

UDC 3300 APPLICATION NOTE

TUNING DUPLEX CONTROL PROCESSES with ACCUTUNE II

PROBLEM

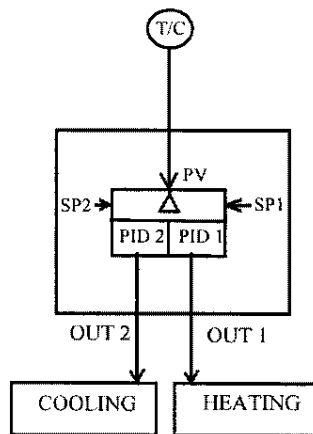
Duplex control provides a unique tuning problem because these applications use one controller with a single process variable which is controlled by two different final control elements which also have different dynamics and gain impact on the process variable. Duplex control processes include temperature control with heating and cooling, RH control via humidify/de-humidify, and PH control with acid and base additives. The customer requires a simple way to start up and tune both operating regions, i.e. the heating zone and cooling zone. Duplex control is often referred to as “heat/cool control” in the industrial marketplace.

SOLUTION

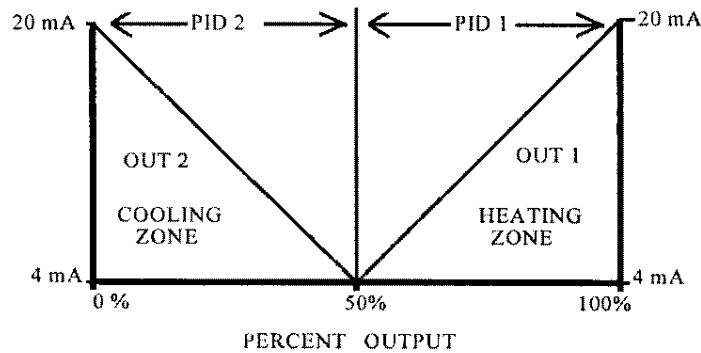
UDC 3300 provides Accutune II, an on--demand tuning algorithm that speeds up and simplifies start-up without needing any knowledge of the process. It can be initiated at the touch of the keypad, and separate PID values are accurately determined for each zone. It applies to any output type, and it works with integrating type processes. Accutune II also provides Fuzzy Logic Overshoot Suppression, a feature that can be enabled to minimize PV overshoot which might result from setpoint changes or external process disturbances.

DESCRIPTION

This diagram shows a typical duplex control Heat/Cool application. Note: the output types may be Current or Relay.



The diagram below illustrates the relationship between the Heating and Cooling outputs and tuning parameters. It shows both outputs as 4-20 mA current signals. During tuning, Accutune II assumes SP 1 will cause a Heating demand, and the calculated tuning parameters will be automatically entered as PID SET 1. Likewise, it assumes tuning at local SP 2 will cause a Cooling demand, and the cooling parameters will be entered as PID SET 2.



DUPLEX TUNING PROCEDURE:

The following procedure assumes the UDC has been properly configured for the correct Control Algorithm, Output Algorithm, and Control Action.. Note that the *Direct/Reverse* Action selection applies to Output 1 (Heating). Output 2 control action is determined by relay jumpers or current output 2 calibration or configuration. Last but not least, **TUNE** must be Enabled in the Atune (or Accutune) Group.

Heat Zone:

1. Adjust **local SP1** to a value within the **Heat** zone
2. Insure the UDC is in **Automatic** mode
3. Press Increment Key + Lower Display key simultaneously to initiate **Heat** zone tuning
 - The output will cycle between 50% and 100%
 - A large “T” appears in Upper Display until TUNE is completed (“TUNE” flashes on UDC2000)
 - **Heat** tuning parameters will be automatically entered for PID SET 1

Cool Zone:

1. Adjust **local SP2** to a value within the **Cool** zone
2. Insure the UDC is in **Automatic** mode
3. Press Increment Key + Lower Display Key simultaneously to initiate **Cool** zone tuning
 - The output will cycle between 0% and 50%
 - A large “T” appears in Upper Display until TUNE is completed
 - **Cool** tuning parameters will be automatically entered for PID SET 2