



How to change the PD setting on your Alicat instrument

The PID settings for your Alicat controller dictate how quickly and precisely your controller reaches its setpoint, with P controlling the power applied to the valve and D acting as a damper, so as to not overshoot your setpoint.

Changing your PD settings:

Your instrument should be tuned for your application, but if your application changes, our instruments are designed to adjust without having to send it back for factory reconfiguration.

How to tune your Alicat controller using serial commands and Flow Vision SC:

Ensure that your controller is connected serially. (Note: These instructions assume a Unit ID of A. If your controller's Unit ID is not A, substitute the correct letter of your Unit ID. If your controller is in streaming mode, do not type the leading 'a' in the instructions below.)

Set PID loop type to PD/PDF.

1. Read the value of register 85: type `ar85<CR>`.
2. If the value of register 85 is 0, 16384 or 32768, your controller's PID loop type is already set to PD. Add 2 to this value, and then type `aw85=[new value]<CR>`.
3. If the value of register 85 is 2, 16386 or 32770, your controller's PID loop type is set to PD2I. Subtract 2 from this value, and then type `aw85=[new value]<CR>`.

Set all PID variables (P and D) to 0.

1. Record your controller's existing PID settings.
 - a. Read the current P value: type `ar21<CR>`.
 - b. Read the current D value: type `ar22<CR>`.
2. Set the P variable in register 21 to 0: type `aw21=0<CR>`.
3. Set the D variable in register 22 to 0: type `aw22=0<CR>`.

Determine the best P value.

1. Ensure that your controller is connected to flow with a 0 setpoint: type `a0<CR>`.
2. Command a 100% setpoint (type `a32768<CR>`), and observe the flow readings.
3. If there is no overshoot, add 50 to the P variable in register 21: type `aw21=[old value+50]<CR>`. Start again at step a.
4. If you observe overshoot (even if the flow does not achieve your setpoint), return P to the previous value (type `aw21=[previous value]<CR>`). Continue to the next step.

Determine the best D value.

1. Ensure that your controller is connected to flow with a 0 setpoint: type `a0<CR>`.
2. Command a 100% setpoint (type `a32768<CR>`), and observe the flow readings.
3. If the flow reading does not match your setpoint, add 50 to the D variable in register 23: type `aw23=[old value+50]<CR>`. Start again at step 1.
4. If the flow reading matches your setpoint and readings are stable, continue to the next step.



Verify your new PID settings at other setpoints.

1. Repeat steps 3-5 for any additional setpoints you desire. (Alicat calibration technicians typically perform this procedure at 100%, 50% and 5% of full scale.)
2. At each setpoint, verify that the controller achieves the new setpoint without significant overshoot or oscillation.
3. If you change any of the P or D values, verify the new setting still works well with your setpoint at 100%

How to tune your Alicat controller from the front panel using an oscilloscope:

Set PID loop type to PD²1.

1. Go to MENU > CONTROL > PID > LOOP TYPE.
2. Select PD/PDF CONTROL. Press SET.

Set all PID variables to 0.

1. Go to MENU > CONTROL > PID.
2. Record your controller's existing PID settings.
3. Press P, then CLEAR, then SET.
4. Repeat step c for D.

Determine the best P value.

1. Ensure that your controller is connected to flow with a 0 setpoint.
2. Command a 100% setpoint, and observe the flow readings.
3. If there is no overshoot, add 50 to the P variable. Start again at step a.
4. If you observe overshoot (even if the flow does not achieve your setpoint), return P to the previous value. Continue to the next step.

Determine the best D value.

1. Ensure that your controller is connected to flow with a 0 setpoint.
2. Command a 100% setpoint, and observe the flow readings.
3. If the flow reading does not match your setpoint, add 50 to the D variable. Start again at step a.
4. If the flow reading matches your setpoint and readings are stable, continue to the next step.

Verify your new PID settings at other setpoints.

1. Repeat steps 3-5 for any additional setpoints you desire. (Alicat calibration technicians typically perform this procedure at 100%, 50% and 5% of full scale.)
2. At each setpoint, verify that the controller achieves the new setpoint without significant overshoot or oscillation.
3. If you change the P or D values, verify the new setting still works well with your setpoint at 100%.