Model DE-3 Air Release Head

Bulletin SS03037 Issue/Rev. 0.3 (8/17)

Smith Meter® Air Eliminator

The **Smith Meter® Model DE-3 Air Release Heads** are an electric float switch devices for installation on a model AR or VAR air eliminator tanks. They are intended to be used in metering systems where air entrapped in the product is particularly troublesome (e.g., pumping off tank trucks and barges).

The triple float switch air release head provides a unique method of air elimination designed to function in an unloading or Petro-gard II system. The elimination of air from liquid product is essential for accurate metering. The DE-3 is used in conjunction with the AccuLoad® Preset controller that operates the control valve, air eliminator solenoid and pumps. With the probability of a large slug of air at the beginning and end of the batch, and possible entrapped air during the batch, the operation of the air release head functions to remove the air as it accumulates in the tank. The three float switches suspended at different levels in the tank sense the level of fluid and perform the appropriate functions as programmed in the AccuLoad.

Features

- **Efficient Air Elimination** — Performs under a wide range of operating conditions.
- **Hazardous Areas** — Suitable for use in NEC Class I, Division 1, Group D[1].

Principle Of Operation[2]

Maximum Flow Rate

Smith Meter Model DE-3 Air Release Head is designed to be used in conjunction with a Petro-gard II unloading system interfaced to an AccuLoad. The three float switches on the DE-3 assembly are configured as Stop (lower switch), Low (middle switch) and High (top switch) flow digital inputs in

the AccuLoad to define when to open the flow control valve, when to advance from the low flow rate to high flow rate and when to close the valve in the unloading system.

When the batch is started, the main pump is turned on and product begins to fill the system and the AccuLoad monitors the Stop float switch. The control valve remains closed to allow the air vent solenoid to vent the initial slug of air from the tank.

The vented air should be plumbed to a low pressure point in a safe location such as a tank or sump. The location must be considered as vapors will vent and accumulate. If the vent solenoid should fail in sealing, there is also the possibility of fluid accumulation in the vent line. A sight glass is incorporated in the DE-3 vent plumbing to verify that the product is not bypassing the meter. When the Stop float switch is activated, the control valve is opened and low flow is initiated as programmed in the AccuLoad. An optional zero flow timer can be programmed into the AccuLoad. If this option is not used, as the fluid level rises in the tank, the zero flow timer counts down. If the Stop float switch is not activated by the incoming fluid within the countdown timer, the batch is stopped.

1 Since power must be present at the reed switches in the float stem within the vessel, damage to the stem could cause a short circuit. Danger of an explosion is eliminated by the use of safety barriers, which limit the current below the level where incendiary sparking can occur.
2 The principle of operation described is only one of the possible sequences of operation available with the AccuLoad.

As the tank fills with product and air is vented through the air vent solenoid, the middle and upper float switches are monitored. Once the middle and the upper float switches are activated, the AccuLoad will initiate the high flow rate programmed in the AccuLoad. If during the batch entrapped air in the fluid accumulates in the tank so that the fluid level drops below the upper and the middle float switches, the low flow rate will remain until the air is vented and the middle and the upper float switches are raised. At this time, the high flow will be returned to resume delivery of the batch.

At the end of the batch, the fluid level in the tank will lower as air enters the tank. As the air accumulates, the upper and the middle floats will drop initiating low flow. The delivery will continue at low flow until the fluid level in the tank drops to the lower float switch. When the lower float drops, the AccuLoad will close the flow control valve and turn off the main pump.

*Reference AB06055 for optional gear pump operation and product detection using Boolean equations in the AccuLoad.

Specifications

Viscosity

DE-3: Up to 45 mPa•s[3] (200 SSU)
VDE-3: Up to 19.8 mPa•s[3] (100 SSU)
Consult factory for higher viscosities.

