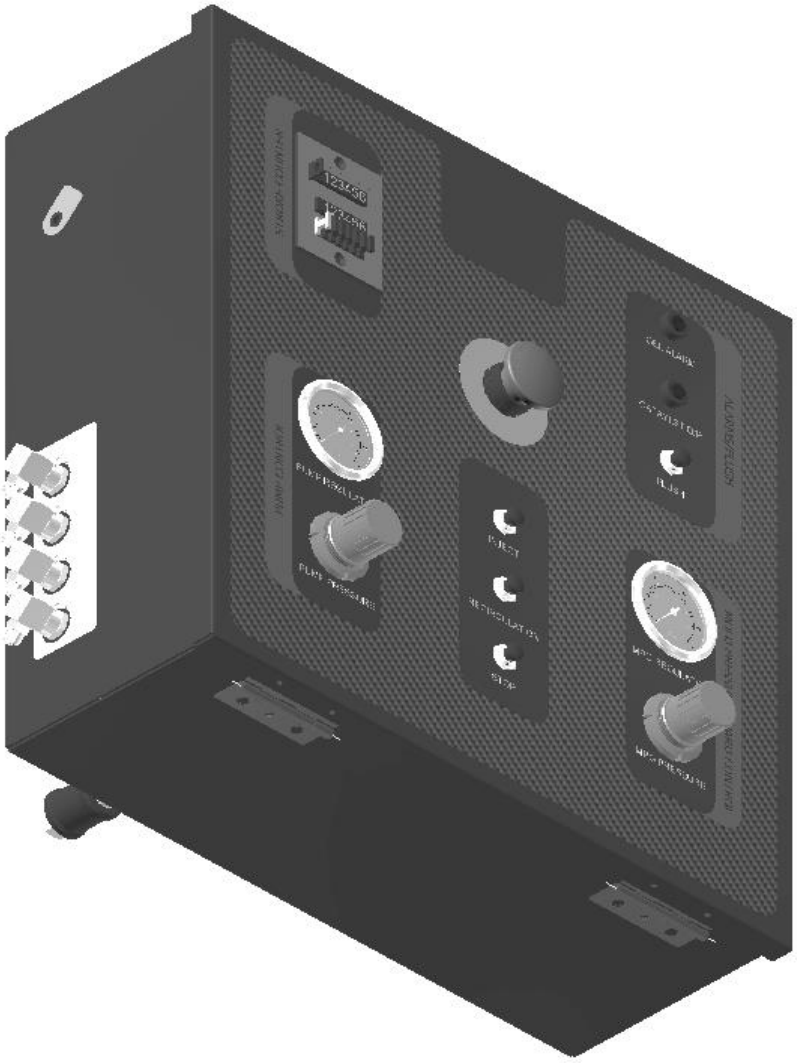
Innovator II Control Unit

Installation & Operations Manual



MAGNUM VENUS PRODUCTS

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8. **CANCELLATION:** The Buyer may cancel any purchase order prior to shipment of the Goods by mutual agreement of the parties and upon payment to Seller of reasonable and proper cancellation charges.
9. **TERMINATION:** Seller may terminate the whole or any part of any purchase order if there is a material breach of these Terms & Conditions. In the event of any such breach, the Seller will provide Buyer with written notice of the nature of the breach and the Seller's intention to terminate for default. In the event Buyer does not cure such failure within ten (10) days of such notice, Seller may, by written notice, terminate the purchase order; provided, that Buyer shall continue its performance to the extent not terminated.
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21. **GOVERNING LAW**: These Terms & Conditions and all disputes related to it shall be governed by the laws of the State of Florida, United States of America, without giving effect to its conflict of law rules.
22. **JURISDICTION AND VENUE:** The parties hereby irrevocably submit to the jurisdiction of the state courts of the State of Florida and to the jurisdiction of the United States District Court for the Middle District of Florida, for the purpose of any suit, action, or other proceeding related to, arising out of or based upon these Terms & Conditions or in any way related to, arising out of or involving sale of Goods hereunder; waive and agree not to assert by way of motion, as a defense, or otherwise, in any such suit, action, or proceeding, any claim that it is not subject personally to the jurisdiction of the above-named courts, that its property is exempt or immune from attachment or execution, that the suit, action, or proceeding is brought in any inconvenient forum, that the venue of the suit, action, or proceeding is improper, or that these Terms & Conditions or the subject matter hereof may not be enforced in or by such court; and waive and agree not to seek any review by any court of any other jurisdiction which may be called upon to grant an enforcement of the judgment of any such Florida state or federal court. The parties hereby consent to service of process by registered mail at the address to which notice is to be given. The exclusive venue for any proceeding under these Terms & Conditions shall be solely in any state court in Pinellas County, Florida, or the Federal District Court for the Middle District of Florida, Tampa Division, sitting in Tampa, Florida. Buyer acknowledges that the prices for Goods offered hereunder are in part dependent on Buyer's consent to jurisdiction in Florida and exclusive venue in Pinellas County, Florida or the Federal District Court for the Middle District of Florida, Tampa Division, sitting in Tampa, Florida, and without Buyer's consent to this jurisdiction and venue provision the prices for the Goods may be higher.
23. **GENERAL:** Any representation, affirmation of fact and course of dealing, promise or condition in connection therewith or usage of trade not contained herein, shall not be binding on either party. If any provision hereof shall be unenforceable, invalid or void for any reason, such provision shall be automatically voided and shall not be part of these Terms & Conditions and the enforceability or validity of the remaining provisions of these Terms & Conditions shall not be affected thereby.

TO THE EXTENT NOT CONTRARY TO APPLICABLE LAW, THE FOLLOWING SHALL APPLY:

24. Buyer waives any available homestead exemption as well as any and all requirements or rights with regard to notice, demand, presentment

IMPORTANT NOTICE: *THIS INSTRUMENT PERMITS SELLER TO OBTAIN AND USE YOUR INDIVIDUAL CREDIT HISTORY FOR CREDIT EVALUATION PURPOSES.*

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

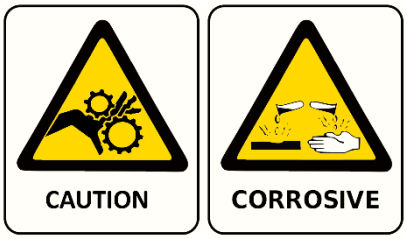
Fire Extinguisher – code ABC, rating number 4a60bc using Extinguishing Media – Foam, Carbon Dioxide, Dry Chemical, Water Fog, is recommended for this product and applications.

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.



Personal Protective Equipment (PPE)
• MVP recommends the use of personal safety equipment with all products in our catalog.
• Wear safety glasses or goggles, 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.

Introduction

The Innovator injection system is a multipurpose injection system that can be used with light resin transfer molding (LRTM), disposable vacuum bags, and reusable silicone bagging systems. Provided with the correct options/accessories the Innovator can accommodate and automate many processes done by hand. Being completely air driven, the system can be set up anywhere in the shop that is convenient to the parts. The unit can also be moved from part to part instead of having to move heavy molds to the injection machine.

Through a series of pneumatic interlocks and controls, the Innovator has virtually eliminated the possibility of operator error. It allows personnel to monitor aspects of the injection other than the pump system while manufacturing a part.

The system used the Rapid Access Design (RAD) concept that all other MVP machines use to decrease maintenance downtime and lost production hours.

Note ***This manual references other MVP manuals for certain components of the Innovator throughout.***

Specialty units are available with Innovator style controls. Please contact your local sales representative for these systems. Although similar in controls and pump assemblies, each unit uses a different mixing head(s) for customer convenience.

This manual provides information for the operation, maintenance, and simple repair of the Innovator II Control Unit. The following procedures are included:

- Step-by-step assembly and disassembly
- Installation, start-up, and shut-down instructions
- Step-by-step operation 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.

Component Assemblies

The Innovator consists of a number of components these components will have their own detailed manuals and drawings. For complete repair and maintenance instruction for your system please reference the applicable manuals. All units come with complete documentation, but always check for updates at www.mvpind.com.

Overview of Controls

Following is a brief description of the main controls and their function. Controls are grouped based on their function to make the system as user friendly as possible.

