



**Advantage  
Engineering**

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# **MLS In-Line Filter OWNER'S MANUAL**

## **OPERATION AND INSTRUCTION GUIDE**

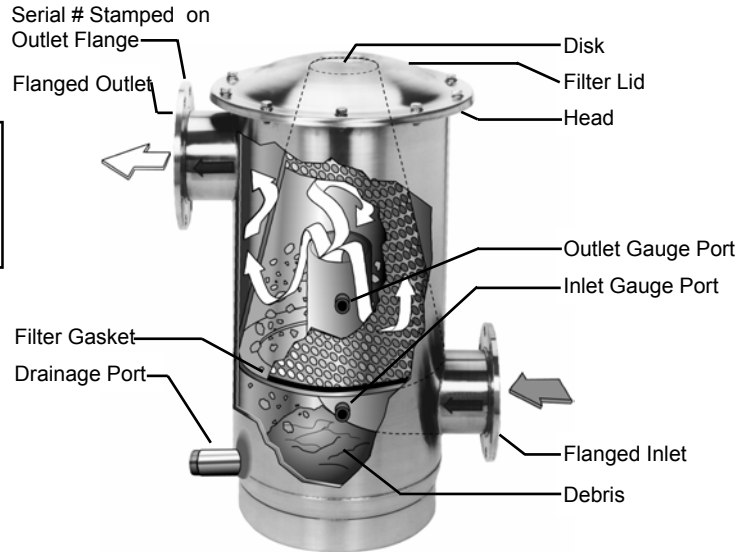
Record in the space below the Serial # of your unit

**Serial #** \_\_\_\_\_

The Serial # is located on the top of the outlet flange or pipe.

### **IMPORTANT**

Please make certain that persons who are to use this filter thoroughly read and understand these instructions prior to operation. Should you have any questions regarding the operation of this filter, please call (317) 887-0729 and ask to speak with one of our customer service representatives.



## **I. SAFETY CONSIDERATIONS**

Safety precautions are essential when any filtration equipment is involved. These precautions are necessary when using, storing, and servicing your filter. If safety precautions are overlooked or ignored, personal injury or product damage may occur.

Your filter was designed for specific applications. It **should not** be modified and/or used for any application other than originally specified. If there are any questions regarding its application or installation, contact Advantage, Inc.

**Always heed the following precautions, as they are essential when using your MLS In-Line Filter.**

- 1) Read this manual carefully. Consider the applications, limitations, and the potential hazards specific to your filter.
- 2) (Flanged units only) The filter must be placed on a firm, supporting surface. The filter **should not** be suspended by the Inlet and outlet flanges.
- 3) Absolutely under no conditions should the filter lid or pressure gauges be removed while the filter is pressurized. Standard bolted lid models should never exceed 150 PSI; V-Band clamp models should never exceed 125 PSI.
- 4) Units with damaged or missing parts should **never** be operated. Contact our customer service representatives for replacement parts.
- 5) Back-flow prevention devices should be installed upstream of the inlet and downstream of the outlet of the filter as to prevent back flow or vacuum effects which may be damaging to the filter element.
- 6) Pressure relief valves of a sufficient size and volume should be installed upstream of the inlet and downstream of the outlet of the filter. They should be set to relieve pressure at 1.2 times the maximum operating pressure (not to exceed the max. rated pressure). This helps prevent damage to the filter and element if severe stoppage or water hammer occurs.

**AT NO TIME SHOULD THE INTERNAL PRESSURE EXCEED THE MAXIMUM RATED PRESSURE FOR YOUR FILTER**

## **II. BEFORE FILTER OPERATION**

There are a few tasks that must be accomplished before your MLS In-Line Filter is ready for operation. Please review the following checklist. When all tasks are complete the filter is ready to be used.

1. (Flanged Units Only) Is your MLS In-Line Filter placed on a firm, supporting surface? Failure to do this may cause stress on the weld joints. Advantage recommends a concrete pad be poured under the base of the filter.
2. Are the inlet / outlet connections securely fastened to the in-line pipe? The arrows clearly depict flow direction (see above).

3. Have you installed a check valve/back flow prevention device upstream of the inlet and downstream of the outlet of the filter so as to prevent back flow or vacuum effects which may be damaging to the filter element?
4. Have you installed a quick-pressure relief valve upstream of the inlet and downstream of the outlet of the filter; set to relieve pressure at 1.2 times the maximum operating pressure (not exceeding the maximum rated pressure of your filter)? This is to prevent damage to the filter element when and if severe clogging or water hammer occurs. Pressure relief valves are available in various sizes, consult your local dealer or valve manufacturer to obtain the proper valve for your application.
5. Have you installed a valve on the drainage port located at the bottom of the filter body (see front cover diagram)? This valve, when opened, will allow debris to escape the filter body.
6. Make sure back-mount pressure gauges are installed in the gauge ports located on the front of the filter body (see front cover diagram). These gauges will allow you to monitor the pressure differential on each side of the screen so as to know when and if the filter element is clogging.
7. Is the MLS In-Line Filter lid securely fastened? Each bolt should be tightened to ensure safety and an adequate seal.

### III. TORQUE SPECIFICATIONS

#### **BAND CLAMP MODELS:** (MLS-2, MLS-3, and MLS-4C)

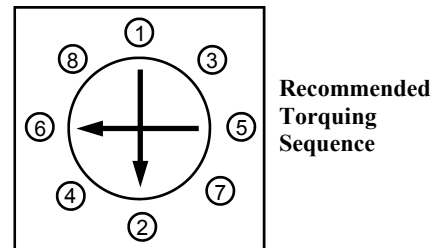
The over-center latch clamp is used on the MLS-2, MLS-3, and MLS-4C units and is installed by placing the clamp around the filter, latching the T-bolt with the receiver, and pushing the latch handle towards the filter body until the safety catch engages. The over-center clamp does not require adjustment to be installed and removed. The lock washer is set at the factory for proper clamp compression and normally requires no field adjustment. Minor tightening may be necessary over time. (SEE TABLE BELOW)

NOTE: The MLS-4 filter is available with both a bolted lid and clamped lid. These are differentiated by a "B" for the bolted lid and a "C" for the clamped lid model.

#### **BOLTED LID MODELS:** (MLS-4B, MLS-6, MLS-8, MLS-10)

The bolted lid MLS In-Line Filters require that the attachment bolts be tightened sufficiently to make a complete seal without damaging the bolts or the filter head. Grade 5 zinc plated bolts, nuts and washers are used to attach the heads to these strainers. The size and recommended torque of the bolt is dependent on the filter size. The following table shows the bolt size and torque rating for each filter.

FILTER	BOLT SIZE	RECOMMENDED TORQUE
MLS-2 (Clamp)	5/16" - 18	40 – 50 in. lbs.
MLS-3 (Clamp)	5/16" - 18	60 – 80 in. lbs.
MLS-4C (Clamp)	5/16" - 18	75 – 85 in. lbs.
MLS-4B	3/8" - 16	15 – 25 ft.lbs
MLS-6	1/2" - 13	45 – 55 ft.lbs
MLS-8	1/2" - 13	45 – 55 ft. lbs.
MLS-10	5/8" - 11	80 – 100 ft. lbs.



It is important to follow the torque specifications as over-torquing may result in premature failure of the bolt. Another important procedure when tightening the bolted lid is to follow a star wheel torque pattern (see above right). This is similar to the tightening of an automobile wheel in that the next bolt to be tightened is located opposite to the bolt just tightened. Most likely the filter lid will not seat down completely after one series of torquing, this is especially evident on the larger strainers (MLS-8 and larger). A second tightening of the bolts should seat the lid securely to the body. On MLS-8 and MLS-10 models a 1/8 inch lid ring can be seen and should rest flush against the body flange when the head is properly tightened. The MLS-4B and MLS-6 lids also have this ring but it is hidden by the edge of the head. The MLS-4B and MLS-6 heads will seat completely after two torquing sequences.

### IV. FILTER OPERATION

At this point the MLS In-Line Filter is ready for operation. Periodically (depending on liquid quality) the debris that settles out at the bottom of the filter will need to be flushed out. The drainage port located at the bottom of the filter is what makes this possible. Upon receiving your filter, you must install a valve on the drainage port. It is the user's discretion how often the valve should be opened. It strictly depends on how much debris is being captured by the screen and falling into the filter reservoir. Over time, one should be able to accurately determine how often the valve should be opened. **It is important that you never allow debris to accumulate beyond the capacity of the reservoir.**

Larger series strainers (MLS-4, MLS-6, MLS-8, MLS-10) are equipped with a flush port extension inside the filter to allow for a nearly complete cleaning of the filter reservoir every time the filter is flushed. The drainage port valve should be opened while the filter is in operation. Flow rate and pressure determine how long the valve should be open to flush the debris from the filter tank. A good rule of thumb is to leave the valve open until the liquid being expelled flows free of debris. This should take from 30 to 60 seconds depending on the flow, pressure, and amount of debris.

