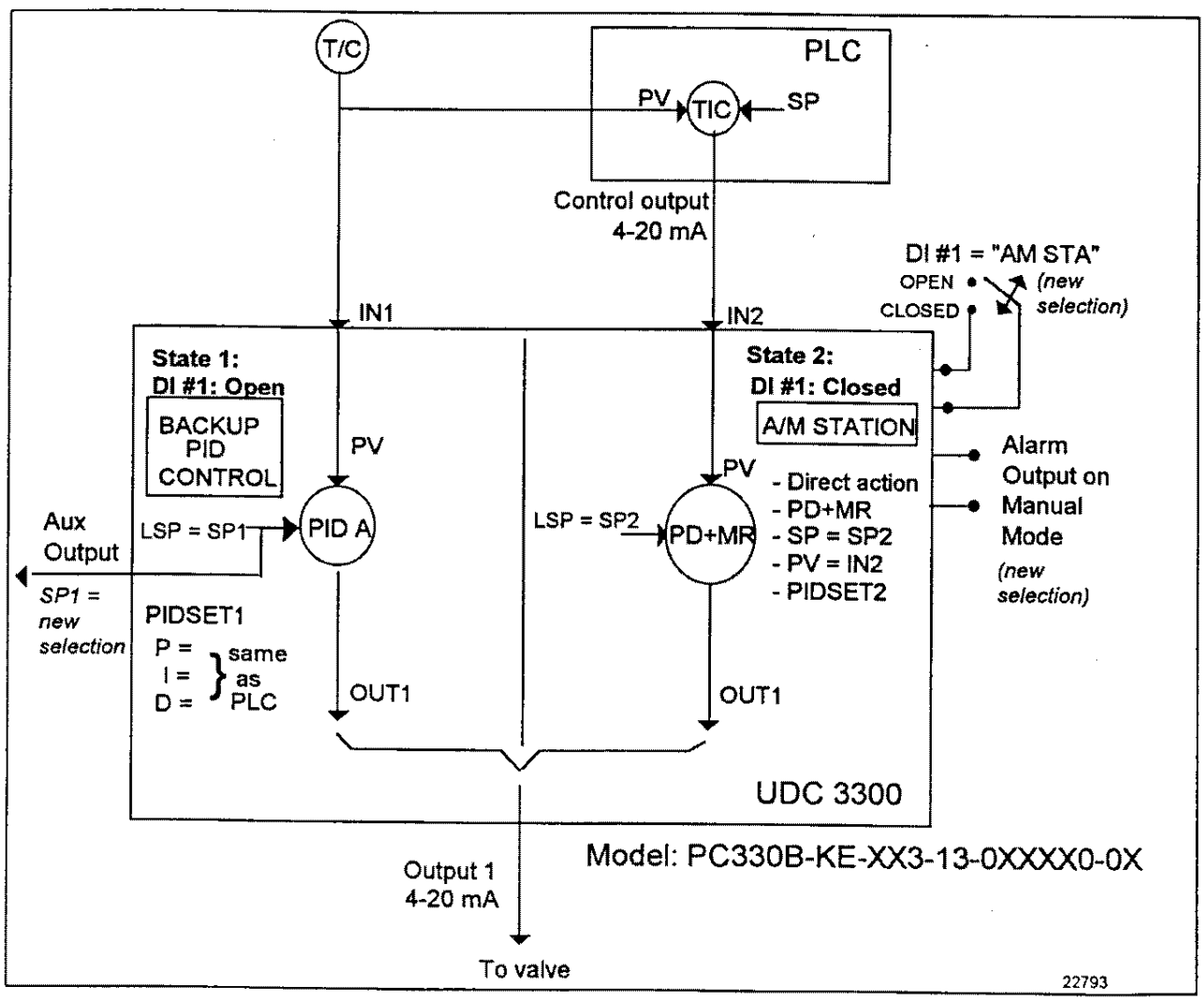
UDC 3300 APPLICATION NOTE
AUTO/ MANUAL STATION and BACKUP CONTROLLER

PROBLEM

There is a trend developing in many industries, such as the Automotive industry to move PID control into the PLC's that are already available on the plant floor. This trend results in the need for a low cost and user friendly auto/ manual station that can also perform as a backup PID controller in the event that the critical main controller fails or is taken out of service for maintenance.

