



Option 21 — PID Data Setup

Parameter ID (PID) data is used as a flow meter diagnostic tool.

Note: PID is not available with HART.

To access the PID Data Setup 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 **21** for the **PID Data Setup** menu, and then press **E**.

```
PID STATE
>ON          ^v
```

A prompt appears to turn the PID function ON or OFF.

5. Press the arrow keys to change the response to **ON**, and then press **E**.

```
PID OPERATION
>MANUAL     ^v
```

A prompt appears to make the PID mode of operation AUTOMATIC or MANUAL.

- **AUTOMATIC** is used for constant flow control that adjusts based on an external or internal set point.
 - **MANUAL** is used for manual flow control using the PID Manual Control menu to set the PID control to a fixed position.
6. Press the arrow keys to select the mode of operation, and then press **E**.

```
PID CONTROL TO
>FLOW RATE  ^v
```

A prompt appears for the FLOW RATE or VELOCITY control variable.

- **FLOW RATE** is for volumetric and mass flow.
- **VELOCITY** is for flow velocity.

Note: The unit labels in additional prompts will reflect flow rate or velocity.

7. Press the arrow keys to select the control variable, and then press **E**.

```
PID SETPT REF
>INTERNAL   ^v
```



A prompt appears for the INTERNAL or EXTERNAL PID set point reference.

- **INTERNAL** is used when the PID variable is controlled with a set point value stored in the flow meter.
- **EXTERNAL** is used when the PID variable is controlled by an analog input.

Note: If you choose EXTERNAL, the external analog input channel must be assigned to the PID EXT. REF variable in Option 20.

8. Press the arrow keys to select the PID setpoint reference, and then press **E**.

```
PID SETPOINT  
>200.00000 SFPM
```

If you choose INTERNAL, a prompt appears for the set point value. The PID SETPOINT uses the units specified in the PID CONTROL TO variable.

Note: The set point value can also be specified using Modbus command 0x06, register 44.

9. Use the numeric and decimal keys to enter the PID set point value, and then press **E**.

Prompts appear for the PID tuning parameters:

- Proportional gain
- Integral time constant
- Derivative time constant

The integral gain is the proportional gain divided by the integral time constant. The derivative gain is the proportional gain multiplied by the derivative time constant.

Linking the integral time constant with the proportional gain and linking the derivative time constant with the proportional gain makes it easier to manually tune the system.

```
PROP GAIN (KP)  
>0.30000000
```

```
INTEGRAL TC  
>1.00000000 SEC
```

```
DERIVATIVE TC  
>0.33000000 SEC
```

10. Use the numeric and decimal keys to enter the PID tuning parameters, and then press **E**. Press **P** to skip to the prompts without making changes.

Prompt appears for the PID low and high limits.



This low output limit is the lowest flow rate or velocity. This high output limit is the highest flow rate or velocity. Both are based on the CONTROL TO variable set point that the meter will control.

```
PID LOW LIMIT
>0.00000000 SFPM
```

```
PID HIGH LIMIT
>6000.00000 SFPM
```

Output will saturate 10 percent below the specified value. The limit also prevents accumulation.

11. Use the numeric and decimal keys to enter the PID low and high limits, and then press **E**. Press **P** to skip to the prompt without making changes.

Prompts appear for specifying the analog output.

```
AO# FOR PID
>2
```

The AO# prompt allows you to assign PID to analog output 1 or 2.

```
ANALOG OUTPUT 2
>PID ^v
```

In the event the defined analog output is pre-assigned, the second prompt allows you select PID.

```
AO2 at 4mA
>0.00000000 SFPM
```

```
AO2 at 20mA
>500.000000 SFPM
```

The final prompts are for setting the 4-20mA settings.

12. Use the numeric, decimal, and arrow keys to enter the necessary values for each prompt, and then press **E**.