



Plungerlift



# PetroCasing

## Wellhead Controller



# Operating Manual

## for Two-Valve Model

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## Getting Started

1. **BECOME FAMILIAR** – Prior to installing the controller on the well, it is suggested the user experiment with selecting settings to become familiar with using the Petro-Casing controller two-valve model.
2. **VERIFY** – Make sure all PSI lines are properly connected.
3. **POWER UP** – Open cabinet door and flip the switch on the reverse side of the faceplate to the UP position. Display briefly shows the serial number and release version of the Petro- Casing unit, then displays [Current Status]. Initial status: Manual mode, valve(s) closed, all limits set to 0 (zero).
4. **SET LIMITS** – At minimum, the user must at least set HiFlo A Open time.

### *Notes:*

- The [Run] button starts the Automatic Cycle. If the plunger is in the lubricator, it opens the HiFlo A valve to start HiFlo time. If the plunger is not in the lubricator, it keeps the HiFlo A valve closed and waits for plunger arrival.
- The [Stop] button closes valves and puts the controller in Manual Mode.
- The central knob is used in two ways: Push to select an option, to move to a menu, or to execute a command. Turn to scroll options or to navigate through menus.
- The first option on every menu is [Back]. Selecting this moves to the previous menu. The last option on every menu is [Current Status]. Selecting this moves to the Current Status screen.
- The user is prompted to save or discard changes upon exiting a menu (via [Back] or [Current Status]). Changes to pressure settings do not take effect until they are saved. Changes to time settings are stored when they are saved, but do not take effect until the start of the next cycle.
- Shutting the cabinet door makes the display screen go to “sleep mode” to conserve battery usage. Shutting the

cabinet door without saving changes to settings voids any changes that were entered. You must save settings to activate them.

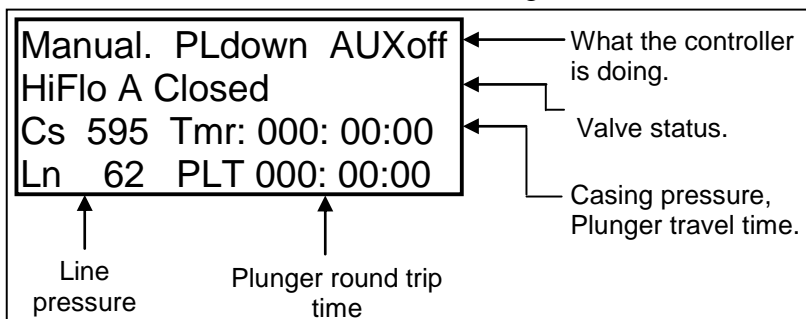
- The top line of the [Current Status] screen provides descriptive details of the present state, such as “Waiting for Plunger”.

## Operating Features

**MAIN MENU** – Press the central knob to access the [Main Menu].

**Battery Indicator** – visually shows the current battery voltage. Fully charged is 3 bars. As the battery is used, voltage goes down to two bars, one bar, and then empty. When the battery indicator is blinking empty, the well will automatically shut in and the top line will display [Manual. LOW BATTERY]. Settings are stored in memory so if the battery fails, settings will not be lost. Batteries are rechargeable. Note that the controller automatically goes to Manual Mode in the event of a low battery.

**Current Status** – real-time status at a glance:



Mode = If controller is in Manual Mode, screen will display [Manual. PLdown AUXoff]. If controller is in Automatic Mode, screen will display the current state of the controller.

PL up/down = If the plunger is down hole, screen will display [PLdown]. If the plunger has arrived, screen will display [PLup]. Note that this display only appears in Manual Mode.

AUX on/off = If an auxiliary switch is activated, screen displays [AUXon]. If an auxiliary switch is not activated, screen displays [AUXoff]. Note that this display only appears in Manual Mode.

HiFlo A = High flow sales valve status (open or closed) and running time until the next event.

PLT = plunger time, or the round trip time it takes for the plunger to fall and travel to the surface once again.

Resets to zero on cycle start.

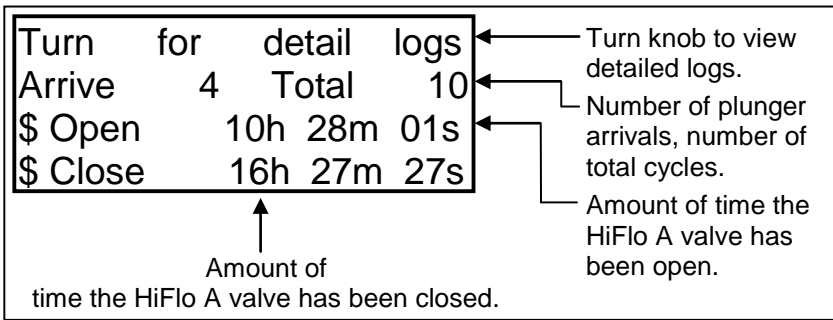
Cs = Real time casing pressure, in psi (appears only when optional pressure transducer installed.)

