THOMPSON STRAINER SCREEN FILTER - OPERATION MANUAL

The Thompson Strainer Screen Filter is a highly efficient, stainless steel strainer which features a large conical screen offering substantially more screen surface area versus traditional basket or "Y" strainers. As water enters the bottom of the strainer housing and flows upward, heavier debris and particulate is accelerated downward, away from the conical screen, into the large debris reservoir at the base of the strainer. Particulate can be flushed from the reservoir via the flush port either manually or automatically with optional flush package. All models operate with less than 1-psi pressure loss at maximum flow when clean.

Serial # _____

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

Table of Contents

SAFETY CONSIDERATIONS

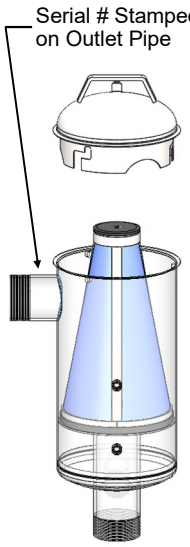
⚠	**GENERAL WARNING**
	Ensure all appropriate personnel read operation manual prior to installation and/or operation of strainer. Review procedures for safe operation of this equipment specific to your application. Failure to comply with instructions and safety precautions could lead to personal injury or product damage.
⚠	**CAUTION**
	Personal Protective Equipment (PPE) - eye protection, ear protection, gloves, and protective footwear - must be worn when operating and servicing the strainer.

1. **DO NOT EXCEED THE MAXIMUM RATED PRESSURE OR TEMPERATURE OF THE STRAINER.** Refer to decals located on the strainer or obtain an official product specification based on strainer Model and Serial Number.
2. **Do not attempt to remove the strainer lid, or any connected device while the strainer is pressurized.**
3. **Do not operate strainer with damaged or missing parts.**
4. Do not suspend the strainer by the inlet and outlet connections. All strainers with vertical inlet piping must be plumbed into properly supported piping. All strainers with a side inlet and bottom foot ring must be placed on a stable supporting surface.
5. Back-flow prevention devices should be installed upstream of the inlet and downstream of the outlet of the strainer to prevent back flow or vacuum effects that can be damaging to the strainer.
6. Pressure relief valves of a sufficient size and volume should be installed upstream of the inlet and downstream of the outlet of the strainer. Pressure relief valve settings should never exceed the maximum rated pressure. Failure to install relief valves could lead to personal injury or product damage.

RECEIVING & INSTALLATION

1. Inspect strainer to ensure no damage has occurred during transportation.
2. Confirm all connection plugs and protectors are removed.
3. Locate serial number on top of outlet flange or pipe (see diagrams below) and record in the box on page 1.
4. Plumb the strainer into the piping system; red arrows located on the inlet and outlet pipe indicate flow path.
5. Do not suspend the strainer by the inlet and outlet connections. All strainers with vertical inlet piping must be plumbed into properly supported piping. All strainers with a side inlet and bottom foot ring must be placed on a stable supporting surface.
6. Installation of isolation valves on the inlet and outlet of the strainer is recommended to isolate the strainer for maintenance.
7. Install a valve on the flush port located at the bottom of the strainer body (see diagram below). The valve must be plumbed to atmosphere and the flush line should not have any elevation or be piped to a pressurized line. Ensure flush line is plumbed to prevent operator from contact with flush water.
8. Install pressure gauges or other pressure monitoring devices (sold separately) in the gauge ports located on the strainer body (see diagram below) to allow monitoring of the pressure differential across the screen.
9. Utilize air relief port located on the strainer lid (see diagram below) to aid in draining the strainer and for pressure relief prior to opening the lid. Standard equipment ships with hex plug or install optional air relief valve (sold separately).
10. Ensure all strainer ports are properly connected.
11. Ensure the lid is properly installed. See diagram below and Section “Torque Recommendations” for instructions.
12. The strainer is not freeze protected. Proper freeze protection methods must be utilized to ensure the strainer will not be damaged if exposed to freezing conditions.

