

USER GUIDE

PCS HIGH-LOW™ CONTROLLER

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BASIC OPERATIONS

Controller's Faceplate

Figure 1 shows the controller's faceplate with the power on/off switch, status display, and keypad.

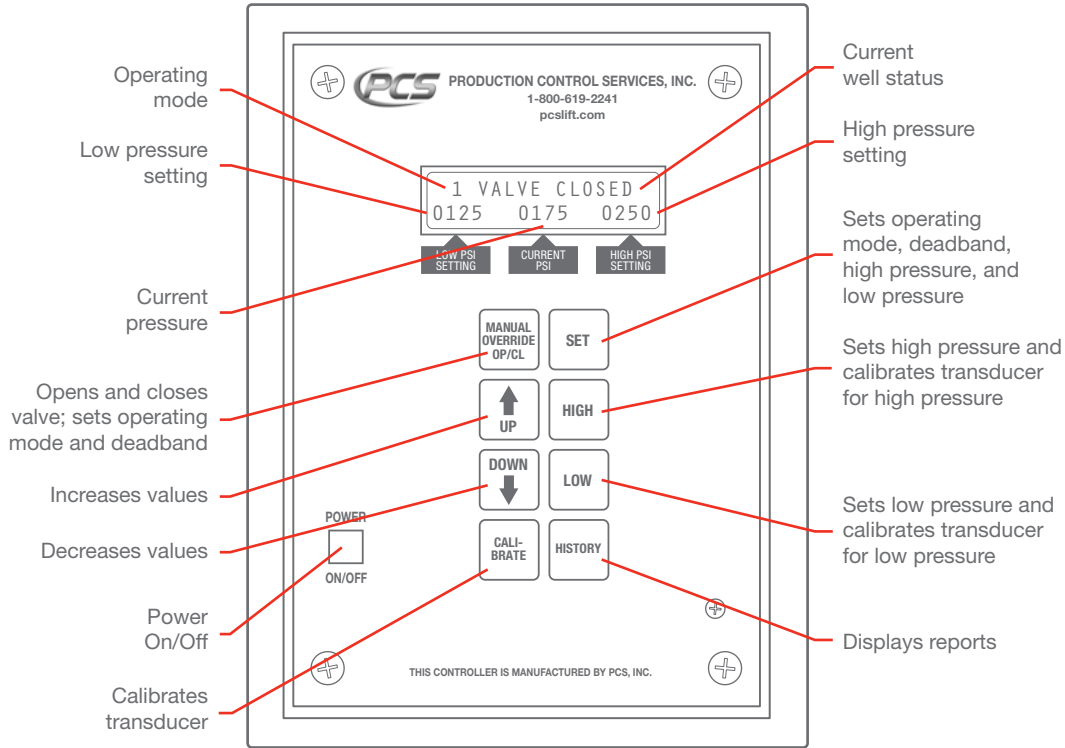


Figure 1 – Controller's Faceplate

Turning the Controller On and Off

To turn the PCS High-Low Controller on or off, insert a screw driver into the slot marked POWER ON/OFF. See Figure 1.

Move the toggle switch to the left to turn the controller on. Move the toggle switch to the right to turn the controller off.

Status Display

After you turn the PCS High-Low Controller on, the status display remains on. The controller never sleeps.

The first line of the status display shows the operating mode (for example, mode 1) and the current well status.

Example:
1 VALVE CLOSED

The second line of the status display shows the low pressure setting, the current pressure, and the high pressure setting.

Example:
0125 0175 0250

OPERATING MODES

The PCS High-Low Controller supports 3 operating modes:

- Mode 1: Maintaining pressure within safe limits
- Mode 2: Using pressure operation to intermit a well
- Mode 3: Operating a circulating valve on a compressor

This section describes all 3 operating modes.

