is also shown as “CONNECTED”. Tablet PC battery level is also shown.

Filling the Hopper

The user places the plastic pellets into the hopper manually or via auto loader (not included). Always prime the hopper before start using the machine to ensure there is enough plastic inside. When there is plastic coming out of the discharge hole, you should stop.

Start the Heat



After pressing HEAT on the tablet, the cylinder barrel is heated to the set temperature. In general, it needs about 15 minutes to heat to the set temperature. **NOTE:** the machine will not RUN before reaching its set minimum temperature.

PLEASE DO NOT LEAVE THE MACHINE IDLE ABOVE MELTING TEMPERATURE MORE THAN 30 MINUTES. THIS MAY CAUSE DETERIORATION OF THE PLASTIC PELLETS. HOPPER ENTRY PIPE CAN ALSO BE CLOGG, AND MAY NEED TO BE CLEANED.

Manual Controls

Manual controls can be used for testing each component for functionality, new mold installation, and purging. It is essential to set lower pressure settings to safely operate manual controls.

Purging

Warning: USE PERSONAL PROTECTIVE EQUIPMENT BEFORE PURGING.

SAFETY: PRESSURIZED HEATED PLASTIC CAN CAUSE SEVERE BURNS. NOZZLE VALVE SHOULD BE OPEN AT ALL TIMES DURING PURGING TO PREVENT SPLATTERING.

If all motor movements are verified ok in manual-operation state, you can perform the purging process. Ideally, use a purging material, natural LDPE plastic pellets, or an equivalent product. Repeat the purging process 3-5 times with manual controls until all the old material is removed from the barrel.

- Remove the mold and have the nozzle plate area clean
- Load the hopper with purging material and run the hopper until the barrel is full
- Set the HEAT on and wait until a minimum 200 C or until you've reached the specific melting point of your plastic.
- Set the holding pressure at a low pressure i.e., 25
- Open the valve
- Take your safety measures with goggles and have the mold gate closed
- Use the HOLD PRESSURE button to start the purging process
- Once the plunger has pressed all the way into the barrel, press HOME INJECTION
- Repeat this process multiple times until the discharged material is visually the same as the purging material

Start RUN



Press the RUN button on the tablet, and the machine starts the fully automatic single injection cycle.

NEVER UNPLUG THE MACHINE WHEN THE SPRING IS PRESSED!

Stopping the Machine

The injection spring and clamp motors must be homed before shutting down the machine. Check if the mold has any parts left on it or not. First HEAT, then the SYSTEM must be turned off. Now it is safe to unplug the machine. Do not leave the machine plugged into power.

