PCS COMPANY

The PCS Mold Water Flow Monitoring System is essential for those who need factual, up to the minute and historical data on how each waterway in the mold cooling system is functioning

SMARTMANIFOLD
BY INTERNATIONAL TEMPERATURE CONTROL

with

Waterflo

Technology

VISIONS 3000 Hot Runner Control

Optional

Mold Water Flow Monitoring

Linux Rev 2.51

Why Water Flow Monitoring & Hot Runner Controls in One Package ?

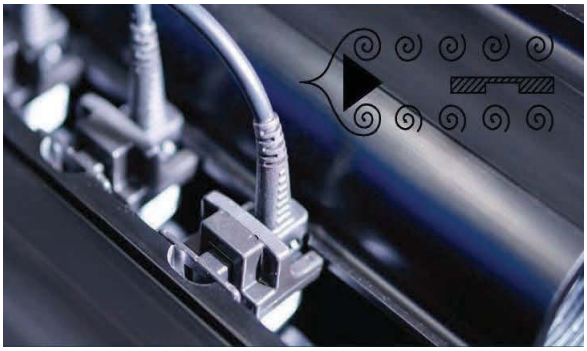
It just makes sense!

For the first time PCS offers Injection Molders an affordable solution for the precise monitoring of flow rate and temperature within each channel of a tools cooling system combined with VISIONS 3000 Hot Runner Temperature Controller.

The integration of *Smart Manifold* with ***Waterflo*** technology and the VISIONS 3000 Hot Runner Control, provides insight into the molding process far beyond what can be derived from the individual systems.

- All Hot Runner & Water Cooling information is displayed together.
  "Cavities (Gray)" "Manifolds (Red)" "Water (Blue)"
- The system provides precise data for temperature and flow rate of each water channel. (+/-1.5%)
- System can also be configured to monitor the main water input and output pressure. (OPTIONAL)
- By bringing this information together in one place, the linkage of how events in one system affect the behavior of the other can be easily recognized.
- Reduces back and forth time trying to figure out what the problem is and how to best to solve it.
- The ability to see how a change in one cooling channel affects hot runner heating in unassociated areas of the tool.
- The two systems together as a package can greatly improve the efficiency of the molding cycle.
- Improves consistency in quality and deformation stability to a much higher level.
- Provides accurate up to the minute data.
- More effectively protects the mold from catastrophic failures, by alarming if any area is suspect. The VISIONS 3000 has several alarm options ranging from screen notification to molding machine shut down.
- Often overlooked by many molders; the efficiency of each cooling circuit is critical to a stable molding process and the production of high quality, dimensionally stable parts.
- The VISIONS 3000 stores in one place, one year of step by step historical data for each zone of both cooling and hot runner heating operations. This invaluable information is date & time stamped for future reference. There is no more guessing as to what transpired and who did it.
- Tool setting for both the Hot Runner & Cooling Systems can be stored on the VISIONS 3000 database and called up the next time the tool is set-up. The database can store in excess of 100 tool sets.
- Like all VISIONS 3000 systems, the *Smart Manifold* is a robust unit which can withstand the rigors of industrial environments.

The *Smart Manifold* has been meticulous engineered and designed to provide exceptional accuracy. This is only possible by the exclusive design and exacting machining of the manifold extrusion which allow for proper placement of the advanced vortex sensors.



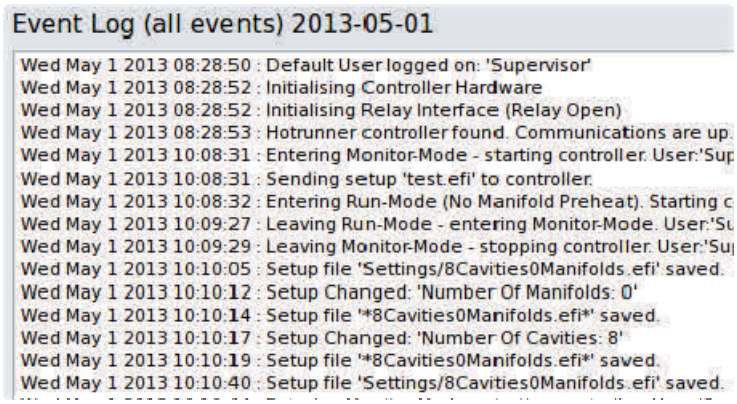
- The *Smart Manifold* works on the Bernoulli principal, meaning there are no moving parts to wear out, which equates to a long service life while also allowing for operation with heavily contaminated water.
- Sensor placement within the *Smart Manifold* have been precisely engineered for maximum temperature and flow accuracy.
- The advanced sensors are retained by a simple clip. arrangement, for ease of replacement.