Ln = Real time line pressure, in psi (appears only when optional pressure transducer installed.)

### **Plunger History** – displays logs of plunger activity:

*View Log Summary* = Displays number of plunger arrivals, number of total cycles, HiFlo A valve open time, and HiFlo A valve close time. Turn knob to view detailed logs. Press knob to return to [Plunger History] menu.

*Erase Summary* = Erases the log summary. When this option is selected, the user will be prompted to confirm the erasure of the summary.



Turn for detail logs = Turn knob to view detailed cycle logs.

Arrive = Displays number of times plunger arrived.

Total = Displays total number of cycles.

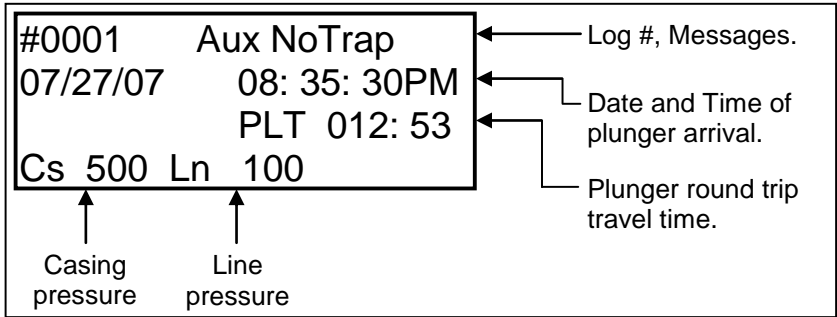
\$ Open = Displays time HiFlo A valve has been open.

\$ Close = Displays time HiFlo A valve has been closed.

*View All Logs* = Shows all stored plunger history.

Turn knob to navigate through logs. Press knob to return to [Plunger History] menu.

*View Missed Logs* = Displays only the times when the plunger missed (searches back at least 100 plunger logs). Turn knob to navigate through logs. Press knob to return to [Plunger History] menu.



Log # = identifier, with most recent log numbered 0001.

Aux NoTrap = Messages about this plunger run:  
 Aux – Aux input was triggered.  
 NoTrap – plunger unexpectedly left lubricator. Trap failed.  
 HiL – High Line pressure detected.  
 <blank> – no special messages

Date/Time = When the log was created.

PLT = plunger round trip travel time (or “missed” is indicated).

Cs, Ln = Pressures at the time the plunger arrived or missed. (appears only if optional pressure transducers are installed.)

**Set Pressures – This menu only appears if optional pressure transducer(s) are installed.** If you exit this menu via [Back] or [Current Status], you will be prompted to save or discard changes. Settings established here only take effect once they have been saved.

*Lo Casing* = When the casing pressure drops below the level set here, the plunger will be dropped and the HiFlo A valve closed.

When the plunger is not in the lubricator, this setting has no effect.

*Hi Line* = If line pressure is greater than this setting, the HiFlo A valve shuts in. The well re-opens when line pressure drops below this setting.

*Hi Line Window* = An advanced control option, the [Hi Line Window] is a band limit for the [Hi Line], to accommodate fluctuations right at the [Hi Line] setting. It prevents the valve from repeatedly opening and closing. For example, if [Hi Line] = 150 and [Hi Line Window] = 10, the valve shuts when the line pressure reaches 150, but doesn't re-open until the pressure drops to 140.

**Set Times** – If you exit this menu via [Back] or [Current Status], you will be prompted to save or discard changes. Saved settings only take effect at the next cycle start.

*HiFlo A Open* = The amount of time to leave “HiFlo A” valve open and hold the plunger in the lubricator.

*Hold Time* = The amount of time to delay dropping the plunger after the HiFlo A Open time. The HiFlo A valve remains closed.

*Trap Open Time* = Amount of time trap stays open to drop the plunger. This time can be set longer if you expect freezing in the lubricator.

*MaxPlgrRuns* = After this number of plunger runs, it holds the plunger for manual inspection. The HiFlo A valve remains closed. It will not release the plunger until operator presses Start. Screen says “Plunger on Hold”.

