



## JHM Technologies, Inc.

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[www.rtmcomposites.com](http://www.rtmcomposites.com)

“THE ULTIMATE EPOXY RTM INJECTION SYSTEM”

### Infuser PRG™ EPX (Epoxy)

Designed for injecting multiple component Epoxy resins, at controlled Pressures and Flow rates. The unit uses the proven JHM Technologies, Inc. positive displacement double acting pumping system, which mixes on demand at the injection head with the **INFINITELY variable hardener ratio** settings adjustable from:

**(50cc Slave pump provides mix ratios from 2.3 to 1 up to 10 to 1) or (25cc Slave provides 4.7 to 1 up to 20 to 1) (Note: only one Slave pump is included, specify either the 25cc or 50cc at time of ordering)**

The Infuser PRG offers the state of the art in fully automated RTM Injection which puts the control of the process in the automated equipment and molds thus eliminating the reliance on the operator for the quality and repeatability of the moldings produced. The Infuser PRG meets the daily demand of production for today's competitive manufacturing environment.



### Specification & Standard Features

- 100 cc Resin/ 50cc or 25cc Hardener pump system with adjustable ratio
- On board 5 Gallon Stainless Steel Solvent with variable solvent purge amounts
- Compact automatic injection head with re-circulation and low mix wastage, including easily removed NRV valves for ratio checking
- Electronic MPG injection pressure sensor & electronic regulator
- Mono Color Touch Screen Display with illuminated background indicating system condition and alarms
- Multi level user interface with password protection
- Automatic control of injection/flushing cycle
- User inputs of actual injection pressure, flow rate, and volume
- **Closed loop PID control of injection flow rate with pressure limit governor** The KEY to optimum RTM process control!
- Recipe control for individual settings of multiple molds (**99 recipes**) **Note: With Data Collection option the total recipe storage is nearly unlimited.**
- Automatic recirculation facility through mixhead and return to supply for resin and catalyst
- **AUTOMATIC Cavity Vacuum Level Confirmation** – One the many unique features of the Infuser PRG system is the ability to sense the precise cavity vacuum level and to confirm it is within the pre-

#### Standard features cont:

- set limits. If the vacuum is not within the preset limits, then the display will alarm the operator of a vacuum fault and the system **WILL NOT inject the part until the fault is corrected.**
- **25' Hose Set** – Nylon lined Resin & Hardener hoses (feed & return), feed Hose, nylon line recirculation return.
- On board in-line heater capable of raising the resin temperature 20°(c) over ambient @ 3 liters per minute of flow for each component. **(NOTE: Each Heater to be powered at 240 VAC @ 10 amps as standard, optional 120 VAC)**
- **Mounted on stationary floor stand**

### Key Standard Automated Features:

**Fully Automatic Process Control Function** – Each automatic program recipe will be set for flow rate, having a upper pressure limit governing the injection pressure. This is to mean that the flow rate as set will be maintained as long as the pressure limit is not exceeded, in the event the pressure is exceed, the flow rate will automatically be reduced by 10% to keep the pressure below the maximum setting.

**Automatic Flush** – Flush can be set as an automatic function with fully programmable settings for individual Air purges and Solvent Purge(s), the flush can also be configured for manual flush waiting then for the operator to press the flush button before the flush initiates. This feature is used when either the mixhead must be disconnected before the flush such as when injecting through a nylon tube into the mold.

**Fully Upgradeable** – The modular design of the entire Infuser series of RTM Injection equipment is built on the flexible design architecture that allows for all features to be upgraded. This allows for the upcoming innovations to be added later as well as never allows your investment in the Infuser to become obsolete. You always have the ability to add what ever feature you desire in the future, while it is always best to take full advantage of the feature offered when you initially purchase the system for the most economical packaged system, it then still does allow for upgrade as your needs may change in future without having to purchase a complete new system.

