

# Owner's Manual Maxim Controller for the Thompson Pump Skid Product Line

800 Orange Avenue, Daytona Beach Fl 32114 Phone: 386/248-0500 - Fax: 386/248-3033 - Toll Free: 800/881- 0320 www.millerleaman.com

Thompson Pump Skid Maxim Controller Owner's Manual

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#### Miller-Leaman, Inc.

• 800 Orange Avenue • Daytona Beach, FL 32114 •

• Toll Free: 800 881-0320 • Phone: 386 248-0500 • Fax: 386 248-3033 •

• E-mail: <u>sales@millerleaman.com</u> • Web Site: <u>www.millerleaman.com</u> •

#### **First Edition**

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Toll Free: 800 881-0320 • Phone: 386 248-0500 • Fax: 386 248-3033 E-mail: <u>sales@millerleaman.com</u> • Web Site: <u>www.millerleaman.com</u>

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**Miller-Leaman** knows the Industrial Markets with thousands of installations and many unique applications. Our experience along with our Thompson Strainer line of filtration products, Helix HD & HS Series Filters, and our innovative Turbo-Disc Filter gives you a selection of filtration equipment that will solve your most challenging problems.

#### **Typical Applications Include:**

- Spray Nozzle Protection
- Cooling Tower Water
- Chilled Water
- Process Cooling Water (injection molding, extrusion, etc.)
- HVAC Systems (protection of heat exchanger, etc.)
- Makeup Water
- Pre-Filtration for R.O. and Other Filters
- Well Water
- Surface Water (lakes, rivers, canals, etc.)
- Intake Water / City Water Intake
- Municipal Water
- Reclaimed Water
- Wastewater
- Scrubbers
- White Water
- Gland Seal Protection
- Vacuum Pump Protection
- Golf Course / Turf Irrigation
- Landscape / Irrigation
- Agricultural Irrigation

#### Automatic Turbo-Disc Filter Features:

- Extremely Low Amount of Backwash Water Volume
- Automatic, Self-Cleaning System Triggered By Differential Pressure, Elapsed Time, or Manual Override
- Centrifugal Separator Action Built Into Design, Therefore Keeping Disc Media Clean Longer Before Back Flush Cycle
- Polypropylene Disc Media, Designed for a Long Service Life
- Interchangeable Color-Coded Disc Cartridge Options for Different Micron Levels of Filtration
- Modular Design with Small Footprint
- Continuous Supply of Downstream Flow, Even During Backflush Cycle
- Booster Pump Option Available for Low Pressure Applications
- No Tools Necessary to Service Disc Cartridge

### Use of this Manual

Congratulations on your purchase of a Thompson Pump Skid Maxim Controller for the Thompson Pump Skid System.

This Owner's Manual provides instructions on how to operate the system.

The objective of this manual is to provide simple, clear and complete instructions. It is backed by Miller-Leaman, Inc.'s commitment to offer superior customer support. Every effort has been made to ensure the accuracy and completeness of information in this manual.

#### **General Information**

If any of the information or procedure explanations in this manual are unclear, please contact a Miller-Leaman Service Provider for assistance.

**ONLY** service personnel trained in electrical and mechanical safety should undertake operation, repairs or servicing of this equipment.

If there is any concern regarding the level of training, skill or comprehension of the manual's instructions, please have the work done by a qualified operator or a Miller-Leaman representative. Failure to do so could result in injury or damage to the equipment. Common sense and good judgment are crucial to the safe and successful operation and maintenance of the Thompson Pump Skid Maxim Controller for the Thompson Pump Skid System.

## About the Company

**Miller-Leaman, Inc.** was founded in 1991 by Bill Miller, Marty Shuster and Robert Leaman. Miller-Leaman manufactures three unique filtration products: a patented line of stainless steel liquid filters/strainers commonly known as the **Thompson Filter/Strainer**, the **Helix Screen/Disc Series** and the automatic **Turbo-Disc** filter. Many new custom Filtration and Ultra-Filtration systems are being added to meet the needs of our customers.