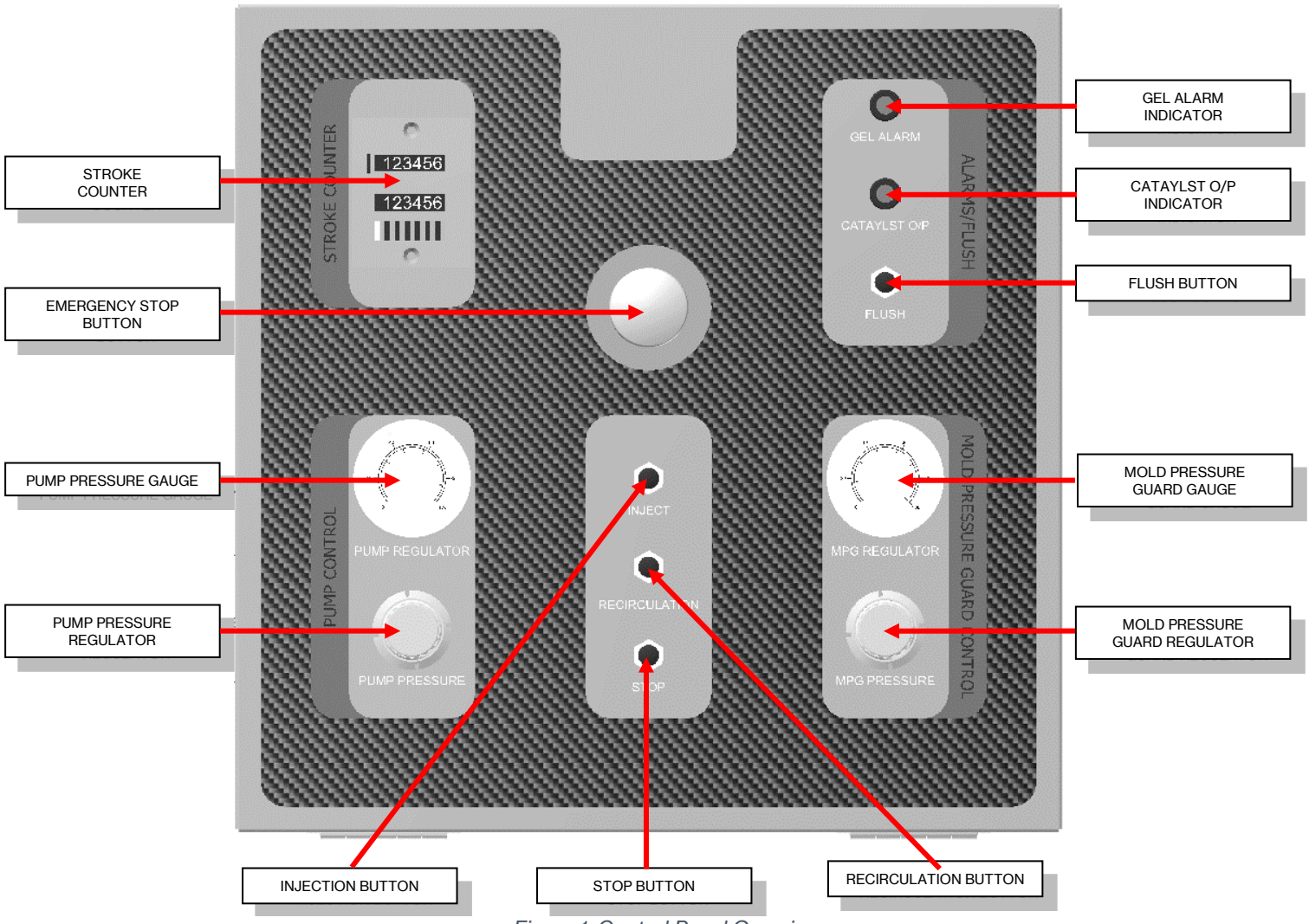


Figure 1. Control Panel Overview

Innovator II Control Panel		
Control Name	**Type of Control**	**Function**
Emergency Stop	Push Button	Press this button in the event of an emergency to place the system in a safe state. Twist and pull to release and allow machine operation.
Pump Pressure	Pressure Gauge	Displays the air pressure being supplied to the pump.
Pump Pressure	Regulator	Adjust this to control the air pressure being supplied to the pump and to set the pump speed.

CAT/OP	Indicator Light	Will turn red if overpressure state exists.
RGA Alarm	Indicator Light	Will turn red if gel alarm timer has expired.
Flush Button	Push Button	Press this button to operate the flush cycle
Mold Pressure Guard	Preset Level Gauge	Displays signal air pressure being supplied to the Mold Pressure Guard (MPG) control.
Mold Pressure Guard	Regulator	Use this to adjust the MPG control signal air pressure.
Inject Button	Push Button	Press this button to start the machine in inject mode.
Recirculate Button	Push Button	Press this button to start the machine in recirculation mode.
Stop Button	Push Button	Press this button to stop the machine in injection, recirculation, or flush mode.
Stroke Count	Counter	Displays the current number of strokes the pump has performed.
Stroke Count Preset Count	Counter	Displays the number of strokes at which the unit will shut down when reached.
Stroke Count Digit Modifiers	Spin Buttons	Click up or down to adjust the number in the Preset Count column to set the stroke count the machine should stop at.
Digit Lockout	Button	Press this button to keep the stroke count setting.
Reset Button	Push Button	Press this button to reset the current stroke count.

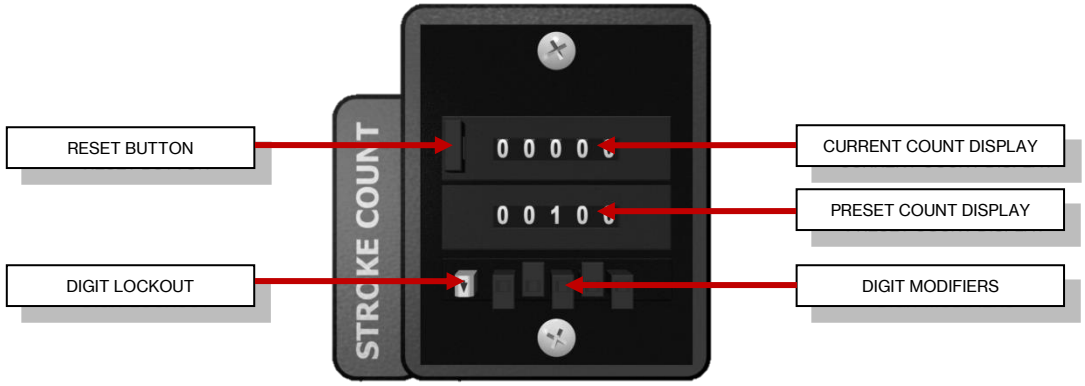


Figure 2. Stroke Counter

Operating the Unit

Before an Innovator system can be used, the air isolation sleeve-valve must be moved to the **ON** position and the E-Stop must be released. When air is initially supplied, all controls should automatically reset to their non-operational state.

Note ***Residual pressures may remain in the system even though the E-Stop has been activated and the air supply has been removed from the machine.***

Emergency Stop

When the E-Stop is activated, the machine will enter a safe state. If the machine is injecting, recirculating or flushing, the E-Stop is equivalent to pressing the stop button.

To de-activate the E-Stop, twist and pull to release.

Catalyst Over-Pressure Protection

Innovator units feature catalyst over-pressure protection. In addition to the industry standard inclusion of a pressure relief valve in the catalyst circuit, the control circuit detects the over-pressure condition and stops the pump from running. In injection or recirculation modes, this is equivalent to pressing the stop button.

For example, if during an injection the catalyst system is over-pressurized, the injection will stop, the gun will close and the system will shut down.

A visual indicator of the over-pressure condition (see Figure 1) is provided on the face of the control box, and will change from black to red in the event of a catalyst over-pressure condition. To reset the over-pressure control circuit, the catalyst pressure must be relieved and the reason for the condition must be remedied before the machine can be operated in injection or recirculation modes.

RGA (Resin Gel Alarm)

The unit features a Resin Gel Alarm (RGA) system designed to alert the operator to the risk of catalyzed resin curing in the machine or mold during an injection or prior to the machine being flushed and cleaned.

When the inject button is pressed and the machine starts in injection mode, the RGA becomes active. It monitors the time between pump strokes during an injection, and if the user adjustable preset time is exceeded an audible alarm will sound and the visual RGA indicator (see Figure 1) on the control panel will change from black to red.

The alarm is reset when the pump stroke changes direction in injection mode, but the RGA will continue to monitor the pump strokes and will alarm again if the preset time between pump strokes is once again exceeded.

For example, if the machine stalled during an injection due to a higher than normal back-pressure in the injection line, the alarm will activate. The operator may increase the injection pressure to make the pump stroke and therefore reset the alarm and complete the injection.

The RGA is de-activated (so that it stops monitoring pump strokes and cancels any active visual/audible alarms) by either flushing the machine or pressing the RGA reset button.

The RGA reset button is located on the side of the control panel and can be pressed by inserting a small screwdriver or equivalent through the hole marked RGA reset. This is not intended to be used in normal operation and is provided as a means to silence the alarm if the pump cannot run and the machine cannot be flushed.

A user configurable pneumatic timer, which can be adjusted between 20-300 seconds (0.3 – 5 minutes) is located in the control box. In addition, a factory set timer of between 30-60 seconds is included in the RGA circuit to limit the switching rate of the circuit. These two timers need to time-out in sequence in order for the alarm to trigger. In practice if the mechanical timer is set to 5 minutes, and the duration of a pump stroke exceeds around 5.5 – 6 minutes during an injection, the alarm triggers.

Flush

Press the flush button to clean the injection head. The operator cannot initiate a flush when the machine is in injection mode, therefore accidental flushing of the system into a mold during an injection is not possible.

The flush system has a timer function that will stop the flush cycle automatically. The default duration of the flush is set between 30-60 seconds during manufacturing; this can be adjusted by the user if required.

The flush cycle can be stopped at any time by pressing the stop button. The flush cycle cannot be entered while injecting.

Caution ***Before pressing the flush button, ensure that the outlet from the mixing head is directed to a suitable waste container.***

Mold Pressure Guard (MPG)

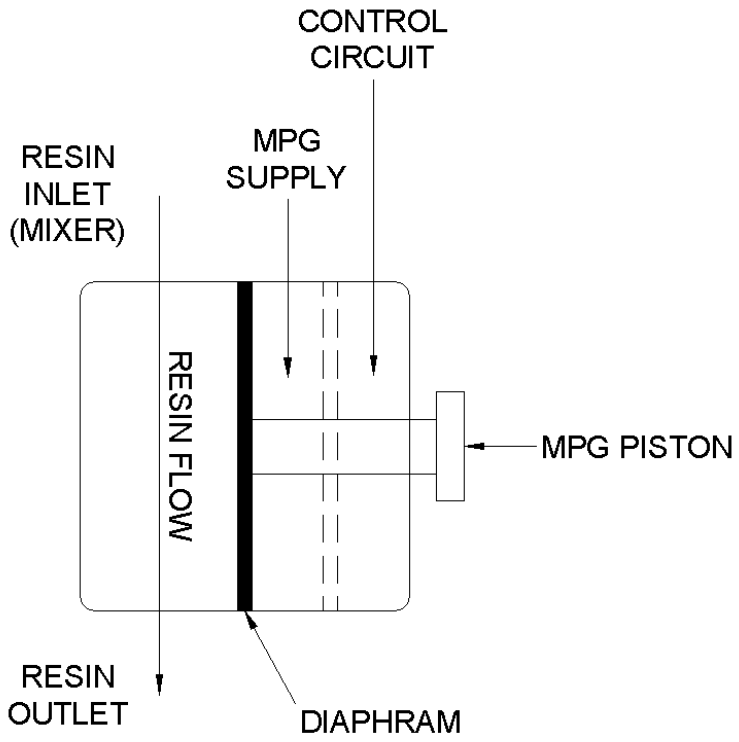
The unit features a Mold Pressure Guard (MPG), which is used to control the maximum allowable pressure at the mixing head. This can be used to provide line pressure control during an injection or as a safety mechanism to prevent the line pressure from exceeding the maximum working pressure of the injection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

The MPG block is supplied with 2 air lines. One air-line supplies air from the MPG pressure regulator on the control panel. The other is connected to an internal circuit on the control box.