**Dual In-Line PID Controlled Heaters** – Both the Resin and Hardener temperature is precisely controlled automatically through the Infuser PRG PLC. The prescribed component temperature is pre-set into the PLC recipe of the part to be injected, then upon the initiation of the inject cycle the Infuser PRG will circulate the resin and hardener until the precise component temperature is confirmed at the MIXHEAD, once the components are at the pre-set temperature at the mixhead, the signal will then be sent to stop recirculating and to automatically open the mixhead to allow the mixed resin to enter the mold. This features insures the resin is injected at the prescribed temperature from the first drop entering the mold to the last of the injection.

### **Software Function Details:**

**Expandable and Flexible** – The Infuser PRG software is built on rock solid industrial PLC hardware and software as offered by the Panasonic Corporation and used through-out the world for countless industrial automation applications. The entire software program used on the Infuser PRG was built from the ground up specifically for the RTM molding processes and has been laid out in such a way that it is very easy to add additional features to meet specific needs on a customer by customer basis. The Infuser PRG system is fully matched to meet the needs of today's custom RTM molder.

**Simple Intuitive Operation** – The Operator interface is simple and intuitive to navigate through. In the manual mode the operator sets the maximum injection pressure, the heater set points, the flow rate and the minimum / maximum vacuum limits, then the injection is started with simply pressing the start button. During the injection in either the automatic or manual modes, if the operator wants to pause the resin flow he simply presses the start button once again and the Infuser PRG stops, while still counting the injection elapsed time, once the start button is pressed again the injection continues from where the process was paused. The completion of the injection is halted by pressing the stop button, it should be noted that each of the “start”, “stop” and “Flush” buttons are located on the operator control panel., as well as, at the end of the static mixer as part of the RFID tag reader module. The automatic injection will operate exactly as the particular part recipe has been programmed to follow. Each automatic recipe contains the pre-set values for maximum injection pressure, flow rate and total amount to inject with each of these values having up to 4 different settings or “steps” within the recipe which allows for the settings to change as needed in respect the stage of the resin fill within the mold, this feature provides the means to expedite the injection process while tailoring the fill to the part so as to prevent over pressuring / filling.

**Three Password Levels** – The Infuser PRG has three password log-in levels. The full access level is the “supervisor” level which has access to recipe editing, system configuration and full system function. The “operator” level allows for Manual & Automatic Injection, Recipe Selection. The “Maintenance” level allows access to the preventative maintenance screens and their reset. Each of the Passwords can be changed at the supervisor log-in level.

**Automatic Flush** - The automatic flush feature will allow for both immediate automatic flush or manual flush depending on how the individual recipe is configured for the injection cycle. The flush has separate flush adjustments for 1<sup>st</sup> air purge, solvent volume, and 2<sup>nd</sup> air purge. The flush can also be set to provide a “double flush” which then follows the presets for the 1<sup>st</sup>, air purge, then solvent then 2<sup>nd</sup> air purge and adds a second adjustable volume solvent purge followed by a final 3<sup>rd</sup> air purge to ensure all solvent has been tried from the flush system.

**Automatic Recirculation** – Recirculation can be set to begin automatically on a timed basis. The Infuser PRG can be configured to time the interval the machine is to rest between injections and then if

no injection has occurred a set time for the machine to automatically recirculate the resin mixture from the resin pump to the mixhead and back to the source can be set. This ensures the materials in the resin and hardener lines are kept in suspension and when a in-line heater is used that the resin is maintained at the preset molding temperature. The automatic “starting” of the machine can be configured to be enabled that when the timer initiates the recirculation that the machine either sounds the alarm to notify the operator he needs to press the start button to allow the recirculation to begin for the preset time, or the machine can be configured to sound a alarm to notify anyone near the machine it is about to begin moving and the machine will automatically start recirculating without pressing the start button. This configuration is enabled in the “supervisor” level of system configuration settings.

