1 Example 10.8 Heat Exchanger Cascade Control

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2 Scale TIC operator setpoint to analog units required by PID

3 SUB REAL: TIC2501_SP IN1, TT2501_LO IN2, Q → TmpR
SUB REAL: TT2501_HI IN1, TT2501_LO IN2, Q → TmpR2
DIV REAL: TmpR IN1, TmpR2 IN2, Q → TmpR
MUL REAL: TmpR IN1, 32000.0 IN2, Q → TmpR
REAL TO INT: TmpR IN, Q → TIC2501_S...

4 TIC2501 Heat exchanger temperature master loop

5 PID ISA TIC2501: FIC2501_S... SP, TT2501 PV, CV → TIC2501_CV
HEX_TEMP → MAN
#ALW_OFF → UP
#ALW_OFF → DN

6 When both loops auto, copy TIC out to FIC SP. When master in manual and slave in auto, copy flow SP to IC manual out.

7 HEX_TEMP: MOVE INT 1: TIC2501_CV IN, Q → FIC2502_SPS

8 FIC102 Flow Loop - must convert setpoint into analog channel units

9 STM_FLOW: MOVE INT 1: FIC2502_SPS IN, Q → TIC2501[13]

10 If not controlling temperature, scale operator SP to 0-3200 for PID.

11 HEX_TEMP
SUB REAL: FIC2502_SP IN1, FT2502_LO IN2, Q → TmpR
SUB REAL: FT2502_HI IN1, FT2502_LO IN2, Q → TmpR2
DIV REAL: TmpR IN1, TmpR2 IN2, Q → TmpR
MUL REAL: TmpR IN1, 32000 IN2, Q → TmpR
REAL TO INT: TmpR IN, Q → FIC2501_SPS

12 FIC2502 Steam flow slave loop

13 PID ISA FIC2502: FIC2502_S... SP, FT2502 PV, CV → FY2502
HEX_TEMP, STM_FLOW → MAN
#ALW_OFF → UP
#ALW_OFF → DN

14 If controlling temperature, scale flow SP back to 0-8 gpm range for operator.

15 HEX_TEMP
INT TO REAL: FIC2502_SPS IN, Q → TmpR
DIV REAL: TmpR IN1, 32000 IN2, Q → TmpR
SUB REAL: FT2502_HI IN1, FT2502_LO IN2, Q → TmpR2
MUL REAL: TmpR IN1, TmpR2 IN2, Q → TmpR
ADD REAL: TmpR IN1, FT2502_LO IN2, Q → FIC2502_SP

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