

Innovator Plus Control Box

Component Manual

This manual is applicable
to the following models:

- INV3-CB-100-10
- INV3-CB-100-10T



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Safety & Warning Information

Warnings

Due to the vast number of chemicals that could be used and their varying chemical reactions, the buyer and user of this equipment should determine all factors relating to the fluids used, including any of the potential hazards involved. Particular inquiry and investigation should be made into potential dangers relating to toxic fumes, fires, explosions, reaction times, and exposure of human beings to the individual components or their resultant mixtures. MVP assumes no responsibility for loss, damage, expense or claims for bodily injury or property damage, direct or consequential, arising from the use of such chemical components.

The end user is responsible for ensuring that the end product or system complies with all the relevant laws in the country where it is to be used and that all documentation is adhered to.

Recommended Occupational Safety & Health Act (OSHA) Documentation:

- 1910.94 Pertaining to ventilation
- 1910.106 Pertaining to flammable liquids
- 1910.107 Pertaining to spray finishing operations, particularly paragraph (m), Organic Peroxides and Dual Component Coatings

For Additional information, contact the Occupational Safety and Health Administration (OSHA) at <https://www.osha.gov/about.html>.

Recommended National Fire Protection Association (NFPA) Documentation:

- NFPA No.33 Chapter 14 Organic Peroxides and Dual Component Materials
- NFPA No. 63 Dust Explosion Prevention
- NFPA No. 70 National Electrical Code
- NFPA No. 77 Static Electricity
- NFPA No. 91 Blower and Exhaust System
- NFPA No. 654 Plastics Industry Dust Hazards

Fire Extinguisher – code ABC, rating number 4a60bc using Extinguishing Media –Foam, Carbon Dioxide, Dry Chemical, Water Fog, is recommended for this product and applications.

The following general warnings and guidelines are for the setup, use, grounding, maintenance, and repair of equipment. Additional product-specific warnings may be found throughout this manual as applicable. Please contact your nearest MVP Technical Service Representative if additional information is needed.

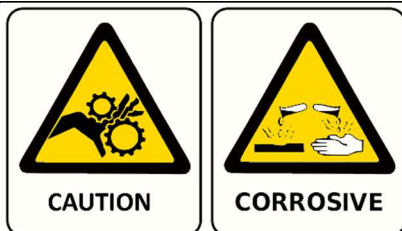
Safety Precautions

- Avoid skin contact and inhalation of all chemicals.
- Review Material Safety Data Sheet (MSDS) to promote the safe handling of chemicals in use.
- Restrict the use of all chemicals to designated areas with good ventilation.
- Chemicals are flammable and reactive.
- Noxious fumes released when combusted.
- Operate equipment in a ventilated environment only.
- Uncured liquid resins are highly flammable unless specifically labeled otherwise.
- Cured laminate, accumulations of overspray, and laminate sandings are highly combustible.
- Do not operate or move electrical equipment when flammable fumes are present.
- Ground all equipment.
- If a spark is seen or felt, immediately halt operation. Do not operate the equipment until the issue has been identified and repaired.
- Contaminated catalyst may cause fire or explosion.
- Containers may explode if exposed to fire / heat.
- Use and store chemicals away from heat, flames, and sparks.
- Do not smoke in work areas or near stored chemicals.
- Do not mix Methyl Ethyl Ketone Peroxide (MEKP) with materials other than polyethylene.
- Do not dilute MEKP.
- Keep food and drink away from work area.



Physical Hazards

- Never look directly into the spray gun fluid tip. Serious injury or death can result.
- Never aim the spray gun at or near another person. Serious injury or death can result.
- Chemical compounds can be severely irritating to the eyes and skin.
- Inhalation, ingestion, or injection may damage internal organs and lead to pulmonary disorders, cancers, lymphomas, and other diseases or health conditions.
- Other potential health effects include: irritation of the eyes and upper respiratory tract, headache, light-headedness, dizziness, confusion, drowsiness, nausea, vomiting, and occasionally abdominal pain.
- Eye contact: Immediately flush with water for at least 15 minutes and seek immediate medical attention.
- Skin Contact: Immediately wash with soap and water and seek immediate medical attention.
- Inhalation: Move the person to fresh air and seek immediate medical attention.
- Do not remove shields, covers, or safety features on equipment that is in use.
- Never place fingers, hands, or any body part near or directly in front of the spray gun fluid tip. The force of the liquid as it exits the spray tip can shoot liquid through the skin.
- Keep hands and body parts away from any moving equipment or components.
- Do not stand under plunger
- An improperly loaded drum may lead to an imbalance, causing a unit to tip over



Personal Protective Equipment (PPE)

- MVP recommends the use of personal safety equipment with all products in our catalog.
- Wear safety goggles, hearing protection, a respirator, and chemical resistant gloves.
- Wear long sleeve shirts or jackets and pants to minimize skin exposure.
- PPE should be worn by operators and service technicians to reduce the risk of injury.



For Additional information, contact the Occupational Safety and Health Administration (OSHA). <https://www.osha.gov/about.html>

Symbol Definitions



Indicates the risk of contact with chemicals that are hazardous, which may lead to injury or death.



Indicates the risk of contact with voltage / amperage that may lead to serious injury or death



Indicates that the materials being used are susceptible to combustion



Indicates the risk of contact with moving components that may lead to serious injury or death.



Indicates that the system or component should be grounded before proceeding with use or repair.



Indicates the use of lit cigarettes or cigars is prohibited, because the materials being used are susceptible to combustion.



Indicates that the materials and/or the process being performed can lead to ignition and explosion.



A recommendation for the use of Personal Protective Equipment (PPE) before using or repairing the product.

Polymer Matrix Materials: Advanced Composites

Potential health hazards associated with the use of advanced composites can be controlled through the implementation of an effective industrial hygiene and safety program.

https://www.osha.gov/dts/osta/otm/otm_iii/otm_iii_1.html#t_iii:1_1

Resins		
Composite Component	Organ System Target (Possible Target)	Known (Possible) Health Effect
Epoxy resins	Skin, lungs, eyes	Contact and allergic dermatitis, conjunctivitis
Polyurethane resins	Lungs, skin, eyes	Respiratory sensitization, contact dermatitis, conjunctivitis
Phenol formaldehyde	Skin, lungs, eyes	As above (potential carcinogen)
Bismaleimides (BMI)	Skin, lungs, eyes	As above (potential carcinogen)
Polyamides	Skin, lungs, eyes	As above (potential carcinogen)
Reinforcing materials		
Composite Component	Organ System Target (Possible Target)	Known (Possible) Health Effect
Aramid fibers	Skin (lungs)	Skin and respiratory irritation, contact dermatitis (chronic interstitial lung disease)
Carbon/graphite fibers	Skin (lungs)	As noted for aramid fibers
Glass fibers (continuous filament)	Skin (lungs)	As noted for aramid fibers
Hardeners and curing agents		
Composite Component	Organ System Target (Possible Target)	Known (Possible) Health Effect
Diaminodiphenylsulfone	N/A	No known effects with workplace exposure
Methylenedianiline	Liver, skin	Hepatotoxicity, suspect human carcinogen
Other aromatic amines		
Composite Component	Organ System Target (Possible Target)	Known (Possible) Health Effect
Meta-phenylenediamine (MPDA)	Liver, skin (kidney, bladder)	Hepatitis, contact dermatitis (kidney and bladder cancer)
Aliphatic and cyclo-aliphatic amines	Eyes, skin	Severe irritation, contact dermatitis
Polyaminoamide	Eyes, skin	Irritation (sensitization)
Anhydride	Eyes, lungs, skin	Severe eye and skin irritation, respiratory sensitization, contact dermatitis

Catalyst - Methyl Ethyl Ketone Peroxide (MEKP)

MEKP is among the more hazardous materials found in commercial channels. The safe handling of the “unstable (reactive)” chemicals presents a definite challenge to the plastics industry. The highly reactive property which makes MEKP valuable to the plastics industry in producing the curing reaction of polyester resins also produces the hazards which require great care and caution in its storage, transportation, handling, processing and disposal. MEKP is a single chemical. Various polymeric forms may exist which are more or less hazardous with respect to each other. These differences may arise not only from different molecular structures (all are, nevertheless, called “MEKP”) and from possible trace impurities left from the manufacture of the chemicals, but may also arise by contamination of MEKP with other materials in its storage or use. Even a small amount of contamination with acetone, for instance, may produce an extremely shock-sensitive and explosive compound.



WARNING

Contamination with promoters, materials containing promoters (such as laminate sandings), or with any readily oxidizing material (such as brass or iron) will cause exothermic redox reactions which can be explosive in nature. Heat applied to MEKP or heat buildup from contamination reactions can cause the material to reach its Self-Accelerating Decomposition Temperature (SADT).

Researchers have reported measuring pressure rates-of-rise well over 100,000 psi per second when certain MEKP's reach their SADT. For comparison, the highest-pressure rate-of-rise listed in NFPA Bulletin NO.68, “Explosion Venting”, is 12,000 psi per second for an explosion of 12% acetylene and air. The maximum value listed for a hydrogen explosion is 10,000 psi per second. Some forms of MEKP, if allowed to reach their SADT, will burst even an open topped container. This suggests that it is not possible to design a relief valve to vent this order of magnitude of pressure rate-of-rise. The user should be aware that any closed container, be it a pressure vessel, surge chamber, or pressure accumulator, could explode under certain conditions. There is no engineering substitute for care by the user in handling organic peroxide catalysts. If, at any time, the pressure relieve valve on top of the catalyst tank should vent, the area should be evacuated at once and the fire department called. The venting could be the first indication of a heat, and therefore, pressure build-up that could eventually lead to an explosion. Moreover, if a catalyst tank is sufficiently full when the pressure relief valve vents, some catalyst may spray out, which could cause eye injury. For this reason, and many others, anyone whose job puts them in an area where this vented spray might go, should always wear full eye protection even when laminating operations are not taking place.

Safety in handling MEKP depends to a great extent on employee education, proper safety instructions, and safe use of the chemicals and equipment. Workers should be thoroughly informed of the hazards that may result from improper handling of MEKP, especially regarding contamination, heat, friction and impact. They should be thoroughly instructed regarding the proper action to be taken in the storage, use, and disposal of MEKP and other hazardous materials used in the laminating operation. In addition, users should make every effort to:

- Store MEKP in a cool, dry place in original containers away from direct sunlight and away from other chemicals.
- Keep MEKP away from heat, sparks, and open flames.
- Prevent contamination or MEKP with other materials, including polyester over spray and sandings, polymerization accelerators and promoters, brass, aluminum, and non-stainless steels.

- Never add MEKP to anything that is hot, since explosive decomposition may result.
- Avoid contact with skin, eyes, and clothing. Protective equipment should be worn at all times. During clean-up of spilled MEKP, personal safety equipment, gloves, and eye protection must be worn. Firefighting equipment should be at hand and ready.
- Avoid spillage, which can heat up to the point of self-ignition.
- Repair any leaks discovered in the catalyst system immediately, and clean-up the leaked catalyst at once in accordance with the catalyst manufacturer's instructions.
- Use only original equipment or equivalent parts from Magnum Venus Products in the catalyst system (i.e.: hoses, fitting, etc.) because a dangerous chemical reaction may result between substituted parts and MEKP.
- Catalyst accumulated from the purging of hoses or the measurement of fluid output deliveries should never be returned to the supply tank, such catalyst should be diluted with copious quantities of clean water and disposed of in accordance with the catalyst manufacturer's instructions.

The extent to which the user is successful in accomplishing these ends and any additional recommendations by the catalyst manufacturer determines largely the safety that will be present in his operation.

Clean-Up Solvents and Resin Diluents



WARNING

A hazardous situation may be present in your pressurized fluid system! Hydro carbon solvents can cause an explosion when used with aluminum or galvanized components in a closed (pressurized) fluid system (pump, heaters, filters, valves, spray guns, tanks, etc.). An explosion could cause serious injury, death, and/or substantial property damage. Cleaning agents, coatings, paints, etc. may contain Halogenated Hyrdrocarbon solvents. Some Magnum Venus Products spray equipment includes aluminum or galvanized components and will be affected by Halogenated Hydrocarbon solvents.

There are three key elements to the Halogenated Hyrdrocarbon (HHC) solvent hazard.