Cleaning the Machine

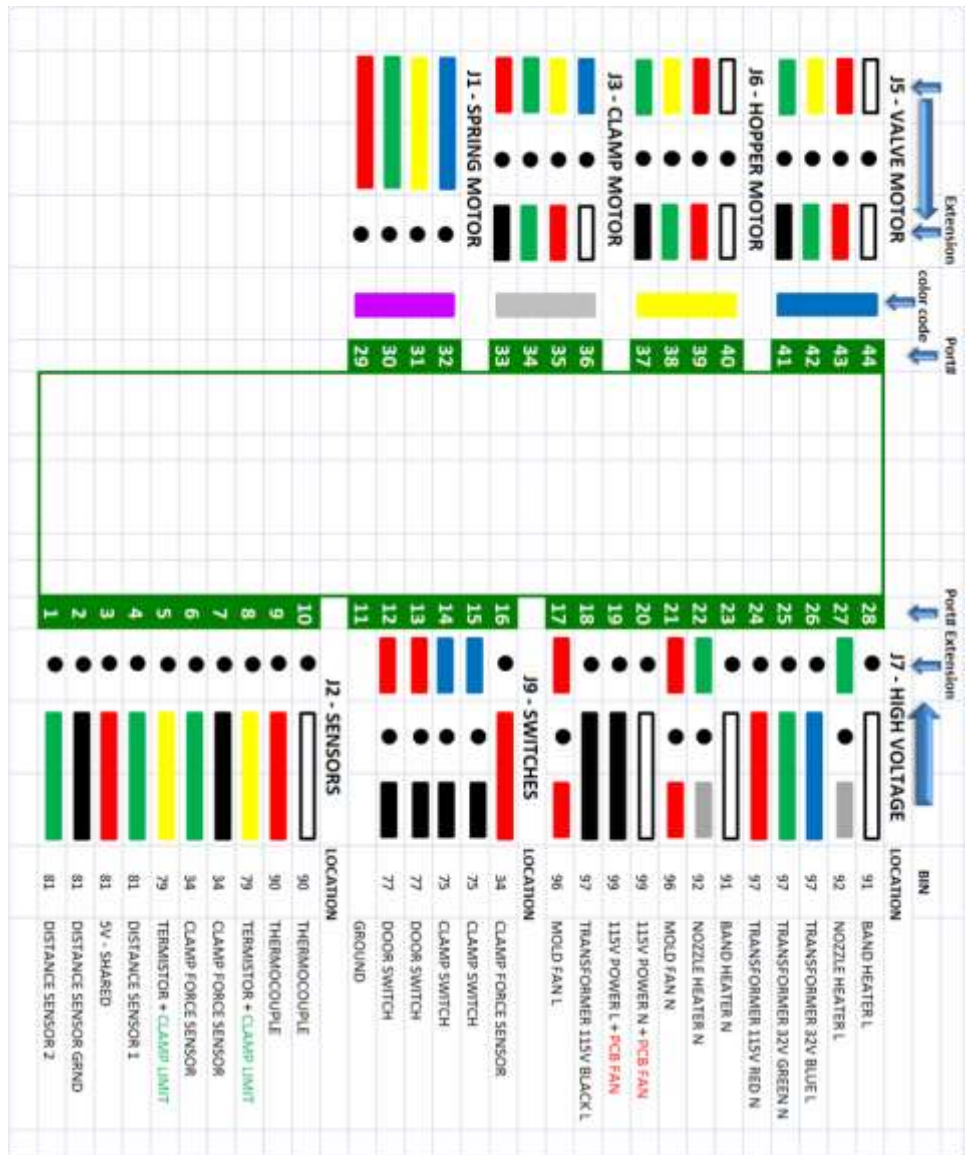
The user must empty the hopper. Plastic pellets can be vacuumed from the hopper feeder pipe for the next injection session. A flat edge tool can be used to clean excess hardened plastic that may have stuck to the machine or molds.

Troubleshooting Guide

Please follow the troubleshooting matrix below in the numerical order of recommended actions.

| Problem Areas | Suggested Actions (Try in order recommended) | | | | | | | | | | | | | | | | | |
|---------------------|---|-----------------------------|---------------------|---------------------|-----------------------------|-----------------------------|---------------------------|---------------------------|------------------------------------|------------------------------------|-----------------------|---------------|---------------------|---------------------|-------------------------|-------------|----------------------|---|
| | Increase Injection Pressure | Decrease injection pressure | Increase fill speed | Decrease fill speed | Increase barrel temperature | Decrease barrel temperature | Increase mold temperature | Decrease mold temperature | Increase nozzle/barrel temperature | Decrease nozzle/barrel temperature | Increase size of gate | Enlarge vents | Decrease cycle time | Increase cycle time | Increase clamp pressure | Repair mold | Change gate location | |
| Drooling | | | | | | 2 | | | | 1 | | 3 | | | | | | |
| Short Shots | 1 | | 2 | | 3 | | 4 | | | | 6 | 5 | | | | | | |
| Sinks | 1 | | | 2 | 4 | 5 | | 3 | | | 6 | | | | | | | |
| Voids in Part | 1 | | | 2 | 3 | 4 | | | | | 5 | 6 | | | | | | |
| Flash | | 2 | | 3 | | | | 4 | | | | | | | | 1 | 5 | |
| Burn Spots on Part | | | | 1 | | 2 | | | | | 4 | 3 | | | | | | 5 |
| Poor Weld Lines | 1 | | 2 | | 3 | | 4 | | | | 5 | | | | | | | 6 |
| Parts Stick in Mold | | 1 | | 2 | | | | | | | | | | 3 | | | | |
| Warpage | 2 | | 3 | 4 | | | | 5 | | | | | | 1 | | | | 6 |
| Sprue Sticking | | | | | | | | | 2 | | | | 1 | | | | | |