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 level/flow of air pressure is reduced by the MPG piloted regulator, the supply pressure to the pump is reduced, in effect slowing it down. Once the air pressure in the control circuit has dropped below approximately 15 psi, the pump will shut off. In the case of the Pro gun configuration, the gun will also close. Once the pressure has been restored,

either by fluid being drawn into the mold, recirculation engaged or blockage cleared from output line, the system will start up again.



Note ***The MPG control is active in recirculation or injection mode. It is normal to hear air leaking from the MPG block when the MPG is operational.***

Injection mode

Before starting an injection ensure all external connections to the mold are correctly made. Also ensure that resin and catalyst lines are correctly primed and that the required levels of materials are available. Ensure the level of fluid in the flush tank is sufficient to clean the machine after the injection. Injection mode cannot be entered while recirculating or flushing.

Note ***When the system is initially primed with resin and catalyst, ensure the machine is run in inject mode and resin is collected in a suitable container from the mixing head and that air is purged. Once this has been done, ensure the resin is correctly catalyzed by performing cup tests prior to using the machine to inject a mold.***

Prior to and during operation in injection mode, use the pump pressure regulator and gauge to suitably adjust the air pressure supply to the pump and control the pump speed.

Set the MPG set-pressure to the required pressure. Once the injection has begun, the pump will stop running when the fluid pressure at the injection head exceeds this setting. When

the injection line pressure reduces below the MPG set-pressure, the machine will continue to inject.

Adjust the pre-determine counter to set the number of required pump strokes for the injection. See Figure 2 for an overview of the predetermining stroke counter. To change the preset count, press and hold the white button with arrow decal while pressing one of the black buttons under the preset count corresponding with the digit to be modified.

Note ***The machine cannot be started in inject mode. If a previous injection was stopped automatically when the shot count was reached, the stroke count must be reset. Press the reset button on the predetermining counter to reset the count and allow the machine to be started.***

Press the inject button to start the machine in inject mode. The machine cannot be started in inject mode if it is operating in recirculation or flush modes. The injection head will open, the Pro gun/TAS signal will pressurize and the pump will run. To stop the machine and leave inject mode, press the stop button. If the predetermining counter reaches the user set shot count, the machine will stop automatically.

If a PPVS sensor is being used, the pump will stop when the mold pressure reaches set-point. When the mold pressure drops to an acceptable level, the pump will run once again.

Recirculation mode

Prior to and during operation in recirculation mode, use the pump pressure regulator and gauge to suitably adjust the air pressure supply to the pump and control the pump speed.

Press the recirculate button to start the machine. The pump will run, then resin and catalyst will be pumped around the system and returned to the source.

Note ***Recirculation mode cannot be entered when the machine is injecting or flushing.***

To stop the machine, press the stop button.

Note ***The catalyst over pressure valve is active during recirculation.***

Guard Interlocks

If the machine is fitted with a slave arm guard that does not require a tool to open, the guard will be fitted with an interlock to stop the pump running when it is opened.

In this case, if the guard is open or not correctly closed, the machine will not operate in injection or recirculation modes. Opening the guard while the pump is operating will have the same effect as pressing the stop button. Once the guard is closed the machine will operate normally.

Control Box User Connections

Side of Control Box

Signal connections are supplied on the side of the control enclosure and are illustrated and explained in the table below.

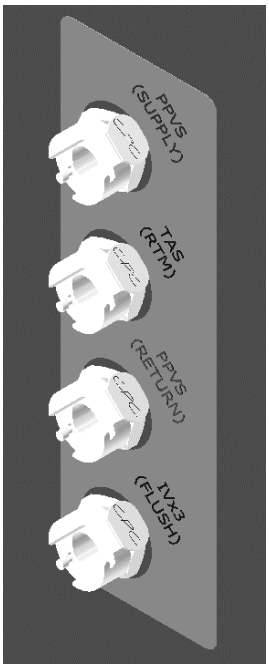
Side Connections		
Connection Name	**Description**	**Illustration**
PPVS Supply	Use this to connect a PPVS. This line becomes active once the injection cycle is initiated.	
TAS (RTM Only)	Use this to connect a Turbo Autosprue (TAS) or similar valve to the machine. This line becomes active once the injection cycle is initiated.	
PPVS Return	This is the return signal from the PPVS when used. Once this port receives a signal it will start the pump system. If the PPVS blocks the signal the pump will stop and the Pro gun will close. If using the Megaject version the dispense head will stay open. ***Note*** ***There must be a signal present on the PPVS signal for the machine to inject. If no PPVS is used, the supplied jumper must be installed between the PPVS supply and the PPVS signal for the unit to function properly.***	
IXv3 Flush	Once the flush cycle is initiated this line will move the IXv3 valve into the flush position. This line is active until the next injection cycle is started.	

Figure 3. Side Connections

Rear of Control Box

The connections on the lower rear of the control box are illustrated below.

Configuring Control Box

The user can adjust the flush timer duration, the MPG response time, the RGA stroke timer, and alarm volume. Use the air circuit for your machine controls to identify the location of the components that require adjustment.

Many components in the control box are labeled to aid identification and therefore locating items that may require adjustment should be relatively straight forward with the aid of a circuit diagram (see Circuit Drawings section at the end of this manual).

The internals of a typical Innovator control box are shown in Figure 4 .Some components have been marked for illustrative purposes, however it must be emphasized that the appropriate air circuit should always be used as the definitive reference.

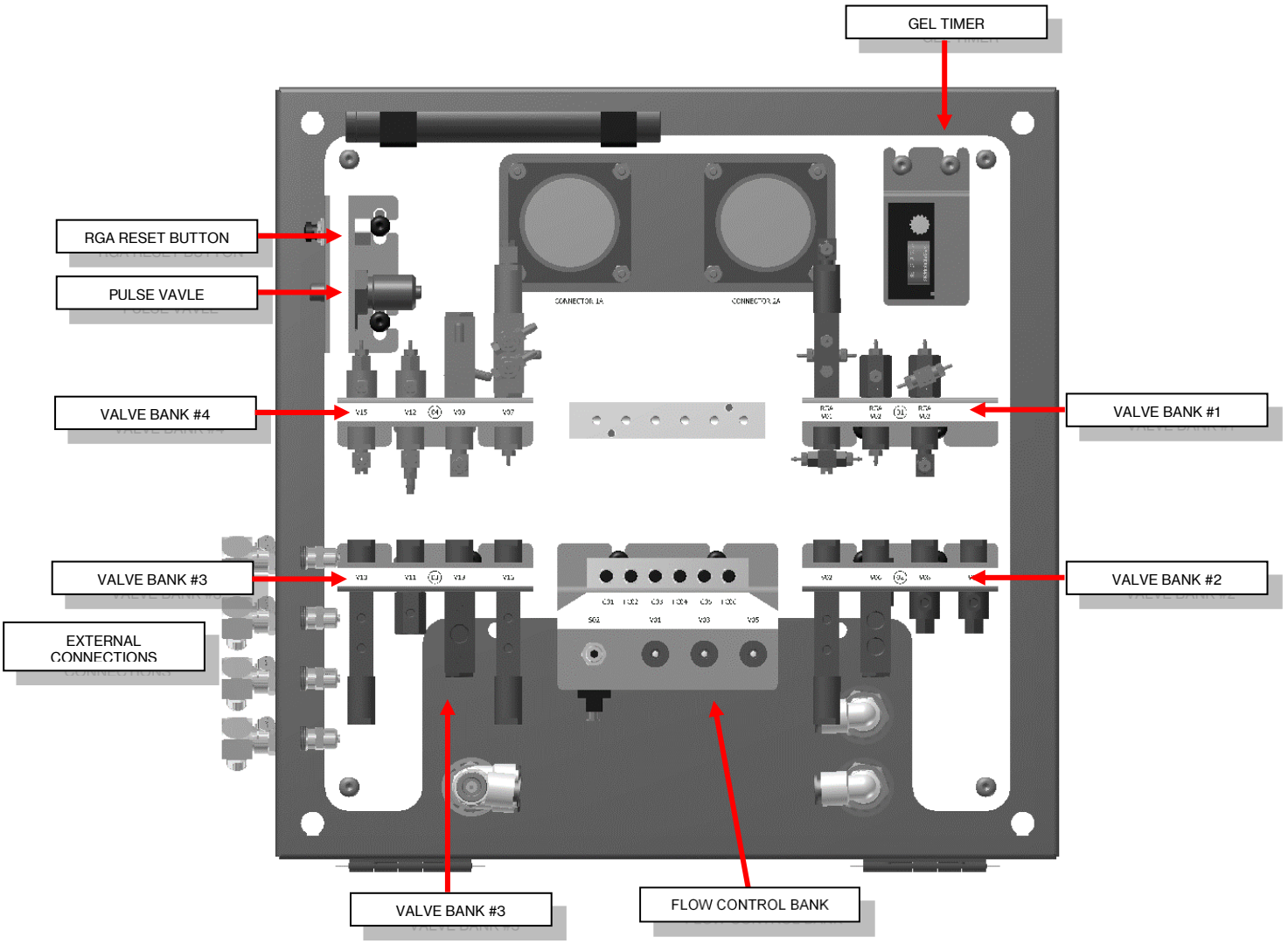


Figure 4. Configuration of Internal Controls

Flow Control Bank Adjustments

RGA Adjustment

The time between strokes permitted to pass before the RGA alarms and the volume of the alarm whistle can be adjusted by the user.