Mode 1: Maintaining Pressure within Safe Limits

In operating mode 1, the controller:

- Closes the valve when the current pressure reaches the high pressure setting. The controller does not open the valve until the pressure drops below the high pressure setting.
- Closes the valve when the current pressure reaches the low pressure setting. The controller does not open the valve until the pressure rises above the low pressure setting.

Important! To keep the controller from closing and opening the valve repeatedly when the pressure fluctuates around the high or low pressure setting, use a deadband. See “Deadband” on page 4.

Mode 2: Using Pressure Operation to Intermit a Well

In operating mode 2, the controller:

- Opens the valve when the current pressure reaches the high pressure setting
- Closes the valve when the current pressure reaches the low pressure setting

Mode 3: Operating a Circulating Valve on a Compressor

In operating mode 3, the controller:

- Opens the circulating valve on the compressor when the current pressure reaches the low pressure setting
- Closes the valve when the current pressure reaches the high pressure setting

Creating an Operating Program

Select the Operating Mode

=  **SET SET MANUAL OVERRIDE**

- 1 To select the operating mode, press SET SET MANUAL OVERRIDE.

The status display shows the current operating mode.

For example: CURRENT MODE: 1

- 2 Press UP to select the operating mode.

Note: Pressing DOWN displays the current well status without changing the operating mode.

- 3 Press SET to change the operating mode.

Calibrate the Transducer

See “Transducer Calibration” on page 4.

High Pressure Setting = **SET HIGH**

Depending on the operating mode, the controller opens or closes the valve when the pressure reaches the high pressure setting.

- 1 Press SET HIGH.
- 2 Press UP or DOWN to change the high pressure value.

Press and quickly release the UP or DOWN button to move 1 psi. Press either button without releasing it to make a big change in the pressure value.

Low Pressure Setting = **SET LOW**

Depending on the operating mode, the controller opens or closes the valve when the pressure reaches the low pressure setting.

- 1 Press SET LOW.
- 2 Press UP or DOWN to change the low pressure value.

Press and quickly release the UP or DOWN button to move 1 psi. Press either button without releasing it to make a big change in the pressure value.

Deadband =  SET MANUAL OVERRIDE

Deadband is a difference in pressure that the controller uses to prevent the valve from closing and opening repeatedly when the pressure fluctuates around the high or low pressure setting.

Example for operating mode 1:

The high pressure setting is 250 psi, the low pressure setting is 125 psi, and the deadband is 5 psi. The controller closes the valve when the pressure reaches:

- A high of 255 psi. The controller waits until the pressure reaches 245 psi to open the valve.
- A low of 120 psi. The controller waits until the pressure reaches 130 psi to open the valve.

Example for operating mode 2:

The high pressure setting is 250 psi, the low pressure setting is 125 psi, and the deadband is 5 psi.

- The controller opens the valve when the pressure reaches 255 psi.
- The controller closes the valve when the pressure reaches 120 psi.

Example for operating mode 3:

The high pressure setting is 250 psi, the low pressure setting is 125 psi, and the deadband is 5 psi.

- The controller closes the valve when the pressure reaches 255 psi.
- The controller opens the valve when the pressure reaches 120 psi.

To set the deadband:

- 1 Press SET MANUAL OVERRIDE.

The status display shows:

```
DEADBAND  0005
```

- 2 Press UP or DOWN to change the deadband value.

Press and quickly release the UP or DOWN button to move 1 psi. Press either button without releasing it to make a big change in the pressure value.

TRANSDUCER CALIBRATION

The controller uses a transducer to monitor pressure.

Calibrate Transducer for Low**Pressure =  CALIBRATE LOW**

- 1 With the transducer in place, remove pressure.
- 2 Press CALIBRATE LOW.

The status display shows:

```
TRANSDUCER ZERO?
UP=YES   DOWN=NO
```

- 3 Press UP.

Calibrate Transducer for High**Pressure =  CALIBRATE HIGH**

- 1 Apply pressure to the transducer.
- 2 Press CALIBRATE HIGH.

