VISIONS 3000 Control System

Technical Data Sheet 6: Tool Diagnosis Functions

What is "Tool Diagnosis":

The VISIONS 3000 incorporates a suite of functions specifically designed to trouble shoot the mold both at start-up and during normal operations.

Question:

Why would anyone put a mold in a press and start it up without performing a swapped heater or thermocouple wiring analysis, heater power/wattage monitoring to identify leakage,. Thermocouple/heater fault analysis, mold cooling analysis, etc.?

The cost of a new or re-worked tool is significant. Installing it in the molding press only to find a problem can cause crushing cost and production delays. With the VISIONS 3000 you will have the peace of mind of knowing your have the ability to check all your tools prior to insertion in the press.

Monitor Mode

The VISIONS 3000 Monitor Mode permits the operator full access to all the Setup and edit modes while seeing the effect on-screen with live thermocouple readings, but with NO power being applied to the tool. This is particularly beneficial with new tools that appear to have no errors on the tool room bench, but exhibit unusual behavior in the press.

Diagnosis:

The main difference between the VISIONS 3000 and our competitors is that we control power. It is realized that all hot runner controllers control power, but in the VISIONS 3000 the primary emphasis is on power. It is power that produces heat and any temperature rise in the tool is a result of the power being applied. Only with the proper control of power can temperature be controlled. With our competitors, the emphasis in on temperature with their flashy PID terms and statements of accuracy of temperature, with power being relegated to second place. In terms of understanding what is going on within the tool, we need to know what the power is doing.

For example; in the Tool Diagnosis function, as well as the expected functions of Thermocouple Open, Swapped, Reversed and Swapped/Reversed detection, the VISIONS 3000 applies a measured amount of power to each zone in turn for a period of 1 minute. Within this time the response in measured and the results shown on the screen. Note; the level of power applied to manifold zones is larger because of there larger thermal mass.

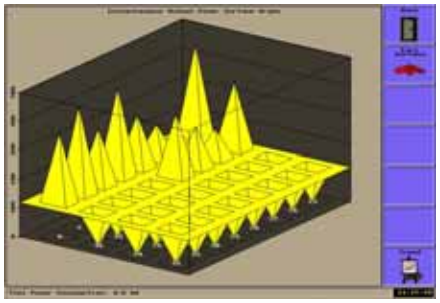
Given a group of, typically, cavity zones with the same specification, an application of the same amount of power should result in the same increase in temperature in the same time on all the zones. Any deviance will be the result of a fault within the bushing (or perhaps, a misplaced thermocouple). This additional insight into the functioning of the tool is invaluable to a toolmaker for determining faults.

The results of the Tool Diagnosis can be printed out and signed off, to attest that all problems have been found - and that the problems have been rectified and all is now well.

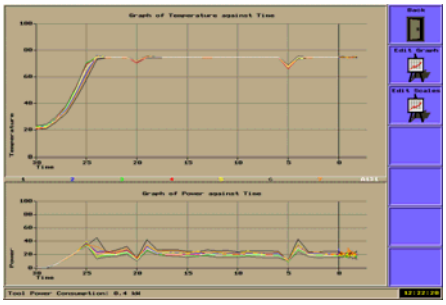
This control of power, as opposed to the competitions control of temperature, is a fundamental difference between the VISIONS 3000 and other products. Along with enhanced diagnostics, comes improved temperature control. The fact is, Thermocouples lie, are very fragile and provide false readings even though they appear to be working.

For example; during temperature ramp-up, when starting a cold mold, power is fed equally to all cavity and manifold zones. Again the VISIONS 3000 balanced system will show an even temperature rise across all zones if they are operating properly.

Graphs:



A further example; when running at set point temperature - by showing power against measured temperature and the set point - zones that consume differing amount of power yet maintaining the same set point temperature, immediately show up. This is clearly illustrated on either the 3-Dimension Surface Graphs or Trend Graphs.



Whilst Trend Graphs are useful for history and comparative data, the 3-Dimensional Surface Graph feature, which is unique to the VISIONS 3000, gives an exceptional (at-a-glance) insight into tool wide operations. Blocked or non-operational water channels within the mold are immediately revealed by the reduced power (inverted pyramids) required in those zones so effected. Since the zones can be laid out in a grid that reflects the location of the zones within the tool, the information is easily understood.

A phrase that is repeatedly use when demonstrating the VISIONS 3000 is that temperature control is a function of power. By showing the instantaneous power demand of each zone, the user gains a true insight into the functioning of the mold. Displaying current or percentage of power is nowhere near as informative.

Toolguard:

Toolguard is unique to the VISIONS 3000 and is a proprietary, proven system that monitors the power consumed by the tool during normal production and automatically places the tool into standby should the power be reduced by a preset amount, triggering a fault usually caused by the failure of the water cooling system within the tool.

Unlike other similar systems, the VISIONS 3000 Toolguard feature is a non-contact detection system. With Toolguard active, it is possible to prevent poor quality molding and tool damage caused by a water cooling failure.

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