Option 22 — Manual PID Control

The PID is under manual control if PID operation is in Manual mode (Option 21) and the PID state is ON. Automatic mode starts a PID control action as soon as you specify the automatic setting. Use Display mode to view Option 41, External Input Current, for value information.

Under manual control, you can adjust the PID output or 4-20 mA position signals. The flow rate or velocity is maintained to the PID set point value.

To access the Manual PID Control menu in Program mode:

1. Press **P**.

2. Enter your **Advanced** access password, and then press **E**.

3. Press **2** to invoke the Quick Jump option.

4. Press **22** for the **Manual PID Control** menu, and then press **E**.

    When the flow meter is configured with the PID function, the PID state is **ON**, and PID operation is set to **Manual**, the following prompt appears.

    ```
    _____

    OUT=  0 PERCENT
    ^=OPEN    v=CLOSE
    _____
    ```

5. Press the arrow keys to open (increase) or close (decrease) the output, and then press **H**.

    -   100 percent is the maximum PID limit equivalent to the maximum output current is reached.

    -   0 percent is the minimum PID limit equivalent to the minimum output current is reached.

Manually Tuning A PID Loop

To manually tune a PID loop:

6. Place the unit in manual control mode or open loop control.

7. Increase or decrease the 4-20 mA output from 5 to 10 percent, and note the flow response change.

8. Then the Proportion Gain starting point is: 2 x output change (engineering units/flow response change) (this is a unit less number)

9. Note the system response time change (from 0 to 63 percent).

10. Set the Integral response time to this number.

11. Set the derivative time constant to 1/6 of the integral time.

12. Place the flow meter in a closed loop or automatic operation. Make a small change to the set point and observe the reaction.

13. Some flow meters require different parameters at different operating points. Rather than resetting the parameters multiple times, it is recommended that you optimally tune the flow meter at the normal flow rate and accept the less-than-optimal response at other flow rates. If the variation in loop stability is too large over normal operating flow ranges, then an advanced PID controller with variable gain settings is required to overcome the limitations of the built-in flow controller.