

Model DE-1, VDE-1 and DE-2 Air Release Heads

Bulletin SS03030 Issue/Rev. 0.7 (8/17)

Smith Meter® Air Eliminator

The **Smith Meter® Model DE Air Release Heads** are dual-electric float switch devices for installation on air eliminator vessels.

The dual floats provide a unique and efficient method of air elimination from liquids, as is essential for accurate metering. Air is gathered in the vessel until the lower float switch is actuated. This causes the air vent solenoid valve to open and signals the block valve downstream of the meter to close. The flow is blocked until sufficient air is eliminated from the vessel to actuate the upper float by liquid. This causes the air vent solenoid valve to close and signals the block valve to open, resuming flow.

The DE Head is intended to be used in metering systems where bulk air is particularly troublesome (e.g., unloading off tank trucks and barges, or stripping tanks).

Features

- Efficient Air Elimination – Performs under a wide range of operating conditions.
- Versatile – Can be used up through 12" systems on most new and existing air eliminator vessels.
- Hazardous Areas – Suitable for use in NEC Class I, Group D, Division 1.
- Optional Downstream Venting – Eliminates need for a "spit can" and hazardous or undesirable vapors from escaping into the atmosphere.

Principles of Operation

The Smith Meter Model DE Air Release Head senses the presence of air in the air eliminator or deaerator vessel by means of two float-actuated reed switches. These floats are located at different levels on a stem which protrudes into the vessel. As air accumulates in the vessel, the lower float



switch is tripped. This opens the air vent solenoid valve and signals the block valve downstream of the meter to close, thus preventing air from entering the meter. The block valve remains closed until the accumulated air in the vessel has been vented sufficiently to actuate the upper float switch. This closes the air vent solenoid valve and signals the block valve to open so flow can continue.

The air venting line may be plumbed back into the flow line to eliminate the need for a "spit can." A sight glass is incorporated in this line to assure that the product is not bypassing the meter.

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.

Applications

Most metering systems, where air elimination is needed, are potential applications for Smith Meter Model DE Air Release Heads. Versions are available for most petroleum, many

petrochemical, chemical and industrial liquid applications. The basic Model DE Air Release Heads can be applied to vessels or systems up to 12".

The DE Head is installed in the downstream position on multiple head vessels (8" - 12"). Blind covers are used where additional air release heads were previously installed.

A Model DE Air Release Head can be used to replace most existing mechanical air release heads. The standard unit will directly replace Model RB, DB, UB, and B style Air Release Heads on existing air eliminator (or deaerator) vessels.

The basic Model DE-1 Head is used for most clean, low viscosity applications. It will interface with a variety of electrically-controlled shut-off valves, including the Model 200-30A Block Valve (Fig. 1).

The DE-1 is supplied complete with factory-mounted, dual float switch stem, normally-closed solenoid, junction box with relay, current limiting barriers, sight glass, check valve and ball valve.

The Model DE-2 is typically used on high viscosity or crude oil applications. It includes a second, independent (parallel), normally-open solenoid controlled air vent line, which closes a direct-acting valve such as a Model 202 Bare Valve (Fig. 2).

In addition to the dual float switch stem, the DE-2 is supplied with a normally-closed two-way solenoid and a normally-open three-way solenoid, junction box, relay, current limiting barriers, sight glass, check valve, ball valves, and valve opening speed orifice.

Specifications

Viscosity

DE-1: Up to 45 mPa·s¹ (200 SSU)

VDE-1: Up to 45 mPa·s (200 SSU)

DE-2: 45 mPa·s through 400 Pa·s (200 through 2,000 SSU)

Note: DE-2 applied over 45 mPa·s to use bare 202 valve only

Power Requirements

Voltage:

Standard: 110 V/50 Hz 120 V/60 Hz.

Optional: 220 V/50 Hz 240 V/60 Hz.

12 VDC ±10%

24 VDC ±10%

For other voltages, consult factory.