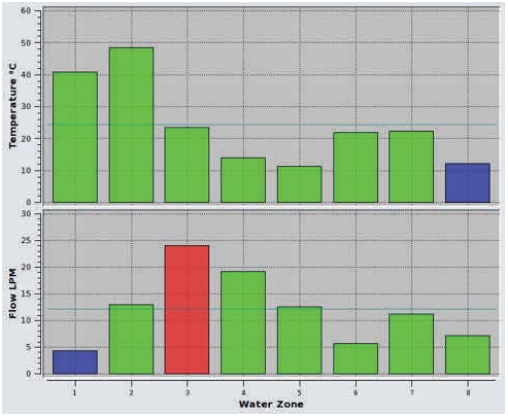
The PCS Intelligent Water Flow Monitoring System can protect your mold, improve quality while also improving cycle time. This is done by quickly identifying cooling problems and alerting to various common cooling channel problems such as:

- No or reduced water flow from the water chiller/heater
- Blocked waterways on a cooling circuit by circuit basis
- Reduction in system operating pressure
- Scale / rust build up
- Inconspicuous / minor leaks
- Incorrect setting of the water chiller / heater
- Faulty water chiller / heater operation
- Incorrect piping

Often overlooked is the importance of historical data. With the PCS system, information is stored for one year, is date and time stamped for tractability. Recording historical data means a performance log for each channel in the water cooling system is stored in the systems memory, allowing the user to track channel by channel performance and identify problems. This Data can be downloaded onto a USB stick or via Ethernet connection.

More importantly historical information provides operational insights not normally available to the user. By displaying data in a graphic format, the user can easily spot trends in deteriorating performance for any channel.





Tool Validation:

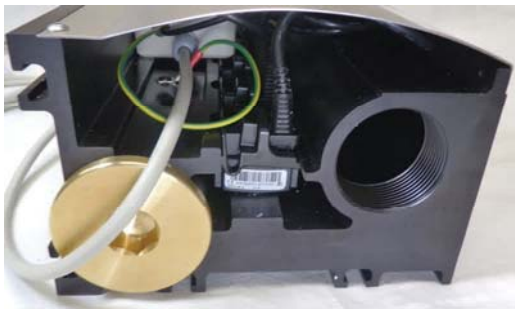
The tool Validation function of the VISIONS 3000 can provide documentation certifying the condition of both the tools hot runner & cooling systems prior to installation in the molding press. Without proper Tool Validation the molder can only hope there are no problems with all cooling and hot runner zones. Until now it has been both difficult and/or very expensive to measure actual flow rate and temperature for each cooling channel in the mold. Now with the VISIONS 3000 and the *Smart Manifold* with ***Waterflo*** technology you have the ability to read actual flow & temperature elements. With the VISIONS 3000 both the tools hot runner and cooling system can be fully validated and results recorded to establish a base line before the tool is put into production. You now have the ability to compare known actual base line date with actual in-process performance, thereby fully understand tool operation.

Now the VISIONS 3000 with the optional *Smart Manifold*, allows the user to bring all processes elements (Molding Machine, Hot Runner Control & Mold Cooling System) to the light of day, by provide actual feedback on the tools operation, allowing for intelligent decision making.

As any good process engineer will tell testify, it is not what the machine is told to do that is important; it is what the machine is actually doing that matters.

