



Plungerlift



PetroCasing

Wellhead Controller



Operating Manual

for Three-Valve Model

For software versions 1.303 and greater - Oct 19, 2011

Table of Contents

Getting Started.....	Page 1
Operating Features.....	Page 2
Safety Constraints.....	Page 9
Maintenance Checklist.....	Page 10
Troubleshooting/FAQ's.....	Page 10
Rules of Thumb.....	Page 12
Multi Products Company – Diverse Line of Products.....	Page 13
Limited Warranty.....	Page 15
Registration.....	Back Cover

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 three-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 OrfTank Time and Sales Time and preferably Fallback, Shutin, and Trap Open times.

Notes:

- The [Run] button starts the Automatic Cycle. If the plunger is in the lubricator, it opens the Sales valve to start Sales time. If the plunger is not in the lubricator, it keeps the Sales valve closed, opens the Orif/Tank valve 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.

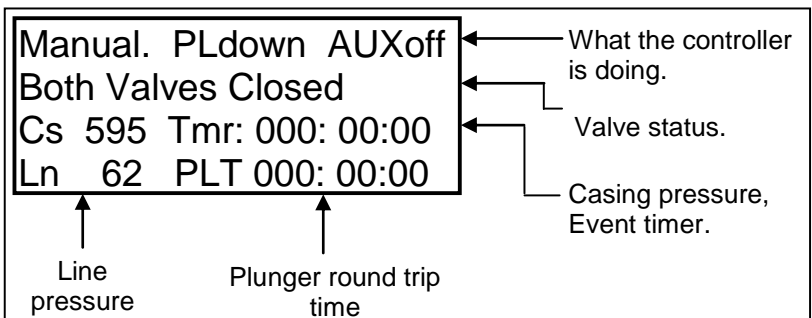
- Shutting the cabinet door makes the display screen go to “sleep mode” to conserve battery usage. Shutting the cabinet door without saving changes to settings voids any changes that were entered. You must save settings to activate them.
- The top line of the [Current Status] screen provides descriptive 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]. 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:

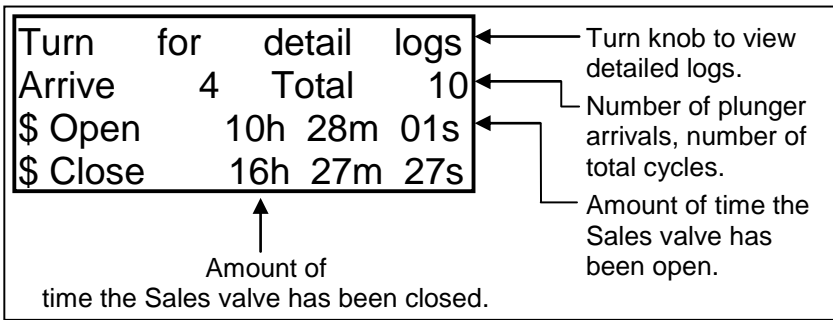


Mode = If controller is in Manual Mode, screen will display [Manual. PLdown AUXoff]. If

- 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.
- Valve status = Valve status (open or closed).
- Tmr = Event timer counts down to 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, Sales valve open time, and Sales 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.

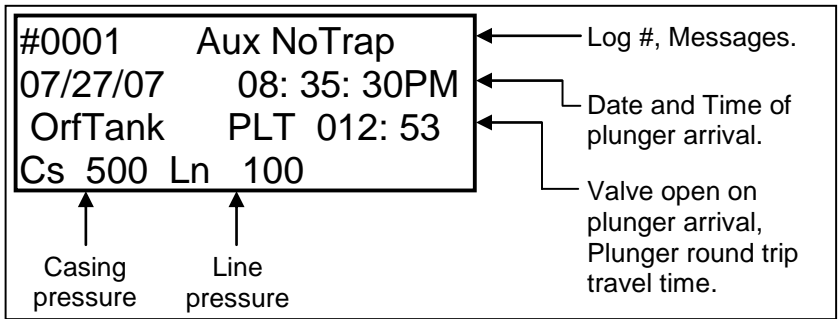
\$ Open = Displays time Sales A valve has been open.

\$ Close = Displays time Sales 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.

OrfTank/Sales = Name of valve open when plunger arrived.

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.

Hi Casing = When the plunger is down hole, the casing pressure must go above the level set

here, for the OrfTank valve to open. When the plunger is in the lubricator, this setting has no effect.

Lo Casing = When the casing pressure drops below the level set here, the plunger will be dropped and the Sales 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 Sales 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.

Sales Time = The amount of time to leave Sales valve open and hold the plunger in the lubricator.

OrfTank Time = The maximum amount of time to leave OrfTank valve open and wait for the plunger to arrive in the lubricator.

Fallback Time = Amount of time to allow for the plunger to fall to the bottom to get below the liquid before starting a new cycle.

Shutin Time = The amount of time the valves are shut after a missed plunger arrival, to build enough pressure to force the plunger up. Missed plunger arrival can be caused by insufficient pressure to lift the plunger up, or too much fluid to allow the plunger to return all the way up.

Hold Time = The amount of time the plunger remains in the lubricator after Sales Time, with valves shut, before fallback time.

Trap Open Time = Maximum 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. Both valve remains closed. It will not release the plunger until operator presses Start. Screen says “Plunger on Hold”.

OrfTank (open/closed) – Available in Manual Mode only, can be used to open and close valve. Will only allow opening if Sales valve is closed. Timing of how long the valve is open is tracked on the Current Status screen (PLT Time).

Sales (open/closed) – Available in Manual Mode only, can be used to open and close valve. Will only allow opening if OrfTank valve is closed.

Trap (open/closed) – Available in Manual Mode only, can be used to open and close plunger trap.

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

Sales 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 Sales 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.

Safety Constraints

EXTREME CAUTION! Never open the Sales 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!

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 optional 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.

Q: My Current Status screen indicates “Plunger Error” ...now what?

A: This error message indicates the plunger is not where the controller expects it to be. Check the plunger sensor. Also, it could be that the trap was held open for the Trap Open Time seconds but the plunger never left. Freezing liquid may stop the plunger temporarily. Low casing pressures can cause slow response for the trap actuator. Make sure the Trap Open

Time setting is much larger than the expected time for the plunger to leave the lubricator. A larger Trap Open Time will not impact well performance because as soon as the plunger leaves the lubricator, the trap will close.

Rules Of Thumb

- Lowest bottom hole flowing pressure is desirable.
- Casing wells with positive seal plungers (rubber cups) and pressures above 1000 psi, should have plunger pressure relief (rupture disk) for safety.

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
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 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.
7188 State Route 30 East • Millersburg, OH 44654
Phone: 800-777-8617 • Fax: 330-674-2125
www.plungerlift.com



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

Multi Products Company, Inc.
1-800-777-8617 ♦ www.plungerlift.com

Place
Stamp
Here

Multi Products Company, Inc.
7188 State Route 39 East
Millersburg, OH 44654