- | | |
|--|--|
| 1. The presence of HHC solvents. | 1,1,1 – Trichloroethane and Methylene Chloride are the most common of these solvents. However, other HHC solvents are suspect if used; either as part of paint or adhesives formulation, or for clean-up flushing. |
| 2. Aluminum or Galvanized Parts. | Most handling equipment contains these elements. In contact with these metals, HHC solvents could generate a corrosive reaction of a catalytic nature. |
| 3. Equipment capable of withstanding pressure. | When HHC solvent contact aluminum or galvanized parts inside a closed container such as a pump, spray gun, or fluid handling system, the chemical reaction can, over time, result in a build-up of heat and pressure, which can reach explosive proportions. When all three elements are present, the result can be an extremely violent explosion. The reaction can be sustained with very little aluminum or galvanized metal; any amount of aluminum is too much. |

- The reaction is unpredictable. Prior use of an HHC solvent without incident (corrosion or explosion) does NOT mean that such use is safe. These solvents can be dangerous alone (as a clean-up or flushing agent) or when used as a component or a coating material. There is no known inhibitor that is effective under all circumstances. Mixing HHC solvents with other materials or solvents such as MEKP, alcohol, or toluene may render the inhibitors ineffective.
- The use of reclaimed solvents is particularly hazardous. Reclaimers may not add any inhibitors. The possible presence of water in reclaimed solvents could also feed the reaction.
- Anodized or other oxide coatings cannot be relied upon to prevent the explosive reaction. Such coatings can be worn, cracked, scratched, or too thin to prevent contact. There is no known way to make oxide coatings or to employ aluminum alloys to safely prevent the chemical reaction under all circumstances.
- Several solvent suppliers have recently begun promoting HHC solvents for use in coating systems. The increasing use of HHC solvents is increasing the risk. Because of their exemption from many state implementation plans as Volatile Organic Compounds (VOCs), their low flammability hazard, and their not being classified as toxic or carcinogenic substances, HHC solvents are very desirable in many respects.



WARNING

Do not use Halogenated Hydrocarbon (HHC) solvents in pressurized fluid systems having aluminum or galvanized wetted parts.

Magnum Venus Products is aware of NO stabilizers available to prevent HHC solvents from reaction under all conditions with aluminum components in closed fluid systems. HHC solvents are dangerous when used with aluminum components in a closed fluid system.

- Consult your material supplier to determine whether your solvent or coating contains Halogenated Hydrocarbon solvents.
- Magnum Venus Products recommends that you contact your solvent supplier regarding the best non-flammable clean-up solvent with the heat toxicity for your application.
- If, however, you find it necessary to use flammable solvents, they must be kept in approved, electrically grounded containers.
- Bulk solvent should be stored in a well-ventilated, separate building, 50 feet away from your main plant.
- You should only allow enough solvent for one day's use in your laminating area.
- NO SMOKING signs must be posted and observed in all areas of storage or where solvents and other flammable materials are used.
- Adequate ventilation (as covered in OSHA Section 1910.94 and NFPA No.91) is important wherever solvents are stored or used, to minimize, confine and exhaust the solvent vapors.
- Solvents should be handled in accordance with OSHA Section 1910.106 and 1910.107.

Catalyst Diluents

Magnum Venus Products spray-up and gel-coat systems currently produced are designed so that catalyst diluents are not required. Magnum Venus Products therefore recommends that diluents not be used to avoid possible contamination which could lead to an explosion due to the handling and mixing of MEKP and diluents. In addition, it eliminates any problems from the diluent being contaminated through rust particles in drums, poor quality control on the part of the diluents suppliers, or any other reason. If diluents are absolutely required, contact your catalyst supplier and follow his instructions explicitly. Preferably the supplier should premix the catalyst to prevent possible “on the job” contamination while mixing.



WARNING

If diluents are not used, remember that catalyst spillage and gun, hose, and packing leaks are potentially more hazardous since each drop contains a higher concentration of catalyst and will therefore react more quickly with overspray and the leak.

Cured Laminate, Overspray and Laminate Sandings Accumulation

- Remove all accumulations of overspray, Fiberglass Reinforced Plastic (FRP) sandings, etc. from the building as they occur. If this waste is allowed to build up, spillage of catalyst is more likely to start a fire; in addition, the fire would burn hotter and longer.
- Floor coverings, if used, should be non-combustible.
- Spilled or leaked catalyst may cause a fire if it comes in contact with an FRP product, oversprayed chop or resin, FRP sandings or any other material with MEKP.

To prevent spillage and leakage, you should:

- | | |
|--|---|
| 1. Maintain your Magnum Venus Products System. | Check the gun several times daily for catalyst and resin packing or valve leaks. REPAIR ALL LEAKS IMMEDIATELY. |
| 2. Never leave the gun hanging over or lying inside the mold. | A catalyst leak in this situation would certainly damage the part, possibly the mold, and may cause a fire. |
| 3. Inspect resin and catalyst hoses daily for wear or stress at the entry and exits of the boom sections and at the hose and fittings. | Replace if wear or weakness is evident or suspected. |
| 4. Arrange the hoses and fiberglass roving guides so that the fiberglass strands DO NOT rub against any of the hoses at any point. | If allowed to rub, the hose will be cut through, causing a hazardous leakage of material which could increase the danger of fire. Also, the material may spew onto personnel in the area. |

Toxicity of Chemicals

- Magnum Venus Products recommends that you consult OSHA Sections 1910.94, 1910.106, 1910.107 and NFPA No.33, Chapter 14, and NFPA No.91.
- Contact your chemical supplier(s) and determine the toxicity of the various chemicals used as well as the best methods to prevent injury, irritation and danger to personnel.
- Also determine the best methods of first aid treatment for each chemical used in your plant.

Equipment Safety

Magnum Venus Products suggest that personal safety equipment such as EYE GOGGLES, GLOVES, EAR PROTECTION, and RESPIRATORS be worn when servicing or operating this equipment. Ear protection should be worn when operating a fiberglass chopper to protect against hearing loss since noise levels can be as high as 116 dB (decibels). This equipment should only be operated or serviced by technically trained personnel!



CAUTION

Never place fingers, hands, or any body part near or directly in front of the spray gun fluid tip. The force of the liquid as it exits the spray tip can cause serious injury by shooting liquid through the skin. NEVER LOOK DIRECTLY INTO THE GUN SPRAY TIP OR POINT THE GUN AT OR NEAR ANOTHER PERSON OR AN ANIMAL.



DANGER

Contaminated catalyst may cause fire or explosion. Before working on the catalyst pump or catalyst accumulator, wash hands and tools thoroughly. Be sure work area is free from dirt, grease, or resin. Clean catalyst system components with clean water daily.



DANGER

Eye, skin, and respiration hazard. The catalyst MEKP may cause blindness, skin irritation, or breathing difficulty. Keep hands away from face. Keep food and drink away from work area.

Treatment of Chemical Injuries



CAUTION

Refer to your catalyst manufacturer's safety information regarding the safe handling and storage of catalyst. Wear appropriate safety equipment as recommended.

Great care should be used in handling the chemicals (resins, catalyst and solvents) used in polyester systems. Such chemicals should be treated as if they hurt your skin and eyes and as if they are poison to your body. For this reason, Magnum Venus Products recommends the use of protective clothing and eye wear in using polyester systems. However, users should be prepared in the event of such an injury.

Precautions include:

1. Know precisely what chemicals you are using and obtain information from your chemical supplier on what to do in the event the chemical gets onto your skin or into the eyes, or if swallowed.
2. Keep this information together and easily available so that it may be used by those administering first aid or treating the injured person.
3. Be sure the information from your chemical supplier includes instructions on how to treat any toxic effects the chemicals have.

**WARNING**

Contact your doctor immediately in the event of an injury. If the product's MSDS includes first aid instructions, administer first aid immediately after contacting a doctor.

Fast treatment of the outer skin and eyes that contact chemicals generally includes immediate and thorough washing of the exposed skin and immediate and continuous flushing of the eyes with lots of clean water for at least 15 minutes or more. These general instructions of first aid treatment may be incorrect for some chemicals; you must know the chemicals and treatment before an accident occurs. Treatment for swallowing a chemical frequently depends upon the nature of the chemical.

Emergency Stop Procedure

In an emergency, follow these steps to stop a system:

1. The ball valve located where the air enters the power head of the resin pump, should be moved to the “OFF” or closed position.

Note ***The “open” or “on” position is when the ball valve handle is parallel (in line) with the ball valve body. The “closed” or “off” position is when the ball valve handle is perpendicular (across) the ball valve body.***

2. Turn all system regulators to the “OFF” position (counter-clockwise) position.
3. Verify / secure the catalyst relief line, located on the catalyst relief valve.
4. Verify / secure the resin return line, located on the resin filter.
5. Place a container under the resin pump ball valve to catch ejected resin.
6. Locate the ball valve on the resin pump.
7. Rotate the ball valve 90 degrees to the “On” or open position.

Grounding

Grounding an object means providing an adequate path for the flow of the electrical charge from the object to the ground. An adequate path is one that permits charge to flow from the object fast enough that it will not accumulate to the extent that a spark can be formed. It is not possible to define exactly what will be an adequate path under all conditions since it depends on many variables. In any event, the grounding means should have the lowest possible electrical resistance.

Grounding straps should be installed on all loose conductive objects in the spraying area. This includes material containers and equipment. Magnum Venus Products recommends grounding straps be made of AWG No.18 stranded wire as a minimum and the larger wire be used where possible. NFPA Bulletin No77 states that the electrical resistance of such a leakage path should be 1 meg ohm (10^6 ohms) or less.

**CAUTION**

Whenever flammable or combustible liquids are transferred from one container to another, or from one container to the equipment, both containers or container and equipment shall be effectively bonded and grounded to dissipate static electricity. For further information, see National Fire Protection Association (NFPA) 77, titled “Recommended Practice on Static Electrical”. Refer especially to section 7-7 titled “Spray Application of Flammable and Combustible Materials”.

Introduction

The Innovator Plus is a state-of-the-art programmable logic controller (PLC) interface injection system that can be used on any MVP dispensing system, whether it is the innovative Patriot, the rugged Universal Proportioner, or anything in between. The controls can process large shot of hundreds of pounds or as small as 5 ccs. The Innovator Plus can be used for various applications, including:

- Polyester
- Vinyl ester
- Epoxy
- Urethane

The system automates and tracks every step of the injection process, reducing costly production mistakes and down time. Data acquisition software tracks all aspects of the injection for in-house quality assurance audits or process reporting for the end user.

This manual provides information for the operation, maintenance, and simple repair of the MVP Innovator Plus Control Box. The control system will vary slightly in the model/options ordered. This manual only covers the controllers and their operation. For pumping system details, consult the operations manual for your system. The following procedures are included:

- Installation instructions
- Step-by-step operation instructions
- Setup and programming instructions



Please read this manual carefully and retain for future reference. Follow the steps in the order given, otherwise you may damage the equipment or injure yourself.

Models and Options

The Innovator Plus controls package comes in 4 versions. Models will accept almost any MVP pump configuration available. For larger or custom configurations, please contact your local MVP representative.

Permanent Mount Platform Systems

- INV3-PLAT-1000-3 Optional 10" color HMI, no thermocouple inputs.
- INV3-PLAT-1000-4 Optional 10" color HMI, with thermocouple inputs.

Portable Cart Mount Platform Systems

- INV3-PLAT-2000-3 Optional 10" color HMI, no thermocouple inputs.
- INV3-PLAT-2000-4 Optional 10" color HMI, with thermocouple inputs.