DE Head/Block Valve	Watts			
	Standard		High Capacity	
	AC	DC	AC	DC
DE-1/200-30A	40.0	40.0	36.7	31.2
DE-2/202	29.7	35.3	26.4	26.5

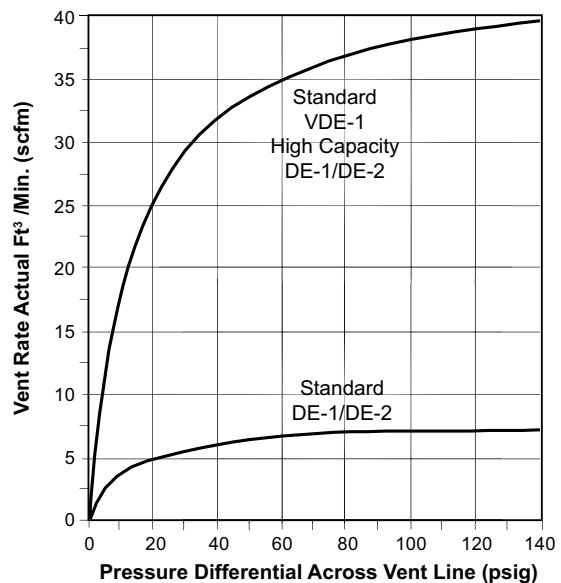
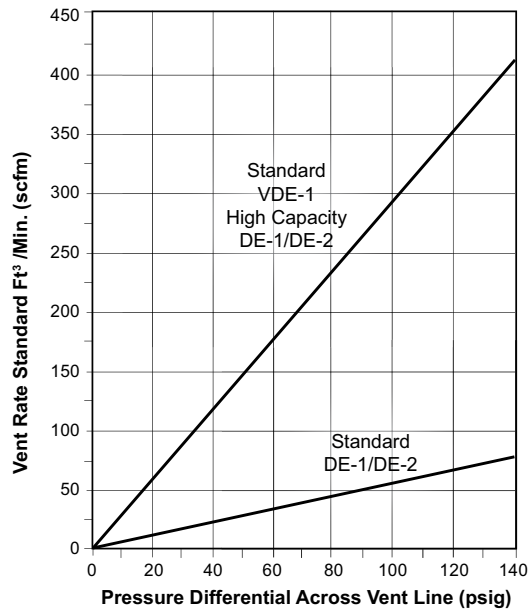
Weight

DE-1: 21 lb. (9.5 kg.)

VDE-1: 52 lb. (23.6 kg.)

DE-2: 24 lb. (10.8 kg.)

Air Vent Rate



¹ 1,000 mPa·s = 1,000 cP = 1 Pa·s.

Materials of Construction (Wetted Parts)

Model	Type	Float Assembly	Mounting Plate	Tubing and Fittings / Pilot Valves	Solenoid Valves ⁹	Sight Glass
DE-1	Standard	Buna/S.S.	Carbon Steel	Carbon Steel/Viton	300/400 S.S./Viton	Bronze
	Optional	316 S.S.	316 S.S.	300 S.S./PTFE ⁸	⁹	300 S.S.
VDE-1	Standard	316 S.S.	Carbon Steel	Carbon Steel/Viton	300/400 S.S./Viton	Stainless Steel
DE-2	Standard	316 S.S.	Carbon Steel	Carbon Steel/Viton	300/400 S.S./Viton	Bronze
	Optional	–	316 S.S.	300 S.S./PTFE ⁸	⁹	300 S.S.

Modeling

Horizontal Tank Modeling

Example: DE-1 – CF – 1 – 1 – HC

Type

DE-1 – Single Solenoid Configuration
DE-2 – Dual Solenoid Configuration

Mounting Plate/Material

Used with Model AR Tank or Other:

CF – Standard Smith Meter/"RB" Bolt Circle/Carbon Steel
S – Standard Smith Meter/"RB" Bolt Circle/Stainless Steel
AC – 3" Class 150 ASME Flange/Carbon Steel³
AS – 3" Class 150 ASME Flange/316 Stainless Steel^{3,4}

Float Assembly – Working Pressure/Density^{1,2}

Used with Model AR Tank or Other:

1 – Buna Float/316 Stainless Steel Stem – 300 psig (2,068 kPa)/0.45 Min. Sp. Gr.
2 – 316 Stainless Steel Float and Stem, Standard on DE-2 – 100 psig (689 kPa)/0.70 Min. Sp. Gr.
3 – High Pressure 316 Stainless Steel Float and Stem – 750 psig (5,171 kPa)/0.75 Min. Sp. Gr.

Special

Blank – Standard
HC – High Capacity⁶
ET – Ethanol Service⁷

Voltage

1 – 120V/60Hz
2 – 240V/60Hz
3 – 12 VDC⁵
4 – 24 VDC⁵
5 – 110V/50Hz
6 – 220V/50Hz

Ordering Information

Operating Conditions

Liquid – Name and sp. gr., Maximum Viscosity, Temperature Range (Min./Max.), Maximum Operating Pressure

For Field Installation

Specify tank model and size.