Larger strainers require higher flushing pressures to achieve complete cleaning: the MLS-4 can be flushed as low as 15 - 20 PSI; the MLS-6 can be flushed as low as 30 - 35 PSI; and the MLS-8 and MLS-10 should be flushed at 40 PSI or greater if possible.

***(Note: After operation, open the drainage port to allow the water contained in the filter body to drain. If there is corrosive chemical content in the water, it may corrode the filter element. Also, in winter months, the water may freeze and expand putting unnecessary stress on the filter body).***

## **V. FILTER ELEMENT CLEANING**

The pressure gauges that you have the option of installing can be used to monitor the pressure differential between the inlet and outlet sides of the filter. When there is a pressure loss of 5-10 PSI between the inlet and outlet side of the MLS In-Line Filter, the filter element may require cleaning.

**CAUTION: Make sure that the system is completely shut down when the filter element is to be taken out and cleaned. NO pressure should remain in the system.**

Follow these steps when cleaning the MLS In-Line Filter element:

**Step 1: (Bolted Lid Models)** Remove the top of the MLS In-Line Filter by removing the grade 5 zinc bolts from the lid.

**Step 1: (Band-Clamp Lid Models)** Remove the top of the MLS In-Line Filter by taking off the band-clamp assembly.\*

**Step 2:** Lift the filter element (conical screen) out of the filter body.

**Step 3:** Carefully scrub down the filter element with a rigid nylon brush until all matter is loosened.

***Do not use a steel brush.***

**Step 4:** Wash the filter element off with clean water. It is preferred to use a hose with a significant amount of water pressure.

***Do not use a pressure washer.***

**Step 5:** Wash all matter from the filter gaskets and clean the inner-ring where the bottom of the filter element rests.

**Step 6:** Make sure the U-shaped gasket is fitted securely to the bottom of the filter element. Reposition the filter element into the body of the filter.

**Step 7:** Make sure the filter head gasket is secure on the top of the filter body. On V-Band models, O-rings should be seated completely in the body flange. Reposition the filter lid back on the filter body. *Tighten the lid securely either with the bolts or with the band-clamp.*

\* For band-clamp models, opening and closing is achieved without adjusting the lock nut. It is tightened at the factory to the correct compression. (Minor tightening may be necessary if the gasket loses memory over time). To open the clamp, depress the safety latch and pull the over-center lever outward. To close the clamp, make sure the T-Bolt is seated in its receiver and push the over-center lever back toward the filter housing. *Be sure that the safety latch is engaged before putting the unit to use.*

## **VI. INFORMATION CONCERNING WATER HAMMER**

### **WHAT IS WATER HAMMER?**

Water hammer is a phenomenon that can occur in fluid systems with long pipes between the fluid source and the outlet. The term itself refers to the sound made when water hammer occurs which resembles banging a hammer on a long pipe. Water hammer is a rapid change of pressure caused by a rapid change in velocity. When the velocity is changed a pressure wave that travels at the speed of sound is initiated and travels in the upstream direction until it reaches some stationary energy level, like a reservoir. A rarefaction wave (at the pressure of the water source) then travels downstream at the same speed. If the flow has been shut off downstream the pressure wave impacts the blockage and the pressure in the entire system is raised very quickly.

### **WHAT CAUSES WATER HAMMER?**

Any action that can cause a rapid change in the velocity of the flow can set off a water hammer - closing a downstream valve, pipe fracture, pump stoppage, etc. The critical time for which a valve may be closed depends on the length of piping between the valve and the source reservoir. The longer the distance the slower the valve may be shut to cause a water hammer. Typically for short lengths of pipe (below 500 ft) the critical time is less than 1/10 second.

### **WHAT CAN WATER HAMMER DO?**

Pressure spikes from water hammer can raise fluid pressures to very high values (in excess of 1000 PSI depending on the situation). Such pressure spikes can result in mechanical failures such as broken valves, pipes, strainers, joints, etc. Water hammer does not have to occur fully to raise the pressure. A partial hammer can occur that raises the pressure to a certain percentage of the theoretical maximum. The MLS In-Line Filter is rated to an absolute maximum pressure of 150 PSI for bolted lid models, 125 PSI for band clamp lid models. A water hammer pressure spike that raises the pressure higher than the maximum rated pressure may result in filter damage.

### **WHAT CAN I DO TO PREVENT WATER HAMMER?**

There are precautions that can be taken to prevent or decrease the effect of water hammer. A pressure relief valve that leads to a surge tank or accumulator may protect other key components from water hammer. A close adherence to operational policies will also help prevent valves or pumps from being accidentally shut off thereby causing a water hammer. A close examination of a system will alert you to the location of potential hazards.

## **VII. LIMITED WARRANTY**

This Warranty gives you specific legal rights and you may also have other rights which vary from state to state.

**1) Duration:** Filter Housing: One year from the date of purchase by the original purchaser. Conical Screen: Ninety days from the date of purchase by the original purchaser (other than for purposes of resale).

**2) Who gives this warranty (Warrantor):** Advantage Incorporated / 525 East Stop 18 Road, Greenwood, IN 46142 (317) 887-0729

**3) Who receives this warranty (Purchaser):** The original purchaser (other than for purposes of resale) of the Advantage product.

**4) What products are covered by this warranty:** Any MLS In-Line Filter housing and conical screen filter elements manufactured by the warrantor.

**5) What is covered under this warranty:** Defects on materials and workmanship, which occurs within the duration of the warranty period.

**6) What is not covered under this warranty:**

**A)** Implied warranties, including those of merchantability and fitness for a particular purpose, are limited to one year from the date of original purchase. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

**B)** Any incidental, indirect, or consequential loss, damage, or expense that may result from any defect, failure, or malfunction of the Advantage product. Some states do not allow the exclusion or limitation of incidental or consequential damages, so the above limitation or exclusion may not apply to you.

**C)** Any failure that results from an accident, purchaser's abuse, neglect, or failure to operate the products in accordance with the instructions provided in the owner's manual supplied with the product.

**D)** Items or service that are normally required to maintain the product, i.e. gaskets, bolts, nuts, and washers.

**7) Responsibilities of warrantor under this warranty:** Repair or replace, at warrantor's option, products or components which have failed within the duration of the warranty period.

**8) Responsibilities of purchaser under this warranty:**

**A)** Deliver or ship the Advantage product to the Advantage manufacturing facility. Freight costs, if any, must be borne by the purchaser.

**B)** Use reasonable care in the operation and maintenance of the product as described in the owner's manual.

**9) When the warrantor will perform repair or replacement under warranty.**

**A)** Repair or replacement will be scheduled and serviced according to the normal workflow at the manufacturing facility, and depending on the availability of replacement parts.

**B)** If the purchaser does not receive satisfactory results from the product repair or replacement, the purchaser shall contact Advantage immediately.

**NOTE:** THIS WARRANTY IS VOID IN THE EVENT THE PURCHASER FAILS TO COMPLY WITH ANY ONE OF THE REQUIREMENTS FOR INSTALLATION AND USE OUTLINED OR SET FORTH IN THIS MANUAL AND ADVANTAGE INCORPORATED ASSUMES NO LIABILITY WHATSOEVER.



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## OWNER'S MANUAL

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## I. SAFETY CONSIDERATIONS

<b>GENERAL WARNING</b>	
	<p>Ensure all appropriate personnel read owner's manual prior to installation and/or operation of controller. Failure to Comply with instructions and safety precautions could lead to personal injury or product damage. Please call and ask to speak with one of our customer service representatives if there are any questions.</p>
<b>CAUTION</b>	
	<p>Disconnect controller from power source before servicing or removing cover.</p>

## II. DESCRIPTION

The PDA/ATF-MAX is a dual purpose controller for both monitoring the pressure differential with alarm indicator and automatically controlling the flush valve of a Thompson strainer.

### III. SYSTEM OVERVIEW

The PDA/ATF-MAX system consists of the following primary components:

A) PDA/ATF-MAX controller

B) Power supply

C) Transducer / Wiring assembly

D) Mounting bracket

E) Flush valve assembly



The controller interface contains the controller screen and keypad interface as shown. The clear cover provides protection for the controller and can be opened with the two latches on the side of the controller housing to access the keypad.