Hardware:

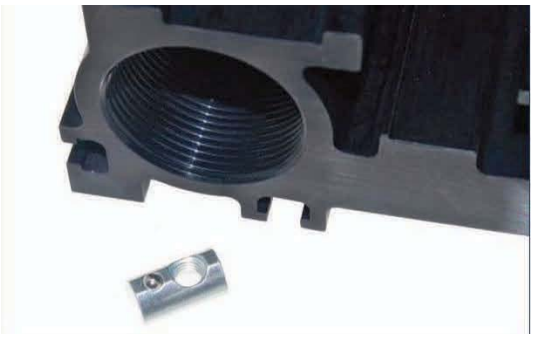
***SMART MANIFOLD*:**



The intelligent design of the *Smart Manifold* allow for the sensors to be located within the Manifold. This produces a slim line unit with a small footprint. The design also provides protection for the sensors by keeping them enclosed within the manifold assembly.

Smart Manifolds are manufactured from custom aluminum extrusions which are black anodized to resist corrosion. These extrusions are designed to specifically produce a precise linear flow path for each sensor. With meticulous attention to detail the sensors locations are positioned to provide accurate measurement.

The manifolds can be mounted on machine platens or the mold with “roll-in” “T-nuts” which fit in Integrated extruded slots, which are located on two faces of the extrusion. The compact slim line design of the manifold enables it to be mounted in the smallest space possible next to the machine, on platens or on the mold, keeping the pipe runs to the absolute minimum.



The *Smart Manifold* has 1-1/2” ports on both ends of the manifold to accommodate primary water “in/out” flow. This allows maximum flexibility when connecting the water supply. There are 1/2” ports for the individual channels for both “in” and “return” lines

SENSOR:

The *Smart Manifold* is equipped with very compact sensors that are capable of reading both flow rate & temperature. The sensor is based on the vortex flow measurement principal, which uses a bluff body in the middle of the flow path to create a small eddy current (vortices) and the pressure of this current is measured to determine the flow through a given cross sectional area.

The sensors have no moving parts, this combined with a large flow path, make them ideally suited to mold cooling, even when using heavily contaminated water.

The sensors are integrated directly into the manifold, keeping size to a minimum while protecting them from damage.

Sensors are available with two flow ranges to suit the application (4 gpm/15 lpm & 10 gpm/40 lpm). Sensors are held in place with a simple clip arrangement which makes replacement effortless therefor keeping maintenance very simple.

Sensors are also available which will read out the main system water in-put and out-put pressure, allowing for up to the minute and historical review.

INTERFACE UNIT;

