



# UDC 3500 Application Note

## *UDC 3500 Cascade Control*

### Advantages of Cascade Control

- Allows faster Inner loop controller to handle disturbances in inner loop.
- Prevents inner loop disturbances from affecting the outer loop
- Keep non-linearity (such as adverse valve characteristics or a sticky valve) within the inner loop.
- Permits “metering” of mass flow or energy.

### When to use Cascade Control

- Primary variable has slow response to disturbances.
- Process changes cause serious upsets in controlled variable.
- Another variable is affected by disturbance and closely related to the controlled variable.
- Secondary variable can be controlled and responds quickly to primary controller.

### Cautions

- There must be two different input variables that affect the process.
- The Inner loop (Loop 1) should be significantly faster ( say, 3 to 10 times faster) than the Outer loop (Loop 2).
- If the Inner loop and the Outer loop dynamics are about the same, then the Loop 2 (primary controller) should be tuned for a slower response.
- Cascade control may be more difficult for operators to understand.



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## Start-Up Information

1. Make sure that the unit is not in the Cascade mode (no “I” on display).
2. Select Loop 1, Tune loop 1 using the “Accutune”.
3. Place the unit in the Cascade mode (“I” on the display).
4. Select Loop 2, Tune loop 2 using the “Accutune”.

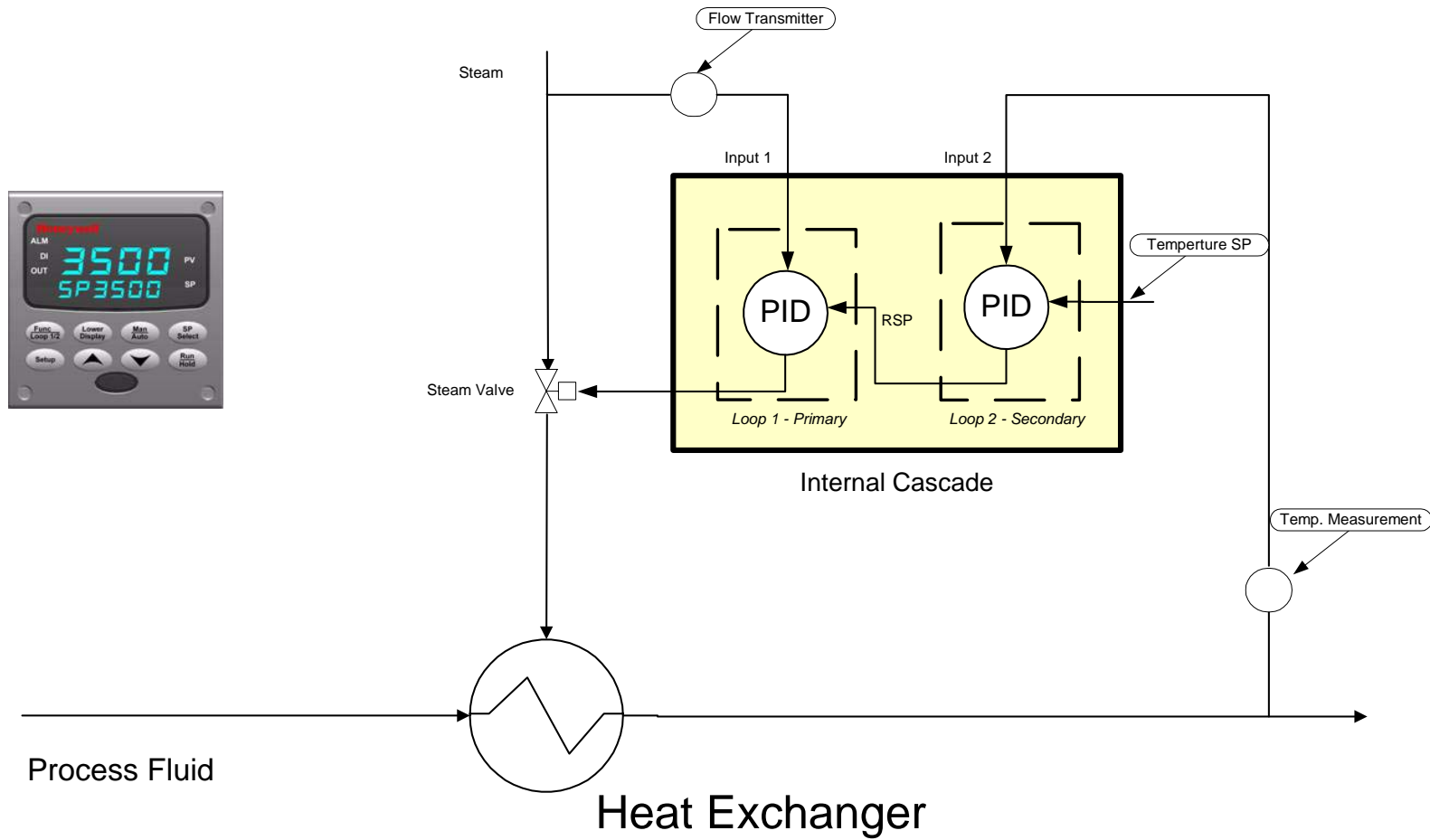
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Attached documents for reference:

- Page 3            Sample Loop
- Page 4            Block diagram of a Cascade loop and it's operation



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