A) Controller Screen

B) Keypad



## IV. OPERATION

### Startup

- 1) Plug in the power plug into a standard 115VAC wall outlet
- 2) Upon power-up, the company information screen will be shown for 15 seconds.
- 3) After 15 seconds, the screen will change to the manifold pressure screen and will begin monitoring differential pressure across the strainer.

### Automatic Flushing

Under normal operation, a timed flush will be initiated on a periodic schedule defined by the PDA/ATF-MAX programmed setting. (every 24 hours per factory setting).

In addition, a timed flush will be initiated when the differential pressure reaches the setpoint defined by the PDA/ATF-MAX settings.

See the *MENU SCREENS* section for information on changing factory settings.

### Consecutive Flush Alarm

If three consecutive flushing operations are detected by the PDA/ATF-MAX, a consecutive flush alarm will be triggered and no additional flush cycles will be initiated until the alarm is cleared.

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. The optional Customer's Remote Reset input, Input iB, allows for a remote reset of the Consecutive Flush Alarm.

### Scrolling through Menu Screens

The *PDA/ATF-MAX* 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.

### Changing Parameter 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.



*REFER TO THE MENU SCREENS SECTION FOR DETAILED INFORMATION ON EACH SCREEN AND/OR PARAMETER.*

## V. MENU SCREENS

### Power Up Screen

The Power Up screen displays the company information for Miller Leaman. Each time the PDA/ATF-MAX is plugged in, or when power is returned after a loss, this screen will be displayed for 15 seconds. The Power Up screen can be viewed by unplugging the PDA/ATF-MAX's power, then plugging it back on again.

Miller-Leaman Inc.

800-881-0320

### Manifold Pressure Screen:

After 15 seconds, the Power Up screen will be changed to the Manifold Pressure screen. The Manifold Pressure Screen displays the pressure in PSI for inlet manifold, outlet manifold, and the calculated differential pressure between the inlet and outlet manifolds.

Manifold Pressure

Inlet : 0034.0

Outlet : 0032.0

PSID : 0002.0

### The Status Screens

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:

#### Status: OFF MAX

The Inlet Pressure transducer is monitored to sense sufficient Inlet Pressure and allow Timed Flushes, and Differential Pressure Flushing. When the inlet pressure is sensed as lower than the Setpoint, 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. When the Inlet Pressure is sensed as low, the top line of the Status Screen will display Status: OFF MAX alternating with Inlet Pressure Low.

Status: OFF MAX

PSID : 00.0

Inlet Pressure Low

PSID : 00.0

Status: OFF MAX

>> High PSID <<



## V. MENU SCREENS (CONT.)

### Status: AUTO MAX

Indicates that the Inlet Pressure is not Low, 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 MAX when the Inlet Pressure is not low 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.

```
Status: AUTO MAX
PSID : 0003.0
Press OK to Start
A Flush Cycle
```

```
Status: AUTO MAX
>> High PSID <<
Press OK to Start
A Flush Cycle
```

### Status: ON MAX

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 Flush Valve is opened, and the Alarm Light/Sounder output is flashing. This output flashes the Light and Sounder throughout the entire Flush cycle. 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 Alarm Light/Sounder will be turned off, and the Status Screen will display Status: AUTO MAX.

```
Status: ON MAX
Flush Cycle
```

```
Press ESC to Stop
```

```
Status: AUTO MAX
PSID : 0003.2
Press OK to Start
A Flush Cycle
```

### Status: System Alarm

On any of the status screens, 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). Output #4 will be turned ON, which will then energize Relay 1 (R-1). Relay 1 provides a Dry Contact signal for the Customer's Consecutive Flush Alarm monitoring.

The Consecutive Flush Alarm will also cause the Alarm Light/Sounder to change from flashing to steady ON. The Consecutive Flush Alarm will also disable any additional Flush Cycles from occurring.

```
Status: ON MAX
>> System Alarm <<
Press ESC to Stop
```

## V. MENU SCREENS (CONT.)

### Flush Interval & PSID Setpoint Screen

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.

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 set-point is located on Screen 2.

```
Flush Interval
HOURS:MM 0024:00
Enter
PSID Setpoint 07
```

### Flush Duration Screen

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 Duration
Seconds: 00008
```

### Inlet Low Pressure Setpoint Screen

The Inlet Pressure transducer is monitored to sense sufficient Inlet Pressure and allow Timed Flushes, and Differential Pressure Flushing. On these systems, when the inlet pressure is sensed as lower than the Setpoint, 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. When the Inlet Pressure is sensed as low, the top line of the Status Screen will display Inlet Pressure Low.

**Setpoint Adjustment** - The Inlet Low Pressure Setpoint is adjustable from 5 (PSI) to 20 (PSI). Factory Preset value is 15 (PSI). This setpoint is located on Screen 4

```
Inlet Low Pressure
Setpoint: 00015
```

## V. MENU SCREENS (CONT.)

### Time Since Last Flush & Triggered By Screen

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.

```
Time Since Last
Flush           00000:04
Triggered By:
PD Transducers
```

### Flush Counters Screen

**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.

```
Flush Counters
Trip:           00010
Life:          000000010
Press ESC to Reset
```

### Controller ID Screen

This screen is READ ONLY and is used to identify the controller version and ID.