**HiFlo A** (open/closed) – Available in Manual Mode only, can be used to open and close valve. Will only allow opening if plunger is detected in lubricator and Trap is closed (safety feature). Timing of how long the valve is open is tracked on the Current Status screen (PLT Time).

**Trap** (open/closed) – Available in Manual Mode only. If HiFlo A valve is open, Trap cannot be opened (safety feature).

## Options

*Aux* = Optional input that opens or closes valves based on data from an external switch. For example, an auxiliary switch may be placed in the tank (tank topper) that prevents overflow by shutting in the valve when the liquid reaches the top of the tank.

Label: User can determine label; that label appears on [Current Status] screen  
HiFlo A Valve: Indicate here what the valve does (On/Off) when the auxiliary switch activates.

In the above example, the tank topper is the auxiliary switch, and the label would be “tank topper”. Because the user wants the HiFlo A valve to close when the tank is full, both valves would be set to [Off] using this menu. When the tank fills, the liquid activates the switch, which signals the valve to close. The program pauses where it was, and the valve closes, waiting for the tank to be emptied. When the tank is

emptied, the topper switch re-sets, and the program resumes where it had paused. (If the valve had been open prior to the program pause, it re-opens now.)  
The Trap remains unchanged.

*Set Date/Time* = Specify the date and local time.  
This is used for time stamping logs (ex. [Plunger History] logs).

*Version/Serial #* = Select this option to view the controller version and serial number.  
View-only, this option cannot be changed by the user.

*Well ID* = Change the name of the well. The default [Well ID] is the controller serial number.  
USB Log is named using [Well ID]. The [Well ID] has a maximum of 8 characters.

**USB Drive** – When the USB drive is used to download or upload information, the screen displays the “percent done” to indicate data is being copied.

*Download recent log* = Download logs of recent activity (since the last download), from the controller to the USB drive.

*Upload Settings* = Upload new settings from the USB drive to the controller.

*Download total log* = Download all logged information, from the controller to the USB drive.

*Multi Technician* = Security function for Multi personnel use only.

**EXTREME CAUTION!** Never open the HiFlow A valve while the plunger is down hole. Limiting gas flow **limits plunger speed** to safe levels. If there is little or no fluid on top of the plunger and there is sufficient pressure and volume, the plunger can burst through the steel lubricator and high into the air, causing serious injury or death.

**EXCESSIVE PLUNGER SPEED IS DANGEROUS!**

## Safety Constraints

Multi Products Company, Inc. and its affiliates are not responsible for injury or death caused by careless or reckless operation of the controller.

Please observe these additional safety precautions:

- Even with the features of this controller, gas is present around the well and is highly flammable. **Never smoke near the well.** Basic well safety must be followed.
- Do not turn the power on/off or change the battery in an explosive atmosphere. Doing so creates a spark hazard that could ignite the gas present in the air.
- Prior to disconnecting the battery for removal, make sure the power switch is OFF.
- Use care when running a bypass valve (where there is no choke) to ensure sufficient fluid above the plunger to slow the plunger to within safe speeds.

## Maintenance Checklist

Repeated plunger misses can indicate a worn plunger. Periodically check plunger diameter. The frequency of this check is based on plunger usage, well cycles, and well conditions. Contact your sales representative for guidelines for your plunger model.

The following checks should be conducted **weekly**:

- Verify the solar panel is clear of obstructions and facing the sun.
- Pull the solar panel plug and verify that the battery is sufficiently charged and holding charge.
- Visually and audibly verify the mechanical solenoid valve is working and free of debris.

## **Troubleshooting/FAQ's**

*Q: My transducer pressure is inaccurate...can I recalibrate?*

A: No calibration is required. If pressure readings are inaccurate, the transducer needs to be replaced. Contact your sales representative.

*Q: My battery indicator is blinking low...what do I do?*

A: If the battery gets low at night, unplug the solar panel to verify the battery is holding charge. If not, replace the battery. If the battery indicator is blinking with the solar panel in place, verify the solar panel connections. If the solar panel is functioning and connections are established, the battery needs to be replaced.

*Q: My Current Status screen shows PLUNGER ERROR... what does this mean?*

A: The plunger arrival sensor is stuck. Check the inside of the lubricator for metal shavings, and clear them if necessary. If there are no shavings blocking the sensor, the sensor needs to be replaced. (The plunger arrival sensor is magnetically activated by the plunger because it is metal. If metal shavings are in the way, the sensor does not sense the metal of the plunger and it remains on, as if detecting the plunger constantly.) Note that the controller will automatically go to Manual Mode in the event of a plunger error.