Manufacturing operations and management personnel are located in Daytona Beach, Florida in a newly renovated, state-of-the-art 52,000 square foot facility. If your ever in the area we encourage you to visit our facility for plant tour.

Miller-Leaman promotes the **Thompson** filter/strainer, **Helix Series** and the standard in disc filtration **Turbo-Disc** filter, for a variety of markets including agricultural and industrial. Miller-Leaman markets and sells the **Thompson** filter/strainer, **Helix Series** and **Turbo-Disc** products through a network of dealers, distributors, manufactures' reps and OEM's. If you are interested in becoming a distributor, please complete our response form on the distributor inquiries web page. We thank you for your interest in our innovative line of filtration systems.

#### Message from our Vice President, Chris Shuster

**THANK YOU...** for considering our innovative Thompson Pump Skid Maxim Controller for the Thompson Pump Skid System product line. This manual is designed to give you all the necessary information about our Thompson Pump Skid Maxim Controller for the Thompson Pump Skid System filtration products. If you find that you need additional information, or clarification on information that you see, please do not hesitate to contact us.

In addition to the exceptional quality of our products, customer satisfaction is our highest priority. There are many filtration manufacturers competing in our market; therefore, we will endeavor to differentiate ourselves by offering unique products backed by a dedication to customer satisfaction.

On our website, you will find extensive technical information, including 3D model drawings, product owner's manuals, and other valuable information.

We would appreciate the opportunity to assist you with any filtration applications you are working on. Our toll free number is **1-800-881-0320**. You can also e-mail us at **sales@millerleaman.com**. We look forward to building a long-lasting, mutually beneficial relationship with your company.

#### Expect the Best,

Chris Shuster, Vice President

#### 5.14 MAXIM Controller - Setup and Troubleshooting

MAXIM Controller Settings: Prior to start-up, read and fully understand this *MAXIM Controller* section of the Manual. Turn on the controller by moving the switch to the "ON" position. Check the controller's settings by scrolling through the menu screens. The settings are factory preset at nominal values, however, these may need to be adjusted to meet your system's backflush needs.

Be sure the Pressure Differential setpoint is properly set once there is water flow. The recommended PD setpoint is 1-2 PSID above the "clean" gauge reading at the systems MAXIMUM flow rate. Setting this PD setpoint at low flow may result in continuous backflushing at higher flow rates, since the Pressure Differential increases with flow rate. Typical PD setpoints are between 3-6 PSID, depending on flow rate.

The following is a typical configuration of the Maxim 4 controller inputs and outputs.

#### CAUTION: Disconnect controller from power source before removing cover!

Maxim Millennium III circuit board configuration A. **Outputs - Output #1** controls the Flush valve. **Output #2** controls the Pump through Relay 1 in the Starter

- Box. Output #3 is a relay output for the System Alarm - Consecutive Flush Alarm signal and Stacklight/Sounder. Output #4 (Flush Master) Differential Pressure Alarm signal - relay output turned on during Flushing Cycle.
- B. Inputs I1 The optional Customer Initiate Flush input will signal the Maxim Controller to start a Flush cycle. I2 - Flush TimerON Enable input. The Flush Timer enable signal is ON whenever the Pump is running.
- C. The Analog/Digital Input locations allow Miller-Leaman Inc. to design customer specific programs. These programs are then able to receive and process both digital and analog signals from devices such as Pressure Transducers, Flowmeters, Level Switches, etc. Inputs IC & ID are the Inlet and Outlet Pressure Transducer



connections. These provide a 0-10Vdc signal into the controller. These signals are converted into pressure level values and compared to each other for the pressure differential value. When the PD value exceeds the PD setpoint, the Maxim Controller is signaled to start a Flush cycle. The Inlet Pressure Transducer also is used to disable the Flush Timer and Flush Signal from Differential Pressure, should the Inlet Pressure be less than the Inlet Low Pressure Setpoint.

**D.** Analog Output - Optional output OF provides an analog Differential Pressure signal for Customer monitoring. This is a 0-10VDC signal representing 31PSID full scale, 10 bit resolution.