Recommended Product Specific Gravity

DE-3: 0.65 or greater
VDE-3: 0.40 or greater

Pressure Rating

150 psi (1,034 kPa) maximum working pressure with standard solenoid

Temperature Range

-10°F to 225°F (-12°C to 107°C)
For other temperatures, consult factory

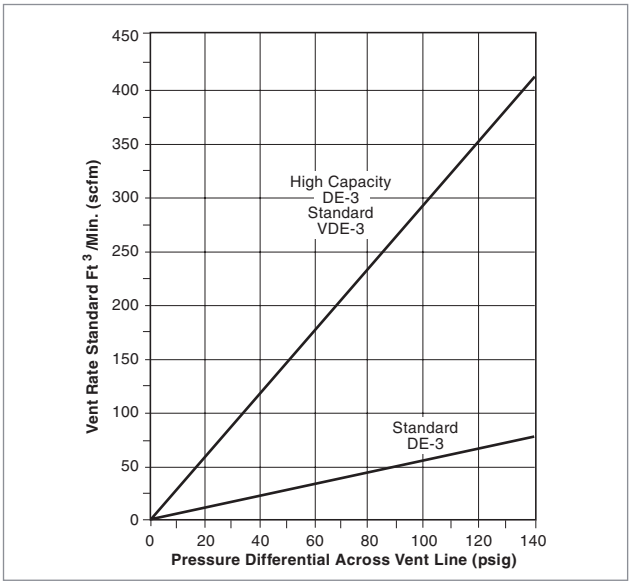
Power Requirements

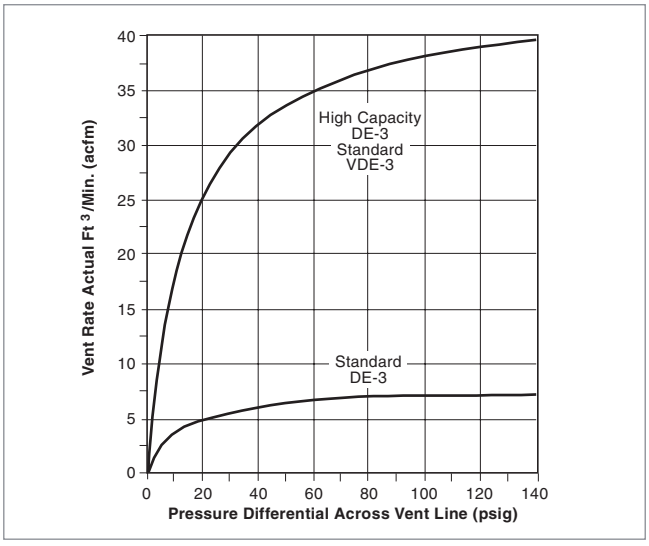
Voltage:
Standard: 120 VAC +0% - 15%, 50/60 Hz
Optional: 240 VAC +0% - 15%, 50/60 Hz
For other voltages, consult factory.

Weight

DE-3: 20 lb (9.1 kg)
VDE-3: 53 lb (24.0 kg)

Air Vent Rate





Materials of Construction (Wetted Parts)

Model	Type	Float Assembly	Mounting Plate	Tubing and Fittings/ Pilot Valves	Solenoid Valves[4]	Sight Glass
DE-3	Standard	316 S.S.	Carbon Steel	Carbon Steel/Viton Low Swell Buna	300/400 S.S./Viton/ Low Swell Buna	Brass
VDE-3	Standard	316 S.S.	Carbon Steel	Carbon Steel/Viton	300/400 S.S./Viton	Stainless Steel

3 1,000 mPa•s = 1,000cP = 1 Pa•s.
4 Consult factory for alternate materials.

Modeling Code

DE-3 for Horizontal AR Tank

Example				
Type	**Plate**	**Float**	**Volt / Solenoid**	**Special**
DE-3	**C**	**4**	**6**	**HC**

Strainer Type	
Code	**Description**
DE-3	Triple Float Configuration

Mounting Plate / Material	
Code	**Description**
C	Standard Smith Meter/"RB" Bolt Circle/Carbon Steel
CF	Standard Smith Meter/"RB" Bolt Circle/Carbon Steel/FIC-3
AC	3" 150 ASME Flange/ Carbon Steel

Float Assembly	
Code	**Description**
3	PTFE[5] Floats with 316 Stainless Steel Stem - Used for model AR-3-1030
4	PTFE[5] Floats with 316 Stainless Steel Stem - Used for model AR-4-2040
6	PTFE[5] Floats with 316 Stainless Steel Stem - Used for model AR-6-3050
7	PTFE[5] Floats with 316 Stainless Steel Stem - Used for model AR-6-4565 and AR-8-45100