Vertical Tank Modeling

Example: VDE-1 – CC – 1 – 1

Type

VDE-1 – Single Solenoid Configuration

Mounting Plate/Material

CC – 6" Class 150 ASME Flange/Carbon Steel

Float Assembly – Working Pressure/Density^{1,2}

1 – Spring Assisted PTFE⁸ Float/316 Stainless Steel Stem – 1,000 psig (6,894 kPa)/0.45 Min. Sp. Gr.
2 – 316 Stainless Steel Float and Stem – 300 psig (2,068 kPa)/0.40 Min. Sp. Gr.

Note: VDE-1 suitable for Ethanol Service standard with HC - High Capacity vent.

Voltage

1 – 120V/60Hz and 110V/50Hz
2 – 240V/60Hz and 220V/50Hz
3 – 12 VDC⁵
4 – 24 VDC⁵

1 Maximum working pressures are for temperatures of -20°F to 100°F (-28°C to 38°C). Consult factory for other temperatures.
2 Reduce to 100 psig (690 kPa) on DC circuits because of solenoids. High working pressure requires high pressure solenoids.
3 For non-Smith Meter vessels with ASME connection for air release head.
4 Includes 316 S.S. tubing, fitting, pilots, and sight glass.

5 Max. 100 psig (689 kPa).
6 High capacity not available with VAR.
7 No sight glass.
8 Polytetrafluoroethylene (PTFE).
9 Consult factory for alternate materials.

See Wiring Diagram in [MN03022](#) (Installation/Operation).

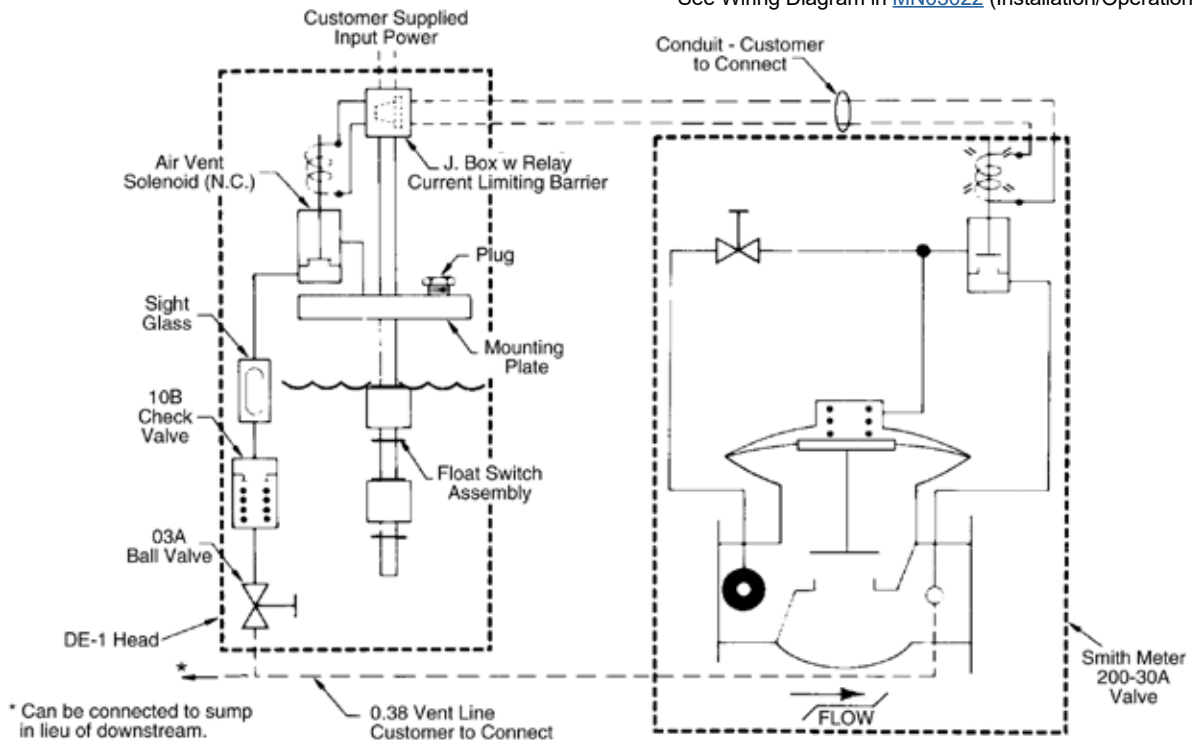


Figure 1 – Smith Meter Model DE-1 and VDE-1 with 200-30A Block Valve in open flowing position and no air sensed in the tank.