#### **Electrical Connections:**

**NOTE:** When using an external power source, the input power to the PC Board must be the same as indicated on the upper left side of the Maxim Controller. Typically the controller is either 24 volts AC or 24 volts DC, however some controllers use 120 volts AC, or 12 volts DC.

The Flush Valve is connected to *Output#*1 terminal(+ *signal, white wire*), *Common (-)* terminal (Power Common, black wire), and Auxilliary Power Out (+) terminal (Power +, red wire) on the Maxim circuit board. Please Note - with power on and no signal, the Flush Valve will move to its closed position, until it is closed.

The Auto Pump Control Relay (R-1 In the Starter Box) is connected and controlled by *Output#2* terminal (RED #38 wire). The Pump is turned ON when the HOA Switch is in the AUTO Position and the Maxim first powers up. The Maxim Controller will turn OFF the Pump when there is a System Alarm / Consecutive Flush Alarm. Relay 2 is the Customer's Pump OFF control. The Pump will remain OFF while Relay 2 is turned ON by the Customer.

The optional **Customer Initiate Flush Signal** input is connected to Input I1. Please Note - this signal must be a discrete 24VDC signal, that references the Common (-) terminals.

Input I2 (BLUE #27 wire) is the signal from the Pump Starter that the Pump is running. Input 2 enables the Flush Interval Timer for the Timed Flush Control. When this input is OFF, the Flush Interval timer will be paused, and a timed Flush will not occur. Differential Pressure Flushing will also be inhibited. DP sensing will continue, and the Status Screen will display >> High PSID << on the second line, the top line of the Status Screen will display Status: OFF.

The **Pressure Transducers** have a three wire connection, white assigned to the input (IC or ID), black to the *Common (-)* terminal, and the red to the Auxilliary Power Out (+) terminal .

The two discrete Customer Output Signals, Output #3, **Consecutive Flush Alarm & Red Stacklight/Sounder**, and Output #4, **Differential Pressure Alarm** (Flushing), are 24VDC signals, that reference the Common (-) terminals.

Review the *Electrical Schematics in the Engineering Drawings* section prior to making any connections to the controller.

#### **Scrolling through Menu Screens**

The MAXIM controller allows the operator to scroll through a selection of menu screens by pressing the A or B buttons. Press A to scroll backward to the previous menu or press B to scroll forward to the next menu. The LCD backlight will automatically turn on for 5 minutes when a button is pressed, thus allowing the operator to easily view the menus in low light situations.

**Power Up Screen:** Screen 7, the Company Information Screen, is the Power Up Screen. Each time the Maxim

Controller is turned on, or when power is returned after a loss, this screen will be displayed for 15 seconds. The Company information Screen can be viewed by turning off the Maxim Controllers power, then turning it back on again.

After 15 seconds, Screen 7 will be changed to the Manifold Pressure Screen. The Manifold Pressure Screen displays the scaled and filtered transducer signals in PSI for both the Inlet Manifold, and the Outlet Manifold. Also displayed is the calculated Pressure Differential between the Inlet and Outlet Manifolds in PSI. The PSID is also displayed on the Status Screen.

Press the **B** button to scroll forward to the **Status** screen.



The next section describes the menus in the order they are seen by scrolling with the B button from the Initial Power Up screen.



Screen 4 - Time Since Last Flush & **Triggered By** 

Screen 5 - Flush Counters **Trip & Life** 

Screen 6 - Machine & **Controller ID** 

Screen 7 - Manifold Pressure

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Note - pressing the B button to scroll forward from Screen 7 - Manifold Pressure screen, causes the display to cycle back around to the beginning and display the Screen 1 - Status screen. Also, pressing the A button to scroll backwards from Screen 1 - Status screen, causes the display to cycle back around to the end and display the Screen 7 - Manifold Pressure screen.

#### **Changing Values**

To change an adjustable value, first scroll to the appropriate menu screen using the A or B button. Follow the directions below to modify the value.