```
Maxim4 PDA/ATF-MAX
Controller v.3.5
Copyright(c)2021
ML31155
```

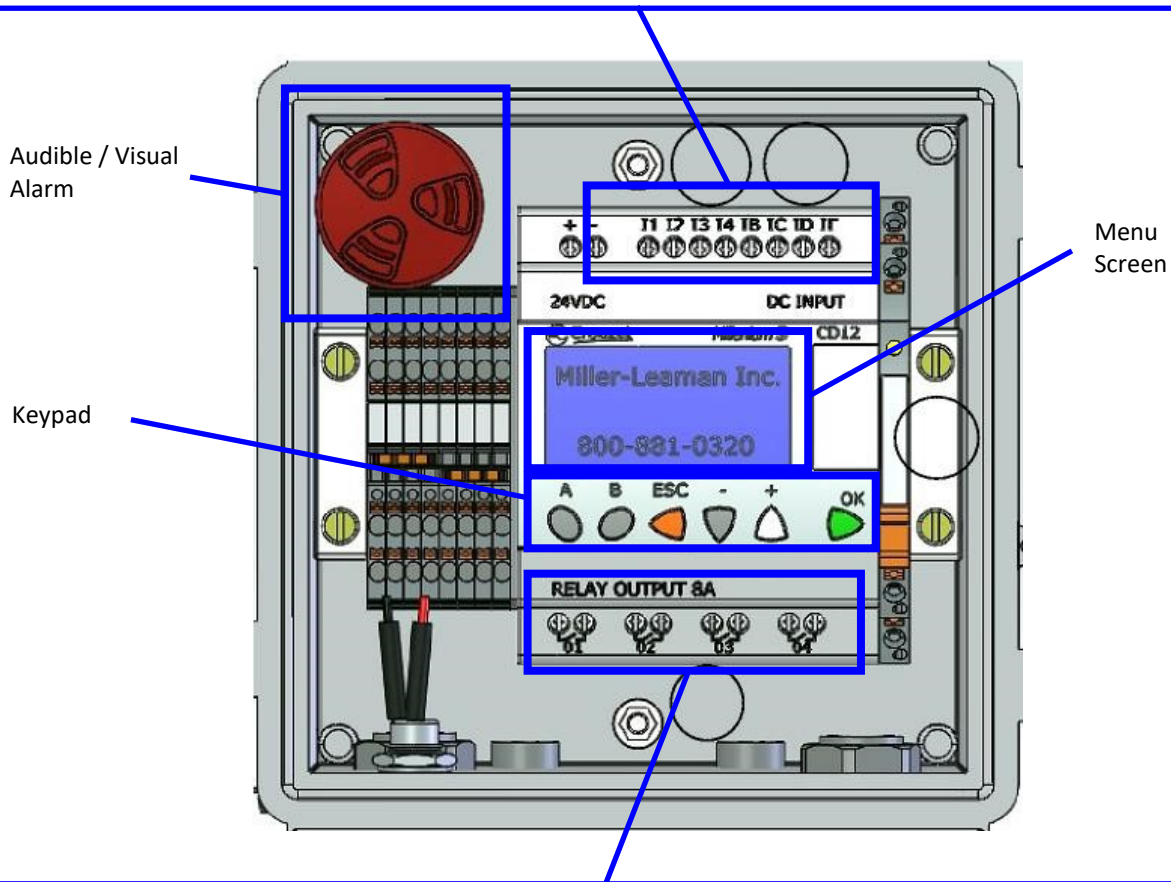
## VI. LAYOUT & I/O CONFIGURATION

### Inputs

I1 - The optional Customer Initiate Flush input will signal the PDA/ATF-MAX to start a Flush cycle.

IB - The optional Customer Remote Alarm Reset input will signal the PDA/ATF-MAX to remotely reset the Consecutive Flush Alarm.

The Analog/Digital Input locations allows customer specific programs. These programs are able to receive and process both digital and analog signals from devices such as Pressure Transducers, Flow-meters, 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 PDA/ATF-MAX 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 Set-point.



### Outputs

(Note - each output's left terminal has been connected to the 24VDC power. The output's right terminal provides the output signal)

Output #1 controls the Flush valve.

Output #2 is not assigned.

Output #3 is a relay output for the Alarm Light/Sounder - DP Alarm is flashing and Consecutive Flush Alarm is steady.

Output #4 Consecutive Flush Alarm signal - relay output turned on when the Consecutive Flush count reaches the setpoint. This output is wired to the coil of Relay 1 (see above) to provide a Dry Contact output.

## VII. ELECTRICAL CONNECTIONS



**NOTE:** When using an external power source, the input power to the Controller must be the same as indicated on the upper left side of the PDA/ATF-MAX. Typically the controller is 24 volts DC. Plug the provided 24VDC Power Supply into a standard 120VAC Outlet, observing all state and local codes.

### Flush Valve

The **Flush Valve** is connected to *Output#1* terminal(+ signal, white wire), *Common (-)* power terminal (Power Common, black wire), and 24VDC (+) power terminal (Power +, red wire). **Please Note - with power on and no signal, the Flush Valve will move to its closed position, until it is closed.**

### Pressure Transducers

The **Pressure Transducers** have a three wire connection, white assigned to the input (IC or ID), blue to the *Common (-)* terminal, and the brown to the 24VDC Power (+) terminal .

### Customer Initiated Flush Signal (Optional)

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.

### Customer Remote Alarm Reset Signal (Optional)

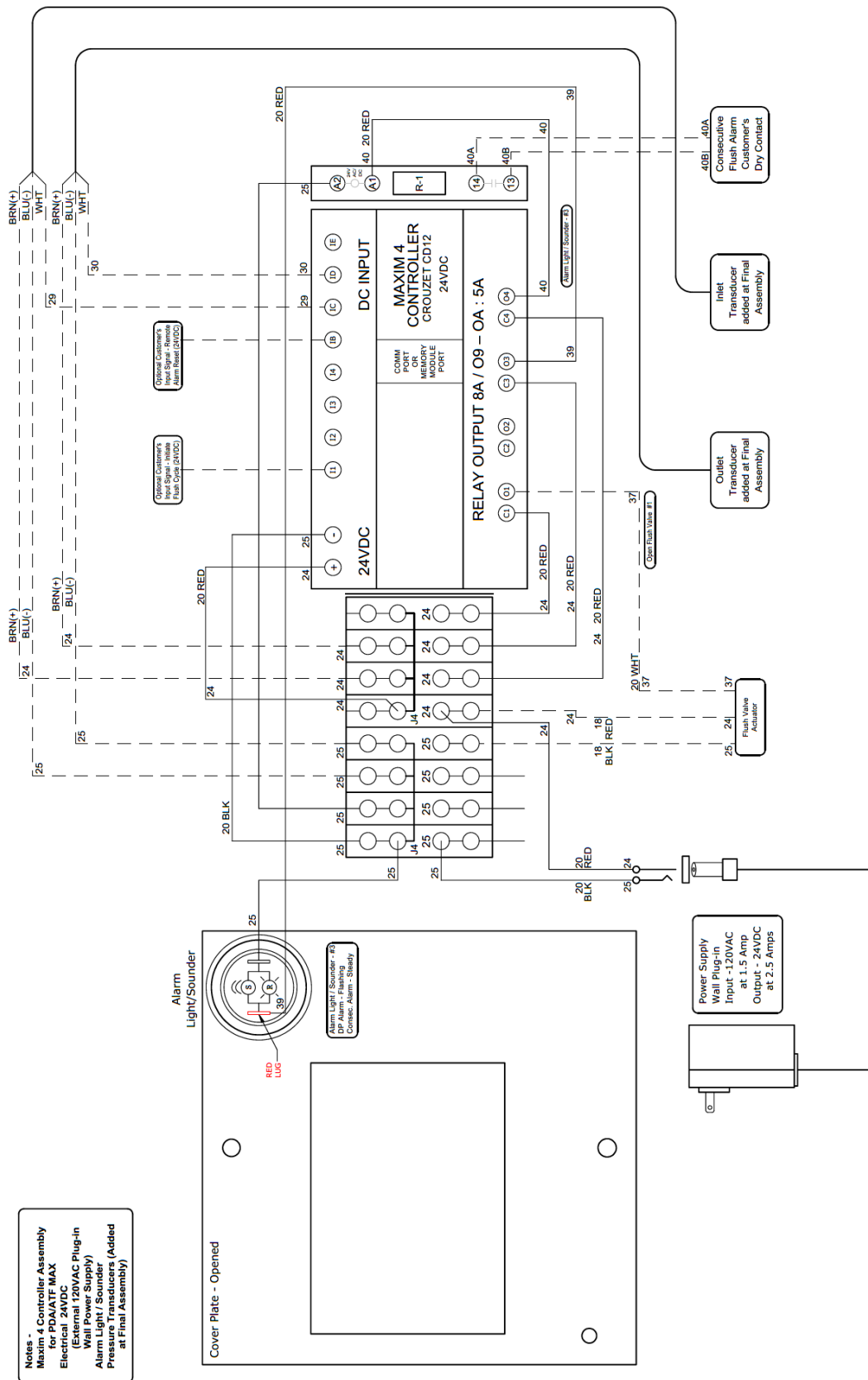
The optional **Customer Remote Alarm Reset Signal** input is connected to Input IB. Please Note - this signal must be a discrete 24VDC signal, that references the Common (-) terminals.

### Consecutive Flush Alarm Output Signal (Dry Contact, Optional)

Output #4 is the discrete **Consecutive Flush Alarm** 24VDC output signal, that is connected to the coil of Relay 1 (R-1). This relay provides a Dry Contact connection for Customer **Consecutive Flush Alarm** signal.

Review the *Electrical Schematic* section prior to making any connections to the controller.

# VIII. ELECTRICAL SCHEMATIC



## IX. WARRANTY

This warranty is given by Miller-Leaman, Inc. (MLI) and 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. MLI warrants its Products against defects in material and workmanship, as per the product warranty schedule listed below, if properly installed, maintained and operated in accordance with MLI instructions and good industry practice, excluding ordinary wear, corrosion, erosion, chemical or abrasive action. This warranty shall not apply to any Products or parts of Products that (a) used or operated in any application outside the stated specifications or design limitations of said Products; or (b) have been damaged or in any way altered due to misuse, negligence or accidents; or (c) have been repaired or altered in any manner outside of MLI factory, unless by express authorization of MLI; or (d) have been used in a manner contrary to MLI instructions or recommendations, including without limitation with respect to site preparation, maintenance or environmental conditions. **MLI MAKES NO OTHER REPRESENTATIONS OR WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. IN NO EVENT SHALL MLI BE LIABLE FOR ANY DELAY, INCONVENIENCE, WORK STOPPAGE, CARTAGE, SHIPPING, LOSS OF USE OF EQUIPMENT, LOSS OF TIME, INJURY OR DAMAGE TO ANY PERSON, DEATH OF ANY PERSON, LOSS OF PROFITS OR ANY DIRECT OR INDIRECT INCIDENTAL OR CONSEQUENTIAL LOSS OR DAMAGES RESULTING FROM OR ATTRIBUTABLE TO THE USE OF THE PRODUCT.** The sole obligation of MLI under this warranty is to repair or replace, at MLI option, any Product or any part or parts thereof found to be defective. MLI makes no warranties, express or implied, for any goods not manufactured or developed by MLI and shall assign to Buyer any warranty for such goods extended to MLI by the Manufacturer and Buyer shall look solely to such warranty in the event of a claim or action relating to such goods. Warranty period: 12 months from factory ship date.