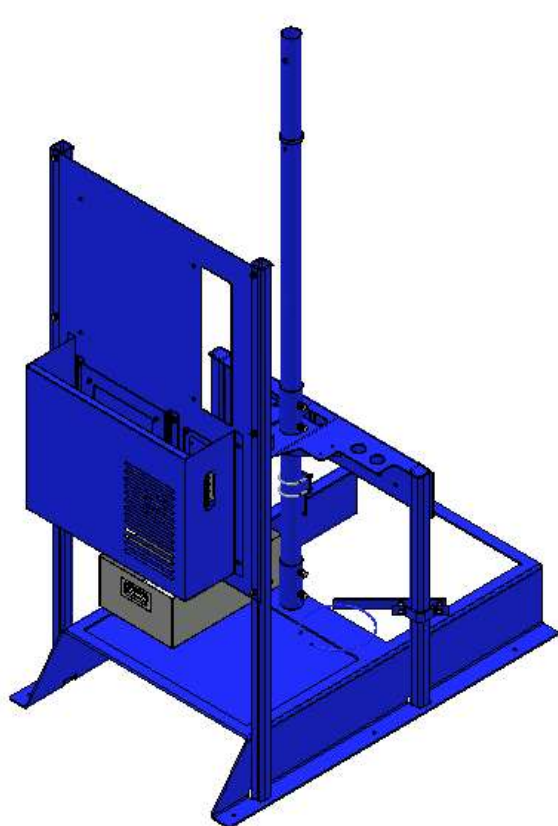


Figure 2. Permanent Mount Platform

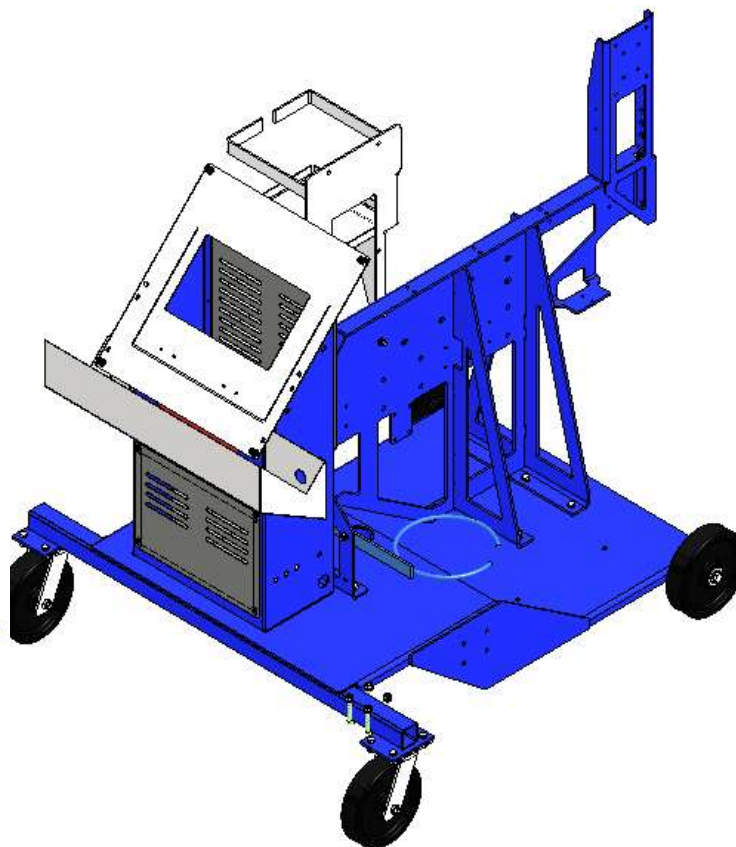


Figure 2. Portable Cart Mount Platform

System Features

Included Standard Features

- MVP pumping system configured to your needs
- Pro Series dispense gun or Megaject injection module
- Recirculation package

- 3-gallon stainless steel flush tank with SP4 flush/air purge module
The SP4 module will flush the injection head with approximately 150 cc solvent/air mix, then pure air to cleanse the system for the next use, reducing solvent usage dramatically
- HDPE 5-gallon gravity of 2-gallon suction feed hardener tank
- Pneumatic closed loop injection pressure control
Using the inline mold pressure guard (MPG) from MVP, injection pressure can be reduced or stopped by sensing backpressure from the injection line
- Catalyst manifold management system with built-in hardener alarm
The electronic hardener alarm senses flow from the pumps. At any time the hardener stops flowing, the system alarms
- 10" color operator interface touch screen
The rugged touch allows the operator to choose recipes to run or to program RFID tags. This option should be used if no RFID unit is installed, and/or if a large amount of data needs to be displayed such as heat, pressure controls/monitoring
- On-panel injection controls, operator interface injection controls
All aspects of Start, Stop, Pause, and Flush can be controlled from both the physical panel and the human-machine interface (HMI)
- 250 recipes
Mold number, part number, pause, and catalyst start/stop (Progressive Hardener Drive only) can be programmed as a recipe for easy retrieval and shot consistency for up to 250 different jobs
- Built-in pause
Using the programmed pause feature, up to 3 scheduled interruptions can be used during the process at any time. Manually the injection can be paused infinitely.
- Data recording capable
When the optional software package is installed, the unit will record to a local PC all processes of the injection at a programmed interval to serve as a permanent record of the manufacturing process for a part
- Maintenance functions
The maintenance function will keep track of run times on all components, allowing for preventative maintenance before breakdowns can occur

Optional Features

- 5-gallon stainless steel flush tank with SP4 flush/air purge module
The SP4 module will flush the injection head with approximately 150 cc solvent/air mix, then pure air to cleanse the system for the next use, reducing solvent usage dramatically. Other sizes are available for epoxy and urethane systems. High-pressure flush is also available
- High-pressure flush system with transfer pump
The high pressure flush pump with auto valves allows the use of highly filled or high viscosity materials to be used in the system
- Inline heaters
- Wired 4-button remote control with 25 ft. cord

Extensions available upon request

- **Electronic closed-loop injection pressure control**
Using the inline MPG from MVP, with or without a pressure transducer, the injection pressure can be reduced/stopped by sensing backpressure from the injection line. This option is for finer control of the inlet pressure and can be set to automatically shut down the system immediately upon detection of out-of-range pressure
- **RFID read/write head**
Used to quickly recall recipes via a remote RFID reader – each mold can have a tag attached for the operator to quickly scan and recall the recipe from memory automatically. Coupled with the standard wired remote, the operator can begin a job without having to return to the controls on the machine
- **Additional 250 recipes**
Adds 250 recipes that can be stored for a full capacity of 500
- **Pneumatic Progressive Hardener Drive (Patriot system only)**
The progressive hardener drive will automatically increase hardener percentage evenly over the course of the injection, allowing for quicker de-molding of parts and increased green strength
- **Software package enabling recording of data/alarms at all intervals and recipe management**
Software package will retrieve all monitored parameters from the control system and record to an MS Access database for retrieval. Must have an ethernet connection to the machine and MS Access 2003 installed on a local PC
- **Fine resolution tracking**
Reduces resolution of material tracking for small shots down to ± 5 cc. MEKP systems only
- **Flow meter package**
Finite dispense amounts can be achieved by using flow meters on the resin, hardener, or both. Helical, Positive Displacement, or Mass flow meters available.
- **Barcode**
Optional barcode scanner allows the tracking of part number, serial number, and operator number
- **Transducer packages**
Optional transducers for monitoring resin/hardener pressures before the mix heads
- **Boom Kits**
Booms available in 48", 72" and 144" lengths

Installing Control Box

The Innovator Plus comes standard with a 10 foot power cord. The control unit can be run with 110 VAC or 220 VAC (5A draw). If the EHC-X option is installed, the unit must be powered at 220 VAC (30A draw).

Refer to the reference label on the panel for electrical connections. Contact your MVP Technical Service Representative for additional information if needed.



WARNING

Because of the variety of electrical codes in various parts of the world, MVP does not supply electrical connectors to any of the hoses mentioned in this manual. The electrical connection should be made by a qualified electrician per codes of the local jurisdiction. Additionally, self-regulating hoses must be installed on a GFCI circuit for protection. Failure to do so voids all warranty and liability directed at MVP or its subsidiaries.

The end user is responsible for ensuring that the end product or system complies with all relevant laws in the country where it is to be used and that all documentation is adhered to.

Operating Controls

The Innovator Plus utilizes a touch screen, manual switches, and push buttons for operation. Once the machine is set up and calibrated, operation is simple.

1. Choose a recipe from the HMI or scan a tag or barcode using the optional reader system.

The corresponding recipe is loaded with all pertinent information and the machine enters a ready state.

2. Push the start button to begin the injection cycle.

The panel mounted push buttons are for actual operation of the machine, while the HMI is commonly used to monitor machine status, load or delete recipes, and create recipes. Although there are minimal controls on the touch screen, they can be used in case of mechanical push button failure.

Overview of Controls

Following is a brief description of all the controls and their function.