- 1. The current selected value will show flashing blocks. Use the + or keys to select another value if desired.
- 2. Press **OK** on the selected value. The value will change from flashing blocks to flashing numbers.

(Flashing blocks indicate the value is locked into memory. Flashing numbers indicates the value is unlocked and can be changed.)

3. Press the + or - buttons to change the value.

(Holding the + or - button will allow the value to increase at a faster rate after the first 10 increments have passed.)

4. When finished, press OK to save the change to memory. The value will return to flashing blocks

The following screens contain values that are operator adjustable. The controller's factory preset values may not be the final operating values. These values should be adjusted to meet the filter's Flush requirements. Reference the filter manufacturer's owner's manual for further information.

**Flush Interval:** The user-defined interval at which the system will initiate an automatic Flush cycle. The Flush Interval timer resets after any Flush cycle occurs (by timer, PD Transducers, operator, or Customer Input Signal). This value is adjustable from 1 minute to 1000 hrs. Setting both values to zero will turn off the Flush timer. It is recommended that the operator adjust the Flush interval timer so that the system Flushes by time before the pressure differential set-point is reached. Factory Preset value is 24 Hours. This setpoint is located on Screen 2.



**PSID Setpoint:** The Pressure Differential setting in PSI, which when compared to the calculated Differential Pressure from the Inlet and Outlet pressure transducers, will cause a Flush cycle to begin when exceeded. The recommended PD setpoint is 1-2 PSID above the "clean" PSID reading at the systems MAXIMUM flow rate. Setting this PSID Setpoint at low flow may result in continuous Flushing at higher flow rates, since the Pressure Differential increases with flow rate. This value is adjustable from 1 to 30 PSID. Factory preset is 7 PSID. This setpoint is located on Screen 2.

**Flush Duration:** The time allotted for the Flush Valve to be open. This time should be set according to the type of filter and the nature of the material being filtered. This value is adjustable from 5 to 300 seconds. Factory Preset value is 8 seconds. This setpoint is located on Screen 3. **Please Note - Flush Valve is not completely open until 3 seconds into this time value.** 



#### Flush Counters (Screen 5)

**Trip:** The number of Flush cycles that have occurred since the counter was last reset. This includes cycles initiated both manually and automatically. This counter can be reset by pressing the red **ESC** button from the *Flush Counters* screen. **Life:** The number of Flush cycles that have occurred in the controller's lifetime. This includes cycles initiated both manually and automatically. This counter cannot be reset.

#### Time Since Last Flush: (Screen 4)

This screen is READ ONLY for information and is not adjustable. The screen shows the amount of time that has elapsed since the system last Flushed (example: 00011:30 is 11 hours and 30 minutes) and how the last Flush was triggered. There are four trigger possibilities:

- 1) Local Operator Flush triggered manually by an operator
- 2) *Timer* the backflush was triggered by time as set on the Backflush Interval screen.
- 3) *PD Transducer* the Flush was triggered by a high pressure differential, as set on the PSID setpoint.
- 4) Customer Input Optional Customer's Input signal at input I1 initiated the Flush Cycle.





#### <u>The Status Screens</u>

The Status screens provide system feedback, allowing the operator to monitor when and how the Flush cycle is occurring. A Flush cycle can be started manually, automatically via the Flush Interval Timer or the Pressure Differential Transducers (PSID), or remotely by optional Customer Input Signal.

The current **Status** of the controller is displayed as follows:

1. <u>Status: OFF</u> - Indicates that the Flush interval timer is paused. The system will not Flush by the timer, nor by PD Transducers. There is assumed to be no flow going through the system. A backflush can still occur manually by the operator by pressing the green OK button on the controller, or remotely via the Customer Input Signal, although, this is not recommended.

At the Pump Starter, wire #27 is connected to the Maxim Controller I2 Input. When the Pump is OFF, and this input is turned OFF, the Flush Interval timer will be paused, a timed Flush will not occure, and Pressure Differential Flushing will be inhibited. The **Status** screen will display **Status: OFF**.