Voltage / Solenoid (All Stainless Steel)	
Code	**Description**
6	120/60 Viton-F Stainless Steel
7	240/60 Viton-F Stainless Steel
8	120/60 Viton-F H-coil Stainless Steel
9	110/50 Viton-F Stainless Steel
10	220/50 Viton-F Stainless Steel
11	120/60 Chemraz H-coil Stainless Steel
12	110/120 Viton-A High Capacity Stainless Steel

Special	
Code	**Description**
Blank	Nothing Special
T	Tee Vent Plumbing
HC	High Capacity Plumbing
ET	Ethanol or Bio-Diesel Service (no sight glass)

5 Polytetrafluoroethylene (PTFE)

Modeling Code

VDE-3 for Vertical VAR Tank

Example			
Type	**Plate**	**Float**	**Volt / Solenoid**
VDE-3	**CC**	**1**	**1**

Strainer Type	
Code	**Description**
VDE-3	Triple Float Configuration

Mounting Plate / Material	
Code	**Description**
CC	S6" 150 ASME Flange/Carbon Steel/FIC-3

Float Assembly	
Code	**Description**
1	PTFE[5] Float s.g. 0.45/316 Stainless Steel Stem
2	316 Stainless Steel float s.g. 0.40/316 Stainless Steel Stem

Voltage / Solenoid (All Stainless Steel)	
Code	**Description**
1	110/120 Viton-A Stainless Steel
2	220/240 Viton-A Stainless Steel
3	110/120 Viton-A Stainless Steel (Class H Coil)

Note: VDE-3 suitable for ethanol service standard with HC-High Capacity Vent.