*Q: My Current Status screen indicates "Manual Mode – Sensor Error"...now what?*

A: An error message indicates a disconnected or malfunctioning pressure transducer. There are two transducers: Line and Casing. When the top line of the screen indicates "Sensor Error", the bottom line will show pressures for one of those and "ERR" on the problem transducer. Check the wire at the connection of the appropriate transducer to verify a good connection. If the wires have proper contact, the transducer needs to be replaced. Contact your sales representative. Note that the controller will automatically go to Manual Mode in the event of a sensor error.

## Rules Of Thumb

- Lowest bottom hole flowing pressure is desirable.
- Ideal plunger speed is between 750 and 800 feet per minute.
- Fluid column height (ft.) = Diff / 0.07794
- Fall through dry pipe = 1000 feet per minute
- Fall through gaseous liquid = 250 feet per minute
- Plunger fall time is roughly 5 minutes per 1000 feet
- Ideal plunger arrival time (min.) = Depth / 750

# Multi Products Company – Diverse Line of Products

Contact Multi Products for all your Wellhead Efficiency needs:

## Automation

- Pressure Controllers
- Time Controllers
- Flow Measurement Systems
- Accessories, including Sensors, Solar Panels, and Alarms



Casing Plunger System

## Wellhead Equipment

- Plungers
- Lubricators
- Motor Valves
- Flow Chokes
- Bottom Hole Springs
- Accessories, including Broaches, Retrieval Tools, and Drip Pots



## Vapor Recovery System



## Pumpjack Control



## Field Services



[www.plungerlift.com](http://www.plungerlift.com)  
1-800-777-8617

## **Limited Warranty**

Multi Products Company products are warranted to be free from defects in material and workmanship for a period of ONE (1) YEAR. Parts will be replaced free of charge for the full warranty period, and labor to replace defective parts will be provided at no charge for One Hundred Eighty (180) days from the date of receipt of registration information. Thereafter, purchaser must pay for the labor involved in repairing the product or replacing the parts at the prevailing rate, together with any transportation charges to or from the place where warranty service is provided. This warranty is extended by Multi Products Company, 7188 State Route 39 East, Millersburg, Ohio 44654, to the original purchaser only.

**THIS WARRANTY IS GIVEN IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, WHICH ARE SPECIFICALLY EXCLUDED, INCLUDING WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MULTI PRODUCTS COMPANY BE LIABLE FOR INCIDENTAL OR CONSEQUENTIAL DAMAGES TO THE FULL EXTENT SUCH MAY BE DISCLAIMED BY LAW.**

In the event of a defect, malfunction, or failure to conform to specifications established by seller, or if appropriate, to specifications accepted by seller in writing during the period shown, Multi Products Company, at its option, will either repair or replace the product or refund the purchase price thereof, and such action on the part of Multi Products Company shall be the full extent of Multi Products Company's liability hereunder.

This warranty is void if:

- a) The product is used in other than its normal and customary manner, including corrosive environments.
- b) The product has been subject to misuse, accident, neglect or damage.
- c) Unauthorized alterations or repairs have been made, or unapproved parts used in the equipment.
- d) The registration information has not been submitted to Multi Products Company (electronically via website, or via completion and mailing of perforated registration card to the address above) within 30 days of purchase.

In order to obtain performance of this warranty, purchaser must contact its Multi Products Company sales representative or Multi Products Company at the address above.



**Registration**

Please register your Multi Products unit! Registration is easy... go to [www.plungerlift.com](http://www.plungerlift.com) and select “Register a Multi Products unit” or complete this perforated card and send it to Multi Products Company. Warranty is void unless the unit is registered with Multi Products Company within thirty (30) days of purchase.

Thank you for choosing Multi Products. Please contact your service representative for all of your Wellhead Solutions.

Multi Products Company, Inc.  
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Phone: 800-777-8617 • Fax: 330-674-2125  
[www.plungerlift.com](http://www.plungerlift.com)



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**Multi Products Company, Inc.**

**PETRO-TECH  
WARRANTY REGISTRATION CARD**

**Serial #:** \_\_\_\_\_ **Lease Name:** \_\_\_\_\_

**Company Name:** \_\_\_\_\_ **Well #:** \_\_\_\_\_

**Date Installed:** \_\_\_\_\_ **Field/County:** \_\_\_\_\_

**Permit #:** \_\_\_\_\_

## Why choose Multi Products?

- 40 years of plungerlift leadership
- ISO 9001-2000 Certified
- Reliable products that are simple to use
- Superior customer service
- Full range of Wellhead Efficiency Products

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