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MS1243

Air Eliminator



Used in MS1243A & MS1246A Assemblies
(WM10 & WM40 Models)

Principle Operation & Maintenance Manual



Warning Symbols



CAUTION

Follow the warning instructions within the following information to avoid equipment failure, personal injury or death.



TURN POWER OFF

Before performing any maintenance, be sure to turn system power off to avoid any potential electric spark



FLAMMABLE

Flammable liquids and their vapors may cause a fire or explosion if ignited.



EYE PROTECTION

Pressurized systems may cause hazardous leaks and spray that may be dangerous for your eyes. Always wear eye protection around pressurized systems and its hazardous liquids.



INJURY

Wear gloves for protection from hazardous liquids that may cause irritation or burns.



READ

Read and understand all related manuals thoroughly. The Engineering and OIM manuals will provide the knowledge for all

MS1243 Air Eliminator

An air eliminator is a device designed to extract free or accumulated volumes of air or vapor from a liquid dispensing system to achieve accurate measurement results. Each air eliminator must be vented back to a storage tank or into a special “catch” tank vented to atmospheric pressure as the air or vapor released will contain a small amount of liquid.

The Macnaught MS1243 series air eliminator mechanism is a reed curtain valve consisting of two stainless steel reed strips operating in conjunction with a valve plate. One end of each reed is fastened to a float and the other is attached to the housing. The counter balancing reeds allow the float to have maximum sensitivity of air or vapor present in the system. The float assembly is normally closed when air or vapor is absent from the liquid. The float assembly opens when free air or vapor accumulates in the housing. The displacement of the air or vapor lowers the liquid level within the housing, dropping the float and releasing the air or vapor out of the orifice on the valve plates. The efficient design of the float and valve plate assembly allow the air eliminator mechanism to operate at zero or maximum pressure, without stress or fatigue. The MACNAUGHT MS1243 air eliminator mechanism will release approximately 80CFM (cubic feet per minute) at full capacity.



MS1243 Air Eliminator

MS1243 Air Eliminator (Continued)

The efficiency of the air eliminator depends on the amount of backpressure against the air eliminator. If the backpressure at the air eliminator outlet is higher than the venting valve to the storage tank plus the diameter and length of the vent line, then the air eliminator will function correctly. The backpressure at the air eliminator will depend upon the pressure drop of the items downstream of the air eliminator. If the backpressure is not sufficient, some air can be allowed through the meter.

Additional restrictions down stream of the air eliminator may be in the form of orifice plates or implementing a spring-loaded wafer check valve between the air eliminator and flow meter.

The specification of air elimination varies greatly on the design of each system and the potential source of the air in the line. Once free air becomes encapsulated in the fluid, particularly at high flow rates, the air will simply be carried along through the meter, as the air eliminator cannot remove this encapsulated air. There are several factors that must be considered for proper air elimination; types of pumps, vacuum seal leaks, above and below ground tanks, receiving and delivering pipelines, etc.

It is far better to avoid pumping any air or vapor than to attempt to separate and remove it after it has been mixed with the liquid in the pump. Avoid designing a system that receives and dispenses product through the same flow meter or purging the lines before the system sits idle. Each system should have a dedicated meter and a way to refill purged lines without introducing air into the meter.

The choice of pump to be used can effect the amount of air or vapor that is introduced into the system. A centrifugal pump normally requires the MS1243-air eliminator for nominal air present in the system. Centrifugal pumps internally bypass product when a valve is closed down stream, this is an inherent safety feature of centrifugal pumps. However if the RPM of the motor is more than required, the centrifugal pump may cavitate and create encapsulated air within the operating system. The suggestion would be to reduce the motor RPM rather than use the a bulk air eliminator.