CLAMP LID MODEL



Clamped Lid Operating Instructions:

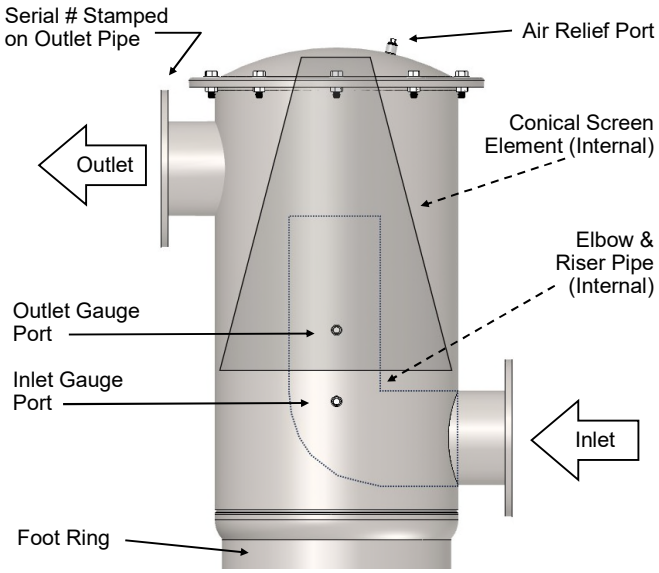
To Close -

- Align vertical slots in the lid assembly with the pins inside the housing.
- Lower the lid assembly until it can be rotated.
- Rotate the lid assembly clockwise to stop. The head will drop into a locked position and should be unable to be removed by pulling straight up.
- Install the V-Band clamp.

To Open -

- Remove the V-Band clamp.
- Using the handle on top of the head; pull up and rotate the lid assembly counter-clockwise until the head is free from the locking pins.

BOLT LID MODEL



STRAINER OPERATION, MAINTENANCE, & STORAGE

CAUTION

The internal pressure of the strainer must be relieved to zero before removing the retaining bolts or clamp of the lid.

Start Up

Ensure air relief port, gauge ports and flush port are all plumbed and installed valves are in closed position. Open valve on the outlet/ downstream side of the filter. Open valve on inlet/upstream side of the filter allowing water to fill and flow through the strainer.

Flushing

Periodically, debris that settles in the reservoir at the bottom of the strainer must be removed. Open the flush port valve while the strainer is in operation to expel accumulated debris. The frequency and duration for opening the valve must be determined by the operator and may vary depending on flow rate, pressure and amount of debris. Debris that does not flush out must be removed manually. **Never allow debris to accumulate beyond the capacity of the reservoir.**

STRAINER OPERATION, MAINTENANCE, & STORAGE

Cleaning

A pressure differential of approximately 5-7 PSI from the clean condition indicates that the screen requires cleaning.

1. Remove strainer from service by closing system valves to ensure no flow or pressure.
2. Check gauges to ensure the internal pressure of the strainer is relieved before removing the retaining bolts/clamp of lid.
3. Open flush port valve to drain fluid from strainer and relieve strainer pressure.
4. Open air relief valve to break vacuum for faster draining and to relieve any remaining strainer pressure.
5. Remove the lid of the strainer.
6. Lift the strainer element (conical screen) out of the strainer body.
7. Carefully scrub the strainer element with a rigid nylon brush to loosen and remove debris. **Do not use a wire/steel brush.**
8. Rinse the strainer element with clean water. **Do not use a pressure washer.**
9. Rinse debris from gaskets and the inner ring inside the housing where the bottom of the strainer element seats.
10. Fit the Filter Gasket (U-shape) securely to the bottom of the screen and position, centered, on the inner ring of the strainer body.
11. Install the Head Gasket or O-Ring and follow instructions in "Torque Recommendations" section.
    - Bolted lid models: fit the strainer head gasket onto the upper flange of the top of the housing
    - Clamp lid models: seat the O-Ring firmly up against the flange of the head assembly.
12. Ensure any attached flush port and air relief port devices are in closed position before returning strainer to service.

Storage (Not in Service)

For storage or extended downtime, follow these steps to prevent premature deterioration of the strainer housing and screen

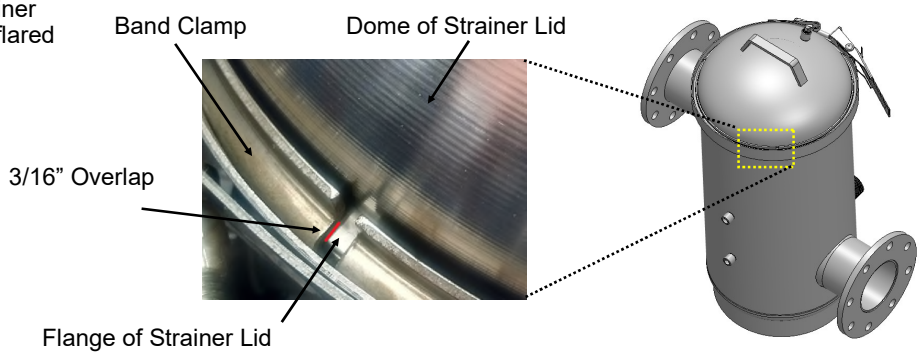
- Isolate the strainer to ensure no flow and release pressure.
- Drain the strainer body by opening the flush port. Remove the internal screen and gaskets; rinse with clean fresh water. Rinse out the inside of the strainer body with clean fresh water and remove any excess water. Replace all components securely when completely dry.