The status display shows:

```
0000
TRANS PRESSURE
```

- 3 After applying pressure, measure with an accurate pressure gauge to obtain the pressure value for the next step.
- 4 Press UP or DOWN to enter the pressure value.

Press and quickly release the UP or DOWN button to move 1 psi. Press either button without releasing it to increase or decrease the pressure value quickly.

For example: if the current pressure is 200 psi, press UP and DOWN to enter 0200.

- 5 Press SET.

OPERATING THE VALVE MANUALLY

Open the Valve = **MANUAL OVERRIDE**

If the valve is closed, press MANUAL OVERRIDE to open the valve.

If the current pressure is out of range, the controller closes the valve after 5 seconds.

Whether the pressure is out of range depends on the operating mode:

- In mode 1, the controller closes the valve if the pressure is too high or too low.
- In mode 2, the controller closes the valve if the pressure is too low.
- In mode 3, the controller closes the valve if the pressure is too high.

For more information, see “Operating Modes” on page 3.

Close the Valve = **MANUAL OVERRIDE**

If the valve is open, press MANUAL OVERRIDE to close the valve.

The display status shows: MANUAL SHUT-IN

To open the valve, you must press MANUAL OVERRIDE again. When you close the valve by pressing MANUAL OVERRIDE, the valve does not open when the pressure is within range.

CONTROLLER REPORTS

The PCS High-Low Controller displays 4 reports:

- Valve Open History
- Valve Total Open Time Report
- Valve Total Close Time Report
- Main Battery Status Report

This section describes all 4 reports.

Display Reports = **HISTORY**

- 1 To display the PCS High-Low Controller’s reports, press HISTORY.

The status display shows the first report: Valve Open History.

- 2 To display each of the next 3 reports, press HISTORY again.
- 3 After you have displayed the last report, press HISTORY to display the current well status.

Valve Open History

This report shows how many times the valve opened since the report was last cleared.

Example: VALVE = 0106

In this example, the valve opened 106 times.

Valve Total Open Time Report

This report shows the total valve open time – up to 999 hrs., 59 min., 59 sec. – accumulated since the report was last cleared.

Example: TOT OPN016:31:13

In this example, the total valve open time is 16 hrs., 31 min., 13 sec.

Valve Total Close Time Report

This report shows the total valve close time – up to 999 hrs., 59 min., 59 sec. – accumulated since the report was last cleared.

Example: TOT CLS024:18:30

In this example, the total valve close time is 24 hrs., 18 min., 30 sec.

Main Battery Status Report

This report shows the current voltage of the main battery.

Example: MAIN BAT: 6.22 VDC

Note: If the main battery drops below 5.8 volts, the controller shuts in the well. The status display shows MAIN BAT SHUT-IN.

Clear Report Values = **SET HISTORY**

- 1 To clear the Valve Open History, Valve Total Open Time Report, and Valve Total Close Time Report, press SET HISTORY.

The display status shows:

PRESS SET TO
CLEAR HISTORY

- 2 Press SET.

Note: To return to the current well status without clearing report values, press HISTORY.

TROUBLESHOOTING

If you have a problem with the controller, try these troubleshooting tips. If they don't solve the problem, call your PCS sales and service representative.

Controller Display Problems

Controller won't turn on or controller's display is blank

The controller never sleeps. The display should never be blank while the controller is on.

- 1 With a screwdriver, move the power switch to off (see page 2).
- 2 Wait a few seconds and then move the power switch back to on.

If the display remains blank, go to Test 1.

Test 1: Check fuse.

- 1 With a screwdriver, move the power switch to off.
- 2 Remove the controller's faceplate.
- 3 Remove the fuse from its yellow casing.
 - If the fuse is defective, replace it with a 5 amp, 250 volt fuse. The controller's box contains 1 extra fuse. When you are done, replace the controller's faceplate and move the power switch to on.
 - If the fuse is OK, go to Test 2.