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REV. 6/22/22

## AUTOMATIC TIMER FLUSH VALVE (ATF2)

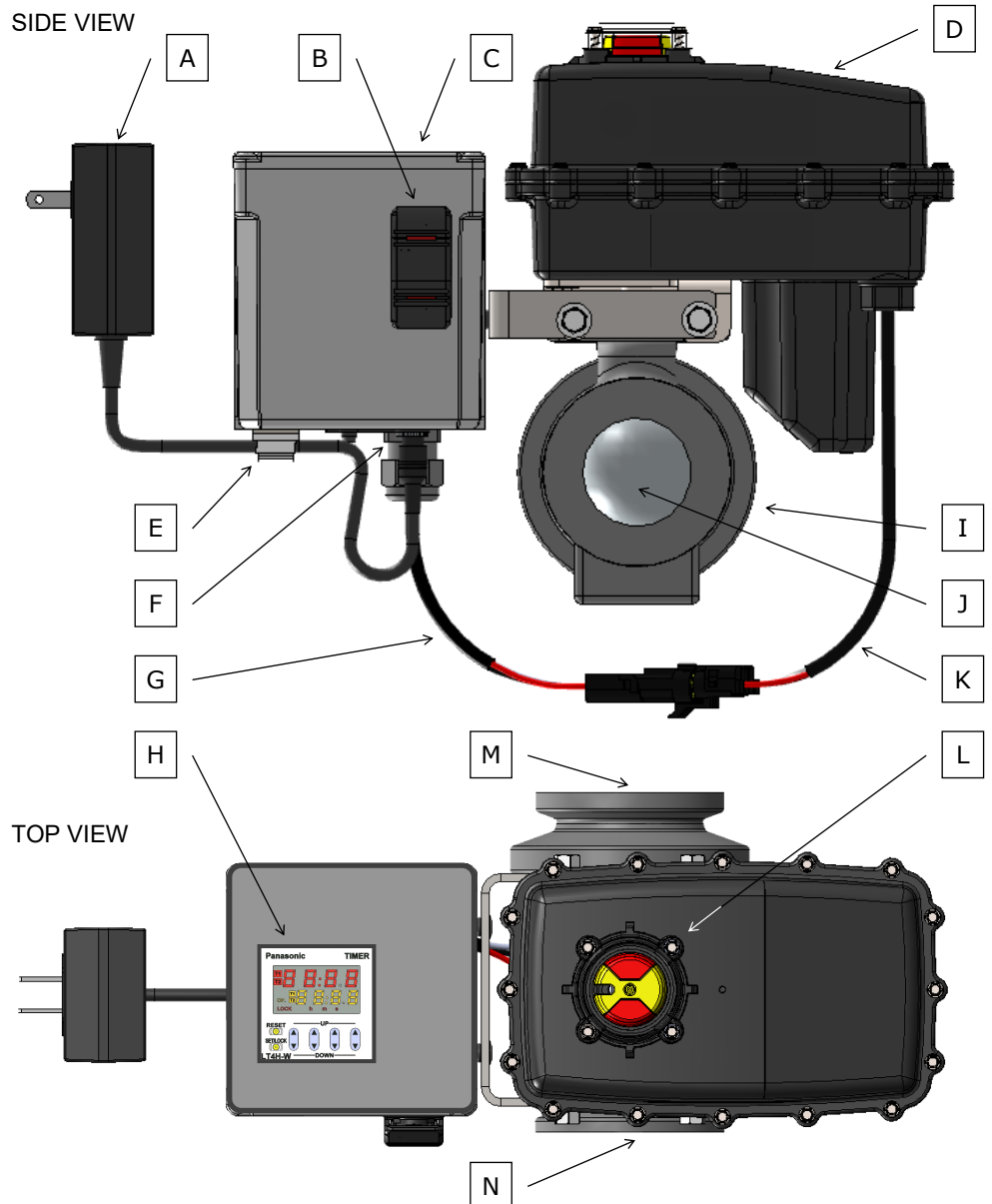
**Description:** The ATF2 is an automated flush valve that is designed for use with the “Thompson” Strainer. The ATF2 has a digital timer that allows the operator to set the frequency and duration of valve opening in order to allow more effective and efficient flushing of the collected debris from the strainer.

**Control Box:** The digital timer is located inside a NEMA 4 enclosure that includes an Auto and Manual Valve function switch.

**Ball Valve/Actuator:** The valve body has a 316SS ball inside a UV modified, glass-filled Nylon housing. The actuator has high torque motor gears and solid state components for increased durability and maintenance free performance contained inside a NEMA6P enclosure.

### Primary Components:

A	POWER SUPPLY
B	CONTROL TOGGLE SWITCH, 3-POSITION, LIGHTED
C	CONTROL BOX
D	ACTUATOR HOUSING
E	POWER CORD CLIP
F	POWER SUPPLY JACK
G	ACTUATOR CABLE
H	DIGITAL TIMER (inside control box)
I	VALVE HOUSING
J	STAINLESS STEEL BALL
K	CONTROL BOX CABLE
L	VALVE POSITION INDICATOR, LIGHTED
M	INLET PORT
N	OUTLET PORT





## SAFETY CONSIDERATIONS / HAZARDS



**ELECTRICAL SHOCK HAZARD.** This device receives power from a 120VAC power source. The power supply must be plugged into a circuit breaker protected receptacle that is designed for use in outdoor/wet locations. Any required electrical work must be performed by a qualified electrician and must comply with all local, state and national electrical codes.



**PINCH POINT HAZARD.** Keep fingers away from valve opening to avoid getting caught in the moving parts. The electric motor supplies a sufficient amount of power to cause personal injury.

## INSTALLATION

### Installation for ATF2 purchased pre-installed on a strainer

1. Ensure the Control Toggle Switch is in the OFF (middle) position. You can push once toward MANUAL FLUSH and the switch will automatically return to the OFF position.
2. Remove Power Supply from packaging.
3. Insert the 2.1mm power supply connector into the power supply jack on the bottom of the control box and run the wire through the power cord clip on the bottom of the control box.
4. Plug the power supply into an appropriate 120 VAC electrical receptacle.
5. When power is connected, the Valve Position Indicator will glow red indicating that the valve is closed.

### Installation for ATF2 purchased separately to install on strainer

1. Thread the inlet of the valve onto the flush port of the strainer. The control switch is located on the outlet side of the ATF2 package and should be facing away from the strainer when properly installed. Use caution to avoid cross threading which can damage the valve.
2. Follow installation instructions 1 through 5 above.

### Optional Power Input

If used in conjunction with the Pressure Differential Alarm (PDA or PDA2) package you have the option to power the ATF2 by connecting a ML10808 Twisted Cable Power Connector from the Power Port Jack on the PDA/PDA2 control box to the Power Supply Jack on the bottom of the ATF2 Control Box. Route the coiled cord through the Power Cord Clip.



**IMPORTANT:** Any piping connected to the outlet of the valve must be plumbed to atmosphere. The flush line must not be elevated away from the strainer and must not be piped into a pressurized line. The Valve and Control Box are water-resistant but not water-proof. Do not install in a location where the ATF2 can be submerged in water. Only remove the cover plate for programming. Keep cover tightly sealed at all other times.

## OPERATION

### GENERAL

The digital timer is set at the factory to initiate an 8 second flush sequence every 24 hours. Review the operational characteristics of your application and program the timer with a flush duration and frequency that best suits your needs. Set the timer to allow longer run time and improved performance of the strainer. The amount of debris stopped by the strainer can vary over time with changing conditions, it is important to routinely check and inspect your system to ensure that too much debris does not accumulate in the strainer which could result in equipment damage. The valve is configured as normally closed; however, in the event of an extended power failure while the valve is fully or partially open, the actuator will be unable to power back to fully closed position. This could result in water continuing to drain from the strainer until power is restored. It is important to inspect this equipment routinely to ensure that the ATF2 has power and nothing is preventing the ball from fully closing. The valve position indicator on the top of the actuator can be used as a visual aid to determine the position of the ball.

