

## The PID Guide

Weather Smart Manufacturing Inc.  
Electric West Inc.  
08/06/2002

### What is a PID?

Our True Level PID is a device that takes the input signals from two external transducers to calculate the true water level above the pump in a CBM well. The pumper can use this information to regulate the water level in the well by changing the “start” and “stop” levels on the PID display.

### What does the acronym PID mean?

It means, “Proportional, Integral and Differential” control. Someone always asks this question!

### How do I use the PID?

There are many different screens on the PID. Most of them are used for changing the PID parameters. During actual use you need to worry about only two screens. The main screen of the PID has two parts. The top red numbers show the water level, and the bottom green numbers display the set point for stopping the pump. The other screen you need to use displays “A1SP” in red on the top, and the bottom green numbers displays the set point for starting the pump. You can toggle between the two screens by pushing the small white button on the LEFT hand side of the PID. To change the set points, use the up and down arrows.

If you arrived at a well and wanted to change the set point, the main screen would already be displayed. To change the “stop” level of the pump you would use the up and down arrows to move the bottom green numbers. Then, to change the “start” level of the pump you would need to push the LEFT hand button ONCE to get to the start level screen. You would then use the up and down arrows to adjust the “start” level of the pump. After you are finished adjusting the “start” level, you would push the LEFT hand button ONCE more to get back to the main screen where the true water level is displayed in red on top, and the “stop” level is displayed in green at the bottom. Once the levels are set, the PID will automatically maintain the water level between these two points, turning the pump on and off accordingly.

### How does it work?

We use two transducers to obtain the true water level in a well. One transducer measures the gas pressure, and the other transducer measures bottom well pressure (water pressure + gas pressure). The two transducers are both rated at 250 PSI. They put out a signal between 4 and 20 milliamps. Four milliamps equals zero PSI. Twenty milliamps equals 250 PSI. Readings from one transducer between these levels can be calculated like this.

$$(\text{mA} - 4) 15.625 = \text{PSI}$$

$$\text{ex. } (12 - 4) 15.625 = 125 \text{ PSI}$$

If there were no gas pressure in the wells, one transducer would suffice. We use two transducers because the gas pressure adds to the water pressure reading that is taken from the bottom well transducer. To get an accurate reading of the water level above the pump our PID subtracts the reading of the top well transducer from the reading of the bottom well transducer. Then, the PID calculates the true water level. The calculation is as follows.

X = top well transducer reading in milliamps

Y = bottom well transducer reading in milliamps

$(y - x) 15.625 = \text{PSI}$                       ex.  $(13 - 6) 15.625 = 109$

$\text{PSI} \times 2.31 = \text{true water level}$               ex.  $109 \times 2.31 = 252 \text{ Feet of water}$

If the example above were an actual well, the PID would display 252 in red numbers on the top. The green numbers at the bottom would display the “stop” level where the pump would turn off.

### **How do you bypass the PID control?**

If the transducers go bad in a well the PID may be bypassed by setting both the “start” and “stop” levels to -900 on the display. The pumps will then be controlled by the Motor Saver 777 device only. Your electrician may also bypass the control relays on the back of the True Level PID by first shorting together terminals 4 to 5, then terminals 8 to 9.

### **Troubleshooting**

The PID is a dependable device. However, it is an electronic device subject to damage from lightning, other electrical problems, or general abuse. If the PID displays something other than normal, it may be damaged and needs to be replaced, it may need to have the program checked, or it might just need to be reset. Some of the problems with PIDs are related to the transducers. Check your power supply, the signal coming from your transducers, and the control connections in the control vent-box on the back of our panel. A bad transducer can cause problems like a “scrolling display”, or negative numbers to be displayed. If you have a problem, try the reset method first. Turn your pump OFF with the on/off switch, then pull the main breaker handle down to turn off power to the panel. Wait for 10 seconds, then move the main breaker handle up again. Watch the PID as it goes through its reset screens. If it doesn't go back to a normal display, give us a call.

### **Electric West Inc.**

Electric West is a Wyoming electrical contractor. Our President, Jim West, has 40 years of oil and gas experience. We take pride in safe, high quality work. We are also a U.L. panel shop. We can custom build your control panels, set them in the field, and provide a turn key electrical installation if you wish. We strive to be flexible, and work quickly to respond to your needs. If you have any questions, feel free to contact us.

**Jim West, President**

**(307) 689-6465**

Lorn MacIlravie, Electrician

(307) 689-2424

Roy Underwood, Field Foreman

(307) 680-6468, (307) 680-0418

Nate Larson, Shop Foreman

(307) 689-6473

Jason Scallen, Electrician

(307) 689-6472

Shop

(307) 686-6466

## Transducer Connections

07/25/02

