JHM Technologies, Inc.

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"THE ULTIMATE RTM INJECTION SYSTEM"

Infuser PRG ™

Designed for injecting polyester, vinylester and methacrylate resins and peroxide catalyst, at controlled flow rates and pressure. The unit uses the proven JHM Technologies pumping system which mixes on demand at the injection head with the catalyst ratio adjustable from 0.5% to 3.0% in increments 0.1% achieved using Progressive Catalyzation Ratio system detailed later. 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 / 4.5 cc Catalyst 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 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-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.
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- **25' Hose Set** – Nylon lined Resin hose (feed & return), Stainless Braided Teflon Lined Catalyst feed Hose, nylon line recirculation return.
- Optional - On board in-line heater capable of raising the resin temperature 20°(c) over ambient @ 3 liters per minute of flow. **(NOTE: Heater to be powered at 240 VAC @ 10 amps as standard, optional 120 VAC @ 20.5 amps must be requested when ordered.)**
- **Mounted on stationary floor stand**

Key Standard Features:

Automatic Progressive Catalyst Ratio Included
The machine incorporates the programmable ACR progressive catalyst ratio facility, which is stepper motor-driven and provides automatic catalyst ratio adjustment between .5% to 3.0% catalysts to resin. ACR system is interfaced with the main PLC controller and responds to the individual mold recipes and will achieve progressive operation during injection to facilitate even cure. The catalyst ratio is to LINEAR from the start to finish ratio set points and automatically advances during the injection process. The advantage to increasing Catalyst ratio during the injection provides an even cure from the start to the end of the injection. This feature will aid not only in reducing mold closed dwell time after injection is completed, the ACR will also provide improved "green strength" making de-molding a "snap".

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.

Catalyst Monitoring Alarm – Each Injection is monitored for the proper catalyst flow, in the even the flow is too low or too high, the system will halt the injection and notify the operator of the catalyst flow concern.

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.

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.

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 1st air purge, solvent volume, and 2nd air purge. The flush can also be set to provide a "double flush" which then follows the presets for the 1st, air purge, then solvent then 2nd air purge and adds a second adjustable volume solvent purge followed by a final 3rd 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 catalyst lines are kept in suspension and when a in-lone 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

Catalyst Alarm - Through a precise in-line pressure transducer and a pre-set minimum & maximum catalyst pressure value setting, a screen alarm will indicate a "low catalyst pressure" or "Catalyst Over pressure" condition during the injection process indicating to the operator to take appropriate action. The pre-set value for both minimum and overpressure is set in the configuration screen, which both the presets and the historical readings can be viewed. Catalyst pressure monitoring can be viewed in real time from either the automatic or manual injection screens as well as the maintenance log-in for the trouble shooting of the machine if needed for servicing.

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

Individual Additional Available Options:

Programmable PID controlled Resin Temperature – 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.

In-line Coriolis Mass Flow Meter - 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 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.

Mixhead enclosure frame & Remote Control - The Mixhead will be surrounded in a ½" square box steel tubing protective cage enclosure with remote injection controls. System "start", "Stop", Flush" and E-Stop" can be controlled from the remote start located in the enclosure frame.

RS485 Network – The Infuser PRG can be upgraded to a RS485 communication network system, this allows for nearly countless modules for input and digital output control. The typical user of the RS485 network feature is one who has many different molds each with different Thermocouples and Pressure / Vacuum sensor which are monitored not only at the time of injection, they are continued to be monitored after the injection. This allows for the Infuser PRG to be controlling a separate molding cycle completely independent from the other mold(s). Other uses is to network other operations with the Injection process, typical application is to use the RFID Tag reader on the initial Gel-coat process to initiate the time a mold begins the molding process, then to track the mold as it passes through the processes until the part is demolded. Through the network and the use of the RFID system, each mold and subsequent molding can be fully tracked as it passes through the production molding process. The part once demolded, can then continue to be monitored using printed bar code or even additional RFID tag mounted to the part through its travel. Call for pricing and details 001-810-629-6515