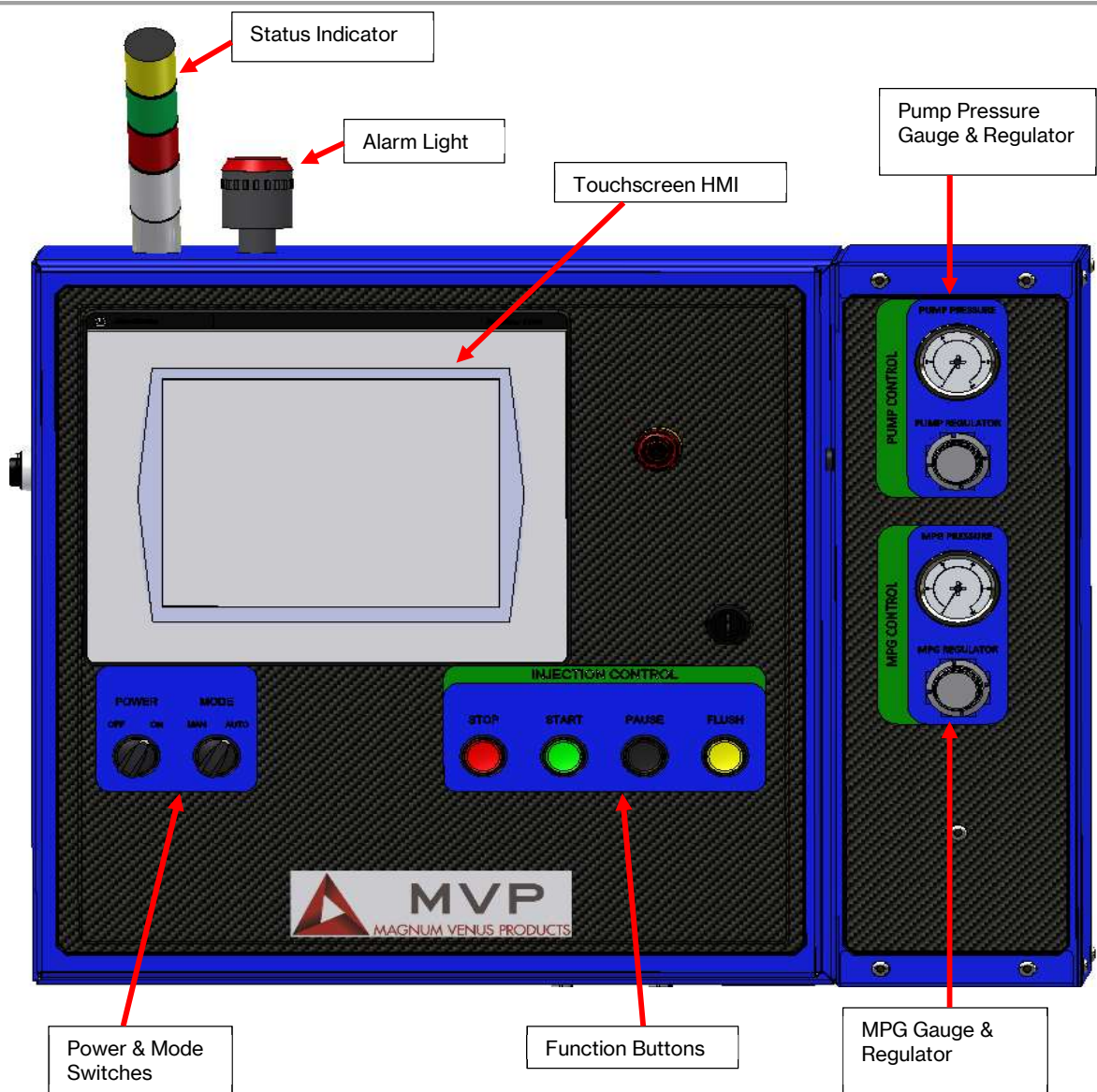


Figure 4. Front View

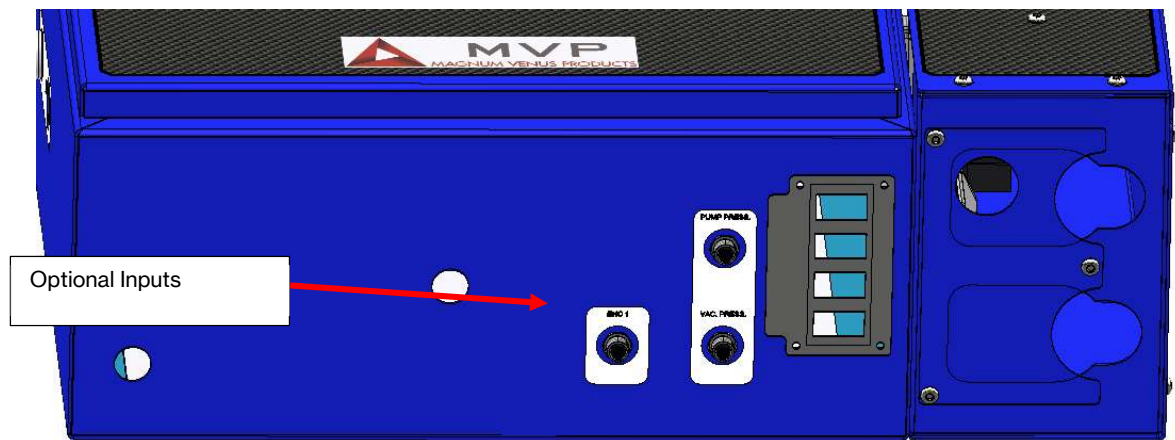


Figure 4. Bottom View

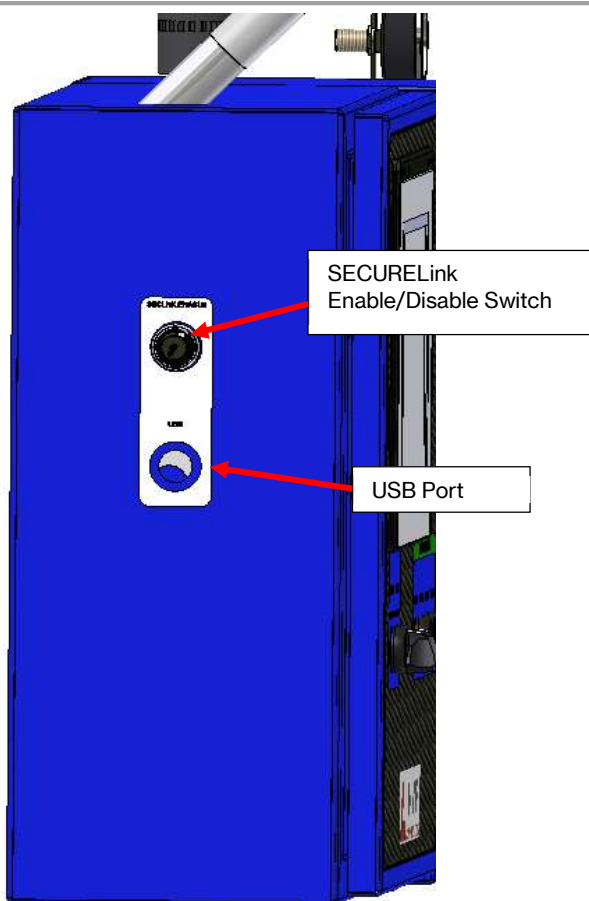


Figure 6. Control Box Left Side View

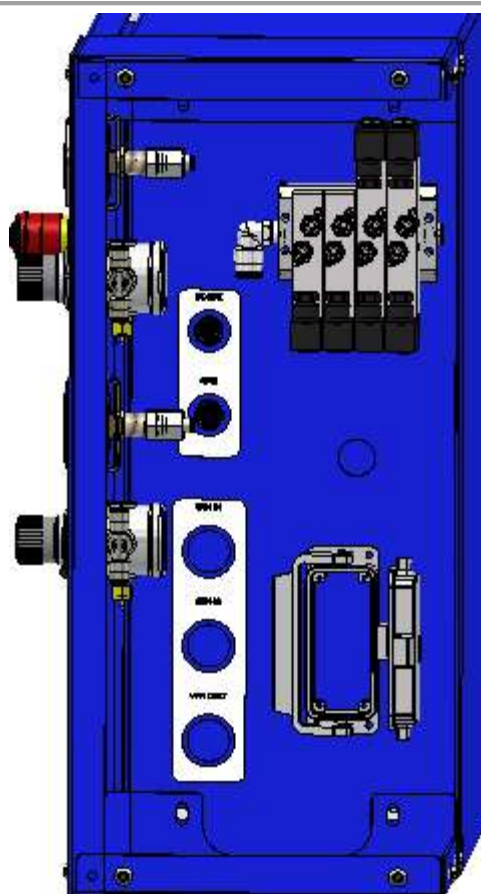
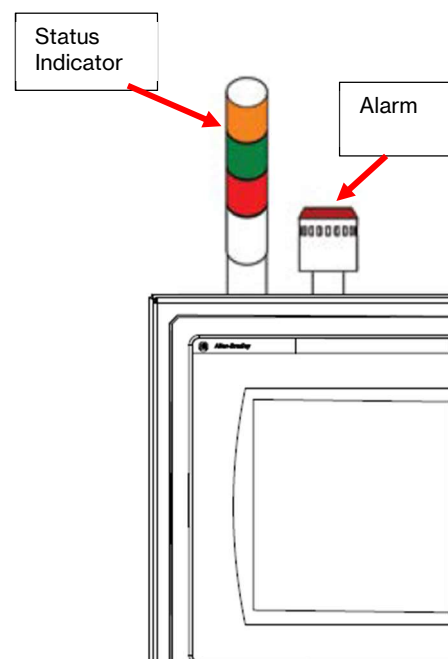


Figure 6. Right Side Pneumatic Controls (Cover Removed)

Control Panel Lights

Machine Status Indicator

Status Indicator Lights	
Light	Indicates
Orange Status Indicator	(machine in motion)
Fast Flash	Recirculation, injection, or dispense head purge currently active
Steady Flash	Paused
Green Status Indicator	(ready)
Slow Flash	Recipe loaded/ready to inject
Red Status Indicator	(non-immediate alarm)
Fast Flash	Catalyst alarm, heat alarm, or no recipe loaded
Steady Flash	Maintenance needed



The alarm light pulsing indicates one of the following:

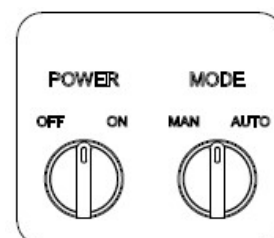
- Gel alarm
- Catalyst alarm

- Master pressure alarm
- Dispense head purge starting in 3 seconds
- Recirculation starting in 3 seconds

If the alarm light is steady, it indicates that the injection cycle is starting in 3 seconds.

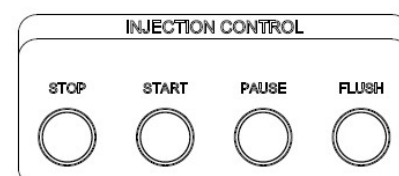
Switch Controls

Controls	
Switch	Function
Power	Toggles unit power supply Note <i>If the EHC-X option is installed, voltage is supplied directly from the supply cord and this switch does not disconnect the circuit. Disconnect the main supply power when servicing.</i>
Mode	Sets the injection mode to automatic or manual



Injection Button Controls

Injection Controls	
Button	Function
Stop	Stops all function of the unit
Start	Starts either manual dispense or auto injection mode
Pause	Pauses auto injection mode
Flush	Engages solvent purge system



Display Screens

Note *Each screen can have multiple sub screens for operations, parameter displays, or parameter inputs. On every display following the STARTUP screen, there is an EXIT button to return you to the previous screen. Refer to the HMI screen map for navigation.*

Note *Depending on machine configuration not all options on all screens may be available.*

The Innovator Plus control system will vary slightly depending on the model/options ordered. This manual only covers the controllers and their operation. For pumping system details, consult the manual for the specific component or system.

The following is a map of the flow from screen to screen. Some screens can be accessed in more than one way.

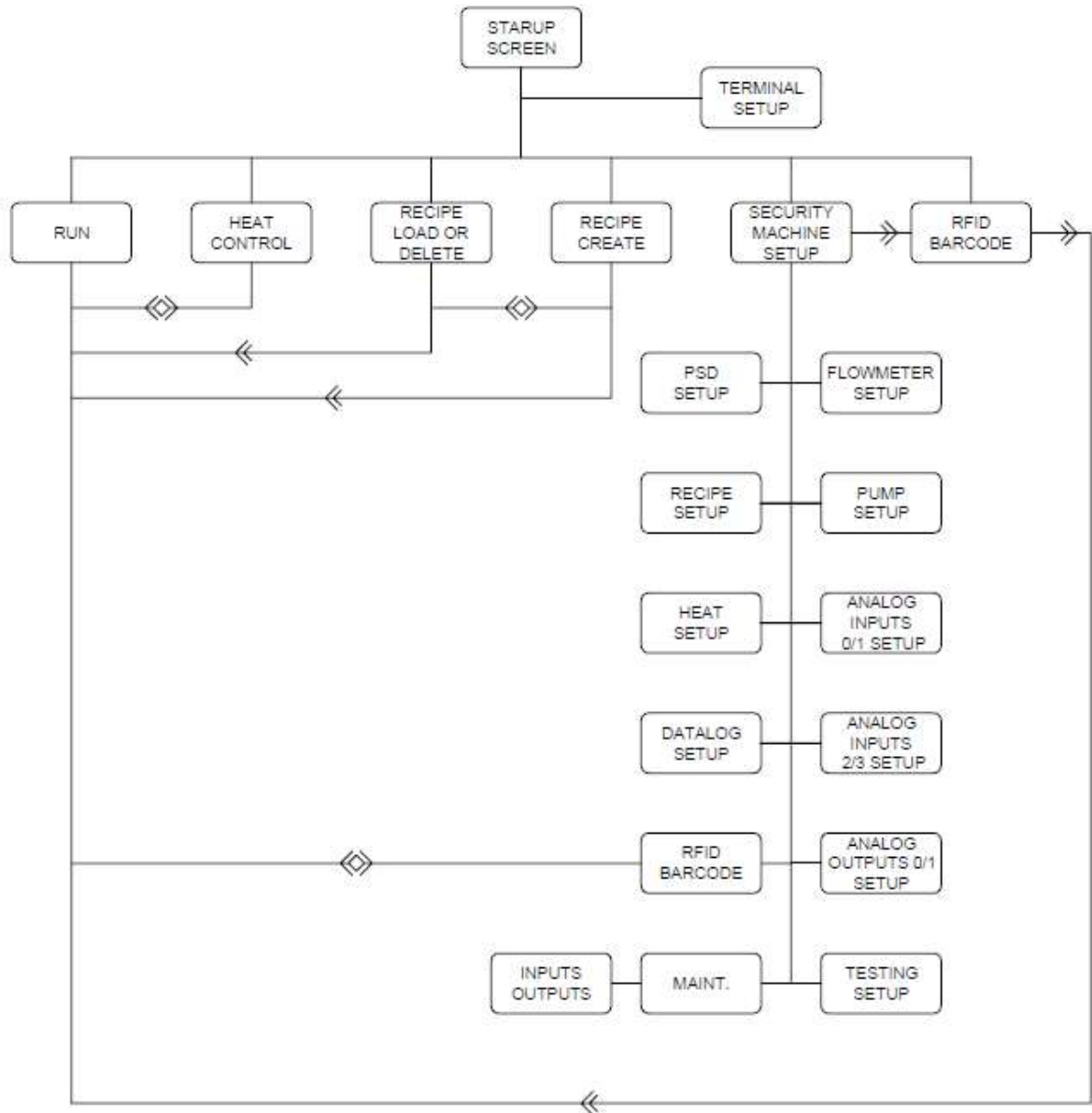
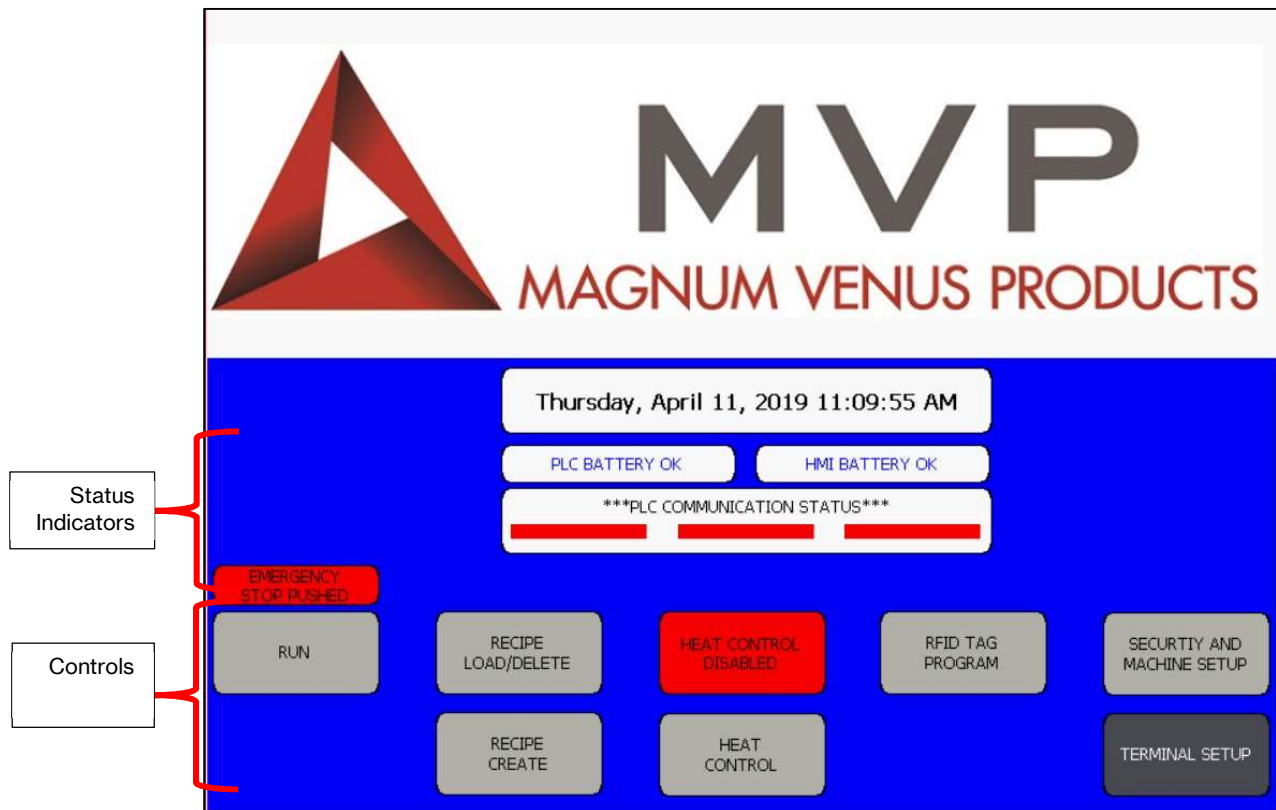