Flush Sequence - The flush time for each of the steps of solvent and air purge are pre-set in configuration screen, the sequence is Air/solvent/air/ or air/solvent/air/solvent/air



#### **AUTO LINK - Mold RFID Tag System**

Each mold has a unique recipe for filling, as well can be fitted with a Auto Link Tag . The molding recipe is kept in the memory of the PLC which can hold 99 different mold recipes and each recipe can then be associated with up to 5 different AUTO LINK Tags. Applications with only one upper and one lower mold would need only one tag for the mold recipe, yet higher volume applications may have one upper and as many as five lower molds. In the case of multiple cavities the Infuser PRG system can remember up to five cavities for one upper set. The AUTO LINK Tag can be fitted to either the Upper mold Half then the number of lower molds matching that Upper can be limitless, or the AUTO LINK Tag can be fitted to each lower mold, in this case then each time the particular lower is used, it can be recorded as part of the DATA Collection system information to determine the usage and maintenance records for each individual cavity. The use of the AUTO LINK Tag is simple, while in the Automatic Injection mode, the Infuser PRG looks at the AUTO LINK Tag held in the reader at the end of the Mixhead Static Mixer, then the correct recipe is *AUTOMATICALLY* loaded when the Start button is pushed to initiate the mold fill. You can also select the recipe from the machine memory without the tag present on the mold as well by selecting the recipe from the up to 99 on board recipe memory.

**Five Tags included with system – additional tags \$5.95 each**

### **ALL OF THE ABOVE FEATURES AND FUNCTIONS COME STANDARD ON THE INFUSER PRG BASE SYSTEM**

#### **Additional Included Options:**

**Programmable PID controlled Resin & Hardener Temperature Control** – The resin temperature required for injection will be programmable in the system configuration screen. This value will then need to be met for the system to being the injection, ensuring the resin at the mixhead it at the prescribed temperature for injection. Upon initiating the injection start, the machine will remain in a recirculation mode until the resin at the mixhead is at the proper temperature, once confirmed to be at the correct temperature the machine will switch both the catalyst and resin valves automatically to the inject position and complete the automatic injection process. Preset temperatures can be programmed for both the recirculation temperature and the Injection temperature separately. In-line heater is a 2000 watt 240 volts heater with solid state relay controls for long-term life.

**Process Data Collection System** – Each of the primary process concerns including: part identification, time of injection, resin / catalyst ratio, resin temperature (with heater option) resin injection pressure, rate of injection, part sequential number. Dwell time per injection cycles, total resin used on a inventory usage for all moldings, all are stored on a Dell Laptop PC. This then allows for collected data to be organized into Excel spreadsheets for easy data review. The Dell Laptop PC allows for the data collected to be communicated through a 10/100 Ethernet port or Wireless network for integration with an in-house communication network system allowing for all of the data to be viewed by selected persons directly on their personal office desktop computers. This feature offers unprecedented ease for the Process Technician as well as Production & Equipment Maintenance Management

**Optional Data Collection System Expansion Features -**

In addition to the features listed above the Process Data Collection system can be ordered with expanded capability which will communicate with modules for Temperature, Analog (current or voltage) and Digital inputs using RS485 communication through the PLC within the Infuser PRG. In this expanded form of the Data Collection system each molding cycle will monitored not only during the injection in real-time, it will continue to monitor the inputs of the modules associated with injection which normally will then continue to feed process data related to mold temperature, pressures and any digital input devices associated with the mold or ancillary equipment.

The scan rate of the external input modules described is 1 per second and the data will update at a rate of 1 every 10 seconds.

**Expansion System add-on cost:**

**Input Module Details:**

**Model 4017 / 8 channel Analog Input** - 16 bit, 8-channel analog input with 3000 VDC optical isolation between the analog input and the module.

**Model 4118 / 8 channel Thermocouple Input** – 8 different & independent thermocouple inputs having 1Kv surge protection on power inputs, 3Kv EFT, and 8 Kv ESD protection. Power input range: +10 ~ +48 VDC

**Model 4051 / 16 channel Digital Input Module** – 16 channel Digital Input Module with 2500 VDC optical isolation for each of the 10V ~ 50V inputs.

