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Service Bulletin: **SB090101_1**

Date: **September 1, 2001**

Subject: **Warning on setting the Auto RESET (I) value to 0.00**

Unit's Affected: **All Model 600(A) and 620(A) Programmer/Controllers with Prom version 2.29 or earlier. Units with version 2.32 or later are not effected.**

Possible Situation: It is possible to "lock in" the power output of a control channel by changing the integral value (Reset) settings to zero from either the front panel or the computer interface (Serial or GPIB.)

How to avoid this situation: If you need to enter "0.00" as the RESET value for INC or DEC then enter "0.00" for both INC and DEC.

From Front Panel PID Adjustments:
If you need "0.00" Automatic Reset (I) then you ***must*** set both the INC and DEC RESET values to "0.00". Make sure the correct Controller channel and PID Set are selected.

From the Computer Interface: Send the INC RESET of 0.00 then send the DEC RESET of 0.00. After sending the RESET Values of 0.00, send the string "ci1 0" (Channel 1) or "ci2 0" (Channel 2). Make sure the correct Controller channel is selected.
The "ci1 0" or "ci2 0" command string sets the stored integral value of the selected channel to zero.

Note: JC Systems ToolBox Software Ver5.26 automatically performs the "ci1 0" and "ci2 0" function above when a RESET value of 0.00 is sent for either INC or DEC.

Background: In PID control, the actual power output of a controller is equal to the sum of three contributions, Proportional (P), Integral (I) and Derivative (D).

PROPORTIONAL (P)**:** The proportional output is a function of the proportional band and the error between the setpoint and the actual process value (i.e. temperature) within the band.

RESET (Integral (I) Term)**:** This contribution grows or diminishes as a function of the error (between setpoint and actual process) the time that this error exists, and the parameter settings for the RESET.

Note: The selection of which (INC or DEC) setting is utilized for changing the stored Integral (Reset action) is done automatically. When the controller is calling for heat (Inc mode), the INC PID settings are used, when calling for cool (Dec mode) the DEC PID settings are used.

The Integral Term (RESET contribution) is reset to zero whenever the Proportional Term (Inc or Dec) contribution is 100% in your JCS Controllers.

RATE (Derivative (D) Action)**:** The value of the contribution (term) is a function of the Rate of Change of the Process variable. This action opposes (opposite sign) the current actions of the controller.

SCENARIO: See the pictorial chart shown below.

(1) The controller is lined out. The process value is equal to the setpoint and the actual process value is not changing. The Proportional Bands for Heat and Cool are 10 deg. C.
All of the power output required to maintain the chamber at this steady state temperature is being provided by the RESET Action (Integral Term).
Let's say that the Setpoint and actual value are 70C. The controller is in its heat mode and producing 45% heat output to maintain the chamber temperature at 70C.