Figure 7. HMI Screen Flow

Startup Screen



The Startup screen displays when the system is initialized. It displays the current date and time, followed by machine status indicators and then controls to navigate the system.

Startup Screen Status Indicators

This display	Indicates
PLC BATTERY LOW	PLC battery needs to be replaced
HMI BATTERY LOW	HMI battery needs to be replaced
PLC COMMUNICATION	Communication between HMI and PLC stable
EMERGENCY STOP PUSHED	E-stop has been engaged

Startup Screen Controls

Button	Function
LOGON	Displays LOGON screen
RUN	Displays RUN screen
RECIPE LOAD/DELETE	Displays RECIPE LOAD/DELETE screen
RECIPE CREATE	Displays RECIPE CREATE screen
HEAT CONTROL ENABLED/DISABLED	Enables or disables all heater controls
HEAT CONTROL	Displays HEAT CONTROL screen
RFID TAG PROGRAM	Displays RFID PROGRAM screen
SECURITY/MACHINE SETUP	Displays SECURITY AND MACHINE SETUP screen
TERMINAL SETUP	Displays TERMINAL SETUP screen

Security Login/Machine Setup Screen

On the Security Login/Machine Setup screen, you can enter passwords to access certain areas of the HMI. The default passwords are as follows:

- Level 1 123
- Level 2 456
- Level 3 789

The first time Level 3 is accessed, it is recommended that the password be reset.

Security Login/Machine Setup Screen Controls

Button	Function
MAINTENANCE	Displays MAINTENANCE screen
SIREN ON/OFF	Turns the audible alarm on or off
The following are only accessible through Level 3 access:	
PROGRESSIVE HARDENER DRIVE	Displays PROGRESSIVE HARDENER DRIVE setup
RECIPE	Displays the RECIPE setup screen
HEAT	Displays HEAT setup screen
RFID/BARCODE	Displays RFID/BARCODE setup screen
DATALOG	Displays DATALOG setup screen
FLOWMETER	Displays FLOWMETER setup screen
PUMP	Displays PUMP setup screen
ANALOG IN 0/1	Displays ANALOG IN 0/1 setup screen
ANALOG IN 2/3	Displays ANALOG IN 2/3 setup screen
ANALOG OUT 0/1	Displays ANALOG OUT 0/1 setup screen

Injection Monitoring and Controls Screen

INJECTION MONITORING AND CONTROLS					
UNIT OPERATION/SETTINGS				ALARMS/STATUS	
INJECTION CONTROL START PAUSE STOP PURGE		EMP/EG EMPG LOW EMPG HIGH SPRUE CONTROL OPEN SPRUE CLOSED RECIRCULATION OFF		ALARMS/STATUS NO RECIPE LOADED MANUAL MODE INJECTION IN PROGRESS PAUSED: 0 RECIRCULATION IN PROGRESS PURGE IN PROGRESS PSD HOMED AND READY HARDENER DELIVERY FAILURE GEL TIME OVERRUN MASTER ALARM TEMPERATURE MASTER ALARM PRESSURE PROGRESSIVE DRIVE ALARM EMERGENCY STOP PUSHED	
PSD CONTROL ENABLED REVERSE FORWARD					
CURRENT RECIPE LOADED: 000 INJECTION SIZE: .00 CC AMOUNT DISPENSED: .00 CC PERCENTAGE OF INJECTION COMPLETE: .00 % FLOW/MIN: .00 CC CURRENT INJECTION TIME ELAPSED: 00:00:00 CURRENT PUMP PRESSURE SETTING: .00 PSI CURRENT CATALYST SETTING: .00 %		RESIN HEATER TEMPERATURE: .0 F RESIN HOSE TEMPERATURE: .0 F HARDENER HEATER TEMPERATURE: .0 F HARDENER HOSE TEMPERATURE: .0 F RESIN PRESSURE: .0 PSI HARDENER PRESSURE: .0 PSI EMPG VAC./PRESS.: .00		ALARM RESET MOLD NUMBER: <input type="text"/> PART NUMBER: <input type="text"/> 0 SERIAL NUMBER: <input type="text"/> 0 OPERATOR ID: <input type="text"/> 0 HEAT CONTROL EXIT	

Injection Monitoring Screen Controls

Button	Function
START	Starts either manual dispense or automatic injection mode
PAUSE	Pauses automatic injection mode
STOP	Stops all function of the machine
PURGE	Engages solvent purge system
SRPUE CONTROL – OPEN	Pressurizes the Turbo Autosprue (TAS) port (manual mode only)
SPRUE CONTROL – CLOSE	Depressurizes the TAS port (manual mode only)
RECIRC	Turns recirculation circuit on/off
PSD CONTROL – ENABLED/DISABLED	Toggles the Progressive Slave Drive (PSD) unit
PSD CONTROL – REVERSE	Moves the hardener to a lower percentage (manual mode only)
PSD CONTROL – FORWARD	Moves the hardener to a higher percentage (manual mode only)
HEAT CONTROL	Displays the HEAT CONTROL screen

Injection Monitoring Screen Settings	
Electronic Mold Pressure Guard (EMPG) Setting	Controls
EMPG HIGH	Pressure setting at which auto injection will pause
EMPG LOW	Vacuum setting at which auto injection will pause
Note Once the EMPG has reached the high setting the unit must be off for a minimum of 10 seconds for the injection to resume. Once injection resumes, the unit must operate for a minimum of 1 second.	
Electronic Pump Pressure Control (EPPC) Setting	Controls
PUMP PRESS.	Powerhead pressure setting
Note If the EPPC is installed, the manual pump pressure regulator must be set to 100 psi at all times. This regulator feeds the EPPC unit supply line.	

Both the EMPG and EPPC settings are loaded from a recipe. Once the unit has started injecting, both settings may be adjusted manually via the HMI.

Injection Monitoring Screen Alarms/Status Indicators	
This display (Yellow)	Indicates
MANUAL/AUTO MODE	Which mode machine is in
INJECTION IN PROGRESS	Automatic injection is in progress
PAUSED	Machine has been paused
RECIRC IN PROGRESS	Recirculation is active
PURGE IN PROGRESS	Purge is in progress
This display (Red)	Indicates
NO RECIPE LOADED	No recipe has been loaded
HARDENER DELIVERY FAILURE	Hardener flow failure
GEL TIME OVERRUN	Programmed gel time has expired without purging
MASTER ALARM TEMPERATURE	Temperature alarm indicated (see PROCESS INFO)
MASTER ALARM PRESSURE	Pressure alarm indicated (see PROCESS INFO)
PROGRESSIVE DRIVE FAILURE	Progressive drive did not reset
EMERGENCY STOP PUSHED	Indicates E-STOP is engaged
ALARM RESET	Resets all alarms. This will disengage all alarms for 10 seconds. If alarm reason is still active, alarm will re-engage

Process Info

The process information displays track real time info on the injection process. In addition, some labels will indicate alarm status in conjunction with the master ALARMS/STATUS indicators.

Injection Monitoring Screen Alarms/Status Indicators	
This field	Displays
CURRENT RECIPE LOADED	The current recipe loaded
INJECTION SIZE	Amount to be dispensed
AMOUNT DISPENSED	Running total amount dispensed
PCT. OF INJECTION COMPLETE	Running percentage of recipe complete

Injection Monitoring Screen Alarms/Status Indicators

This field	Displays
FLOW/MIN	Flow per minute of fluid
INJECTION TIME	Accumulated injection time
CURRENT PUMP PRESSURE SETTING	Pump pressure setting
CURRENT CATALYST SETTING	Current catalyst leve
HEATER #1	Running temperature of heater #1
HEATER #2	Running temperature of heater #2
HOSE #1	Running temperature of hose #1
HOSE #2	Running temperature of hose #2
RESIN PRESSURE	Pressure of the resin
HARDENER PRESSURE	Pressure of the hardener
EMPG STATUS	Status and reading of the EMPG
RESIN TO HARDENER RATIO	Running ratio of pump system

Heat Control Screen

Heat Control Screen Controls

Button	Function
RESIN HEATER ENABLED/DISABLED	Turns on or off the resin heater
PREHEAT START	Starts heater pre-heat sequence
SETPOINT	Displays the heater setting
HEATER ALARMS ENABLED/DISABLED	Turns on or off the heater alarms Note This control only sets the warnings for the RUN screen display.
RESIN HEATER OT RESET	Resets the resin heater OT alarm

Heat Control Screen Alarms/Status Indicators

This display	Indicates
TEMPERATURE	Current temperature of the heater thermocouple
THERMOCOUPLE FAILURE	Resin heater thermocouple is not operating correctly
HEATER LIMITS	Sets the upper and lower limits of the heater. If the heater overruns the upper limit it will shut down.
HEATER OT	Resin heater has reached the high limit setting

Load/Delete Recipe Screen

Recipe Load/Delete Screen Controls

Button	Function
RECIPE NUMBER	Recipe number to load or delete
LOAD RECIPE	Loads recipe into memory for use
DELETE RECIPE	Deletes the selected recipe from the system Note When deleting a recipe, new controls appear to confirm the deletion. Press YES to confirm or NO to keep the recipe.

Recipe Load/Delete Screen Status Indicators

This display	Indicates
NO RECIPE LOADED	No recipe is loaded to start the injection cycle

Recipe Load/Delete Screen Status Indicators

This display	Indicates
RECIPE LOADED	When recipe is loaded and ready to start injection
LOADING RECIPE	Recipe currently loading
INJECTING	Active when injecting Note DO NOT load or delete recipe while injecting!