TORQUE RECOMMENDATIONS

BAND CLAMP MODELS:

The over-center latch clamp is used to secure the lid to the housing on clamp lid models. Replacement clamps are shipped with the lock nut not pre-set and must be adjusted upon installation. Under no conditions should the strainer lid or pressure gauges be removed while the strainer is pressurized. Clamp installation instructions: Ensure O-Ring is properly installed on the lid. Place the lid on the strainer housing, align pins with slots in the lid, and twist to lock into place. Place the clamp around the flared edges of the housing and lid. Latch the T-bolt with the receiver. Push the latch handle towards the strainer body until the safety catch engages.

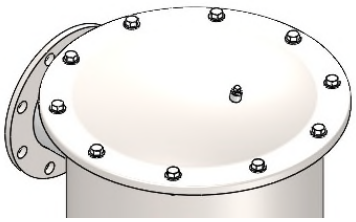
Adjust the lock nut until the clamp Inner Retainer fits securely and is fully engaged around the flared edges of the lid and housing flange.
The engagement can be inspected at the separation gaps of the Inner Retainer and should have a minimum of 3/16" overlap onto the flange of the strainer lid (see diagram).
Reclip safety warning tag to the clamp.



BOLTED LID MODELS:

Bolted lid models require that the attachment bolts be tightened sufficiently to make a complete seal without damaging the bolts or the strainer head. Bolts, nuts and washers are used to attach the heads to these strainers. The following table shows the bolt size and torque rating for each strainer. **NEVER** operate the strainer unless all bolts are properly fastened. It is important to follow the torque recommendations as over-torqueing may result in premature failure of the bolt. Tighten and torque bolts in an opposing pair "star" pattern according to ASME PCC-1-2019 Guidelines for Pressure Boundary Bolted Flange Joint Assembly or MIL-HDBK-60 Threaded Fasteners Tightening to Proper Tension.

Model	Bolt Size	Bolt Quantity	Torque
4" Bolted	(3/8"-16)	10	15 to 25 ft. lbs.
6"	(1/2"-13)	10	45 to 55 ft. lbs.
8"	(1/2"-13)	16	45 to 55 ft. lbs.
10" / 12" / 14"	(5/8"-11)	20	80 to 100 ft. lbs.



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 down stream 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 greater the time required to shut the valve safely. 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. A water hammer pressure spike that raises the pressure higher than the maximum rated pressure of the strainer may result in strainer damage.

WHAT CAN I DO TO PREVENT WATER HAMMER?

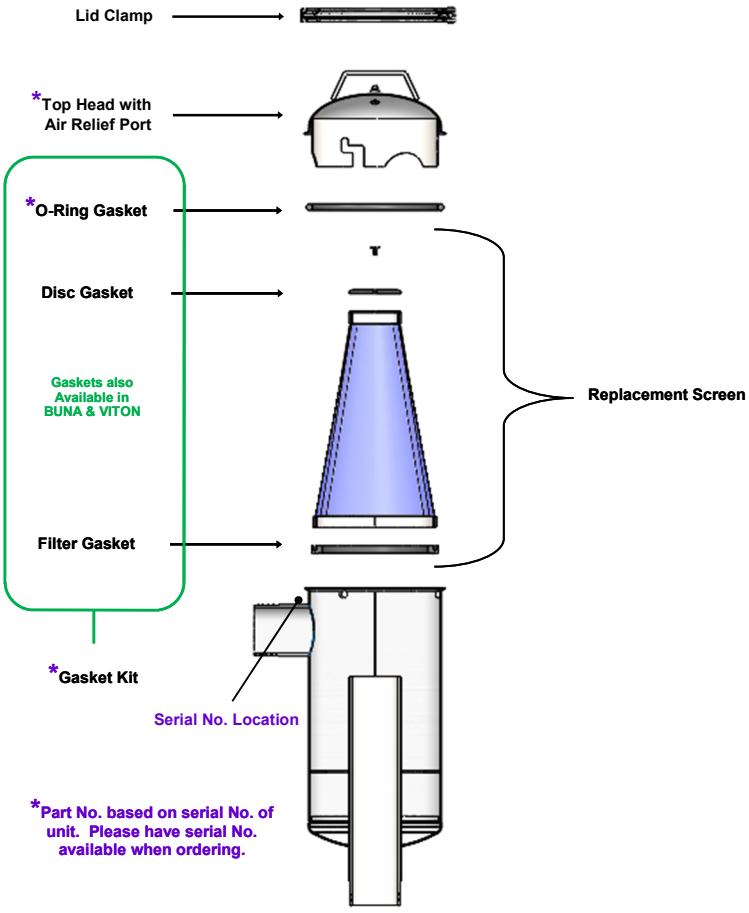
There are precautions that can be taken to prevent or decrease the effect of water hammer. A pressure relief valve that leads to a surge tank or accumulator may protect other key components from water hammer. A close adherence to operational policies will also help prevent valves or pumps from being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