### MANUAL OPERATION AND INDICATORS



#### **Control Toggle Switch, Lighted**

The valve can be opened for a manual flush by pressing and holding the bottom of the Rocker Control Switch located on the Control Box. The lower part of the switch will illuminate red in this position. The valve will remain open only while the switch is being held down. Once the switch is released it will return to "OFF" position the valve will rotate back to closed position. Automatic Flushing will not occur until the switch has been placed in "AUTO TIMED FLUSH" position and the timer has been programmed. The manual flush control switch can also be used to conveniently drain the water out of the strainer before removing the conical screen element from the strainer housing. Isolate the strainer and utilize the pressure relief port on the lid in order to drain the strainer.



#### **Valve Position Indicator, Lighted**

A yellow indicator arrow on top of the Actuator Housing will rotate in sync with the ball valve to show the valve position. When cutout on the yellow indicator is inline with the flush pipe, the valve is open and the indicator will glow with green light. When the cutout on the yellow indicator is tangent to the flush pipe, the valve is closed and the indicator will glow with red light.

# AUTOMATIC PROGRAMMING INSTRUCTIONS

## Preparation for Use

1. Check that the ATF2 has power, the Valve Position Indicator is glowing red (Closed) and the Control Switch is in the OFF position.
2. Check that the valve is operational by momentarily pressing the MANUAL FLUSH end of the Control Switch. A red indicator light on the lower part of the switch will be visible and the valve will open. The valve will remain open as long as the switch is held in the MANUAL FLUSH position. The valve will return to closed position when the button is released.
3. Press the AUTO FLUSH end of the Control Switch allow the Timer to control the actuation of the valve. A red indicator light on the top part of the switch will be visible.
4. Once in AUTO FLUSH mode, the Timer will begin running the last programmed Flush & Duration sequence

## General Display

Elapsed Time will display in red on the top half of the screen.

When T1 (red) is visible the Timer is showing the time (in Hours: Minutes) until the next Flush begins.

When T2 (red) is visible the Timer is showing the time (in Seconds) until the current Flush ends.

The red T1 and T2 lights will flash once per second while they are displaying the elapsed time of either function.

Set Time will display in amber on the lower half of the screen

When T1 (amber) is visible, the Timer is in FREQUENCY edit mode. The operator can adjust the time (Hours:Minutes) until next Flush

When T2 (amber) is visible the Timer is in DURATION edit mode. The operator can adjust the time (Seconds) of the Flush cycle.

The amber "OP." light will display when the flush cycle is active.

## FREQUENCY (T1) Programming

Use the SET/LOCK button to toggle between T1 and T2 programming.

When T1 (amber) is visible, the Timer is in "Frequency" edit mode.

Use the UP/DOWN DIGIT toggle buttons to select the hour(s) and minute(s) of time between flush cycles.

- Digit Toggle #1 changes frequency of flush in ten (10) hour increments.
- Digit Toggle #2 changes frequency of flush in one (1) hour increments.
- Digit Toggle #3 changes frequency of flush in ten (10) minute increments.
- Digit Toggle #4 changes frequency of flush in one (1) minute increments.

When time has been selected, push the RESET button to save the setting and begin the new cycle

Example - the Factory Setting will display as 24:00. Pushing #1 down twice, pushing #2 up one time, pushing #3 down two times, and pushing #4 up five times will change the Frequency of flush cycle to every five hours and forty-five minutes (5:45)

When the preferred time has been selected, push the RESET button to save this time to memory.

## DURATION (T2) Programming

Use the SET/LOCK button to toggle between T1 and T2 programming