Wiring Diagram



NEVER UNPLUG THE MACHINE WHEN THE SPRING IS PRESSED OR WHEN THERE IS HOT PRESSURIZED PLASTIC IN THE BARREL.

PLEASE DO NOT LEAVE THE MACHINE IDLE ABOVE MELTING TEMPERATURE MORE THAN 30 MINUTES. THAT MAY CAUSE DETERIORATION ON THE PLASTIC PELLETS. THE HOPPER ENTRY PIPE CAN ALSO JAM AND MAY NEED TO BE CLEANED.

ALWAYS ASSUME THAT GAS AT HIGH PRESSURE COULD BE TRAPPED BEHIND THE NOZZLE AND THAT IT COULD BE RELEASED UNEXPECTEDLY. PLEASE USE PERSONAL PROTECTIVE EQUIPMENT AT ALL TIMES WHEN RUNNING.

WE DO NOT SUGGEST USING THE TABLET PC FOR OTHER APPLICATIONS OTHER THEN APSX-PIM SOFTWARE. IDEALLY, IT SHOULD BE DEDICATED ONLY FOR APSX-PIM USE. NOT FOLLOWING THIS SUGGESTION VOIDS THE WARRANTY.

ALWAYS USE A MOLD WITH THE TOTAL THICKNESS MORE THAN 2". OTHERWISE, THE MACHINE WILL NOT CLAMP PROPERLY.

Machine Specs

| | SAE | Metric |
|---|--|-------------------------------------|
| Piston Dia [in / cm] | 1 | 2.54 |
| Injection Volume [cu-in / cu-cm] | 1.83 | 30 |
| Injection Pressure [PSI / BAR] | 5000 | 345 |
| Clamping Force [lbs / tons] | 11023 | 5 |
| Opening Stroke w/ & w/o Ejector Plate [in / cm] | 5.5-7.0 | 13.97-17.78 |
| Max Processing temp [F / C] | 600 | 315 |
| Weight [lbs / kgs] | 250 | 113 |
| Standard Mold Size [in / cm] | 4.8" (W) X 6.0" (H) | 12.19cm (W) X 15.24cm (H) |
| Machine Dimensions [in / cm] | 43" (L) X 10" (W) X 15" (H) | 109cm (L) X 25.4cm (W) X 38cm (H) |
| Shipping Crate Dimensions [in / cm] | 48" (L) X 16" (W) X 19" (H) | 122cm (L) X 40.6cm (W) X 48.3cm (H) |
| Steel Bar Frame Diameter [in / cm] | 1 | 2.54 |
| Tie Bar Top Clearance [in / cm] | 5 | 12.7 |
| Min Power Supply [V] | 115 | |
| Heating Power [W] | 1250 | |
| Plastic Materials for Injection | Polycarbonate (PC), Acetal (Delrin), ABS, PC/ABS, Nylon (PA6), Polypropylene (PP), Polystyrene (PS), Polyethylene (PE), Thermoplastic Polyolefin (TPO) | |
| Warranty | 1 year | |

SUPPORT

As with all APSX products, APSX-PIM desktop injection machines are backed by our technical support team to ensure your satisfaction. We support your machine via email, scheduled video calls, phone support, and with our extensive online resources, so you can be 100% sure that when you choose APSX, you've made a perfect selection.

Video conference assisted help is available via calendar scheduling
2 years email support between 10AM-3PM EST.

SPARE PARTS

100% in stock for crucial parts, APSX-PIM is designed with ease of maintenance in mind. Spare parts are in stock at our Cincinnati location. All critical part orders are shipped on the same day. The machine is designed with simplicity in mind, so it is nearly maintenance free.