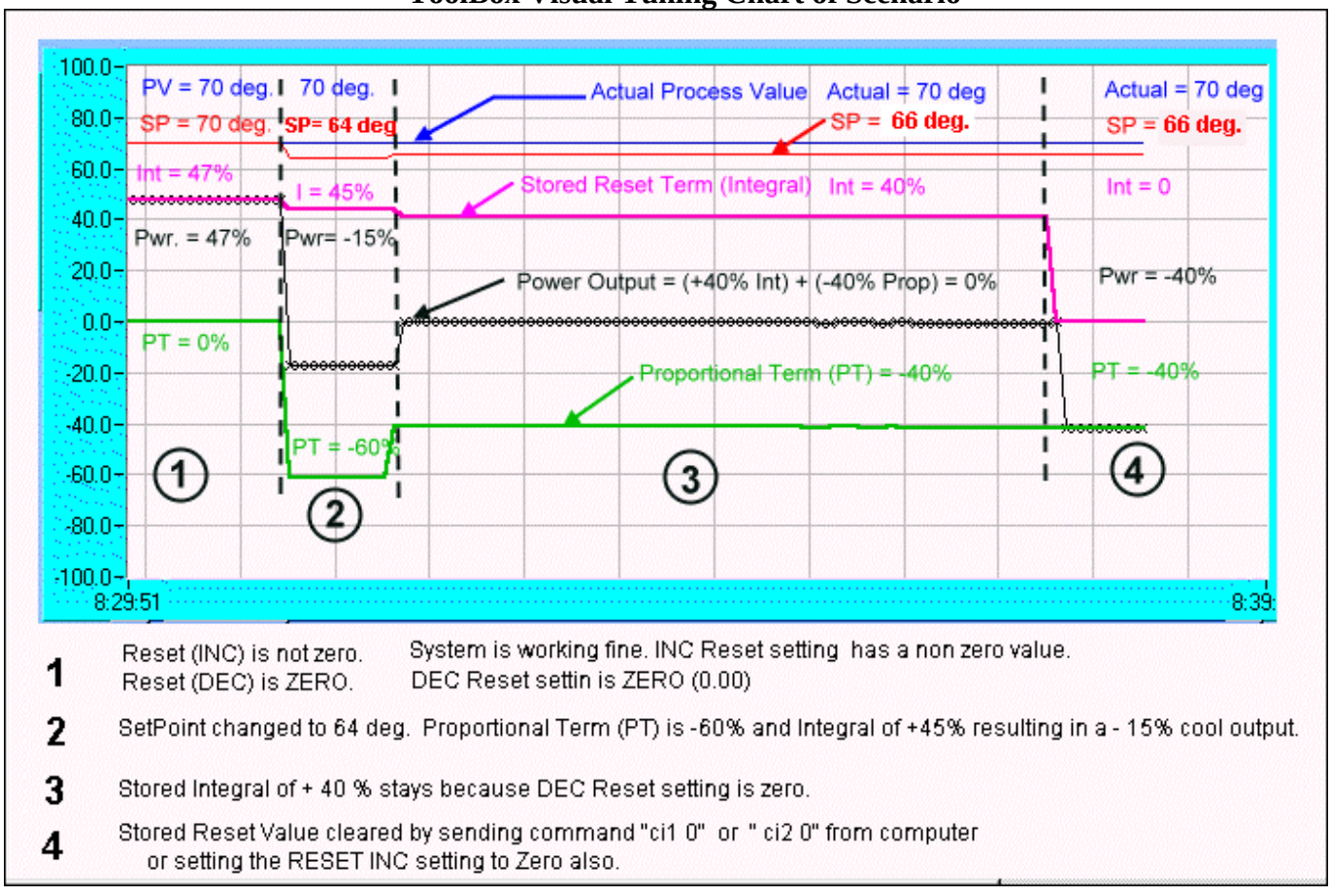
(2) If first the DEC Reset value is set to 0.00. Then the Setpoint is changed to a lower value of 64C, which is 60% of the cool proportional band, then the proportional term will be –60%.
The controller will immediately produce a cooling output of –15% (+45% heating plus -60% cooling). With the value of the DEC Reset adjusted to 0.00, the Stored Integral (Reset Action) cannot change.

(3) The setpoint is then changed to 66C, which is 40% of the cool proportional band, resulting in a Proportional Contribution of –40%.
You have now locked in a heat RESET contribution of 40%. The Proportional contribution has to fight the Stored Reset and now, there is 0 change of the Stored Integral (RESET Action).

(4) The "ciX 0" command is issued from the computer or the Inc Reset value is set to zero from the front panel. With both automatic reset settings now at zero the cool output is -40% which is exclusively produced by the proportional error between the setpoint and actual temperature.

Don't get caught by setting ONLY ONE of the PID RESET Values to ZERO (0.00)!

ToolBox Visual Tuning Chart of Scenario



1 Reset (INC) is not zero. Reset (DEC) is ZERO. System is working fine. INC Reset setting has a non zero value. DEC Reset settin is ZERO (0.00)

2 SetPoint changed to 64 deg. Proportional Term (PT) is -60% and Integral of +45% resulting in a - 15% cool output.

3 Stored Integral of + 40 % stays because DEC Reset setting is zero.

4 Stored Reset Value cleared by sending command "ci1 0" or " ci2 0" from computer or setting the RESET INC setting to Zero also.