The pneumatic RGA control is located bottom center on the flow control ban (see Figure 5). The mechanical timer is shown in Figure 6. Turn the knob to adjust the timer to the required time, between 20 – 300 seconds. The dial shows seconds divided by 10, therefore to set the timer to 100 seconds, adjust the dial to 10.

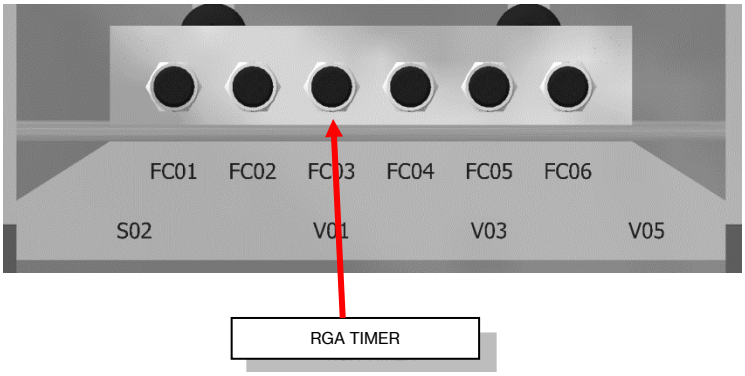


Figure 5. RGA Control

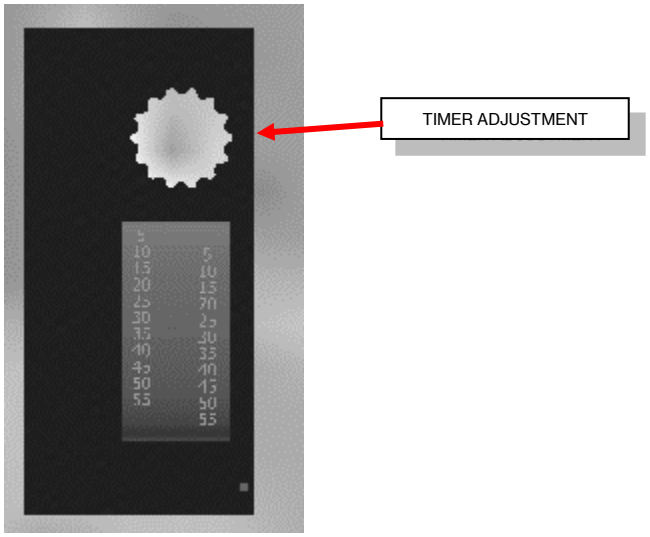
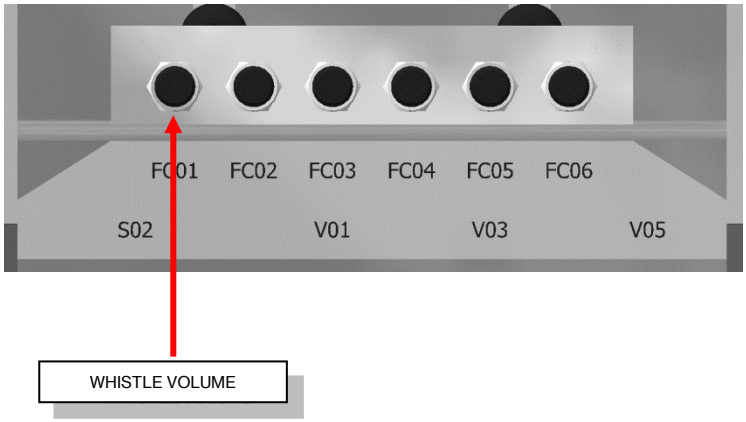


Figure 6. Mechanical Timer Adjustment

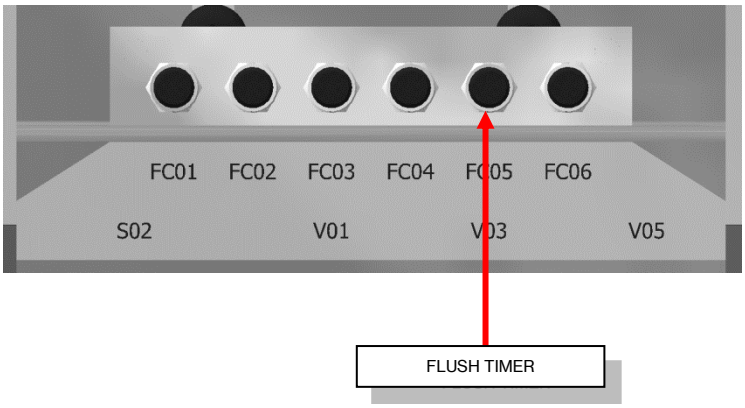
The RGA alarm whistle volume can be changed by adjusting the flow controller that is in line with the whistle.



Flush Timer Adjustment

The flush timer duration can be increased or decreased by adjusting the flush timer restrictor. This controls the rate of airflow out of the timer circuit reservoir, and the speed that the pressure falls in order to actuate the automatic flush stop valve.

To set the timer, adjust the restrictor and then time the flush cycle. Continue this procedure until the desired flush time is obtained. Times of over 60 seconds are achievable with this circuit.



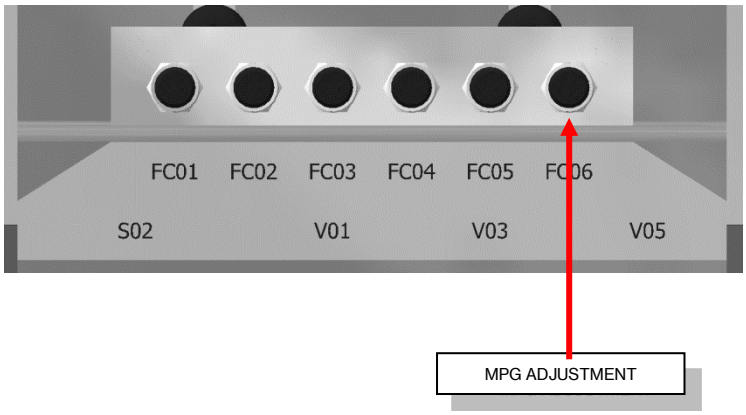
Note ***If the restrictor is fully wound in, air flow will be blocked and the timer will not operate.***

MPG Adjustment

The characteristics of the MPG control circuit can be modified by adjusting the MPG restrictor. This component controls the rate at which air is supplied to the pump speed control circuit. When the MPG leaks air more air than can be supplied through this restrictor, the pressure in the circuit falls and the pump stops.

When the circuit is once again sealed, the restrictor controls how quickly the pressure builds within the circuit and therefore the time and speed in which the pump restarts.

The slower the flow of air through the restrictor, the longer the pump will take to restart.



Note ***If this restrictor is fully wound-in, air flow will be blocked and the pump will not start. Conversely, if too high a flow of air is supplied to the circuit, safe and correct operation of the machine cannot be guaranteed. <u>This flow control is set at factory and should not be adjusted.</u>***

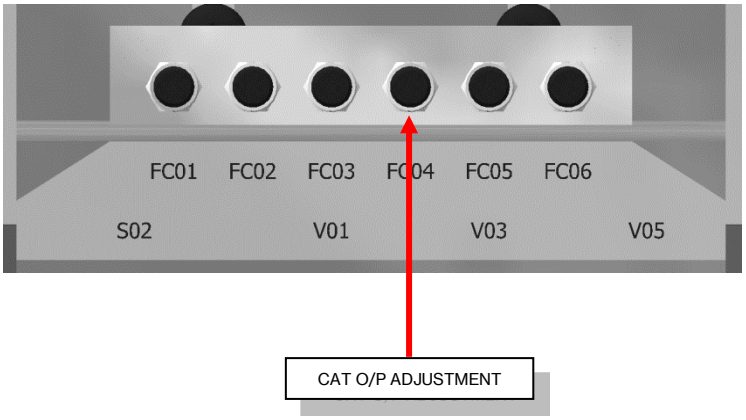
The response of the pump can be further slowed if required by the addition of an air reservoir to the circuit. Contact MVP for more information.

Catalyst Over Pressure Adjustment

The characteristics of the CAT O/P control circuit can be modified by adjusting the CAT O/P restrictor. This component controls the rate at which air is supplied to the bleed control circuit. When the CAT O/P leaks air more air than can be supplied through this restrictor, the pressure in the circuit falls and the pump stops.

When the circuit is once again sealed, the restrictor controls how quickly the pressure builds within the circuit and therefore the time and speed in which the pump restarts.

The slower the flow of air through the restrictor, the longer the pump will take to restart.