Recipe Load/Delete Screen Status Display Fields

This display field	Shows
MOLD NUMBER	Injection tool tracking identifier (RFID only)
PART NUMBER	Part tracking identifier (barcode only)
SERIAL NUMBER	Serial tracking identifier (barcode only)
OPERATOR ID NUMBER	Operator tracking identifier (barcode only)
The following are display only and cannot be modified by the user:	
INJECTION SIZE	Material quantity to dispense
CATALYST START %	Hardener start percentage (PSD only)
CATALYST STOP %	Hardener stop percentage (PSD only)
PAUSE 1, 2, AND 3	Pauses the injection process at programmed targets
PUMP PRESSURE	Pressure to supply the injection pump (EPPC only)
MPG PRESSURE LOW	Low setting of the EMPG to restart injection (EMPG only)
MPG PRESSURE HIGH	High setting of the EMPG to stop injection (EMPG only)

Create Recipe Screen

The Create Recipe screen is used to create recipes that will be stored permanently in the machine until needed. There are certain parameters that must be entered to save the recipe. If the correct

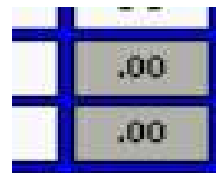
parameters are not entered or bypassed, a warning will display and not allow the recipe to be saved. Any time a red box blinks around a parameter, it is out of range and has not been entered correctly.

Once all parameters are entered correctly and the SAVE RECIPE button is pressed, either the displays will clear indicating the recipe has been saved, or the overwrite popup box will appear confirming overwrite of the current recipe. If you select YES in the popup, the displays will clear indicating the recipe has been saved. If you select NO, the screen returns to a normal state, allowing another recipe to be selected.

To create a recipe, enter the parameters according to the table below:

Recipe Create Screen Mandatory Fields	
In this field	Enter this information
RECIPE NUMBER	The number for the recipe to be recalled later. Must be a number between 1 and 250. Note <i>If additional recipe storage is installed on your unit the number must be between 1 and 500.</i>
UNIT OF MEASUREMENT	Choose the unit of measurement you wish to use to track the injection cycle
INJECTION SIZE	Injection size needed
CATALYST START	Catalyst start percentage Note <i>Only required if PHD is installed/enabled on the system</i>
CATALYST STOP	Catalyst stop percentage Note <i>Only required if PHD is installed/enabled on the system</i>
PUMP PRESSURE	Operating pump pressure Note <i>Only with E/P regulator option. If not available, information must be entered manually.</i>
MPG PRESSURE	Operating MPG pressure Note <i>Only with E/P regulator option. If not available, information must be entered manually.</i>
Optional fields:	
PAUSE AT	Enter at what point the injection cycle should pause Note <i>There are 3 pauses available during injection. Enter the value in each field for which you wish to pause. If no pauses are desired, leave blank.</i>

The grayed out numbers to the right of the catalyst start and stop percentage fields are the maximum amounts allowed according to the system setup information. If you enter numbers that exceed these specifications you will receive a warning and be unable to save the recipe.



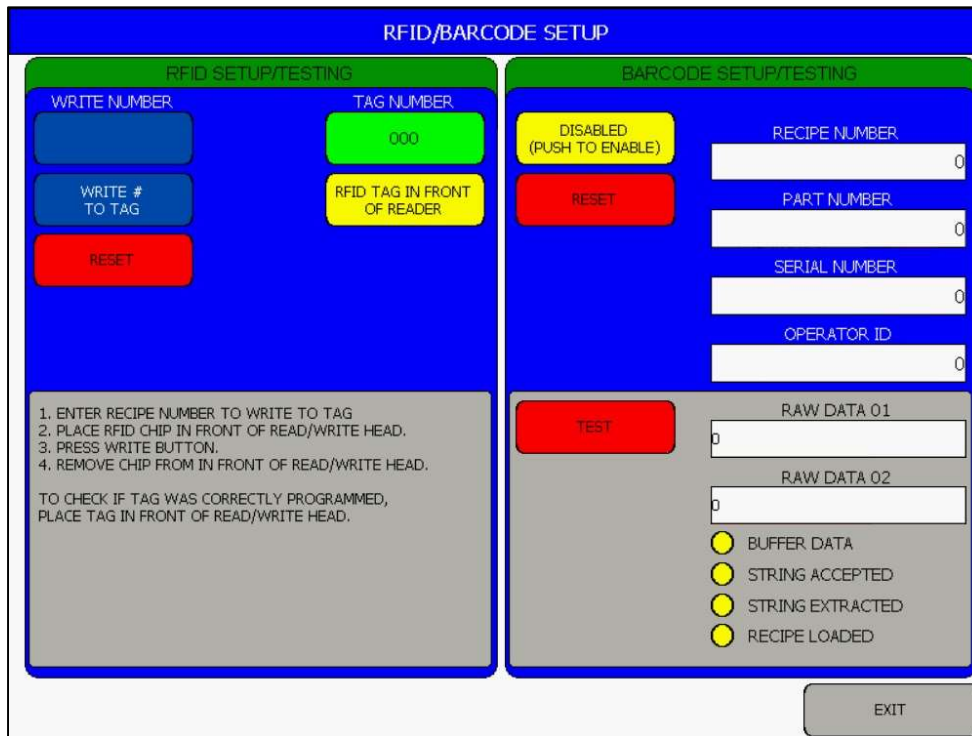
The ADJUST CATALYST START OR STOP PERCENTAGE alarm will appear if the catalyst stop percentage is less than the catalyst start percentage. To correct the alarm, increase the catalyst stop percentage.

Recipe Create Screen Controls

Button	Function
RECIPE NUMBER	Recipe number to overwrite/delete
SAVE RECIPE	Saves selected recipe to system Note <i>When overwriting an existing recipe you must confirm before the save is finalized.</i>
RESET	Clears fields to start over
RUN	Starts injection with the current recipe
EXIT	Leave the create recipe screen
RECIPE LOAD/DELETE	Return to the RECIPE LOAD/DELETE screen

Setting Up System

RFID/Barcode Setup Screen



RFID Setup Screen Controls

Button	Function
WRITE NUMBER	Number to write to tag
WRITE # TO TAG	Writes info to tag
RESET	Resets read/write command due to malfunction

RFID Setup Screen Status Indicators

This display	Indicates
TAG NUMBER	Displays tag number assignment
TAG IN FRONT OF READER	A tag is within reading distance

To program a tag, follow these steps:

1. Place a tag in front of the read/write head.
2. Enter a recipe number that the tag will represent.
3. Press the WRITE # TO TAG button.

The tag number appears in the TAG NUMBER field.

4. To test the tag, remove it from in front of the read/write head and confirm the tag number returns to zero, then return it to the scanning area and confirm the number reappears.

Barcode Setup/Testing

The right half of the screen is to help troubleshoot the barcode inputs and includes the following:

Barcode Setup/Testing Screen Controls	
Button	Function
ENABLE/DISABLE	Enables or disables the barcode reader
RESET	Resets read/write command due to malfunction
Barcode Setup/Testing Screen Status Displays	
This display	Shows
RECIPE NUMBER	Recipe number loaded from barcode scan
PART NUMBER	Part number loaded from barcode scan
SERIAL NUMBER	Serial number loaded from barcode scan
OPERATOR ID	Operator ID loaded from barcode scan

To test barcode input, follow these steps:

1. Push the TEST button, then scan a properly formatted barcode.

The raw data inputs display exactly how the barcode is printed. This is what the data looks like before it is decoded to display the values.

2. Wait for the display to change.

Once the data is accepted, the four indicator lights will activate in sequence as the process evolves and the TEST button indicator will turn off.

3. If the barcode scan is not returning the correct data, review the raw data to make sure it is formatted correctly.

Barcode Formatting

All barcodes must be formatted for CODE128 format. The barcode is set up to have an indicator character followed by the numbers it is indicating.

Indicators

- % Recipe number to recall in PLC

The recipe number cannot exceed 3 digits and must be between 1 and 250 (500 on upgrade), or the PLC will reject it. For example, 1, 103, or 12 is acceptable; 551 or 12556 are not. This is a *required* indicator in all barcodes.

- # Serial number
- ? Model number
- & Employee number

The barcode must be organized in the following order: RECIPE, SERIAL, MODEL. You may omit the serial number, model number, or both, but you must maintain the order structure. The employee number and its indicator are optional, but if you include it note that it does not get reset every scan. The only way to change the employee number is to scan another barcode.

The entire barcode is limited to 82 characters.

Example The following barcode will input the following into the PLC:

Recipe number **123**
Serial number **45678**
Model number **910111213**



Recipe Number (%): Number to recall in the PLC. Number cannot exceed 3 digits and cannot be more than 250(500 with upgrade), or the PLC will reject it.

- 1, 193, or 12 are acceptable
- 501, 12556 are *Not* acceptable

Serial Number (#): No restriction, but the total barcode length cannot exceed 82 characters.

Model Number (?): No restriction, but the total barcode length cannot exceed 82 characters.

Progressive Slave Drive Setup Screen

PROGRESSIVE SLAVE DRIVE SETUP

PATRIOT SLAVE DRIVE SETUP

ENABLED

REVERSE

FORWARD

SCREW PITCH

REAR CLEVIS CENTERLINE

CATAYLST PUMP CLEVIS CENTERLINE

DISTANCE FROM REAR CLEVIS TO CATAYLST PUMP CLEVIS START

DISTANCE FROM REAR CLEVIS TO CATAYLST PUMP CLEVIS STOP

PSD INCREMENT

NEAR SIDE SWITCH OFF

NEAR SIDE SWITCH STATE MUST BE ON TO OPERATE

FAR SIDE SWITCH OFF

FAR SIDE SWITCH STATE MUST BE ON TO OPERATE

EXIT

**WARNING**

These settings should only be adjusted by qualified personnel. Failure to adjust/setup the PSD properly can result in equipment and/or part damage.

Progressive Slave Drive Setup Screen Controls

Button	Function
ENABLE/DISABLE	Enables or disables the PSD
REVERSE	Moves the hardener pump toward the powerhead
FORWARD	Moves the hardener pump away from the powerhead
SCREW PITCH	Drive screw pitch specification
REAR CLEVIS CENTERLINE	½ the width of the rear pivot clevis
CATALYST PUMP CENTERLINE	½ the width of the catalyst pump clevis
DISTANCE FROM REAR CLEVIS TO CATALYST PUMP CLEVIS START	Distance from the front of the rear clevis to the back of the catalyst pump clevis at the home position
DISTANCE FROM REAR CLEVIS TO CATALYST PUMP CLEVIS STOP	Distance from the front of the rear clevis to the back of the catalyst pump clevis at the end of travel
PSD INCREMENT	Incremental movement for each cycle of the drive

Pump System Setup Screen

PUMP SYSTEM SETUP

RECIRCULATION

- MODE: AUTO MODE
- PUMP PRESSURE
- IDLE TIME (MIN)
- DURATION (MIN)

SOLVENT/AIR PURGE SETUP

- MODE: MANUAL
- TYPE: FLUSH TYPE: AIR PURGE/SOLVENT
- CYCLES
- WARNING (SEC)
- AIR (SEC)
- SOLVENT
- AIR PURGE
- SOLVENT

CALIBRATION

- START CALIBRATION
- SAMPLE SIZE: CUBIC CENT.
- SAMPLE SIZE: 000.0000000
- SCALE FACTOR
- STOP CALIBRATION
- 1. PRESS START CALIBRATION, SAMPLE SIZE WILL ZERO.
- 2. DISPENSE INTO CONTAINER AND MEASURE.
- 3. ADJUST SCALE FACTOR UNTIL SAMPLE SIZE MATCHES CONTAINER MEASUREMENT.
- 4. PRESS STOP CALIBRATION

PUMP/GUN*

- RESIN PUMP: x0LS-2300
- HARDENER PUMP: PAT-CP-0245
- DISP. GUN TYPE: PRO GUN

GEL ALARM

- DISABLED
- GELTIME (SEC)

HARDENER ALARM

- DISABLED
- BYPASS TIME (SEC)
- RECIRC ALARM DISABLED

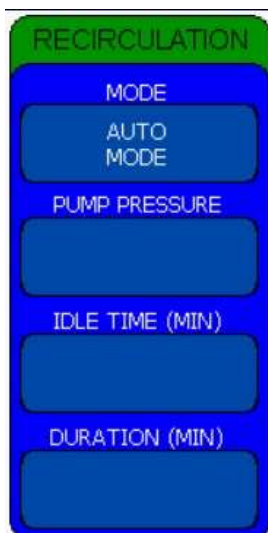
SPRUE

- DISABLED

EXIT

The pump system setup screen is used to configure the pumping system behavior. The screen is divided into sections for ease of reference/operation.