2. <u>Status: AUTO</u> - Indicates that the Pump is running, and the controller is waiting for a Flush cycle to begin. The system is assumed to be in normal filtration mode and flowing water. The Flush interval timer is running. The controller displays Status: AUTO when the Pump is running and a Flush cycle has not begun. A Flush can occur from the Timer, a high pressure differential via the Pressure Transducers, indicated as >> High PSID << on the display, manually by the operator by pressing the green OK button on the controller, or by the Customer Input Signal.</p>





Status of the controller (continued)

3. <u>Status: ON</u> - Indicates that the system is in a Flush cycle, initiated either by the Operator, by the Flush Interval Timer, the Pressure Transducers, or by the Customer Input Signal. The controller will stop displaying the PSID value, but will instead indicate **Flush Cycle**.

The Differential Pressure Alarm (Flush MASTER) output is turned on. This output stays on throughout the entire Flush cycle. This output is a Customer Contact signal provided for Customer monitoring of the Flush Cycles.

The Flush Duration is nominally set for 8 seconds. The Flush Duration time is adjustable - see Setup screen #3 for information.

After this Flush duration time, the Flush Cycle is complete. The Open Flush Valve Output will be turned off, the Differential Pressure Alarm Output (Flush Master) will be turned off, and the Status Screen will display **Status: AUTO**.

To initiate a manual Flush, press the green **OK** button while on the status screen. At any time during the Flush cycle, press the red **ESC** button to stop the cycle.





 Status: System Alarm - On any of the Status screens, OFF, AUTO, or ON, a System Alarm screen can be activated. The second line down will be alternately flashing >> System

Alarm << and whatever was on line 2 before the system alarm occurred.

A system alarm can be any customer specific alarm. The only standard system alarm is the **Consecutive Flush Alarm**. This alarm occurs when the Flush cycle has been initiated three times in a row by the Pressure Transducers (**PSID**). A Customer Contact signal for the Consecutive Flush Alarm is provide at Output #3. This 24VDC signal will also power the Red Stacklight/Sounder during the alarm.

The Consecutive Flush Alarm will also disable any additional Flush Cycles from occurring as well as turning OFF the Pump. Normal operation will cause a timed Flush every 24 hours.

(Nominal Flush Interval Setting - see Setup Screen #2 for adjustment information)

If the Pressure Transducer values are indicating an excessive DP as compared to the individual Pressure Gauges, then the operator should verify proper setting and operation of the Pressure Transducers as well as the wiring into the Maxim Controller.

To reset the **Consecutive Flush Alarm**, first, correct the cause of the alarm, then push the red ESC button on the controller while a Status screen is displayed.



#### Warranty

Miller-Leaman warrants its products against defects in material and workmanship under normal use and service for which such products were designed for a period of twelve (12) months after shipment from our factory. Our sole obligation under this warranty is to repair or replace, at our option, any product or any part or parts thereof we find to be defective. SELLER MAKES NO OTHER REPRESENTATIONS OR WAR-RANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. The warranty set forth above is the only warranty applicable to Miller-Leaman products. Our maximum liability shall not in any event exceed the contract price for the product. IN NO EVENT SHALL MILLER-LEAMAN BE LIABLE FOR ANY DELAY, WORK STOPPAGE, CARTAGE, SHIPPING, LOSS OF USE OF EQUIPMENT, LOSS OF TIME, INCON-VENIENCE, LOSS OF PROFITS OF ANY DIRECT OR INDIRECT INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGES RESULTING FROM OR ATTRIBUTABLE TO THE USE OF THE PRODUCT. This warranty is governed by the Laws of the State of Florida. Venue and jurisdiction of any case or controversy related to the use of this product or this warranty shall lie exclusively in the State Courts of Volusia County, Florida.

# Miller-Leaman, Inc.

Main Office (United States)

800 Orange Avenue Daytona Beach, FL 32114

Toll Free: (800) 881-0320 Local Phone: (386) 248-0500 Facsimile: (386) 248-3033

E-Mail: sales@millerleaman.com

Internet: www.millerleaman.com Local Representative

Revision: ML40175.pub (2/17/2021)