Note ***If this restrictor is fully wound-in, air flow will be blocked and the pump will not start. Conversely, if too higher flow of air is supplied to the circuit, safe and correct operation of the machine cannot be guaranteed. <u>This flow control is set at factory and should not be adjusted.</u>***

Internal Push Buttons and Valve Operations

Internal Controls		
Number	**Name**	**Description**
PB01	Inject Push Button	Pilots Resin Gel Alarm valve (RGA V01), Injection Cycle Start Valve (V02), and disarms the cycle. ***Note*** ***Must have a signal from AN1 to work.***
PB02	Remote Inject Push Button	Pilots Remote Injection Valve (V01). ***Note*** ***Must have a signal from AN1 to work.***
PB03	Remote Stop Push Button	Pilots Flush Cycle Signals Valve (V10), turns Flush Interlock Valve (V05) on, and turns Injection Cycle Start Valve (V02) off. Stops all functions of the Innovator and arms the flush cycle.
PB04	RGA Reset Push Button	Pilots the Resin Gel Alarm Valve (RGA V01) off. This push button is inside the box and accessible through the side via small probe.
PB05	Prime Push Button	Pilots Injection Gun Valve (V06) to allow bypass of PPVS and MPG sensors to allow the injection gun to dispense material. ***Note*** ***Must have a signal from AN1 to work.***
PB06	Stop Push Button	Pilots Flush Cycle Signals Valve (V10), Flush Interlock Valve (V05) on and Injection Cycle Start Valve (V02) off. Stops all functions of the Innovator and arms the flush cycle.

PB07	E Stop	Pilots Flush Cycle Signals Valve (V10), Flush Interlock Valve (V05) on, and Injection Cycle Start Valve (V02) off. Stops all functions of the Innovator and arms the flush cycle. ***Note*** ***This is a maintained button. It must be reset to allow the machine to operate.***
PB08	Flush Push Button	Pilots the Resin Gel Alarm Valve (RGA V01) off and pilots Flush Cycle Signal Valve (V10) on.
PB09	Recirculation Push Button	Pilots Recirculation Gun Valve (V07). Supplied from Recirculation Interlock Valve (V04).
V01	Remote Injection Sequence Start Valve	• In the ON position, pilots the Injection Gun Valve (V02) and Resin Gel Alarm Valve (RGA V01) and starts the injection sequence. • In the OFF position, pilots the Flush Interlock Valve (V05), allowing the flush sequence to activate. • Triggered by Remote Inject Push Button (PB02).
V02	Injection Sequence Start Valve	• In the ON position, pilots the Injection Gun Valve (V06), supplies TAS (RTM Only) panel plug and the Counter Circuit Valve (RGA V03), allowing the injection sequence to start. • In the OFF position, pilots the Flush Interlock Valve (V05), allowing the flush sequence to activate. • Triggered by Inject Push Button (PB01) or Remote Inject Push Button (PB02).
V03	Catalyst Overpressure (CAT O/P) Valve	• In the ON position, supplies the catalyst overpressure circuit. • In the OFF position, pilots Injection Sequence Start Valve (V02) and Flush Interlock Valve (V05), stopping the injection or flush sequence. • Triggered by Catalyst Overpressure Valve (S04).
V04	Not Used	N/A
V05	Recirculation/Flush Interlock Valve	• In the ON position, enables Flush Push Button (PB08), supplies Recirculation Push Button (PB09), and signals AN01, allowing the injection button to be used. • In the OFF position, disables Flush Push Button (PB08), and Recirculation Push Button (PB09). • Triggered by Remote Stop Push Button (PB03), Stop Button (PB06), CE Norm Guard Interlock (S03), Catalyst Overpressure Valve (V03), or E Stop Button (PB07).
V06	Injection Gun Valve	• In the ON position, opens injection gun and enables Mod Pressure Guard Pump Valve (V15). • Note Mold Pressure Guard Gun Valve (V14) and Gun PPVS Valve (V08) signals must be present for this circuit to complete. • In the OFF position, closed injection gun and supplies Mold Pressure Guard Pump Valve (V15). • Triggered by the Gun PPVS Valve (V08) or Prime Push Button (PB05).

V07	Recirculation Gun Valve	• In the ON position opens recirculation gun (Pro) and also pilots the PUMP SIGNAL VALVE (V09). • In the OFF position, closes recirculation gun (Pro). • Triggered by Recirculation Push Button (PB09)
V08	Gun PPVS Valve	• In the ON position, pilots the Injection Gun Valve (V06). • Triggered by PPVS sensor (external).
V09	Pump Signal Valve	• In the ON position, supplies Mold Pressure Guard Pump Valve (V15), Mold Pressure Guard Pump Valve (V15) must have a signal to start the pump. • Triggered by Injection Gun Valve (V06) or PPVS Pump Override Valve (V12).
V10	Flush Cycle Signal Valve	• In the ON position, pilots SP4 Tank Supply Valve (V13), Ix3 Flush Signal (V16), SP4 Quick Exhaust and Gun Head Flush Button. • In the OFF position, pilots Flush Timer Circuit Valve (V11), fills the Flush Timer Reservoir, and supplies a signal to AN1. • Triggered by Flush Push Button (PB08).
V11	Flush Timer Circuit Valve	This is a latching valve. Once Flush Push Button (PB08) is pushed, the signal will slowly vent from the Flush Timer Reservoir and reset the valve. FC05 in this circuit is used to adjust the dwell of the flush cycle.
V12	PPVS Pump Override Valve	• In the ON position, allows the gun return signal to pass and activate the Pump Signal Valve (V09). • Triggered by OR11
V13	SP4 Tank Supply Valve	• In the ON position, supplies the SP4 with pressure to start the flush sequence. • In the OFF position, vents SP4 to allow it to refill. • Note When in the OFF position this valve vents outside cabinet. This prevents SP4 failure from backing solvent up into the internal air supply. • Triggered by Flush Cycle Signals Valve (V10).
V14	MPG Gun Override Valve	• In the ON position, supplies Gun PPVS Valve (V08). • Triggered by MPG Low Pressure Relay Valve (S02). • This is a maintained circuit. Once the MPG starts to vent, it will release pressure on the signals to V14, V15, and the piloted regulator. This in turn will decrease the pump output pressure via piloted regulator. Once the pressure has reached a low set point, the MPG Low Pressure Relay Valve (S02) will close and shut off V14 and V15 until the output pressure of the MPG has decreased to a safe value; then the injection cycle will resume.
V15	MPG Pump Override Valve	• In the ON position, pilots MAC valve on pump power head. • Triggered by MPG Low Pressure Relay Valve (S02). • This is a maintained circuit. Once the MPG starts to vent, it will release pressure on the signals to V14, V15, and the piloted regulator. This in turn will decrease the pump output pressure via

		piloted regulator. Once the pressure has reached a low set point, the MPG Low Pressure Relay Valve (S02) will close and shut off V14 and V15 until the output pressure of the MPG has decreased to a safe value, then the injection cycle will resume.
V16	IVx3 Flush Signal Valve	• In the ON position, pilots IVx3 to move into the flush position of the valve. This valve remains open upon completion of the flush cycle to allow the plunger to remain the down position on the valve. Once the injection cycle is stated the valve is reset. • In the OFF position, removes the flush signal for the IVx3 valve. • Triggered by Flush Cycle Signals Valve (V10).
RGA V01	Resin Gel Alarm Valve	• In the ON position, supplies RGA circuit. • In the OFF position, removes supply from RGA circuit. • Triggered by Inject Push Button (PB01) or Remote Injection Sequence Start Valve (V01).
RGA V02	Timer Valve	• In the ON position, removes supply to the RGA circuit. • In the OFF position, supplies the RGA circuit. • Triggered by Resin Gel Alarm Valve (RGA V01).
RGA V03	Counter Circuit Valve	• In the ON position, supplies the RGA circuit and counter circuit signal. • In the OFF position, removes supply to the RGA circuit and counter circuit signal. • Triggered by powerhead pulse signals.
S01	Start Up Safety Valve	• In the ON position, initiates the stop circuit and reset all valves. • Triggered by main air pressure going from off to on.
S02	MPG Low Pressure Relay Valve	• In the ON position, supplies signals to MPG Gun Override (V14) and MPG Pump Override (V15). • In the OFF position, removes signals from MPG Gun Override (V14) and MPG Pump Override (V15). • Triggered by venting of the MPG block on the gun.
S03	CE Norm Guard Interlock Valve	• In the OFF position, supplies signal to stop circuit. • Triggered by opening the CE Norm Guard.
S04	Catalyst Overpressure Valve	• In the OFF position, supplies signal to stop circuit. • Triggered by venting of the Catalyst Overpressure block on the gun.