A positive displacement pump, will move any air that is in the system. A meter can have multiple problems if the rotary or gear pump is installed incorrectly. Cavitation, pump pressure and mechanical seal leaks are common among these problems. Higher flow rates for products that “foam”, such as #2 fuel oil or kerosene, tends to be a problem for air eliminators to operate efficiently. Turning down the pump pressure to reduce the agitation of the product will help reduce encapsulated air or vapor in the system. On PTO driven pumps, install an engine control device (throttling valve) that regulates the flow of liquid based on

MS1243 Air Eliminator Types

SP - Standard Petroleum

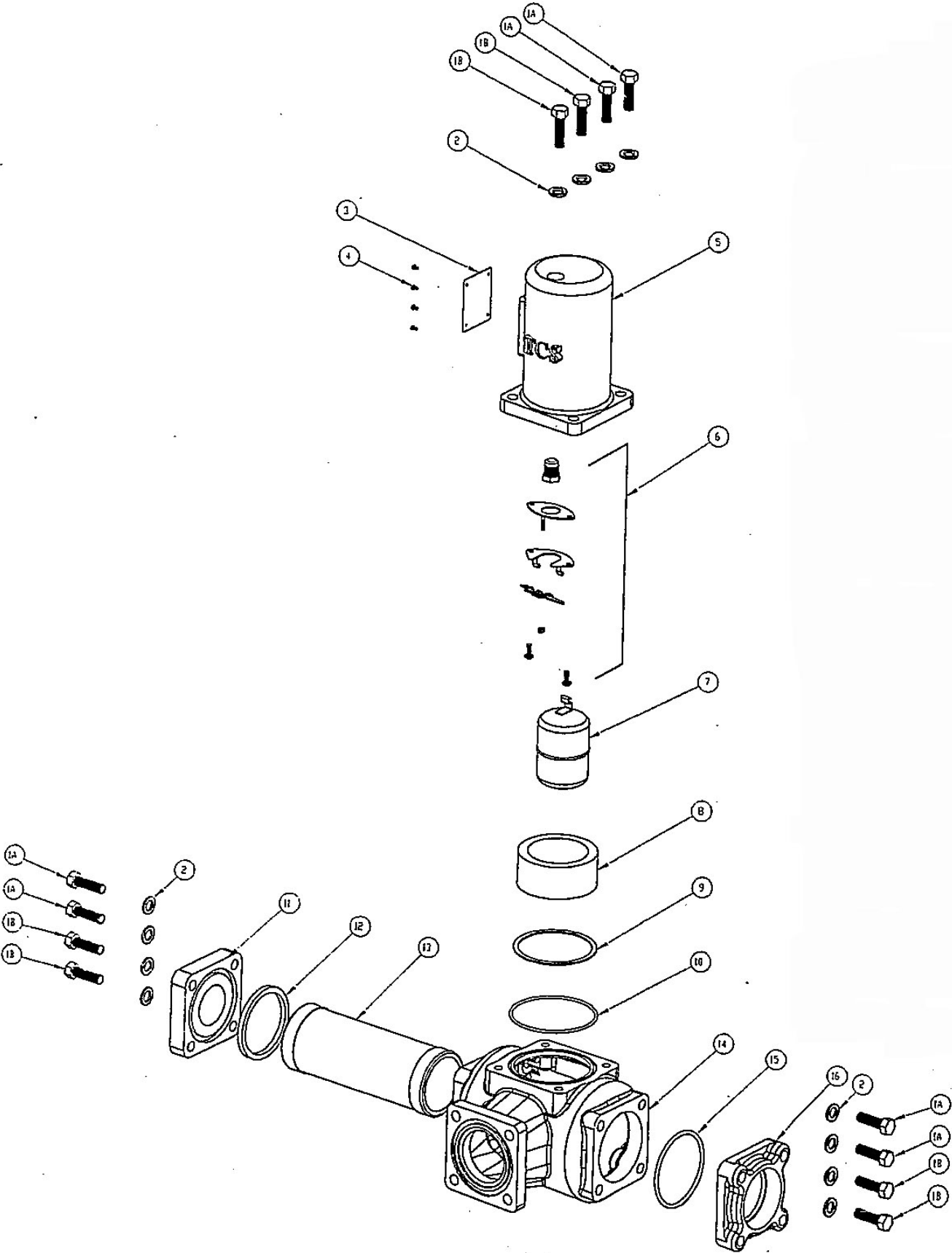
Suitable for refined petroleum products such as Leaded and Unleaded Gasoline, Fuel Oils, Diesel, Bio-Diesel, Kerosene, Jet Fuels, Vegetable Oils, Motor Oils, Ethylene Glycol (Antifreeze), etc.