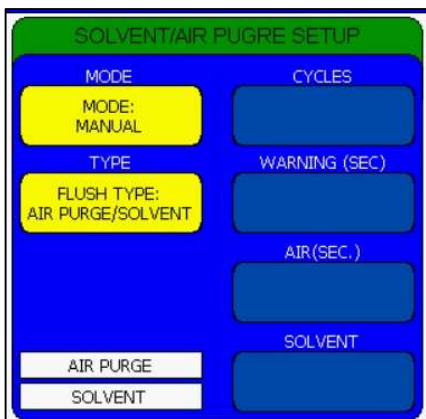
Recirculation



Recirculation Setup	
Field/Button	Function
MODE – TIMED	Uses set parameters to run recirculation at certain intervals
MODE – AUTO	Runs recirculation immediately after dispense gun is disengaged
MODE – MANUAL	In this mode the operator must turn the machine to manual, switch recirculation on and hit the start button to start recirculation
PRESSURE	Sets the pressure for recirculation process
IDLE TIME	Time for which machine is idle before recirculation starts
DURATION	Length of time for recirculation

Solvent/Air Purge Setup

There are some slight variations in the fields and indicators in the Solvent/Air Purge section depending on which mode you are in.



Solvent/Air Purge Setup	
Field/Button	Function
MODE	Sets flush to auto or manual
FLUSH TYPE	Sets flush action sequence
CYCLES	Number of times for flush to run
WARNING	Warning signal time before flush initiates
AIR	Seconds to run air pump
SOLVENT	Seconds to run solvent purge
AIR PURGE INDICATOR	Signals that the air purge valve is open
SOLVENT INDICATOR	Signals that the solvent valve is open
GEL ALARM	Enables or disables the gel alarm
GEL TIME	Set duration before alarm sounds if unit has not been flushed or run
DWELL	Seconds pause between flush cycles (solvent only mode)

Calibration Setup

Calibration Setup	
Field/Button	Function
START CALIBRATION	Starts calibration mode
SCALE FACTOR	Adjustment to match output with counter/flow meters
STOP CALIBRATION	Stop calibration mode
SAMPLE SIZE	Entry for sample size dispensed
UNIT SELECTOR	Sets machine labels to units being dispensed

Pump/Gun Selection

Pump/Gun Selection Setup	
Field/Button	Function
RESIN PUMP	Select the resin pump installed on your system
HARDENER PUMP	Select hardener pump installed on your system
DISPENSE HEAD (GUN)	Choose dispense head/gun Note Once parameters have been set, make sure to save the file.

Gel Alarm Setup

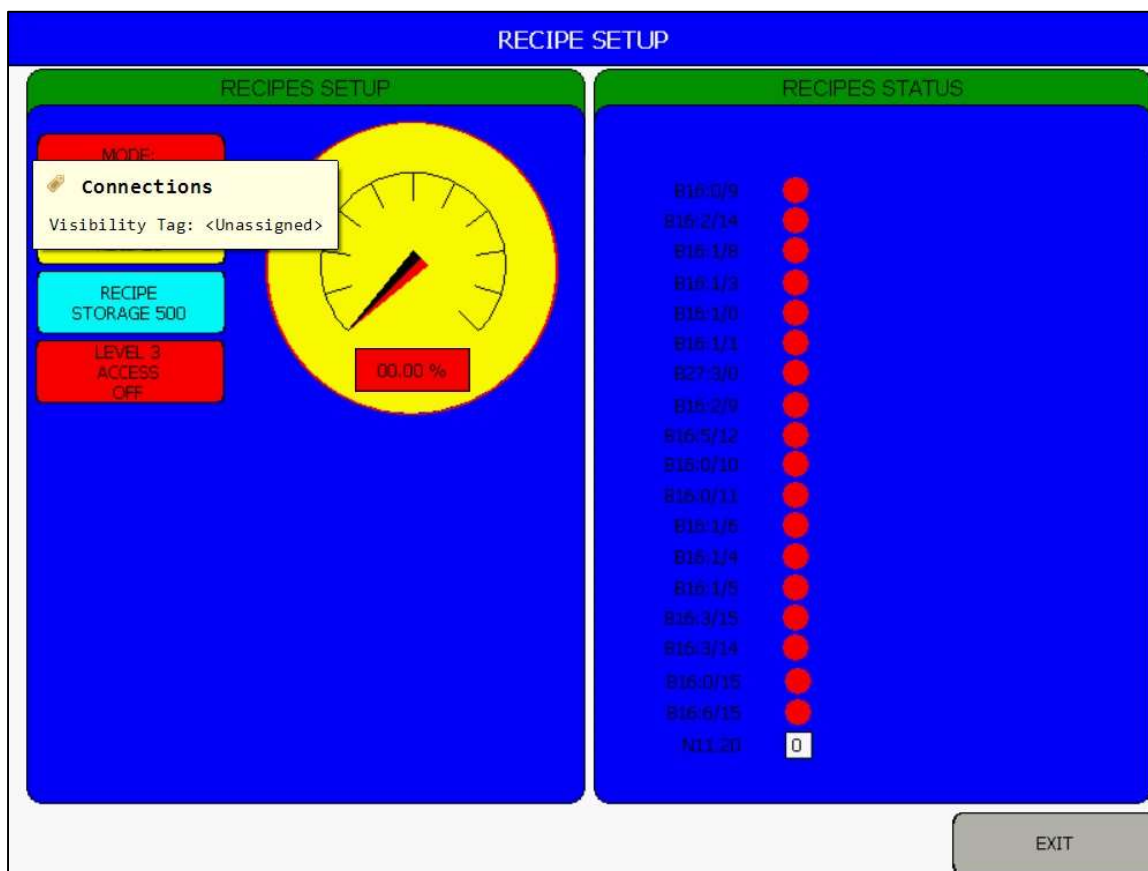
Gel Alarm Setup	
Field/Button	Function
ENABLED/DISABLED	Turns the gel alarm on or off
GEL TIME	Set duration before alarm sounds if unit has not been flushed or run

Hardener Alarm Setup



Hardener Alarm Setup	
Field/Button	Function
ENABLED/DISABLED	Turns the catalyst alarm on or off
BYPASS TIME (SEC)	Delay time in seconds before catalyst will respond
RECIRC ALARM ENABLED/DISABLED	Disable/enable catalyst alarm during recirculation

Recipe Setup Screen



Recipe Setup Screen Controls

Button	Function
CONTINUOUS RECIPE	Enabling will automatically reload the recipe upon completion of previous project
ERASE ALL RECIPES	Erases all recipes in the controller
RECIPE STORAGE 250/500	Enables/disables extra 250 recipe storage

Heat Control Setup Screen

HEAT CONTROL SETUP

HEAT ALARM SETUP

HEAT ALARMS DISABLED

LOW SETPOINT HIGH SETPOINT

HEATER #1 ALARM OFF

HEATER #2 ALARM OFF

HOSE #1 ALARM OFF

HOSE #2 ALARM OFF

HEAT CONTROL SETUP

EHC MASTER DISABLED

LOW SETPOINT HIGH SETPOINT

RESIN HEATER CONTROL OFF

RESIN HOSE CONTROL OFF

EXIT

Heat Alarm Setup Screen Controls

Button	Function
HEAT ALARMS ENABLED/DISABLED	Enable/disable heat alarm access
HEATER #X ON/OFF	Enable/disable individual alarms
LOW SETPOINT	Low point for alarm to trigger
HIGH SETPOINT	High point for alarm to trigger

Heat Control Setup Screen Controls

Button	Function
EHC MASTER ENABLED/DISABLED	Enable/disable heat control access; this also provides power to the EHC module
RESIN HEATER ON/OFF	Enable/disable resin heater
RESIN HOSE ON/OFF	Enable/disable heated resin hose

Maintenance Setup Screen

The screenshot shows the 'MAINTAINENCE' screen with the following components and their controls/status indicators:

Component	RESET	REBUILD TIME	RUN HOURS/MIN
RESIN PUMP	[Red Button]	[Blue Input Field]	[Green Display: 000]
DISP HEAD	[Red Button]	[Blue Input Field]	[Green Display: 000]
RECIRC HEAD	[Red Button]	[Blue Input Field]	[Green Display: 000]
HARDENER PUMP	[Red Button]	[Blue Input Field]	[Green Display: 000]
POWERHEAD	[Red Button]	[Blue Input Field]	[Green Display: 000]
PRG SLAVE DRIVE	[Red Button]	[Blue Input Field]	[Green Display: 00]

Additional buttons at the bottom right: INPUTS OUTPUTS, EXIT.

On the maintenance setup screen, the controls and status indicators are common to each category displayed.

Maintenance Setup Screen Controls

Button	Function
RESET	Enter the run time for the component at which a rebuild is required
REBUILD TIME	Enter rebuild/maintenance time for alarm

Maintenance Setup Screen Status Indicators

Field	Displays
RUN HOURS/MIN	Current run time of component

Input / Output Status Screen

INPUT/OUTPUT DIRECTION	
DIRECT INPUTS	DIRECT OUTPUTS
IN#00 RESIN COUNT SENSOR	OUT #00 PSD FORWARD VALVE
IN#01 OPEN	OUT #01 PSD REVERSE VALVE
IN#02 OPEN	OUT #02 LIGHT/SOUNDER
IN#03 HARDENER FLOW SENSOR	OUT #03 STACK LIGHT RED
IN#04 HARDENER COUNT SENSOR	OUT #04 STACK LIGHT GREEN
IN#05 OPEN	OUT #05 STACK LIGHT YELLOW
IN#06 OPEN	OUT #06 DISPENSE GUN VALVE
IN#07 VPN ENABLE PANEL SWITCH	OUT #07 POWERHEAD VALVE
IN#08 PANEL/REMOTE START BUTTON	OUT #08 SPRUE VALVE
IN#09 PANEL/REMOTE STOP BUTTON	OUT #09 AIR PURGE VALVE
IN#10 PANEL/REMOTE FLUSH BUTTON	OUT #10 RECIRCULATION GUN VALVE
IN#11 PANEL/REMOTE PAUSE BUTTON	OUT #11 FLUSH VALVE
IN#12 PANEL ESTOP BUTTON	OUT #12 OPEN
IN#13 PANEL AUTO/MANUAL SWITCH	OUT #13 OPEN
IN#14 PANEL RECIRCULATION BUTTON	OUT #14 OPEN
IN#15 RFID TAG PRESENT SENSOR	OUT #15 EHC POWER RELAY
IN#16 PSD FAR TRAVEL SWITCH	OUT #16 EHC HEATER RELAY
IN#17 PSD NEAR TRAVEL SWITCH	OUT #17 EHC HOSE RELAY
IN#18 PSD DRIVE COUNT SENSOR	
IN#19 POSITION SENSOR	
IN#20 OPEN	
IN#21 OPEN	
IN#22 OPEN	
IN#23 OPEN	
IN#24 OPEN	
IN#25 OPEN	
IN#26 OPEN	
IN#27 OPEN	

EXIT

Input/Output Direction Setup Screen Status Indicators

Field	Displays
DIRECT INPUTS	Each display corresponds with a sensor or switch. The indicator will turn green when the PLC is activated.
DIRECT OUTPUTS	Each display corresponds with a valve or light. The indicator will turn green when the PLC is activated.

Analog Inputs 0/1 (Resin/Hardener Transducers)

ANALOG INPUTS 0/1 SETUP	
RESIN TSDR (ANALOG IN #0)	HARDENER TSDR (ANALOG IN #1)
TRANSDUCER DISABLED	TRANSDUCER DISABLED
5V TSDR	5V TSDR
SENSOR MIN.	SENSOR MIN.
SENSOR MAX.	SENSOR MAX.
SETPOINT LOW	SETPOINT LOW
SETPOINT HIGH	SETPOINT HIGH
BITS/PSI	BITS/PSI
CUR. READING	CUR. READING
RAW INPUT	RAW INPUT

EXIT

The analog input screens are used to tune the transducers placed on the system. Due to the different transducers available, there are settings that need to be tuned specifically for the type of transducer installed.