5 Polytetrafluoroethylene (PTFE)

Figures

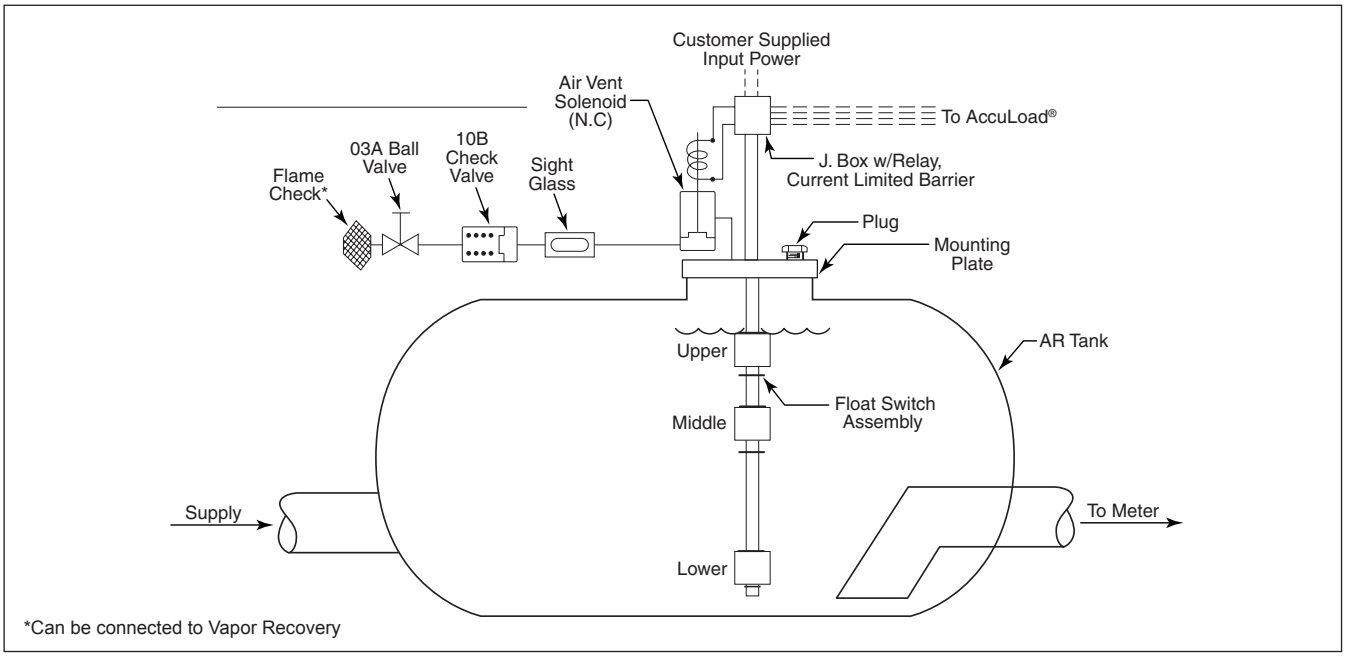


Figure 1 – Smith Meter Model DE-3 with Model AR Air Eliminator Tank

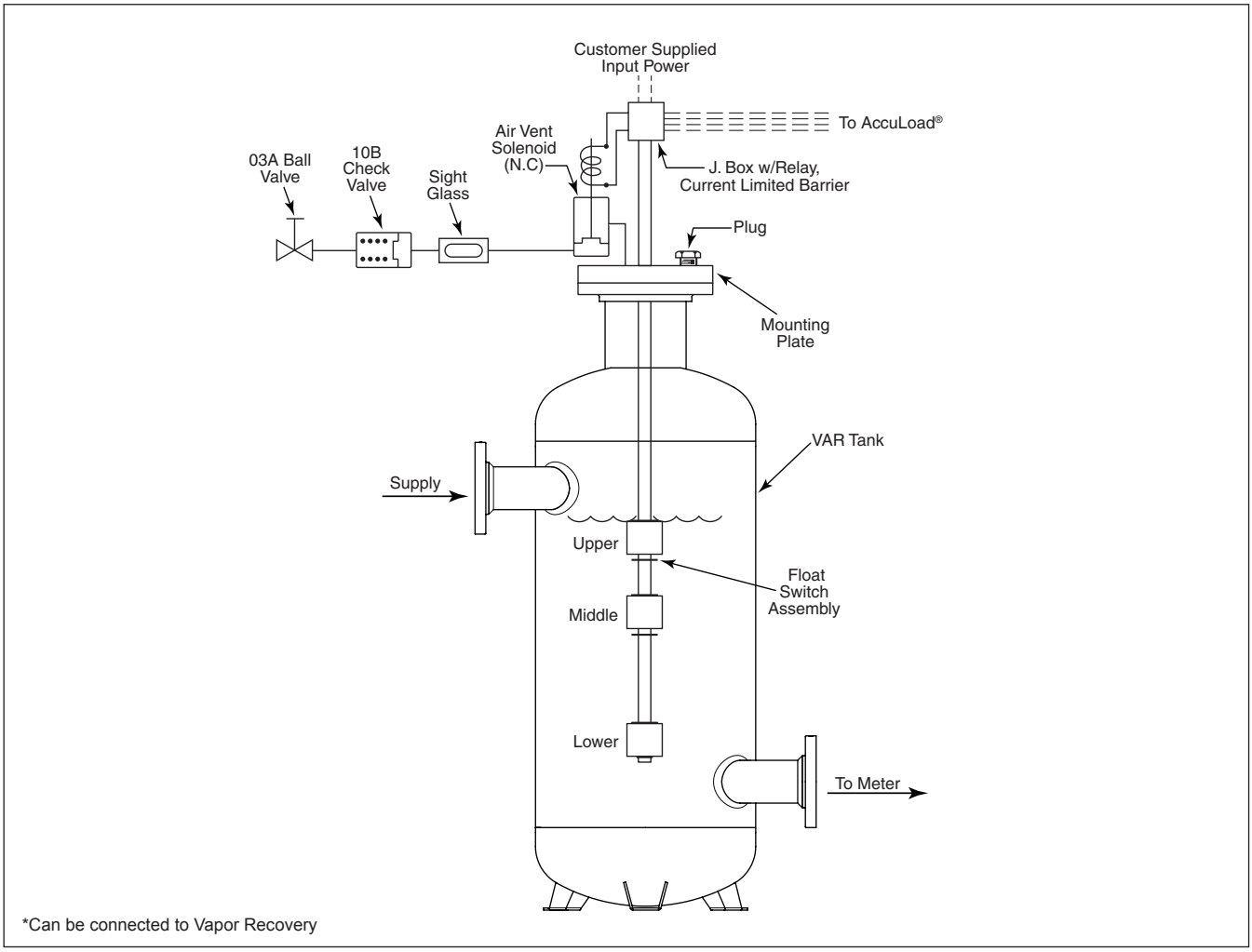
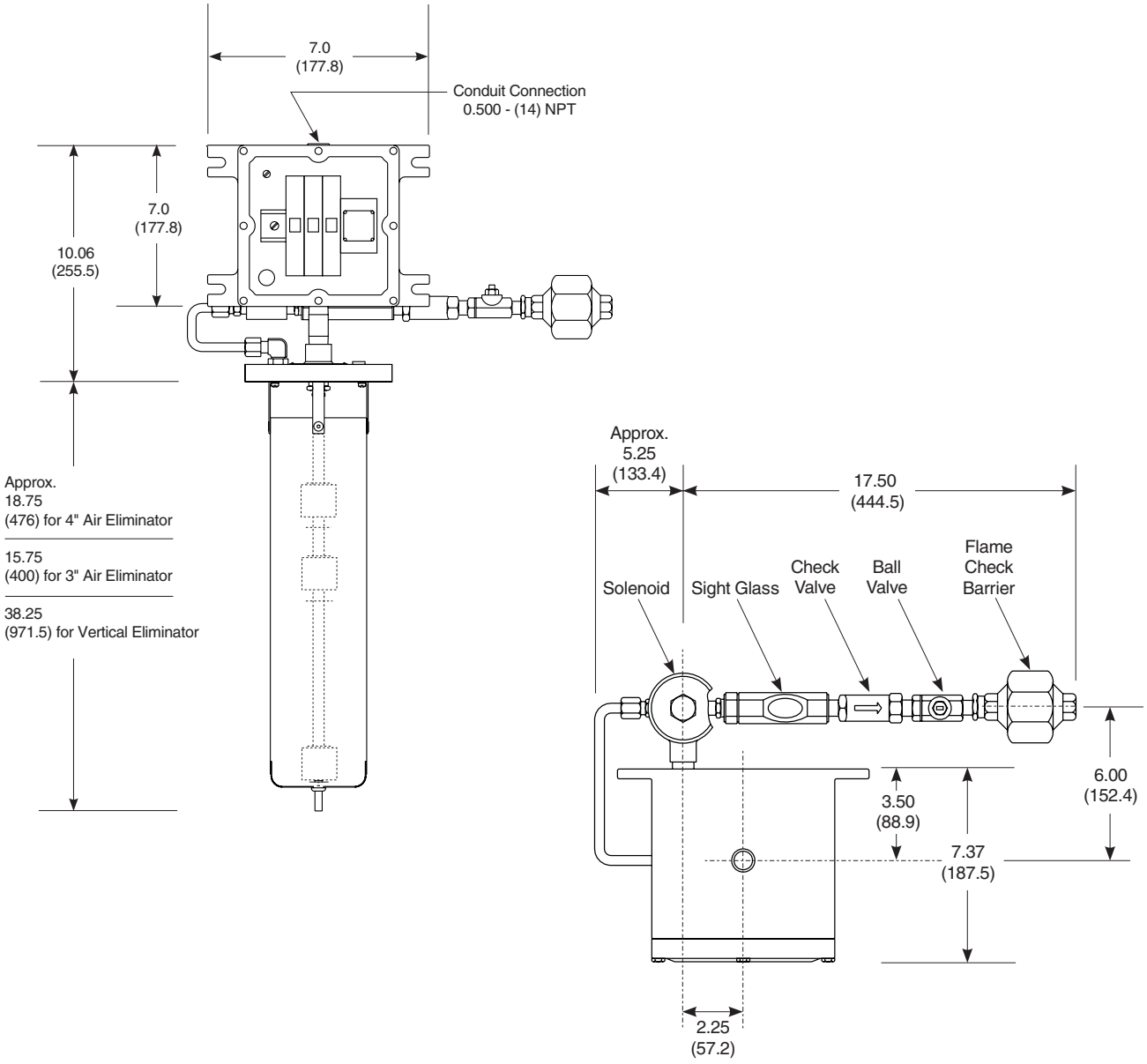


Figure 2 – Smith Meter Model VDE-3 with Model VAR Air Eliminator Tank

Dimensions (DE-3)

Inches (Millimeters)



SS03037 Issue/Rev. 0.3 (8/17) - Editorial change made March 2018 - correction made in modeling.

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