Test 2: Check battery and wire connections.

The main battery's life is approximately 1 to 3 years. The controller has a safety feature. If the main battery is below 5.8 volts, the controller closes the motor valve and shuts in.

- 1 Check the main battery's voltage with a volt meter. Replace the main battery if it is below 6.0 volts.
- 2 Check the main battery wires for loose connections.
- 3 Replace the controller's faceplate.
- 4 With a screwdriver, move the power switch to on.
 - If the display is still blank, call your PCS sales and service representative.
- 5 If the controller's display is now working and if you replaced the main battery, check the manufacture date on the battery. If the battery is less than 3 years old, check the solar panel. Go to Test 3.

Test 3: Check solar panel.

- 1 Disconnect the solar panel from the terminals. Use a volt meter to obtain the voltage and amperage. A good solar panel reading in full sun exposure is 10.7 volts and 350-430 mA.
- 2 If the solar panel is defective, change it.
- 3 Check the solar panel installation.
 - The solar panel should face south.
 - The tilt of the solar panel should be the latitude of the location plus 15 degrees. Example: if the latitude is 45 degrees, tilt the solar panel 60 degrees with respect to the horizon.

- The element should be free from dirt, oil, and so on.
 - Check for cracks in the solar panel.
 - Check whether the solar panel is shaded during any part of the day. If it is, re-position it to receive the most sunlight each day.
- 4 Check the solar panel wire connection.
 - 5 Make sure the power switch is on. The controller's display should be on.
 - 6 If the solar panel tests good, but the main battery is not lasting as long as it should, call your PCS sales and service representative.

Controller's display is scrambled

Static electricity may have made the controller lose its place in the program cycle.

- 1 With a screwdriver, move the power switch to off (see page 2). Wait a few seconds and then move the power switch back to on.
- 2 If the display is still scrambled after this test, call your PCS sales and service representative.

Program Cycle Problems

Controller won't run program cycle or won't open motor valve

Important! If the well is closed by pressing MANUAL OVERRIDE, the controller will not open the well until MANUAL OVERRIDE is pressed again.

Test 1: Check battery and wire connections.

The main battery's life is approximately 1 to 3 years. The controller has a safety feature. If the main battery is below 5.8 volts, the controller closes the motor valve and shuts in. The status display shows MAIN BAT SHUT-IN.

- 1 If the display shows MAIN BAT SHUT-IN, the main battery's voltage is below 5.8 volts. Press HISTORY until the display status shows the Main Battery Status Report. Replace the main battery if it is below 6.0 volts.

Note: A voltage of 0 may indicate a faulty wire connection.
- 2 With a screwdriver, move the power switch to off (see page 2).
- 3 Remove the controller's faceplate.
- 4 Check the main battery wires for loose connections.
- 5 Make sure the fuse is good.
- 6 Replace the controller's faceplate.
- 7 With a screwdriver, move the power switch to on.
- 8 Press MANUAL OVERRIDE a few times to make sure the solenoid is shifting.
 - If the controller is now operating properly and if you replaced the main battery, check the manufacture date on the battery. If the battery is less than 3 years old, check the solar panel. Go to Test 2.
 - If the controller still won't run the program cycle or open the motor valve, go to Test 3.

Test 2: Check solar panel.

- 1 Disconnect the solar panel from the terminals. Use a volt meter to obtain the voltage and amperage. A good solar panel reading in full sun exposure is 10.7 volts and 350-430 mA.
- 2 If the solar panel is defective, change it.
- 3 Check the solar panel installation.
 - The solar panel should face south.
 - The tilt of the solar panel should be the latitude of the location plus 15 degrees. Example: if the latitude is 45 degrees, tilt the solar panel 60 degrees with respect to the horizon.
 - The element should be free from dirt, oil, and so on.
 - Check for cracks in the solar panel.
 - Check whether the solar panel is shaded during any part of the day. If it is, re-position it to receive the most sunlight each day.
- 4 Check the solar panel wire connection.
- 5 Make sure the power switch is on. The controller's display should be on.
- 6 If the solar panel tests good, but the main battery is not lasting as long as it should, call your PCS sales and service representative.