See Wiring Diagram in [MN03022](#) (Installation/Operation).

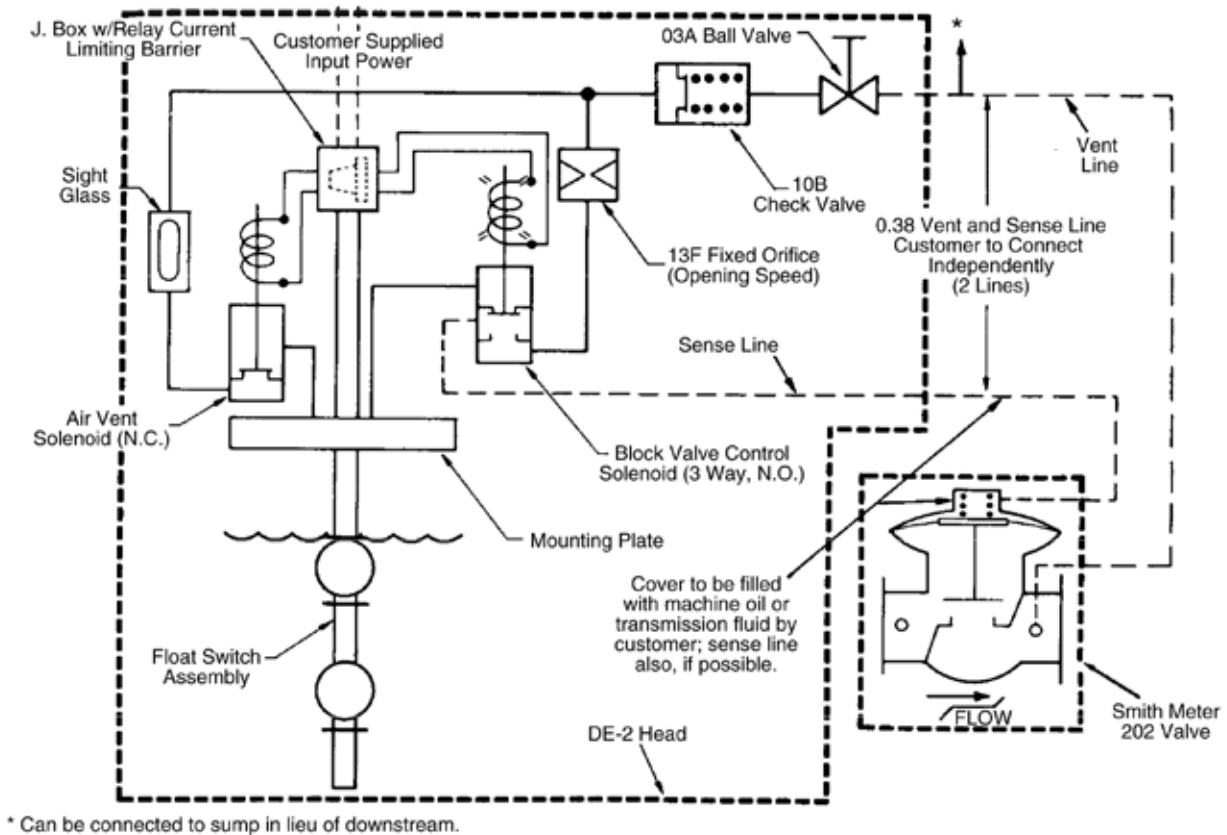


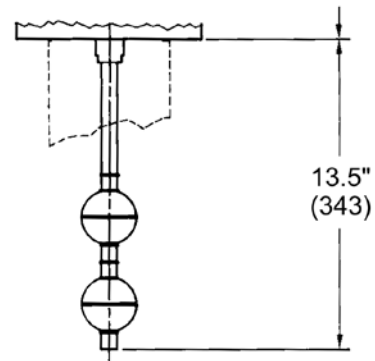
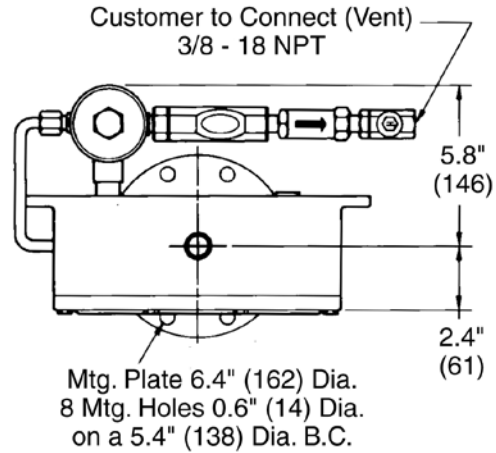
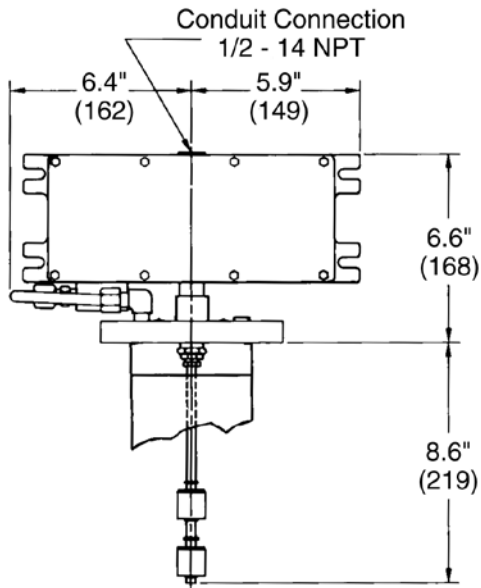
Figure 2 – Smith Meter Model DE-2 with 202 Bare Valve in open flowing position and no air sensed in the tank.