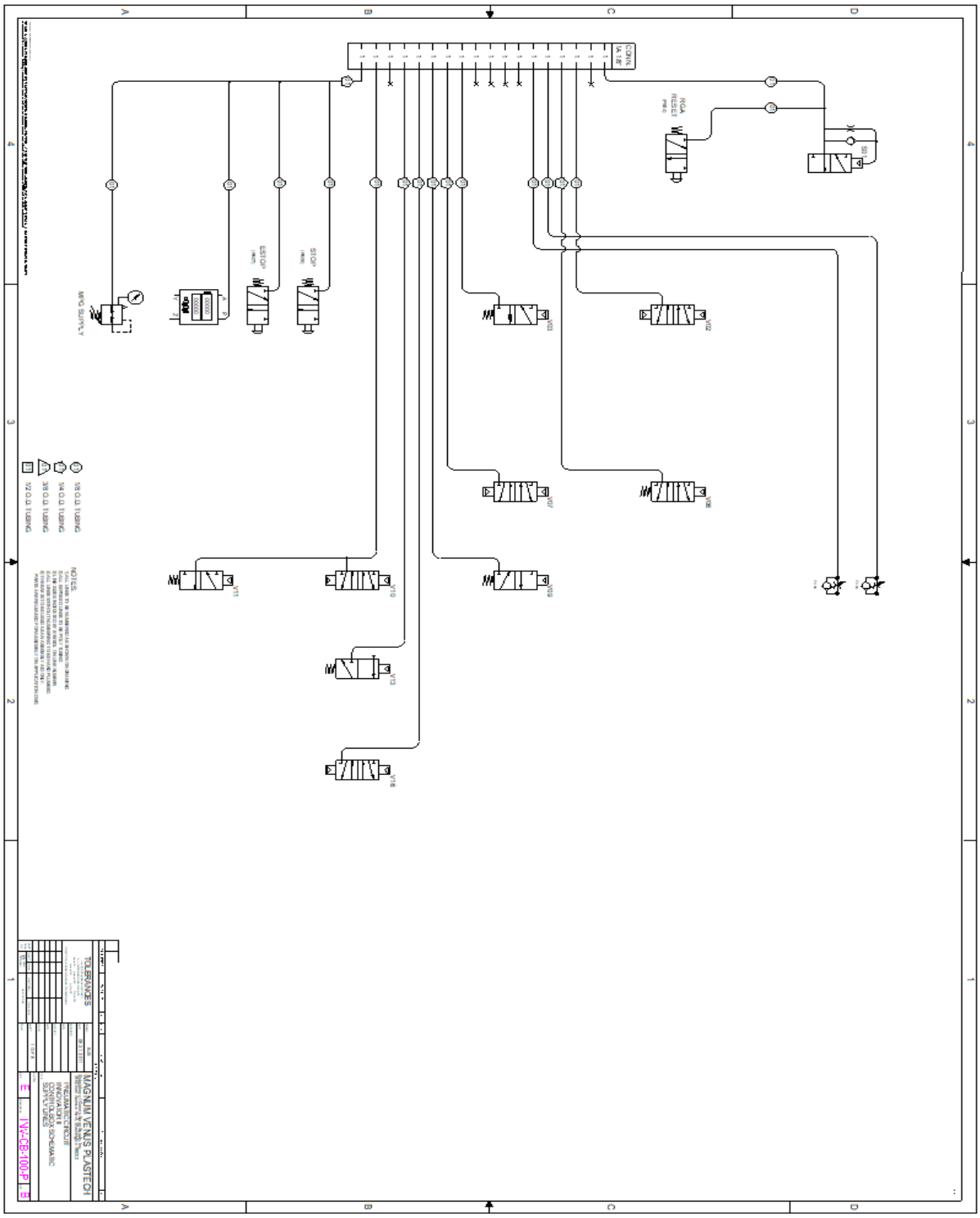
Parts List

Control Panel Parts		
Part Number	**Part Name**	**Used For**
09444	POPPET VALVE	Remote Injection Valve (V01), Gun PPVS Valve (V08), Pump PPVS Valve (V12), MPG Gun Valve (V14), MPG Pump Valve (V15), Counter Circuit Valve (RGA V03)
09187	4-WAY VALVE – DUAL PILOT	Injection Cycle Start Valve (V02), Flush Cycle Signals Valve (V10), IVx3 Flush Signal Valve (V16), Resin Gel Alarm Valve (RGA V01)
PNE-3W-103	3-WAY VALVE	Catalyst Overpressure Valve (V03), Recirc/Flush Interlock Valve (V05), Flush Timer Circuit Valve (V11), CE Norm Guard Interlock (S03), Catalyst Overpressure Valve (S04), Timer Valve (RGA V02)
PNE-4W-101	4-WAY VALVE	Injection Gun Valve (V06)
PNE-4W-102	4-WAY VALVE	Recirculation Gun Valve (V07)
PNE-3W-104	3-WAY CARTRIDGE VALVE	Pump Signal Valve (V09), SP4 Air Supply Valve (V13)
PNE-NV-101	NEEDLE VALVE	Start Up Safety Pulse Valve (S01)
INV-CB-PR-1	MOLD PRESS. GUARD RELAY VALVE	MPG Relay Valve (S02)
09169	3-WAY VALVE	Injection Pushbutton (PB01), Remote Injection Pushbutton (PB02), Remote Stop Button (PB03), RGA Reset (located inside box) (PB04), Stop Pushbutton (PB05), E-Stop Pushbutton (PB06), Flush Pushbutton (PB08), Recirculation Pushbutton (PB09), Remote Flush Pushbutton (PB10)
PNE-ASV-100	STOP AND RECIRCULATION OFF CIRCUIT	Stop and Recirculation Off (AN01); AN01 and Flush Timer Circuit Off (AN02)
09750	SHUTTLE VALVE	Inject (31) Or Remote Inject (32) (OR01); REGA Reset (34) or Flush (35) (OR02); Stop (37) or Remote Stop (15) (OR03); CE Valve (16) or Catalyst Overpressure (49) (OR04); E-Stop (39) (OR05 or OR06); Counter (48) (OR07); Injection Enable (47) or V08 On (48) (OR08); Pump Pulse 1 (18) or Pump Pulse 2 (19) (OR09); V07 On (14) or V12 On (68) (OR10); Stop (50) or V11 On (57) (OR11); Stop (38) or Start Up Pulse Valve (S01) (OR12); Pump Run (05) or Manual Prime (OR13); Remote Flush (OR14)
PNE-FCM-101	FLOW CONTROL CIRCUIT	RGA Alarm Volume (FC01); Pump Pulse Dwell (FC03); Catalyst Overpressure Restriction (FC04); Flush Dwell (FC05); MPG Restrictor (FC06)
7709	PREDETERMINING COUNTER WITH 10-24 FITTINGS	Pre-Determining Counter
0279	PREDETERMINING COUNTER WITH PUSH LOCKS	Stroke Counter Set
6877	PNEUMATIC TIMER	Pneumatic Timer (T01)

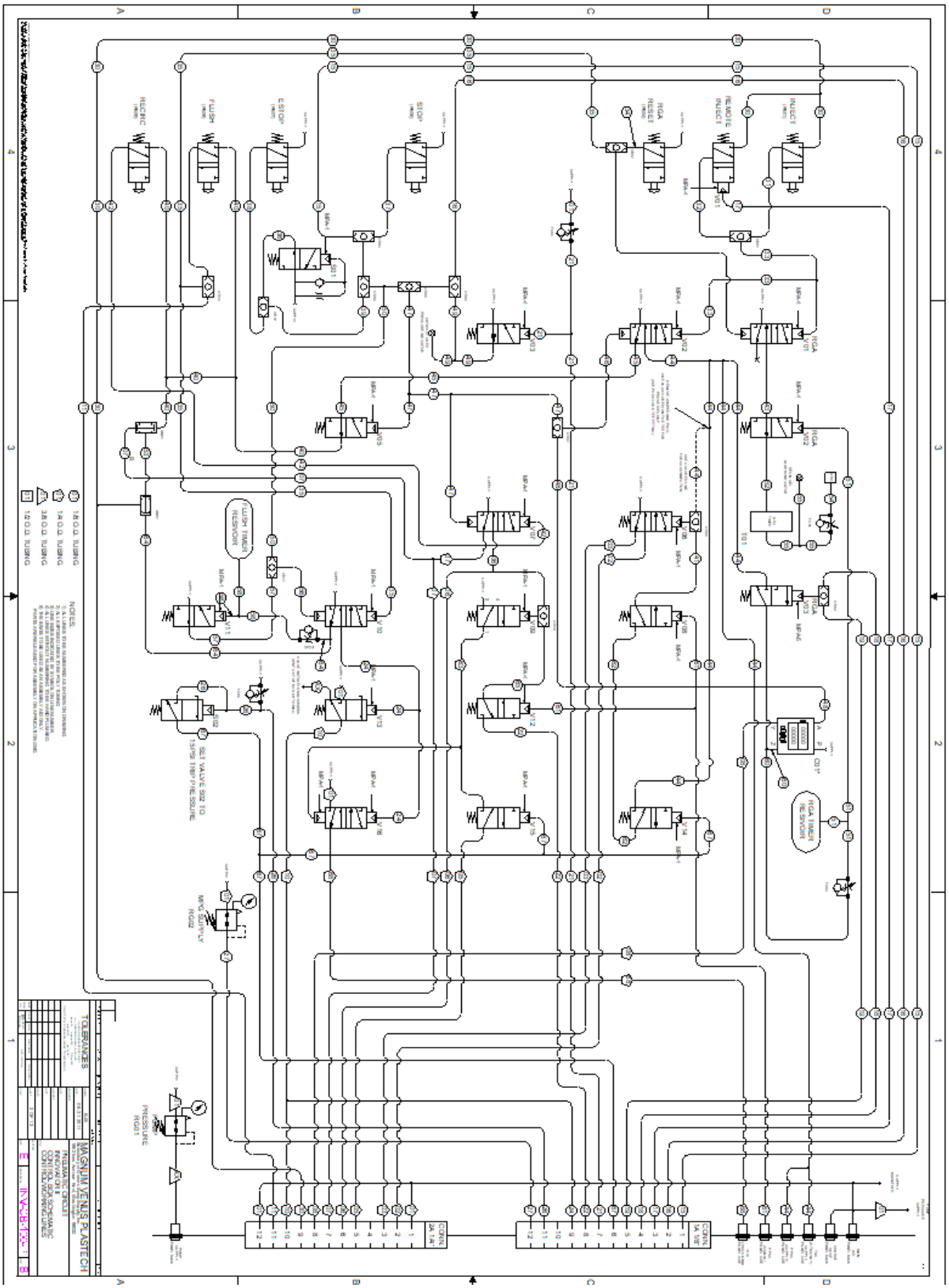
9807-1-1	PILOT OPERATOR	MPA-3 Operator
PNE-APA-103	AIR PILOT ACTUATOR	MPA-5 Operator
INV-CB-RG-1	REGULATOR	RG01 Regulator; RG02 Regulator
08609	.500” PILOTED REGULATOR	RG03 Piloted Regulator
08210	.375” PILOTED REGULATOR	RG04 Piloted Regulator
INV-CB-RG-2	90 PSI NON-ADJUSTABLE REGULATOR	RG05 Adjustable Regulator

