VISIONS 3000 Control System

Technical Data Sheet 3: Power Control

- **Advanced Power Control (APC) Suite For Reduced Power Usage**
- **Balanced Power Output To Improve Stability**
- **Automatic Soft Start Power Ramp To Increase Tool Reliability**
- **Automatic Standby Of Tool To Reduce Power During Down-Time**
- **Manifold Pre-Heat For Heating Manifold Zones Before Cavity Zones**
- **Reduce Peak Current Demand**

Introduction

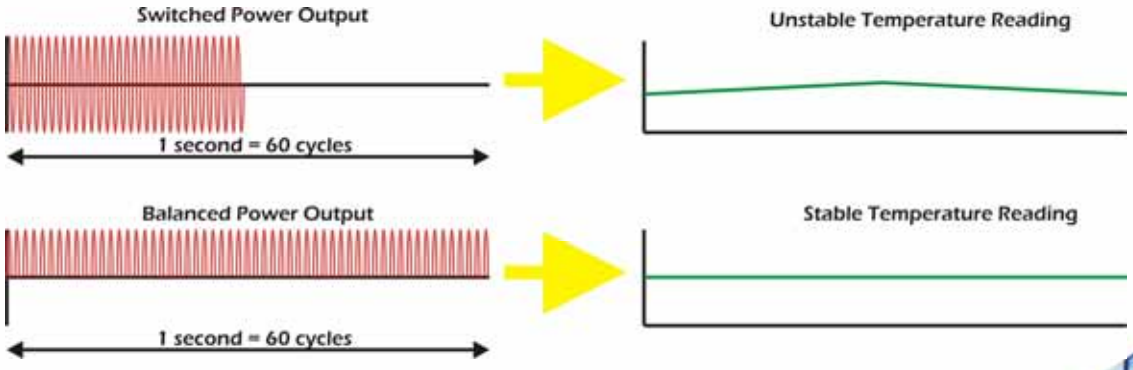
In a comparatively short period of time, energy consumption has become a hot topic. The price of electricity and material seems to be permanently increasing and world attention has focused sharply on global warming and the environmental impact of everything we do. This is particularly relevant in the plastic molding industry which is traditionally a large consumer of electricity.

One significant area of electricity consumption is the mold tool. While Ohms law will always dictate the maximum amount of power that a tool will consume, the VISIONS 3000 hot runner controller has a number features that enable a reduction in the power consumed at various stages of the production cycle, as well as increasing the reliability of heaters used within the mold tool.

APC Suite

The VISIONS 3000 is equipped with Advanced Power Control (APC), which is a range of features that reduces the overall current consumed by the mold tool, therein reducing energy consumption and cutting costs.

Balanced Power Output



To reduce electrically generated noise, the VISIONS 3000 switches the power to the load as the voltage crosses zero. In addition, the VISIONS 3000 also balances the power output by spreading the ON cycles over a 1 second time period. For example, a 50% output power on other systems consists of half a second with power ON, and half a second with power OFF. With the VISIONS 3000, the power is ON for half a cycle and OFF for half a cycle. As can be seen from the graph above, this produces a

considerably smoother power delivery, reducing oscillation of the heater, while increasing reliability and increasing the accuracy and stability of the control loop.

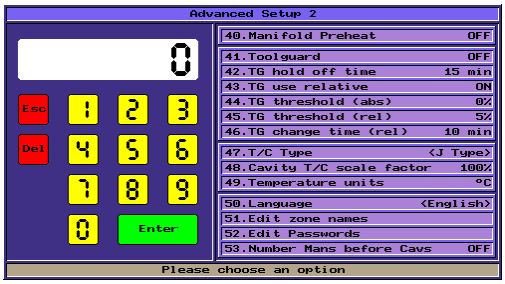
Automatic Power Ramp

All mold tools have a thermal mass determined by the amount and type of steel used in its manufacture. The heat generated by the element heaters in the hot runner system is conducted away from the heaters and into the mold tool at a rate determined by the steel. Increasing the amount of power applied to the element heaters such that it exceeds the rate at which the power/heat is drawn away from the heater and into the tool simply increases the temperature within the element heaters, leading to premature heater failure. On the VISIONS 3000, when RUN mode is activated a power ramp is used to bring the zones to setpoint temperature. This system automatically bakes out moisture from within the tool while increasing power to the element heaters at a rate that they can accommodate. Systems that apply 100% power on selecting RUN are applying full power into cold element heaters, reducing their reliability and, if moisture is present, potentially damaging the tool, without achieving production temperatures any quicker.

Automatic Standby

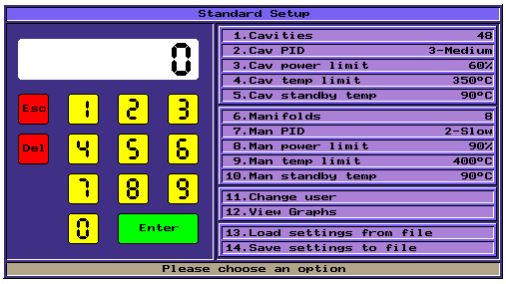
The VISIONS 3000 has a communications interface that accepts a signal from the molding machine to indicate that the press is in production. Should this signal be lost, the VISIONS 3000 will automatically place the tool into standby. In addition, any alarm condition can be configured to place the mold into Standby.

These features ensure that when production stops or an alarm condition occurs, the temperature of the tool is reduced, saving energy and preventing material degradation.



Manifold Pre-Heat

Toolmakers recommend that Manifold zones be brought to setpoint before the cavity zones, as this allows the bushings to bed into the tool better, reducing leakage. Unlike other systems where this is simply an On/Off function, on the VISIONS 3000, this option has a trigger temperature. Once the manifold zones reach this trigger temperature, power starts to be applied to the Cavity zones. This achieves the benefit of heating the manifold zones first, while also satisfying the requirement to achieve production temperatures in the shortest period of time. Another cost saving advantage.



Current Limits

The final feature within the APC suite of the VISIONS 3000, are the power limit settings that can be applied to the Cavity and Manifold zones.

These limits prevent full power from being applied to the heaters, a particular problem with small wattage bushing heaters where 100% power can increase the internal core temperature of the element 100's of degrees over the temperature actually being measured. This reduction in maximum power applied also reduces the overall power being applied to the tool preventing current consumption exceeding supplier limits, reducing costs.

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