**The Data Collection System Expansion Costs include one of each 4017, 4118 & 4051 input module and all software interface between the Infuser PRG PLC and the Data Collection PC included the customized Excel format to record additional post mold injection data as described above:**

**Expansion System add-on cost: \$6,890.00**

**Additional Modules can be ordered –**

**Module 4017 cost: \$385.00 each**

**Module 4118 cost: \$450.00 each**

**Module 4051 cost: \$205.00 each**

**INFUSER PRG SYSTEM MODEL: 7175 - 4**

**with In-line Heaters and Data Collection Options**

**(One) Infuser PRG full feature Base System with RFID \$43,452.00 (List price)**

**(One) 50cc Hardener Slave Pump**

**(Two) In-line PID Controlled Resin Heaters**

**(One) Process Data Collection System**

**(One) Mixhead enclosure frame & RFID Reader with Remote Control**

**(One) Additional Slave Pump Mounting for a fixed 2 to 1 Ratio**

**Secondary Option:**

**(Two) 5 Gallon Bottom Outlet Teflon Lined Resin & Hardener Vessel complete with stainless steel return feed tube \$932.00 x 2 \$1,864.00**

Shipping Details:

40" x 40" x 60" Wooden Crate

**Weight:** 420 to 550 pounds (72kg to 84kg) depending on options included

Shipping Date Lead Time:

7175 – 7 6 to 7 weeks

Domestic Payment Terms:

50% Down with Purchase Order

50% When Ready to Ship

International Terms:

T.T. Bank 50% with Purchase Order

T.T. Bank 50% When Ready to Shi

**Special Option: In-line Coriolis Mass Flow Meters** - For true ultimate process control and verification the In-line Coriolis Mass Flow Meter sets the standard for excellence. The Coriolis meter will indicate the actual flow rate and totalized flow of the resin on a mass basis. This eliminates the inherent variance present in any piston or gear meter mix machine. Further the Coriolis meter will provide real-time readout of the resin mix Specific Gravity which will confirm the filler loading content. This is an invaluable indicator of the true process control needed into today's RTM molding operation. Mass Flow Meters can be added for both the Resin and Hardener components,

**for further details contact the JHM technical team for details.**

## EQUIPMENT WARRANTY

1. All products manufactured by JHM Technologies, Inc. are warranted under normal usage and service against defects in workmanship or materials for a period of 6 months from the date of shipment. JHM Technologies, Inc. will repair or replace at its option any product or assembled components it finds to be defective.
2. This warrantee is limited to the cost of the original product and is in lieu of all other express or implied warranties and excludes the loss of profits, or any other direct or indirect incidental or consequential damages caused by product failure or delay in remedying the same.
3. This warrantee shall not be enforceable if the purchaser is in default, or delay, in making full payment for products purchased from JHM Technologies, Inc.
4. This warranty does not cover failures caused in whole or in part, but not necessarily limited, to the under noted causes:
  - a. Improper application
  - b. Operation outside of design limitation
  - c. Low / high air supply <85 psi >125 psi
  - d. Low / high voltage  $\pm 6\%$  or rated voltage
  - e. Power interruptions, phase failure / reversal, or power spikes
  - f. Product is used with resins, catalyst or solvents that are not compatible with the materials of construction or authorized by manufacture
  - g. Product failure attributed to dirt, moisture or foreign bodies entering the system
  - h. Misuse by operation not in strict accordance with instruction manual
5. Claims for products subject to failure within the terms of this warrantee must be submitted in accordance to the following procedure;

The purchaser must notify JHM Technologies, Inc. of the product failure with 5 working days of the failure and request a return material authorization (RMA) number which will be used to identify the claim once the defective item is returned for inspection in accordance with the terms listed above. Included in the return shipment is to be the full report associated with the product failure, including the JHM Technologies, Inc. product serial number. Accompanying the returned product for WARRANTEE INVESTIGATION is to be a purchaser's purchase order for the replacement item. If in the event of the product not being repairable and pending evaluation of the claim; JHM Technologies, Inc. at their discretion may provide a replacement product F.O.B. point of origin, which would be invoiced to the purchaser in the normal manner. If the purchaser's claim is accepted within the scope of the warranty, a credit note will be issued within 30 days of approval. Should the claim in our opinion fall outside the terms of the warranty period, due to any of the aforementioned exclusions, or through the late submittal of claim, lapse of warranty period, or any reasonable justification giving JHM Technologies, Inc. cause to reject the claim; then no credit note will be issued and the full invoice value will become due within the purchaser's agreed payment terms