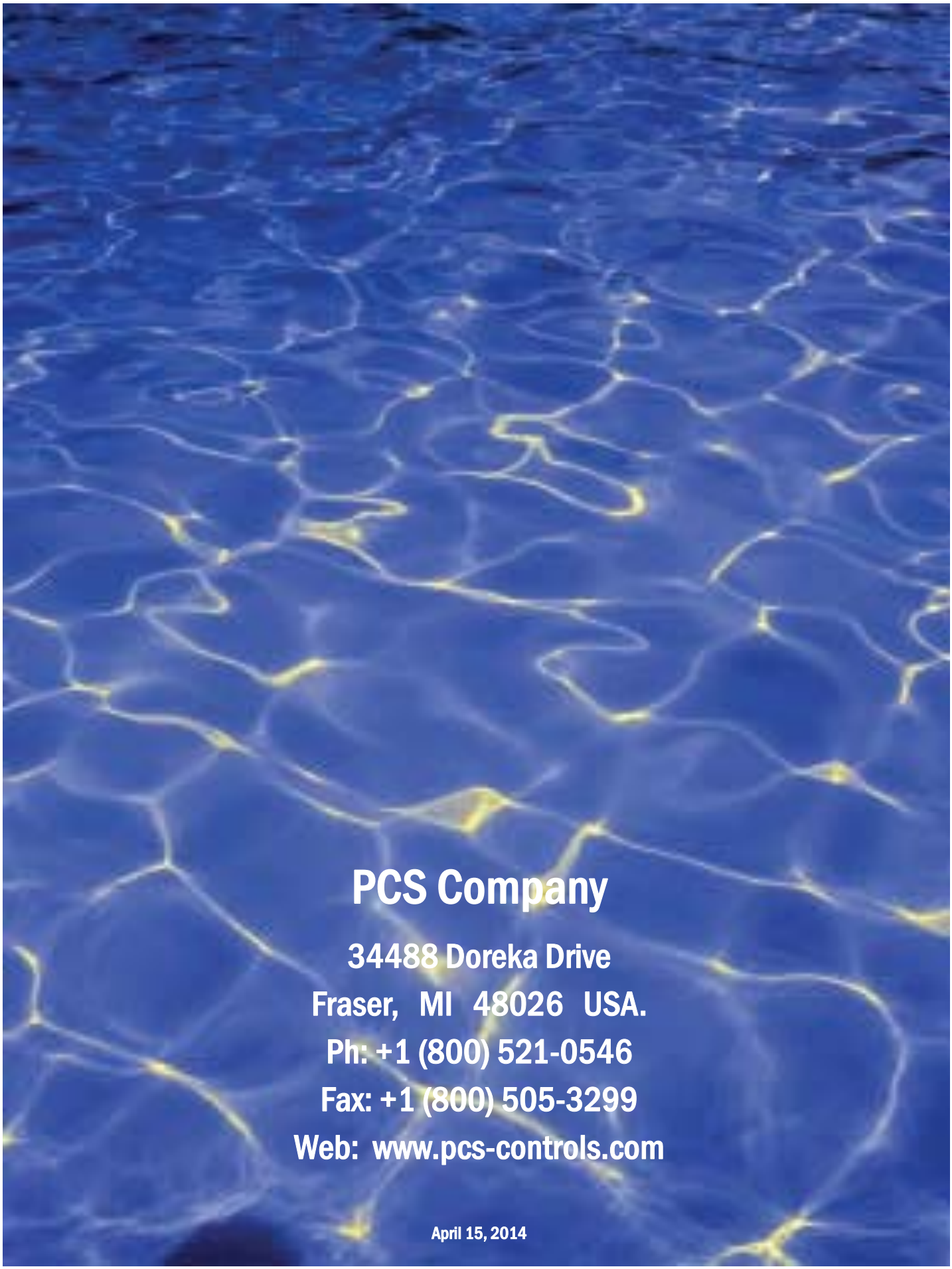
The system is equipped with a interface module which is mounted on the VISIONS 3000 system. The interface module allows multiple manifolds to be daisy-chained together, to seamlessly monitored the system and facilitate true “plug and play” with a simple connection. The interface module allow for the user to easily add additional *Smart Manifolds* at any time.

Technical Specifications:

Smart Manifold	
Manifold Feed	1-1/2" NPT
Manifold Ports	1/2" NPT
Number of Ports	4/8/12 Standard (other sizes on request)
Valves (optional)	Color coded ball valves per channel (optional)
Operating Temperature (max)	32° F - 195° F (0° - 90° C)
Operating Pressure (max)	140 PSI
Temperature Sensing	Per Channel (return)
Flow Sensing	Per Channel (return)
Temperature Sensing Main Inlet	Yes (optional)
Power Supply	12 - 24 Vdc

Sensor	
Sensor Type	Vortex
Range (flow)	Series 1 = 4 gal/min (15 liters/min) Series 2 = 10 gal/min (40 liters/min)
Accuracy (flow)	1.5% full scale
Range (temperature)	32° - 220° F (0° - 105° C)
Resolution (temperature)	.5°
Accuracy (temperature)	+/- 1.5% full scale
Sensor Signal	+/- 0.35 - 3.5Vdc
Output Signal	Voltage
Response Time	< 1 sec.
Power Supply	5 Vdc
Burst Pressure	200 PSI @ 100° F

Item #	Item Description
WF-SM4-1	Water Flow - Smart Manifold - 4 Channel - 4 gpm
WF-SM4-2	Water Flow - Smart Manifold - 4 Channel - 10 gpm
WF-SM8-1	Water Flow - Smart Manifold - 8 Channel - 4 gpm
WF-SM8-2	Water Flow - Smart Manifold - 8 Channel - 10 gpm
WF-SM10-1	Water Flow - Smart Manifold - 12 Channel - 4 gpm
WF-SM10-2	Water Flow - Smart Manifold - 12 Channel - 10 gpm
WF-INT	Water Flow - Interface
WF-IOPS	Water Flow - Pressure Sensor (In/Out) OPTIONAL ACCESSORIE



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