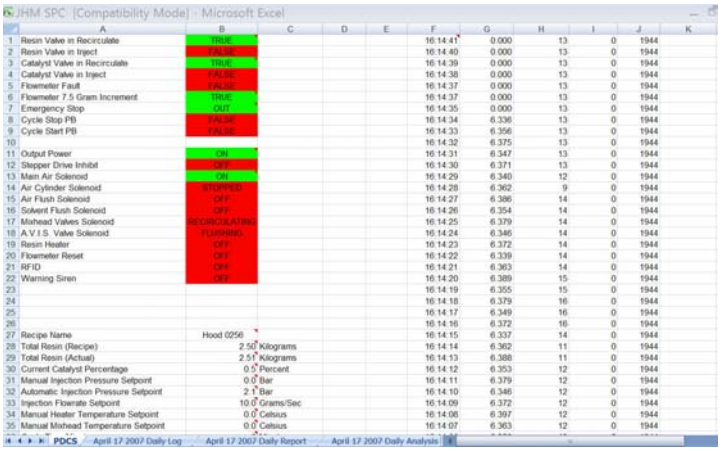
"State of the Art Data Collection"

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 an 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 included 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

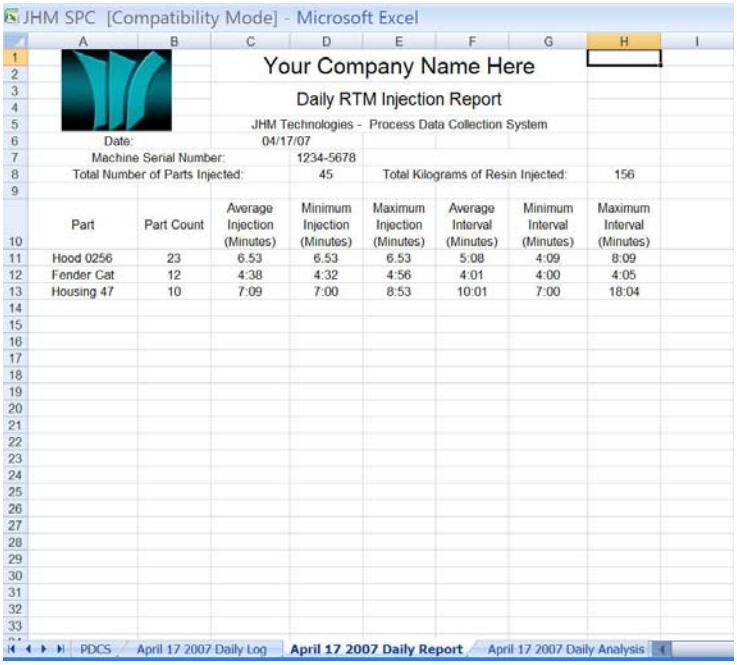
Below are Example Screen Shots of the Primary Data Collection System Pages, all of which are in an Excel Spreadsheet format for easy data storage and comparisons:

PDCS Page



The above page is the PDCS page which is the page in which all of the raw data is collected. The red and green blocks show the condition of each of the PLC I/O conditions. The precise pressure, temperature, flow rates, catalyst ratio, etc. are captured on this page at a rate of 1 sample per second.

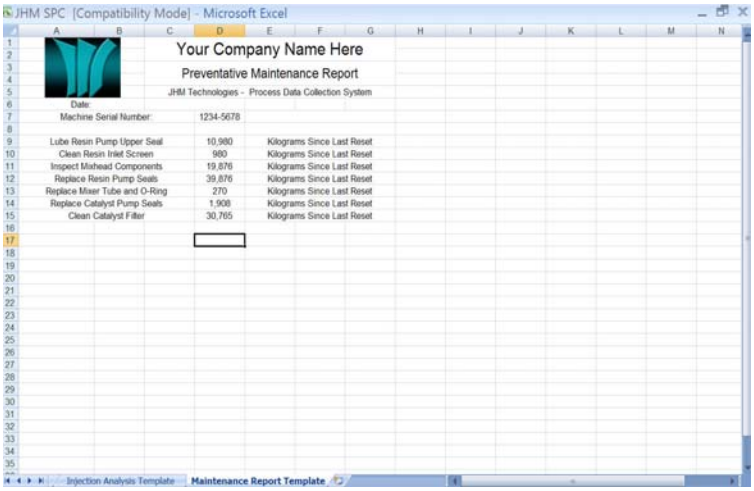
DAILY Production LOG Page



Part	Part Count	Average Injection (Minutes)	Minimum Injection (Minutes)	Maximum Injection (Minutes)	Average Interval (Minutes)	Minimum Interval (Minutes)	Maximum Interval (Minutes)
Hood 0256	23	6.53	6.53	6.53	5:08	4:09	8:09
Fender Cat	12	4:38	4:32	4:56	4:01	4:00	4:05
Housing 47	10	7:09	7:00	8:53	10:01	7:00	18:04