When T2 (amber) is visible, the Timer is in "Duration" edit mode.

Use the UP/DOWN DIGIT toggle buttons to select the seconds of time between flush cycles.

- Digit Toggle #1 changes duration of flush in one thousand (1000) second increments.
- Digit Toggle #2 changes duration of flush in one hundred (100) second increments.
- Digit Toggle #3 changes duration of flush in ten (10) second increments.
- Digit Toggle #4 changes duration of flush in one (1) second increments.

When time has been selected, push the RESET button to save the setting and begin the new cycle.

Example - the Factory Setting will display as 8. Pushing the #1, #2, #3 digit buttons up once and the #4 digit button up twice will change the duration of the flush cycle to one thousand one hundred and ten (1110) seconds or 18.5 minutes.

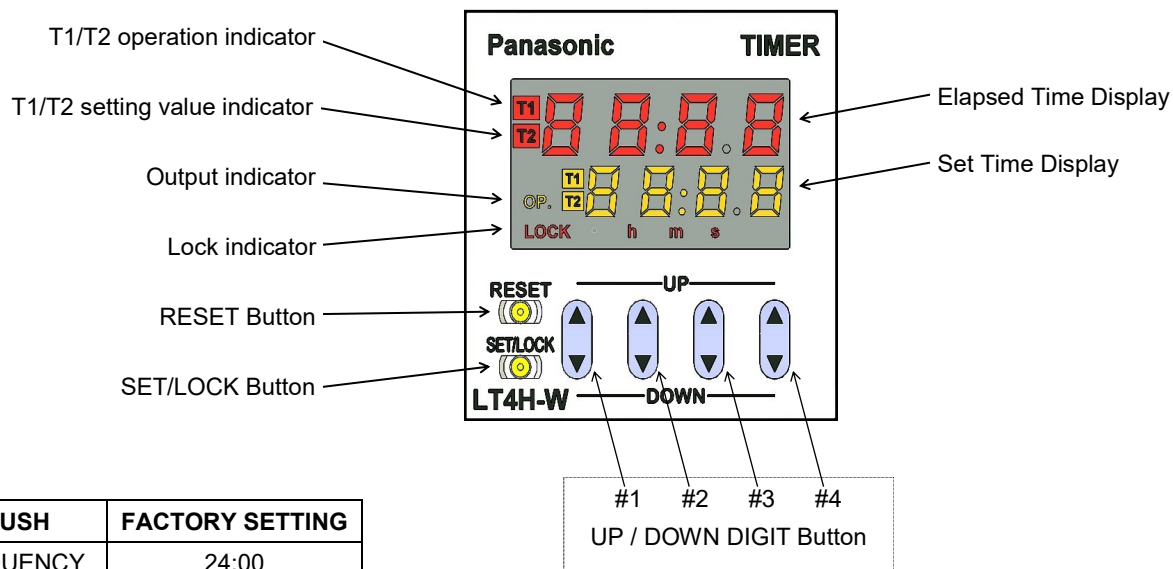
**Valve Cycle Time:** The cycle time of the valve, the time it takes to rotate from closed to open and back to closed, is approximately 8 seconds and the ball will only be fully open briefly in between the opening and closing function. To have the ball remain fully open for 10 seconds, set the Duration of the flush to be 18 seconds (4 seconds of opening time, 10 seconds fully open, 4 seconds of closing time).

## ADDITIONAL FUNCTIONS

**RESET TIMER** - Press the RESET button at any time to restart the T1 / Frequency timer.

**LOCK OUT** - Press and hold the SET/LOCK button and the DIGIT #1 button at the same time to enter "Lock" mode. The amber "LOCK" button will show on the display screen and all buttons will be disabled. Repeat to unlock this function.

## DIGITAL TIMER BUTTON AND DISPLAY INFORMATION



SYMBOL	FLUSH	FACTORY SETTING
T1	FREQUENCY	24:00
T2	DURATION	8

### DISPLAY

DISPLAY	VALVE CLOSED	VALVE OPEN
T1 OPERATION INDICATOR (RED)	Flashing once per second	Not Visible
T2 OPERATION INDICATOR (RED)	Not Visible	Flashing once per second
ELAPSED TIME DISPLAY (RED)	Hours:Minutes until flush begin	Seconds until flush end
OUTPUT INDICATOR(AMBER)	Not Visible	Visible

DISPLAY	SETTING FUNCTION
SET TIME DISPLAY (AMBER)	Displays either T1 or T2 Set Value. Use SET/LOCK button to toggle between
T1 SET VALUE INDICATOR (AMBER)	Displayed when showing/editing T1 setting
T2 SET VALUE INDICATOR (AMBER)	Displayed when showing/editing T2 setting

### BUTTON

BUTTON	ACTION
RESET	Set time selections and Clear Flush
SET/LOCK	Toggle between T1 and T2 Setting . Lock screen (Push Lock and Digit 1 together)

BUTTON	T1 / FREQUENCY PROGRAMMING	T2 / DURATION PROGRAMMING
DIGIT 1	Adjust by 10 hour increment	Adjust by 1000 second increment
DIGIT 2	Adjust by 1 hour increment	Adjust by 100 second increment
DIGIT 3	Adjust by 10 minute increment	Adjust by 10 second increment
DIGIT 4	Adjust by 1 minute increment	Adjust by 1 second increment

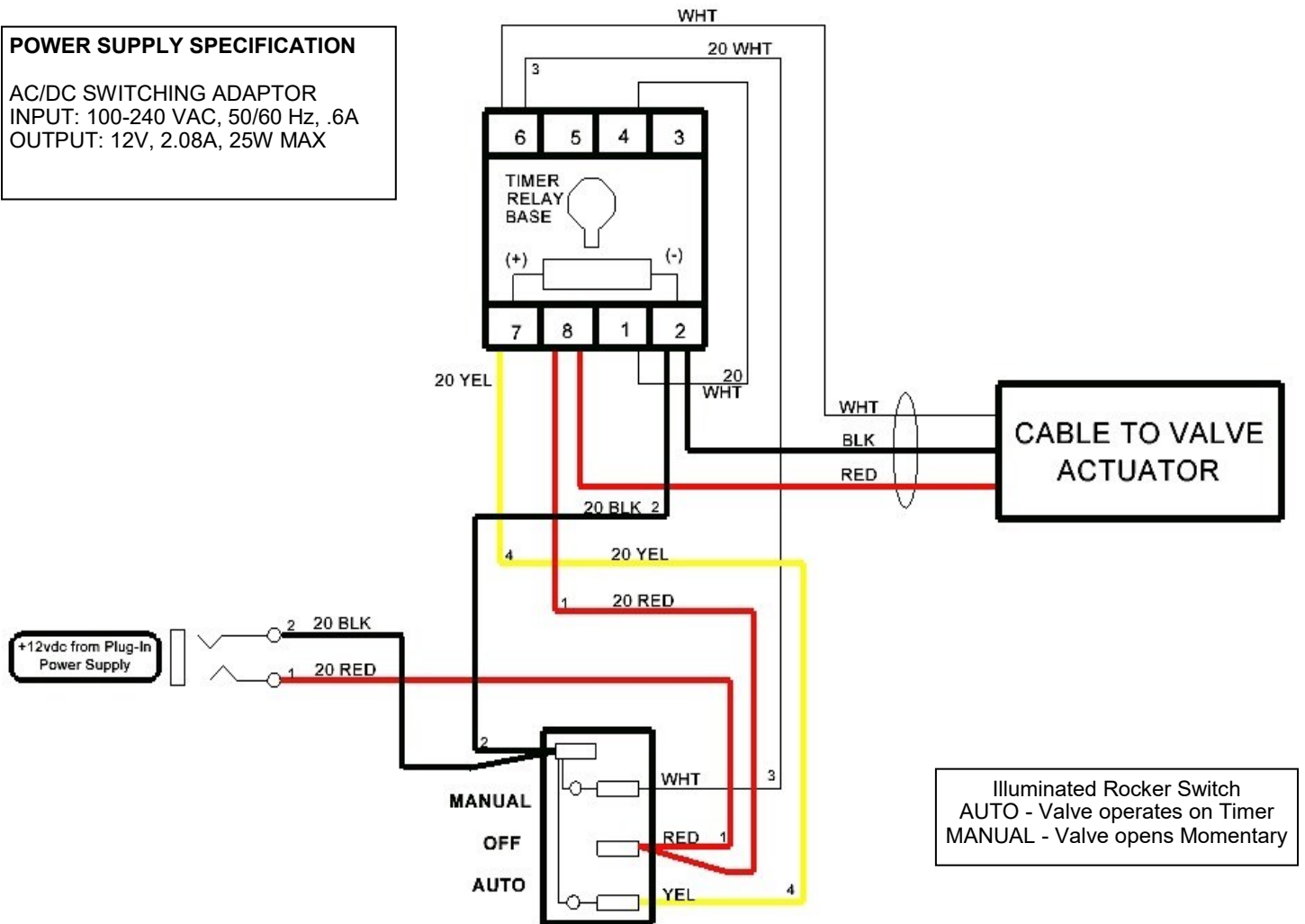
## ATF2 MODEL INFORMATION

MODEL NUMBER	NPT PIPE SIZE	VALVE BALL/BODY	MAXIMUM PRESSURE
ATF2-075	3/4"	316SS / Nylon	150 PSI @ 70 deg. F
ATF2-100	1"	316SS / Nylon	150 PSI @ 70 deg. F
ATF2-150	1-1/2"	316SS / Nylon	150 PSI @ 70 deg. F
ATF2-200	2"	316SS / Nylon	150 PSI @ 70 deg. F
ATF2-300	3"	316SS / Polypropylene	100 PSI @ 70 deg. F

## ATF2 WIRING SCHEMATIC AND POWER REQUIREMENTS

### POWER SUPPLY SPECIFICATION

AC/DC SWITCHING ADAPTOR  
 INPUT: 100-240 VAC, 50/60 Hz, .6A  
 OUTPUT: 12V, 2.08A, 25W MAX



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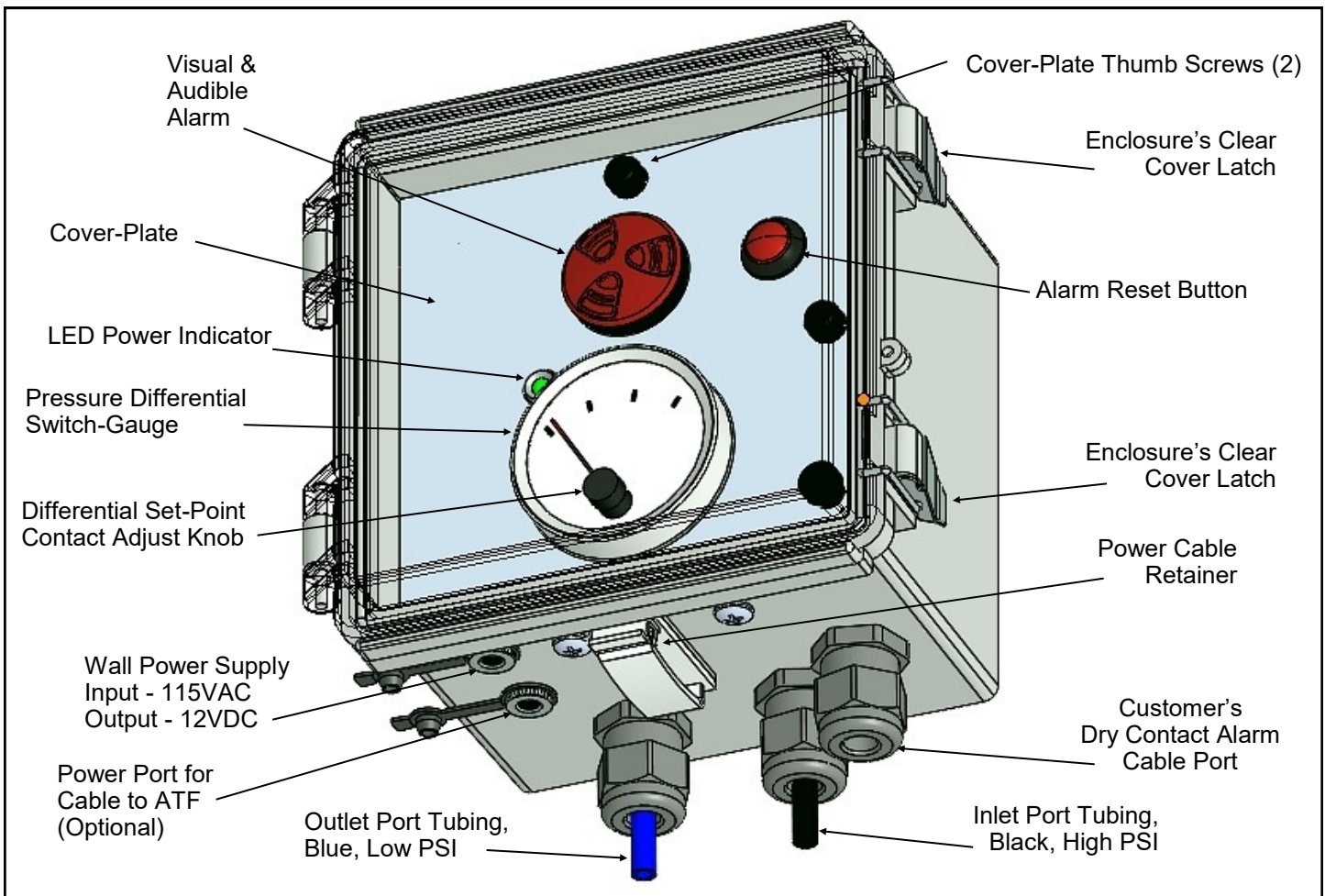
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REV. 6/28/22

## I. PRESSURE DIFFERENTIAL ALARM PACKAGE (PDA2)

**Description:** The pressure differential alarm package continually monitors and displays the strainer's inlet and outlet differential pressure. When the strainer element (conical strainer basket) becomes significantly clogged, the pressure differential switch-gauge will trigger an audible siren and a visual flashing alarm light. These alarms are intended to alert maintenance personnel that the strainer element must be removed and cleaned (see your *Thompson Strainer Owner's Manual* for complete strainer element cleaning instructions).

### PRESSURE DIFFERENTIAL ALARM PACKAGE OVERVIEW (PDA2)



#### Installation Instructions:

The following instructions are to be used as a guide when installing the PDA on to an existing Thompson Strainer

1. Place the PDA enclosure with the black bracket over the high and low gauge ports on the side of the strainer housing.
2. While applying pressure to the enclosure and bracket, tighten the (2) 10-24 stainless steel set screws to secure the bracket on the gauge ports.