Circuit Drawings

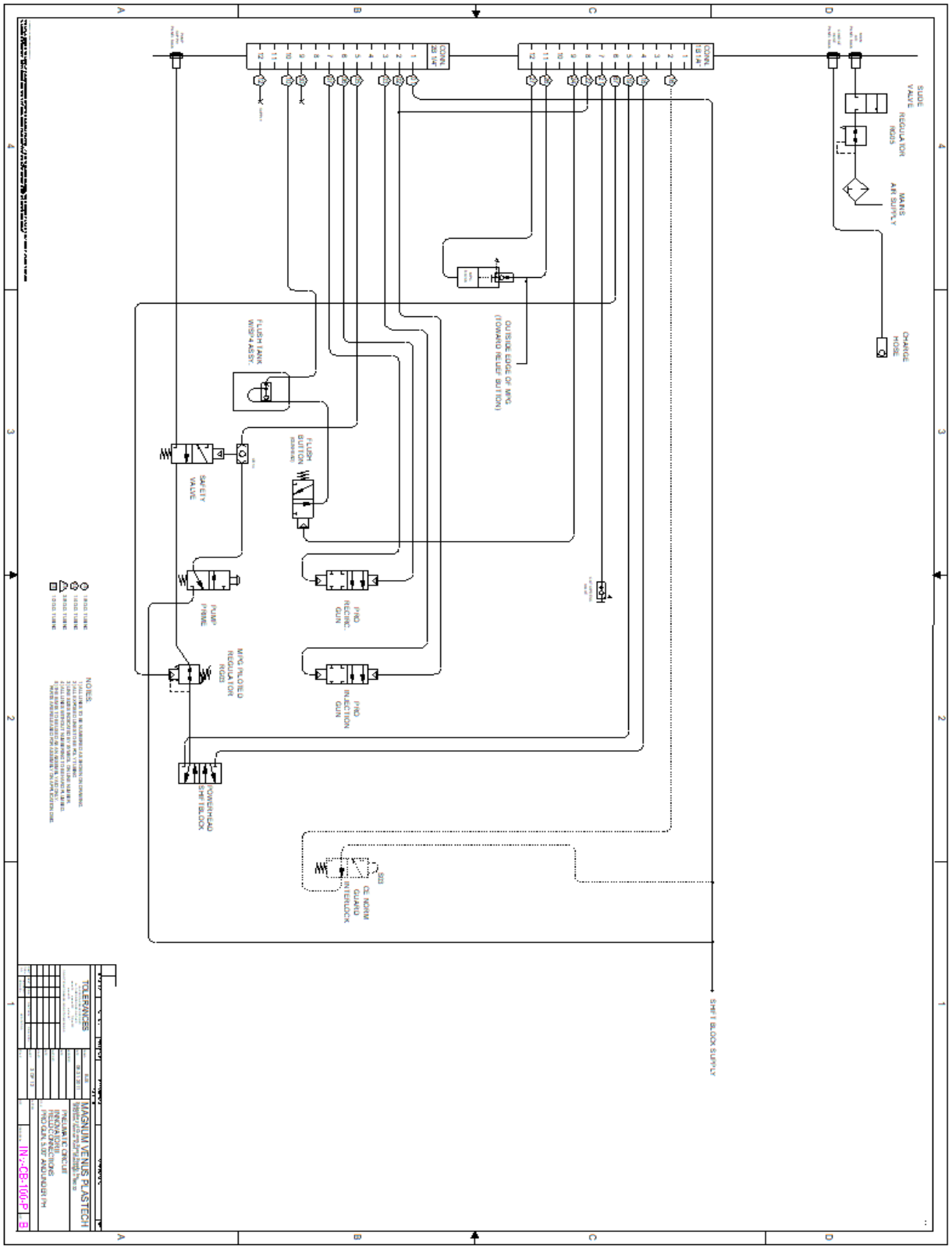
Internal Supply Lines



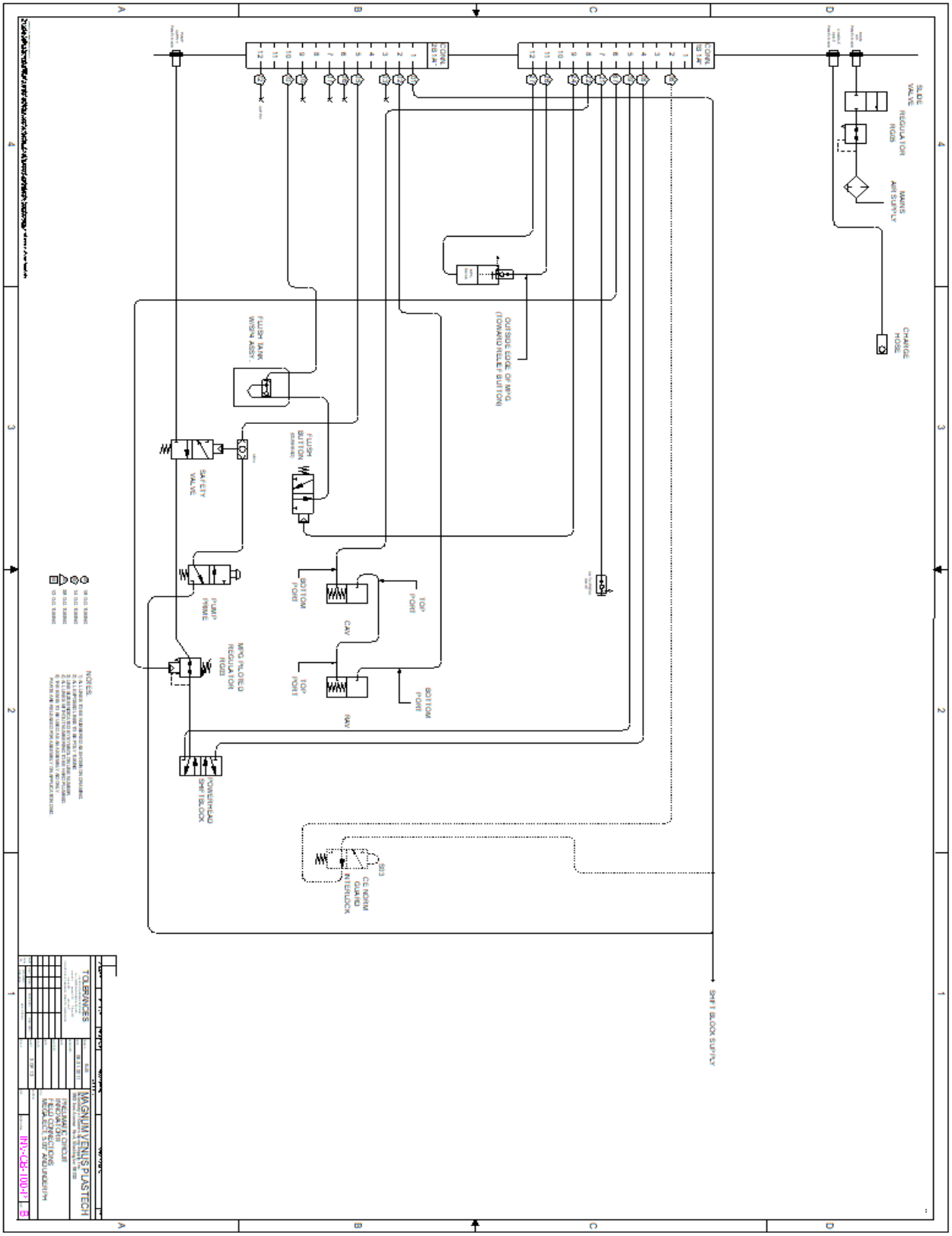
Internal Schematic



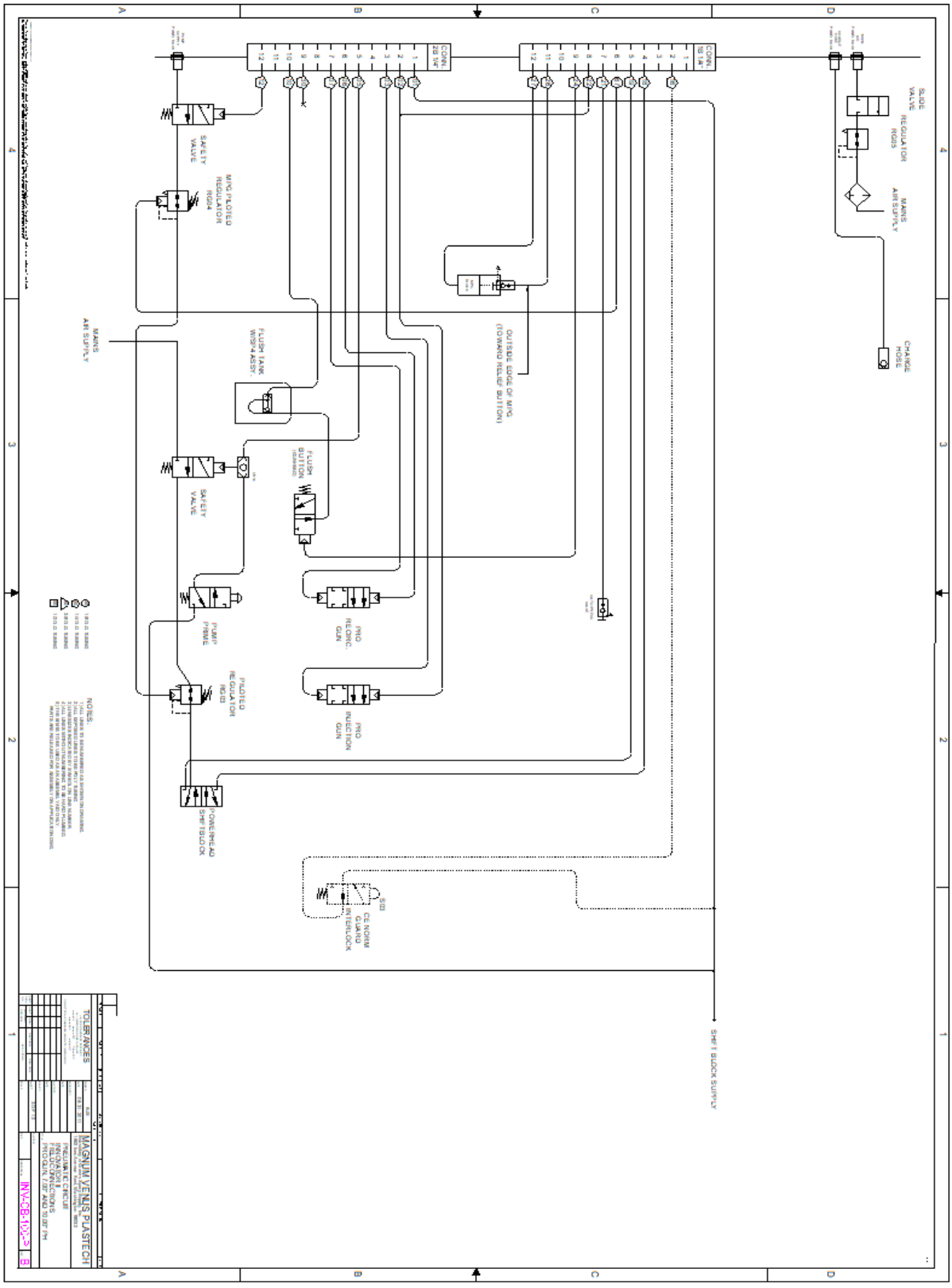
Pro Gun Schematic



