

# UDC 3300 APPLICATION NOTE

## DUAL PV SOURCE PROCESS with TWO PID SETS

### PROBLEM

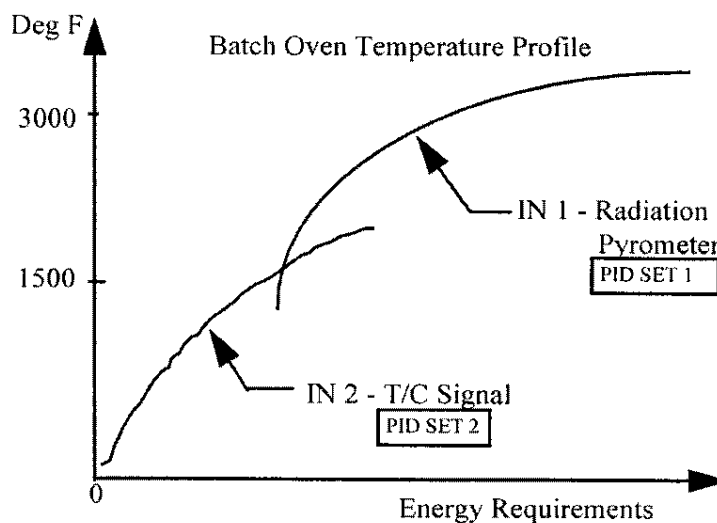
Many processes are non-linear and may also exhibit load changes and dynamics variations over the operating range. The use of two different batch oven temperature sensors or high and low range flow transmitters to cover the full process range are typical examples. Auxiliary heaters are often used at higher temperatures which effect the process gain. These variations result in a predictable tuning problem which would be desirable to avoid.

### SOLUTION

UDC 3300 has the ability to automatically switch between PID Set 1 to PID Set 2 based on the SP level. These products are also available with Accutune II, a new on-demand tuning algorithm that can tune at any SP and automatically enter the new tuning parameters in the correct PID Set. The Tuning can be initiated by a simple keypad action or by a Digital Input which could easily be configured to automatically retune based on an alarm output, a SP program event, or an equipment-actuated remote contact closure. Accutune II applies to any output form and works with integrating type processes. Accutune II also provides a fuzzy logic feature that can be enabled to minimize PV overshoot which may result from setpoint changes or externally induced process disturbances. Further details are provided below.

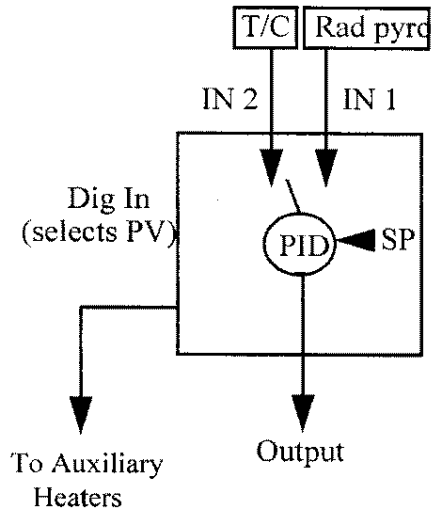
### DESCRIPTION

The following diagram illustrates some of the process characteristics that can lead to tuning problems. Note the need for a thermocouple below 2000 °F and the use of a radiation type device to measure temperatures that can reach 3400°F. In addition, note the dissipation nature of heating processes requires significantly more energy per degree at the higher temperatures which could call for additional heaters, more gain or both.



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The diagram below illustrate how the UDC 3300 might be use to solve the problem outlined above. The automated PID switching at any preconfigured PV or SP value is simplified by Accutune II which will automatically enter the tuning constants in the correct PID SET. Note that the UDC switches from SET 2 to SET 1 when the SP or PV exceeds the pre-configures switching value. It will automatically account for any auxilliary heaters or specific transmitter or sensor ranges that apply at the SP level chosen for retuning. The diagram also show that the Process Variable source can also be selected via a Digital Input . Typical configuration of these features are also provided



**CONFIGURATION:**  
 Tuning Group:  
 Gain  
 Rate     PID SET 1  
 Reset  
  
 Gain 2  
 Rate 2    PID SET 2  
 Reset2  
 Control Group:  
 PID SETS: 2SPSW  
                   or  
                   2PVSW  
 SW Value: 1500  
 Option Group:  
 Dig In : PV is IN 2