3. Connect the blue 1/4" tube into the upper gauge port.
4. Connect the black 1/4" tube into the lower gauge port.

### **Operation Instructions:**

Remove the power supply from the box and insert the connector end into the socket on the bottom of the PDA housing, as indicated in the drawing above. Plug the power supply into a nominal 120VAC power outlet. Standard systems are supplied with a Wall Plug-In 12VDC Power Supply, with an input power of 120VAC.

**Please Note - In the case of an “Outdoor” use application, where there is a chance that the unit could get wet, it is the Customer’s responsibility to provide a safe power outlet, in terms of being water proof, and physically able to accept the plug-in power supply we provide. Miller - Leaman, Inc. also recommends that the installation be only performed by a qualified electrician, and that all Local, State, and National Electrical Codes be followed.**

The pressure differential switch-gauge is factory set to 7-8 PSI. Since the *Thompson Strainer* operates with less than 1 PSI loss during maximum flow when the strainer screen is clean, the differential shown on the switch-gauge will be 1 PSI. Therefore, by the time the differential pressure rises to 7-8 PSI, the strainer element will have become significantly clogged and will require immediate removal and cleaning.

To adjust the pressure differential switch-gauge to a lower setting, simply turn the small black knob to move the differential set-point contact (see illustration above) to the desired location.

**WE DO NOT RECOMMEND SETTING THE DIFFERENTIAL SWITCH-GAUGE HIGHER THAN 10 PSI. DISABLING THE ALARM OR INCREASING THE ALARM SET POINT COULD RESULT IN DAMAGE TO THE STRAINER ELEMENT AND ALLOW DEBRIS TO PASS INTO THE SYSTEM.**

The alarm will latch-ON when the differential set point is reached and will stay latched until the Reset button is pressed. (If the Reset button is pressed but the strainer remains beyond the acceptable differential pressure, the alarm will re-latch immediately). The purpose of the alarm package is to alert maintenance personnel that the strainer element requires cleaning. Therefore, if the Alarm Light is flashing, and has sounded, the strainer needs to be taken off-line and the strainer element needs to be cleaned as instructed in the *STRAINER ELEMENT CLEANING* section of the *Thompson Strainer Owner’s Manual*.

After the strainer is cleaned and put back in service, the differential pressure should be back to 1 PSI. If the switch-gauge indicates a 1 PSI differential but the alarm is still sounding, press the Reset button.

If you have any questions about the Pressure Differential Alarm Package, please call our product specialists at (386) 248-0500. You can also e-mail your questions to support@millerleaman.com.

## **II. GENERAL INFORMATION**

### **Alarm Output - Customer’s Dry Contact:**

See illustration on front page. The PC Board has been factory set up for a 12 VDC Output to the Relay 2 coil when the alarm activates. Relay 2 provides a Dry Contact for the optional use by the Customer. A cable strain relief port has been provided for the Customer’s wiring to this Dry Contact Alarm signal. A maximum switching power of 24VDC 0.5 Amp is recommended. (Please see the PDA2 Electrical Schematic below, on page 3 of this manual. If you have any additional questions please contact MLI at 386-248-0500 or e-mail support@millerleaman.com.)

### **Water Resistance:**

The Pressure Differential Alarm Controller is water-proof, but not submersible. Do not install below ground level where the box can be submerged in water. Keep the enclosure’s Clear cover latched during normal operation. Insure all strain reliefs have be properly tightened to maintain this Nema 4X integrity. Periodically check inside the enclosure, with the power disconnected, and the cover plate opened, for any signs of leakage.

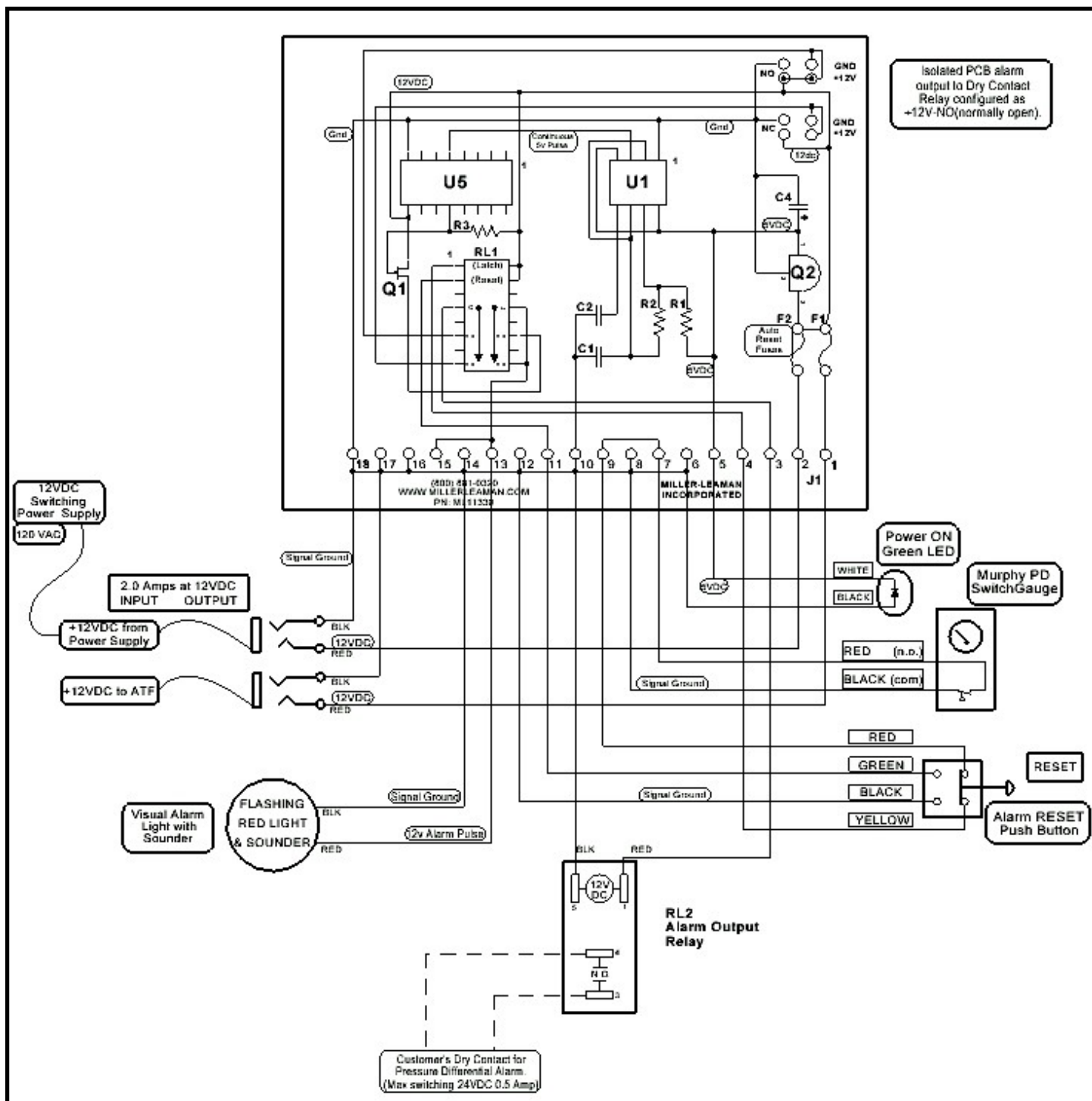
### **Miller-Leaman, Inc. Return Policy:**

Units in need of warranty repair and less than 90-days old, must be returned to MLI accompanied by a Return Material Authorization (RMA) number. To request a RMA number call (386) 248-0500.

### **Maintenance:**

The PDA alarm should be checked on a routine basis by contacting the differential set-point (see illustration on first page) so that the audible and visual alarm engages and the alarm-reset button deactivates the alarms.

### III. PDA2 WIRING SCHEMATIC



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