Test 3: Check solenoid (shift valve).

- 1 Press MANUAL OVERRIDE.
- 2 If the solenoid won't open, clean the supply hoses and puck inside the solenoid valve.
- 3 Retest.
- 4 If they are good, replace the puck or the entire solenoid.

Test 4: Check gas supply pressure, filter, and regulator(s).

- 1 Check the gas supply pressure to the motor valve. The recommended supply pressure is 25-35 psi. If the pressure is too low or too high, it will not open the motor valve.
- 2 Check the filter and regulator(s) for debris and ice.
- 3 If the controller is still not working properly, call your PCS sales and service representative.

Solenoid (Shift Valve) Problems**Solenoid (shift valve) does not operate at any time or does not operate at night**

If the solenoid does not operate at night, the solar panel may be powering the controller during the day.

Test 1: Check battery and wire connections.

The main battery's life is approximately 1 to 3 years. The controller has a safety feature. If the main battery is below 5.8 volts, the controller closes the motor valve and shuts in. The status display shows MAIN BAT SHUT-IN.

- 1 If the display shows MAIN BAT SHUT-IN, the main battery's voltage is below 5.8 volts. Press HISTORY until the display status shows the Main Battery Status Report. Replace the main battery if it is below 6.0 volts.

Note: A voltage of 0 may indicate a faulty wire connection.

- 2 With a screwdriver, move the power switch to off (see page 2).
- 3 Remove the controller's faceplate.
- 4 Check the main battery wires for loose connections.
- 5 Make sure the fuse is good.
- 6 Replace the controller's faceplate.
- 7 With a screwdriver, move the power switch to on.
- 8 Press MANUAL OVERRIDE a few times to make sure the solenoid is shifting.
 - If the solenoid is now operating properly and if you replaced the main battery, check the manufacture date on the battery. If the battery is less than 3 years old, check the solar panel. Go to Test 2.
 - If the solenoid still does not operate, go to Test 3.

Test 2: Check solar panel.

- 1 Disconnect the solar panel from the terminals. Use a volt meter to obtain the voltage and amperage. A good solar panel reading in full sun exposure is 10.7 volts and 350-430 mA.
- 2 If the solar panel is defective, change it.
- 3 Check the solar panel installation.
 - The solar panel should face south.
 - The tilt of the solar panel should be the latitude of the location plus 15 degrees. Example: if the latitude is 45 degrees, tilt the solar panel 60 degrees with respect to the horizon.
 - The element should be free from dirt, oil, and so on.
 - Check for cracks in the solar panel.
 - Check whether the solar panel is shaded during any part of the day. If it is, re-position it to receive the most sunlight each day.
- 4 Check the solar panel wire connection.
- 5 Make sure the power switch is on. The controller's display should be on.
- 6 If the solar panel tests good, but the main battery is not lasting as long as it should, call your PCS sales and service representative.

Test 3: Check solenoid (shift valve).

- 1 Press MANUAL OVERRIDE.
- 2 If the solenoid won't open, clean the supply hoses and puck inside the solenoid valve.
- 3 Retest.
- 4 If they are good, replace the puck or the entire solenoid.

PREVENTIVE MAINTENANCE**Main Battery**

Always replace the controller's main battery when it is 3 years old.

You can get more information
about the PCS products at: pcslift.com



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Warranty: Production Control Services, Inc. warrants all PCS manufactured equipment to be free of defects in material and workmanship for ONE YEAR from date of purchase by original buyer only. Warranty is completely void if abuse, neglect, misuse or misapplication is the cause of the malfunction. Determination of abuse or damage to be made solely by PCS.

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