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 are (a) used or operated in any application outside the stated specifications or design limitations of said Products; or (b) damaged or in any way altered due to misuse, negligence or accidents; or (c) repaired or altered in any manner outside of MLI factory, unless by express authorization of MLI; or (d) 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: Strainer Housing, 12 months from factory ship date & Strainer Screen, 3 months from factory ship date.

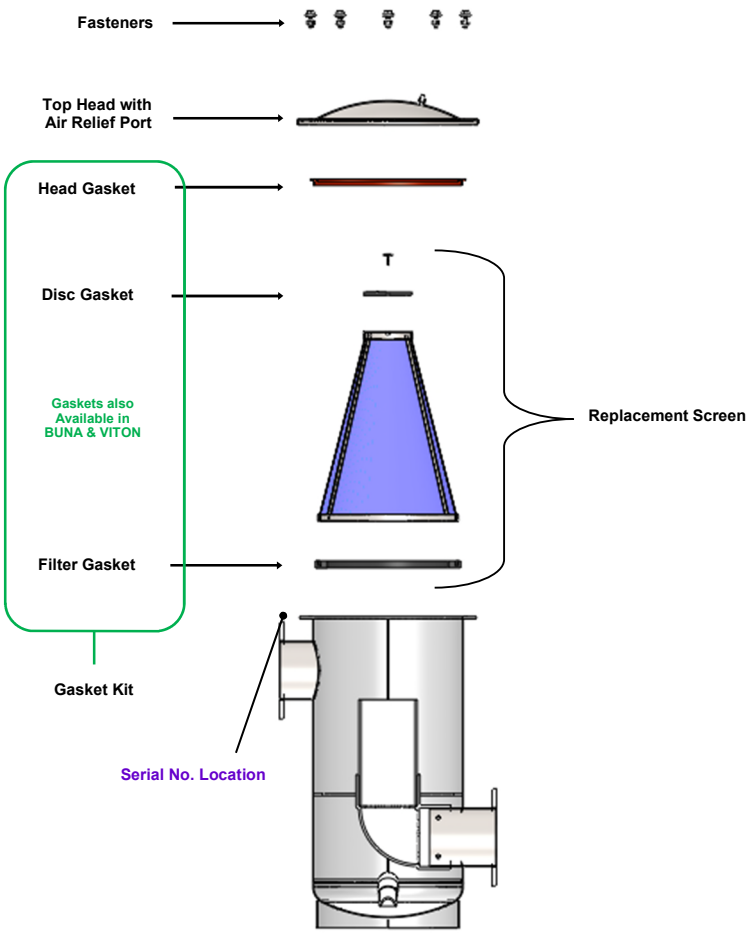
SPARE PARTS

Clamp Lid Models



*Part No. based on serial No. of unit. Please have serial No. available when ordering.