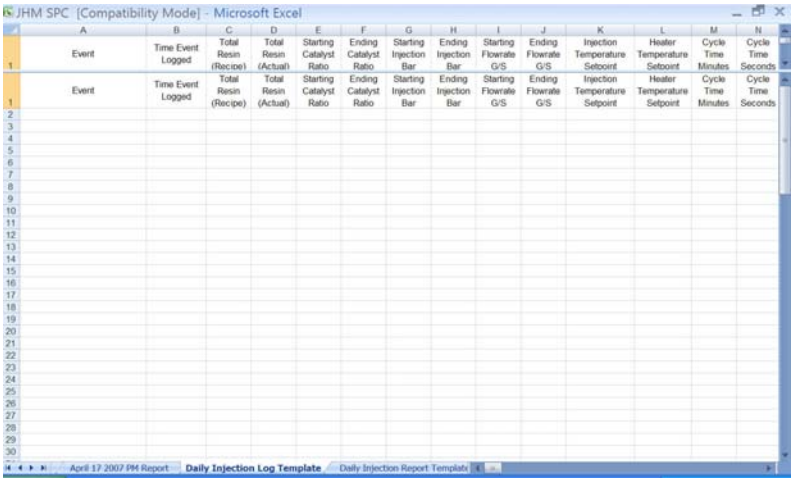
The Daily Log page provides a precise Production report at the end of shift. Each part molding is logged with the Part Count, Injection Times, Interval Times which gives insight to the number of individual parts, as well as, the “rhythm” of the molding process cycle, clearly identifying production flow evaluation. The total amount of resin injected that day is displayed for easy VOC emission records and B.O.M use confirmation. This report is Production Supervisor’s best Friend.

Preventative Maintenance Page



The above page is a unique feature of the Infuser PRG system. Found on the display of the Infuser PRG under the Supervisor configuration are the records for each of the primary maintenance details, showing the amount of resin that the machine has pumped since the last time each detail was serviced. This has proven to give the Maintenance team the needed information of the actual machine usage which has taken place, without this feature the best guide the Maintenance staff has to work with is the calendar which truly has no correlation with actual machine usage, the Infuser PRG has a “built-in Odometer” in a sense for each of the critical maintenance details. **With the data collection system** this information is collected and can be sent directly to the Maintenance Supervisor’s desk for daily review and preventative maintenance scheduling. Without the data collection system, the maintenance supervisor has access to this information, yet he must go to the Infuser PRG machine, log-in, and review the details, **with the data collection system this information is only a mouse click away on his desk.**

Process Variables Page



The above page represents an example of the Process Variables which are critical to the process technical engineer in either troubleshooting the production process or to refine the performance of the process. Here all of the individual process variables are recorded for immediate and long-term review. One of the common uses of this information is for history review of the molding process, this is especially important when the production group reports a problem yet do not recognize just what has changed, here the precise information of how the same part was molding one month or many years ago can be reviewed with just a couple mouse clicks, also since the information is stored in Excel spreadsheets the data can be combined and reviewed from many different molding events if needed. This record eliminates the history being held in the memory of the various operators over the years, with greater accuracy and reliability as well.

Suggested Packaged Systems

INFUSER PRG SYSTEM MODEL: 7175 - 1

(One) Infuser PRG full feature Base System with RFID $33,175.00 (List price)

INFUSER PRG SYSTEM MODEL: 7175 - 2

(One) Infuser PRG full feature Base System with RFID $38,228.00 (List price)
(One) In-line Coriolis Mass Flow Meter

INFUSER PRG SYSTEM MODEL: 7175 - 3

(One) Infuser PRG full feature Base System with RFID $41,786.00 (List price)
(One) In-line Coriolis Mass Flow Meter
(One) Programmable PID controlled Resin Temperature

INFUSER PRG SYSTEM MODEL: 7175 – 4

(One) Infuser PRG full feature Base System with RFID $39,631.00 (List price)
(One) Programmable PID controlled Resin Temperature
(One) Process Data Collection System

INFUSER PRG SYSTEM MODEL: 7175 – 5 (The Ultimate Package)

(One) Infuser PRG full feature Base System with RFID $44,684.00 (List price)
(One) In-line Coriolis Mass Flow Meter
(One) Programmable PID controlled Resin Temperature
(One) Process Data Collection System

CALL TODAY to see if YOU Qualify for SPECIAL PRICING!

Shipping Details:
40” x 40” x 60” Wooden Skid
Weight: 285 to 485 pounds depending on options included

Shipping Date Lead Time:
4 to 5 weeks ARO & Deposit

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 Ship

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 ± 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