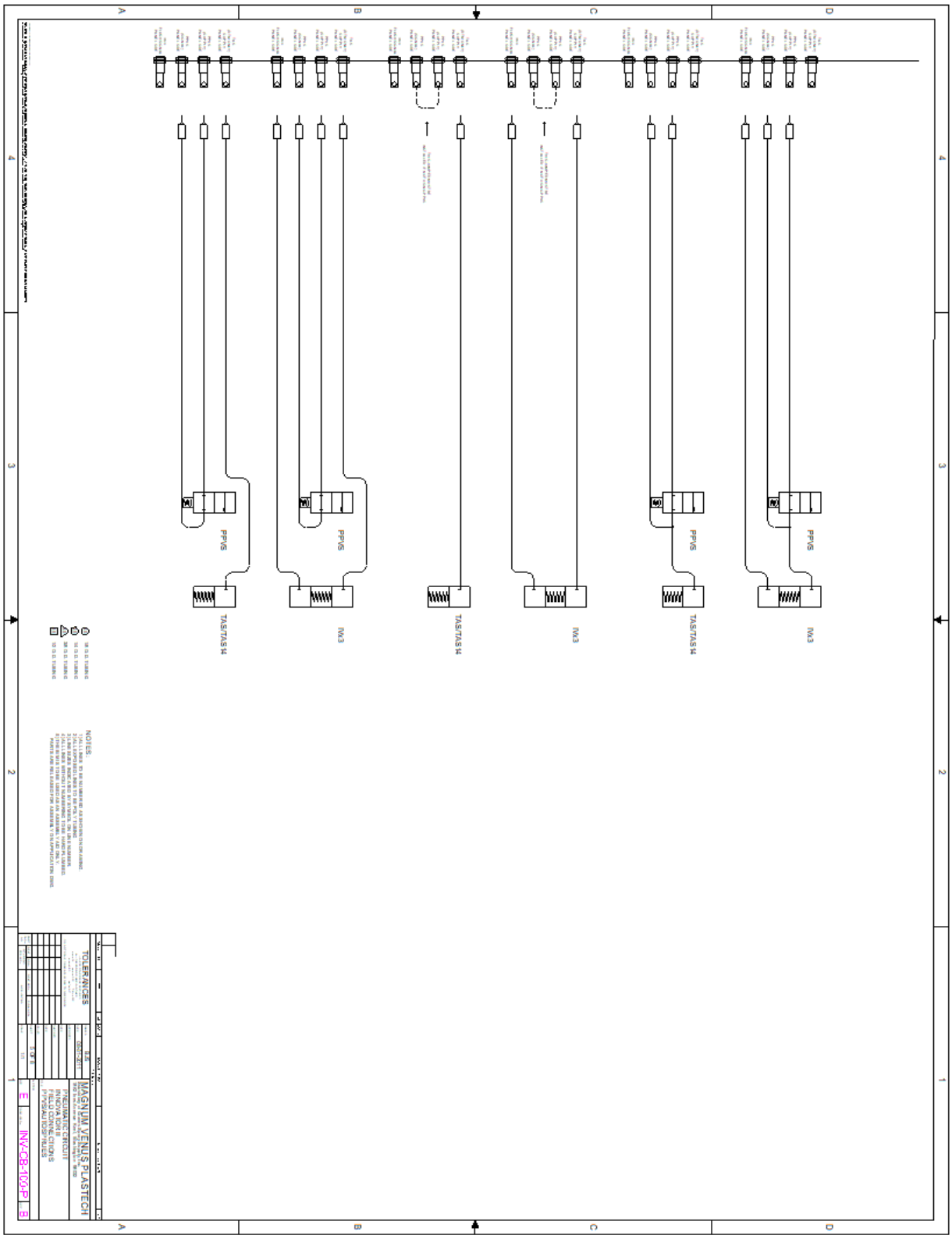
Megaject Schematic



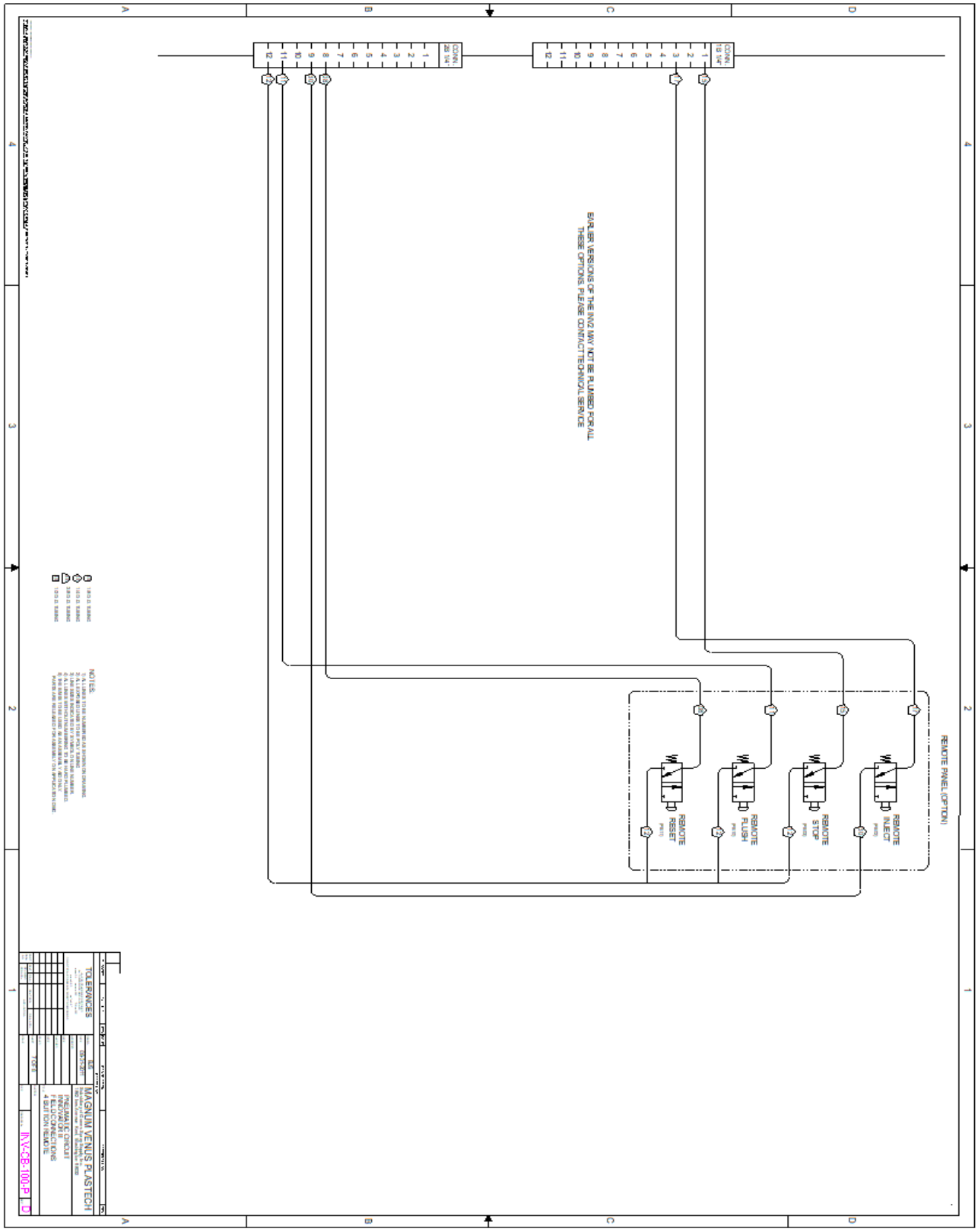
Pro-Gun Schematic for Large Powerheads



Accessories



Remote Pendant



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