LIMITED WARRANTY

12 months REPAIR OR REPLACEMENT warranty condition also applies to returned machines for inspection or repair. Manufacturer's liability shall be limited to repairing, replacing parts or components at the discretion of the manufacturer. Direct sales and video/phone support is part of the equation that allows us to provide high value at a low cost. Once we determine the problem remotely via video conference, we can resolve it with a replacement part or a completely new machine. You must be comfortable with general electric and mechanical repair concepts, including the appropriate safety procedures before working on your machine. If you do not have the required skills, you will need to find someone locally to assist you. Components subject to wear during normal use and over time, such as metal surfaces, labels or decals, finish and condition, seals, safety gates, cabling, electric motor shafts, etc., are excluded from this warranty. Warranty of general machine tolerances is void if the machine is taken out of the crate without following the lifting directions below, disassembled, or altered by customer. Manufacturer is not responsible for any damage to parts, machines, business premises, or other property of the buyer or for any other incidental or consequential damages that may be caused by a malfunction of the machine or its components.

APSX LLC Terms can be found here: <https://apsx.com/terms>

APSX-PIM PLASTIC INJECTION MACHINE

APSX-PIM comes in a wood crate of 50"X20"X18". Total weight is about 300 Lbs

- Unscrew the top and the front panel of the crate where the APSX LLC logo is printed
- Un-bolt the ground clamp to free the machine before lifting
- ONLY lift from the LIFT HOLES on both sides of the machine by using a lift mechanism
- The machine itself is about 200 LBS
- NEVER apply force on the RAIL that encases the wires and sensors when lifting or any other time
- NEVER hold the machine from the motors, fans, or any other attached components when lifting
- If you choose not to follow these guidelines, the limited product warranty becomes void
- See the picture below as a guideline for lifting



TRANSFERABILITY

This warranty is transferable from the original end-user to another party if the machine is sold via private sale before the end of the warranty period. Should you have a problem with your machine, please consult your user manual first. If this does not resolve the problem, contact APSX through our website at www.apsx.com.

SUGGESTED TOOLS AND ACCESSORIES



Kill-A-Watt

Kill-A-Watt meter is used to monitor the power consumption during the machine operation to ensure all the power consuming parts are in good working condition. The LCD screen shows all meter readings: Volts, Current, Watts, Frequency and Power. Press the Watt/VA key once. Watts will be displayed as the active power. Connect the Kill-A-Watt to 120V power and then to APSX-PIM power cord.

15/16" Wrench

Use it for turning the clamp or spring ballbearings/washers manually from the sides. Simply attach the wrench to the nut on the sides next to Block 1 or Block 7 then turn manually when the machine is not powered. The ballbearings/washers should spin against Blocks 1 and 7 freely, with a little friction by the turn of your hand. If there is no friction, or they do not spin at all, then adjust accordingly.

7/16", 1/2", 3/4" Wrenches

Use 7/16" wrench for the bolts on the hopper motor mounts. Use 1/2" wrench for the bolts on the mold clamps. Use 3/4" wrench for the bolts on the Blocks 1 and 7 that hold the 1" steel shafts in place.

3/16", 1/4" and M4 Hex Keys

Use 3/16" hex key for the bolts on the shaft collars, clamp switch collar, hopper weldment to the barrel, mold fan plates, mold gates. Use 1/4" hex key for the bolts on the motor mounts to blocks and on the electronic cover. Use M4 hex key for the bolts on the band heater.

Maintenance

Due to the friction of moving parts on your machine, periodically, we recommend visual inspection and lubrication of the following areas:

-Approximately every 500 hours of run time or at your best discretion-

-Apply synthetic 10W-30 oil on all areas where block bushings slide on the metal shafts, Blocks 2, 3, 5, and 6. (Use a thin even coating on metal shafts)

-Apply synthetic grease or generic chain lube to lubricate spring, clamp, and valve motor chains.

-Apply synthetic grease to ballscrews on Blocks 6 and 2.