Note *Transducers must be either 5 vdc or 10 vdc voltage type.*

Resin Transducer Analog Input #0 Setup Controls

Button/Field	Function
TRANSDUCER ENABLED/DISABLED	Enables/disables transducer input
5V/10V TSDR	Chooses which voltage the transducer outputs
SENSOR MIN	Minimum reading of transducer (see transducer spec sheet)
SENSOR MAX	Maximum reading of transducer (see transducer spec sheet)
SETPOINT LOW	Low alarm setting
SETPOINT HIGH	High alarm setting

Resin Transducer Analog Input #0 Setup Status Indicators

Field	Displays
BIT SPAN	Range of sensor in PLC
BITS/PSI	Control bits broken down to 1 psi
CURRENT READING	Current psi of transducer
RAW INPUT	Raw input of transducer

Hardener Transducer Analog Input #1 Setup Controls

Button/Field	Function
TRANSDUCER ENABLED/DISABLED	Enables/disables transducer input
5V/10V TSDR	Chooses which voltage the transducer outputs
SENSOR MIN	Minimum reading of transducer (see transducer spec sheet)
SENSOR MAX	Maximum reading of transducer (see transducer spec sheet)
SETPOINT LOW	Low alarm setting
SETPOINT HIGH	High alarm setting

Hardener Transducer Analog Input #1 Setup Status Indicators

Field	Displays
BIT SPAN	Range of sensor in PLC
BITS/PSI	Control bits broken down to 1 psi
CURRENT READING	Current psi of transducer
RAW INPUT	Raw input of transducer

Analog Inputs 2/3 (Vacuum/EMPG Transducers)

The analog input screens are used to tune the transducers placed on the system. Due to the different transducers available, there are settings that need to be tuned specifically for the type of transducer installed.

Note *Transducers must be either 5 vdc or 10 vdc voltage type.*

Note *The vacuum transducer (#2) is not used.*

EMPG Transducer Analog Input #3 Setup Controls

Button/Field	Function
TRANSDUCER ENABLED/DISABLED	Enables/disables transducer input
5V/10V TSDR	Chooses which voltage the transducer outputs
SENSOR MIN	Minimum reading of transducer (see transducer spec sheet)
SENSOR MAX	Maximum reading of transducer (see transducer spec sheet)
CAL SENSOR TO TRUE ZERO	Calibrate sensor to atmospheric pressure
CAL SENSOR TO SCALED ZERO	Calibrate sensor to internal fluid pressure

EMPG Transducer Analog Input #3 Setup Status Indicators

Field	Displays
BIT SPAN	Range of sensor in PLC
TRUE ZERO	Reading of sensor at atmospheric pressure
SCALED ZERO	Reading of sensor installed in fluid housing
OFFSET	Differential between true zero and scaled zero
SCALED SPAN	Range plus offset
BITS/PSI	Control bits broken down to 1 psi
CURRENT READING	Current psi of transducer
RAW INPUT	Raw input of transducer

Note *To install sensor into EMPG you must attach the sensor to the input line and calibrate the sensor to true zero. After installing into the EMPG housing and filling with fluid, you must calibrate to scaled zero.*

Analog Outputs 0/1

The analog input screens are used to tune the transducers placed on the system. Due to the different transducers available, there are settings that need to be tuned specifically for the type of transducer installed.

Note *Transducers must be either 5 vdc or 10 vdc voltage type.*

EPPC Transducer Analog Output #0 Setup Controls

Button/Field	Function
REGULATOR ENABLED/DISABLED	Enables/disables regulator output
5V/10V CONTROL	Chooses which voltage the regulator
Min psi	Minimum output of regulator (see spec sheet with regulator)
Max psi	Maximum output of regulator (see spec sheet with regulator)

EPPC Transducer Analog Output #0 Setup Status Indicators

Field	Displays
BIT SPAN	Range of sensor in PLC
BITS/PSI	Control bits broken down to 1 psi
CURRENT READING	Current output from PLC
RAW OUTPUT	Raw output from PLC

Optional Controls

Depending on which options were ordered, the Innovator Plus control package may include optional controls.

Pneumatic Controls

Manual Pump Speed Control

If the EPPC regulator option is not ordered, the pumping system pressure/speed must be controlled manually via the regulator on the front panel. The corresponding gauge displays the input pressure to the pumping system powerhead.

Note *If the EPPC regulator option is installed, the manual regulator must be set to 100 psi at all times.*



Manual Mold Pressure Guard Control

The machine features a mold pressure guard (MPG), which is used to control the maximum allowable pressure at the mixing head. This can be used to provide line pressure control during an injection or as a safety mechanism to prevent the line pressure from exceeding the maximum working pressure of the injection line to the mold.

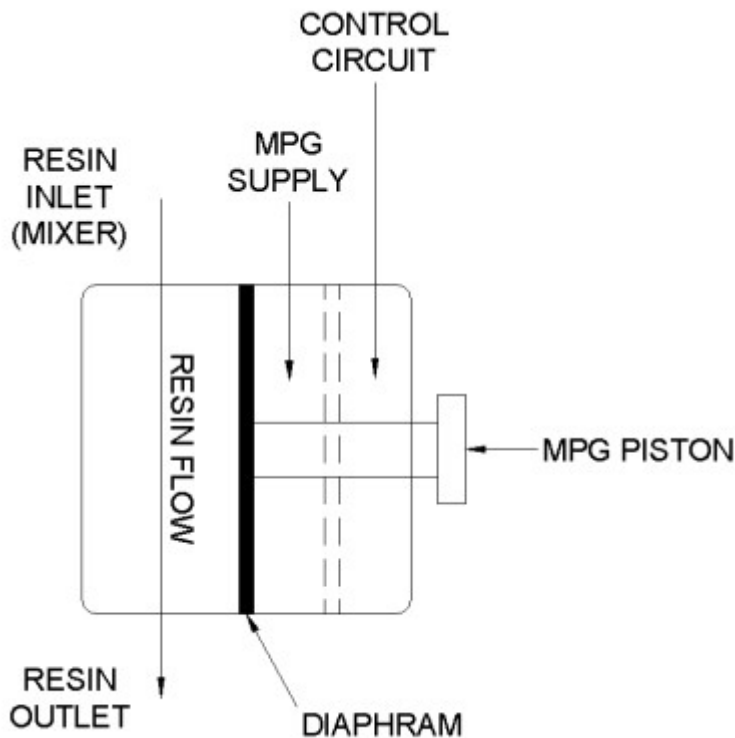
The MPG block is supplied with two air lines. One supplies air from the MPG pressure regulator on the control panel. The other is connected to an internal circuit on the control system.

The fluid override pressure is set via the regulator and gauge on the front panel.

When fluid pressure at the injection head exceeds the MPG preset level shown on the MPG pressure gauge, the internal diaphragm moves the MPG piston outward and leaks air from the line connected to the control circuit.

As the flow of air pressure is reduced by the MPG piloted regulator, the supply pressure to the pump is reduced, slowing it until it completely stops. Once the pressure is restored by either fluid being drawn into the mold, recirculation engaging, or blockage being cleared from the output line, the system will start up again.

Note *The MPG reaction time is set by a small flow control either on the manual pump pressure regulator or (in the case of the E/P option) on the output of the E/P regulator. Reaction time is factory set and should not be adjusted.*



Note *It is normal to hear air leaking from the MPG block when the MPG is operational.*

Fluid Controls

Catalyst Back Pressure Valve

The Innovator Plus comes standard with a recirculation package. In order to preserve the efficient mix meter characteristic of the MVP pumping system, a balance must be achieved between dispense mode and recirculation mode for fluid pressures, mainly the catalyst injection pressure.

On the output side of the recirculation block is an adjustable check valve that will ensure that catalyst pressure will deviate as little as possible when switching modes. In order to set the check valve to the appropriate pressure, the system must be up and running and the operating pressures set. Once this is done, the recirculation catalyst pressure must be set equal or slightly higher than

the dispense pressure to ensure that in dispense mode the catalyst pressure does not have to build to be injected into the resin stream and mixed properly. If the pressure is set too high, a hot spot will appear where too much catalyst has been introduced at the beginning of the dispense cycle.

Adjust the back pressure valve by following the steps in Figure 8.

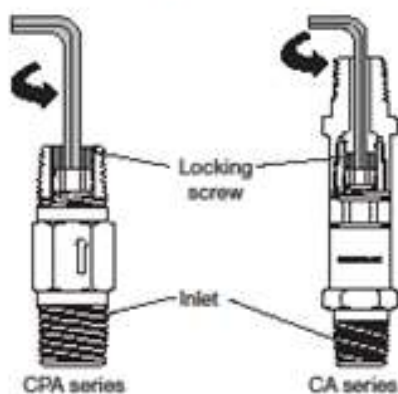
CA and CPA Series Check Valve Cracking Pressure Adjustment

Swagelok

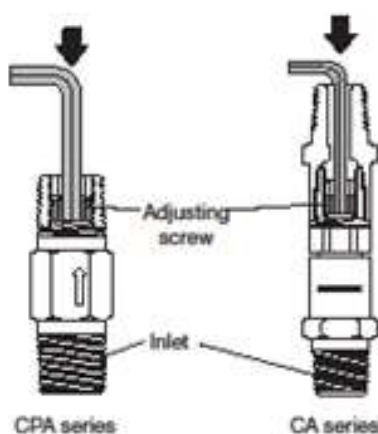
Tools needed

Tool	Size	Component
Hex wrench	CA and 4CPA series: 5/32 in. 6CPA series: 5/16 in.	Locking screw Adjusting screw

1. Loosen locking screw by turning counter clockwise.

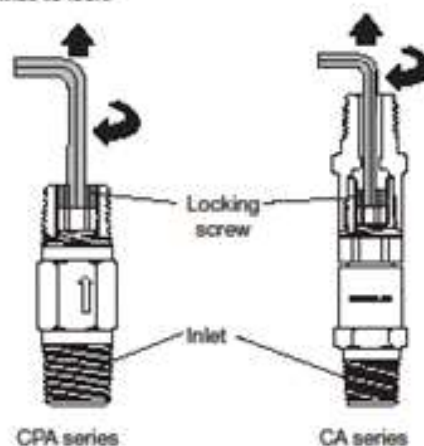


2. Slide hex wrench down into adjusting screw.



3. Turn both screws clockwise to increase cracking pressure, counter-clockwise to decrease.

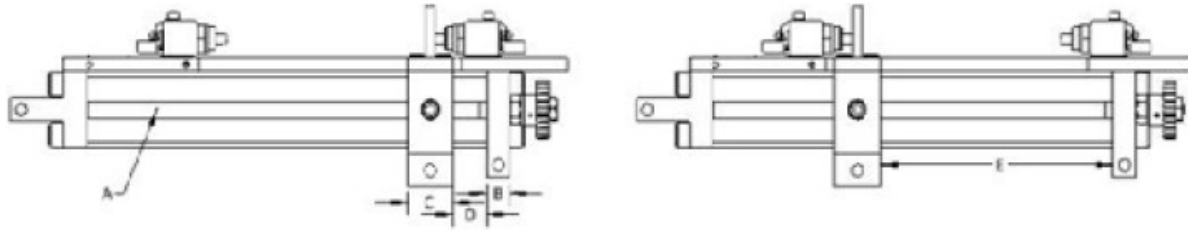
4. Slide hex wrench back up into the locking screw and turn clockwise to lock.



5. Verify cracking pressure.

Figure 8. Back Pressure Valve Adjustment

Progressive Slave Drive



PAT-PSD-3100 Settings									
		A	1/2 (B)	1/2 (C)	D		E		
	Catalyst Pump	Screw Pitch	Rear Clevis Centerline	Catalyst Pump Centerline	Rear Clevis to Catalyst Pump Clevis	Catalyst Start Percentage	Rear Clevis to Catalyst Pump Clevis Stop	Catalyst Stop Percentage	PSD Increment
PAT-LS-12270	PAT-CP-0245	.417"	.250"	.500"	2.600"	.50%	5.625"	1.14%	.125%
	PAT-CP-0555	.417"	.250"	.500"	1.550"	.65%	5.625"	2.44%	.125%
	PAT-CP-0980	.417"	.250"	.500"	1.525"	1.13%	5.625"	4.25%	.125%
	PAT-CP-1530	.417"	.250"	.500"	1.525"	1.75%	5.625"	6.49%	.125%
	PAT-CP-3000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
PAT-LS-24050	PAT-CP-0245	.417"	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	PAT-CP-0555	.417"	.250"	.500"	2.400"	.50%	5.625"	1.21%	.125%
	PAT-CP-0980	.417"	.250"	.500"	1.525"	.56%	5.625"	2.13%	.125%
	PAT-CP-1530	.417"	.250"	.500"	1.750"	.75%	5.625"	3.00%	.125%
	PAT-CP-3000	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A



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