MS1243 Air Eliminator Material of Construction

Description	SP (Standard)
Housing	Hardcoat Anodized Aluminum
Valve Covers	Hardcoat Anodized Aluminum
Float Assembly	Stainless Steel
Hardware	Socket Head Cap Screws
O-ring Seals	Viton®
Valve Plate Seal	Viton®

*Viton® is a registered trademark of E.I. DuPont de Nemours & Co.
Simriz® is a registered trademark of Freudenberg-NOK.
Teflon® is a registered trademark of Dupont Dow Elastomers, L.L.C.*

MS1243 Air Eliminator Assembly



MS1243 Air Eliminator Assembly

Item	Description	Qty	MS1243
			SP
1A	Cap Screw	4	AE016
1B	Cap Screw—Drilled	4	AE016D
2	Ring Washer	4	AE015
3	AE Name Plate	1	AE004
4	#4 x 3/16 Drive Screw	4	AE005
5	AE Head	1	AE006
6	AE Float Mechanism	1	AE008
7	AE Float	1	AE011
8	Sleeve	1	AE019
9	Retaining Ring	1	AE023
10	O-Ring	1	AE024
11	Basket Cover	1	AE018
12	Seal Ring	1	AE003
13	Basket 40 Mesh	1	AE025
14	Strainer Housing	1	AE027
15	O-Ring	1	AE028
16	Flange	1	AE029

MS1243 Air Eliminator Trouble Shooting



PROBLEM: Product is flowing from the Air Eliminators vents

- A) Foreign matter located in between valve plate and metal reeds.
- B) The valve plate may be worn through service life.
- C) The Teflon reed strip may be worn through service life.
- D) The float may have been punctured, containing liquid, not allowing the float to rise and seal the air vents.
- E) The float may have been ruptured from a surge of pressure within the system.
- F) The metal reeds may be fatigued and requires replacement.
- G) The metal reeds may be out of alignment with the seal plate.

PROBLEM: The meter is still registering air within the system

There can be numerous reasons why the meter may still register air. First look at the system configuration and see where air is being introduced into the system. Then determine if the meter is registering “free air” or “entrained air”. Free Air is much easier to remove from the metering system and may require the use of the Spring Loaded Back Check Valve and/or the Differential Air Check Valve and/or High Volume Strainer to help the air eliminator operate more effectively. Entrained Air is much more difficult to remove. Typically the best way to eliminate Entrained Air will be to remove the air source of entry into the system. Some examples are from cavitating pumps and leaking pump/valve seals. A High Volume Strainer may help accumulate the liquid long enough to disperse the Entrained Air from the system. See Air Elimination in the Service Manual for more information.

- A) The air return line is not the required minimum of 1/2” ID.
- B) The metering system has no sufficient way of eliminating the air to atmosphere.
Example: Incorrectly installed “Catch Can” reservoir (lower than the air eliminator itself), or the reservoir is allowed to become full, incorrectly sized vent, etc...)

WARRANTY

Macnaught Pty Ltd warrants that the Products will be free from any defects caused by faulty material or workmanship for a period of Twenty Four (24) months from the date of sale of the Products to the end user (the 'Warranty Period') PROVIDED THAT, during the Warranty Period:

1. Macnaught receives notice setting out full details of any defect in any product and details of the time and place of purchase of the Product: and
2. the end user, at its own cost returns the Product to the nearest authorised Macnaught Service Centre.

Macnaught shall, as its option repair or replace and Product found defective by its inspection or refund the price paid by the end user for that Product.

Macnaught liability and the end user's rights under this warranty shall be limited to such repair, replacement or refund and, in particular, shall not extend to any direct, special, indirect or consequential damage or losses of any nature.

Note:

This warranty does not form part of, nor does it constitute, a contract between Macnaught and the end user. It is additional to any warranty given by the seller of the Products and does not exclude, limit, restrict or modify the rights and remedies conferred upon the end user, or the liabilities imposed on the seller, by any statute or other laws in respect of the sale of the Product.



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