SOLUTION

The enhancements now available on the UDC 3300 enable this functionality to be quickly and simply implemented. A new Digital Input selection enables the UDC 3300 to function as an auto/manual station when the DI is closed and then automatically switch to become a backup PID controller when the DI is opened. The details are illustrated in the figure below and the Description that follows.



DESCRIPTION

As shown is the Figure above, State 2 is the *A/M Staion Mode* where the programmable logic controller (PLC) output is sent through the Auto/ Manual Station. You can switch to Manual and change the output at the controller. (PID SET 2 is being used).

State 1 is the *Backup PID Controller Mode* which is triggered by opening the Digital Input (it uses PID SET 1). When the switch is open the unit becomes a normal controller with "CONALG" of "PID A", using tuning parameters Set 1, LSP1, PV as IN1 and "DIRECT" or "REVERSE" as selected by configuration in the Control Group.

Input 1 is the PV of some upper controller and Input 2 is the upper controller's (ie PLC) output.

If the upper controller fails, the upper device or some watch dog opens the digital input switch and UDC 3300 backup PID A control is active.

When the upper controller reactivates, the digital input switch should be closed, and the Auto/Manual Station becomes a repeater station and allows the upper controller output signal to pass through to the final control element.

CONFIGURATION

There are some things to consider when configuring the controller.

The PV range stays as the IN1 range, even while IN2 is the PV when the switch is closed, therefore:

- The IN2 HI must be less than or equal to the IN1 HI.
  (Suggest: IN2 HI = 100.0)
- The IN2 LO must be greater than or equal to the IN1 LO.
  (Suggest: IN2 LO = 0.0)
- The TUNING GAIN2 must be equal to :
  (IN1 HI – IN1 LO) / (IN2 HI – IN2 LO).
- Set Local Setpoint 2 to 0 % of the Input 2 range

Refer to Table 1 and configure the controller in the order shown.

Table 1: Auto/Manual Station Mode Configuration Procedure

Step	Press *SETUP* to select Setup Group	Press *RUN* to select Function Prompts	Enter Value or Selection	Remarks
1	Control	PID SETS	2 KEYBD	Select other control parameters as needed by the application.
		SP SOURCE	2 LOCAL	
		SP TRACK	NONE	
2	Algorithm	CONT ALG	PD+MR	This allows setting of the Manual Reset value.
3	Tuning	MAN RSET	0	Manual Reset of 50 with the Setpoint of 50% also works , but this is not recommended for A/M Station use.
4	Algorithm	CONT ALG	PID A	Defines Back-up Control Algorithm.
5	Tuning	RSET2MIN	50.00	
		GAIN2	See Note 1	Set the Gain 2 equal to: Input 1 Span/ Input 2 Span If "PB" is selected under "Control" setup group, "PBorGAIN": Set the PROP BD2 to: 100[Input 2 Span/ Input 1 Span]
		RATE2MIN	0.00	Select PIDSET1 tuning parameters as needed by the application.
6	Options	DIG IN1 or DIG IN2	AM STA	

Note: Set Local Setpoint 2 to 0% of the Input 2 range.

CAUTION - DO NOT SELECT:

- In the CONTROL setup list, do not select SP TRACK as PV or RSP.
- In the SP RAMP setup list, do not select SP RATE as ENABLE.
- In the ALGORTHM setup list, do not select CONT ALG as PIDB, ON-OFF, or 3PSTEP.
- In the Display menu when PIDSET# is displayed, DO NOT change the selection.

These features work with the Auto/Manual Station.

- In the SP RAMP setup list, SP PROG (acts on SP1 for backup operation).
- In the SP RAMP setup list, SP RAMP (acts on SP1 for backup operation).
- In the CONTROL setup list, ACTION as DIRECT or REVERSE for the backup PID A operation.

  The PD+MR Action is forced to be DIRECT as required for the pass through of the output signal.