Bolted Lid Models



	STRAINER		REPLACEMENT PARTS						
	Model Number	Inlet/Outlet Size & Type *	Replacement Screen (a)	Head/O-Ring Gasket (EPDM)	Filter Gasket (EPDM)	Disc Gasket (EPDM)	Gasket Kit (b) (EPDM)	Top Head	Lid Clamp or Fasteners
BAND CLAMP LID	MLS-02-XXX	2" NPT	P/N: 2S-XXX	OR-02 / OR-02-2 (Select P/N from Table 1)	FG-02	DG-02	GK-02 / GK-02-2 (Select P/N from Table 1)	TH-02 / TH-02-2 (Select from Table 1)	BC-02
	MLS-03-XXX	3" NPT	P/N: 3S-XXX	OR-03 / OR-03-2 (Select P/N from Table 1)	FG-03	DG-03	GK-03 / GK-03-2 (Select P/N from Table 1)	TH-03 / TH-03-2 (Select from Table 1)	BC-03
	MLS-04C-XXX	4" Flanged	P/N: 4S-XXX	OR-04 / OR-04-2 (Select P/N from Table 1)	FG-04	DG-04	GK-04 / GK-04-2 (Select P/N from Table 1)	TH-04C	BC-04
BOLTED LID	MLS-04B-XXX	4" Flanged	P/N: 4S-XXX	HG-04	FG-04	DG-04	GK-04B	TH-04B	FASTENERS-04
	MLS-06-XXX	6" Flanged	P/N: 6S-XXX	HG-06	FG-06	DG-06	GK-06	TH-06	FASTENERS-06
	MLS-08-XXX	8" Flanged	P/N: 8S-XXX	HG-08	FG-08	DG-08	GK-08	TH-08	FASTENERS-08
	MLS-10-XXX	10" Flanged	P/N: 10S-XXX	HG-10	FG-10	DG-10	GK-10	TH-10	FASTENERS-10
	MLS-12-XXX	12" Flanged	P/N: 12S-XXX	HG-12	FG-12	DG-12	GK-12	TH-12	FASTENERS-12
	MLS-14-XXX	14" Flanged	P/N: 14S-XXX	HG-14	FG-14	DG-14	GK-14	TH-14	FASTENERS-14

REPLACEMENT PARTS NOTES:

(a) Replacement Screen includes: Screen, Filter Gasket (U-Gasket, bottom of screen), & Disc Gasket (top of screen).

(b) Gasket Kit includes complete set for Strainer: (1) Head Gasket or O-Ring, (1) Filter Gasket, & (1) Disc Gasket.

Table 1

Select O-Ring, Gasket Kit, and/or Top Head corresponding to serial number stamped on strainer outlet pipe/flange.

Model	Serial No.	Part Number	Serial No.	Part Number
MLS-2	0001-4999	OR-02 / GK-02 / TH-02	5000 & higher	OR-02-2 / GK-02-2 / TH-02-2
MLS-3	0001-1999	OR-03 / GK-03 / TH-03	2000 & higher	OR-03-2 / GK-03-2 / TH-03-2
MLS-4C	0500-1999	OR-04 / GK-04	2000 & higher	OR-04-2 / GK-04-2

SCREEN OPTIONS: "XXX" (in above part numbers) = MESH or PERFORATED SIZE of SCREEN

Complete Filter and Replacement Screen orders must specify mesh or perforated size of screen. See catalog for micron equivalent to mesh.

Screen Mesh Options: Standard Mesh - **16, 20, 30, 40, 50, 60, 80, 100, 120, 150, 200**

Heavy-Duty Mesh - 24x110, 30x150, 40x200, 50x250 (Dutch-weave screens: heavier wire gauge, lower open area %)

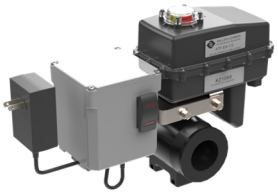
Perforated Options: **1/4", 1/8", 1/16"**

OPTIONAL EQUIPMENT

The following equipment is available for purchase separately from this strainer. Please call for information and pricing.

PDA/ATF-MAX-150 - Powered By Maxim

- Combines the ATF2-150 with the MAXIM controller PLC and pressure transducers to monitor the differential pressure.
- Adjustable PSID alarm set point triggers audible siren and flashing red light alarms as well as actuate the ATF package that purges particles from bottom reservoir.



Automatic Timer Flush Package (ATF2-150)

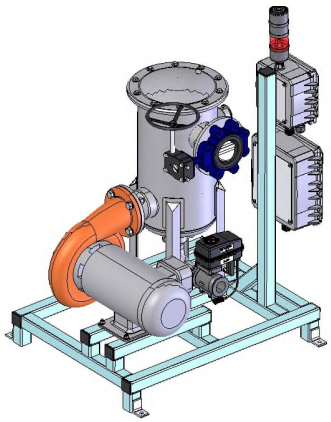
- Purges particles from strainer at operator-defined intervals
- Adjustable Flush Frequency
- Adjustable flush Duration

Pressure Differential Alarm Package (PDA2)

- Monitors Differential Pressure
- Audible and Visual Alarm
- Auxiliary Contacts for BMS Monitoring

***Full Cone* Spray Nozzle Assembly Option**

- Nozzle flush design
- Rinses particles off the screen without removing
- Decreases frequency of screen maintenance
- Custom design to meet your applications



Skid System

- Flow Rates: 50 - 2,000 GPM Pump Skids
- Stainless Steel Strainers, Screens, Piping, and Skids
- Perf Screen to 250-Mesh/55 Micron
- Maxim Controller, Transducers, Pressure Differential Alarm, Automatic Timer Flush

MILLER LEAMAN

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