Dimensions

Inches (Millimeters)

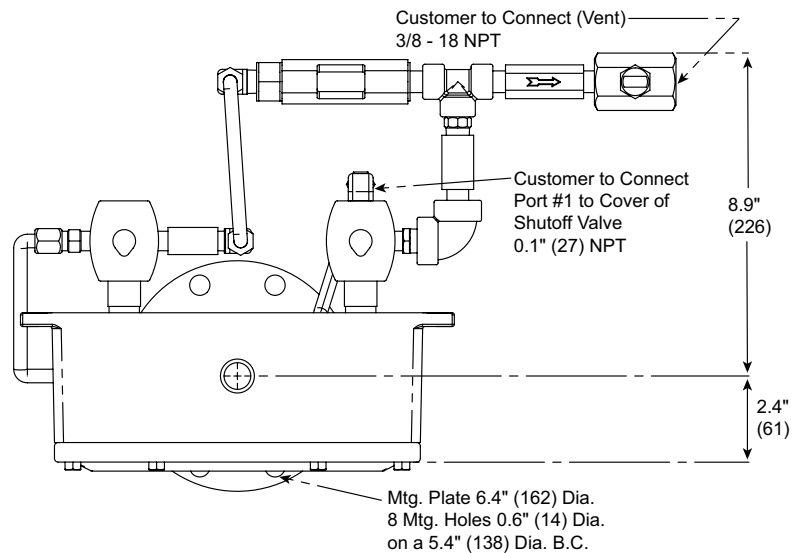
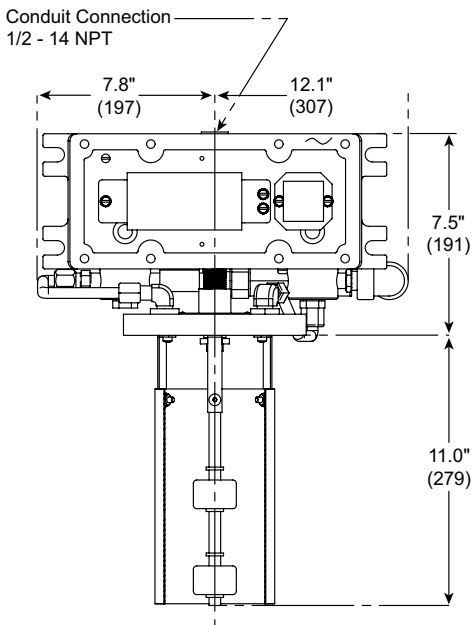
Note: Dimensions – Inches to the nearest tenth (millimeters to the nearest whole mm), each independently dimensioned from respective engineering drawings.

DE-1



-3 Float Assembly
(optional)

DE-2

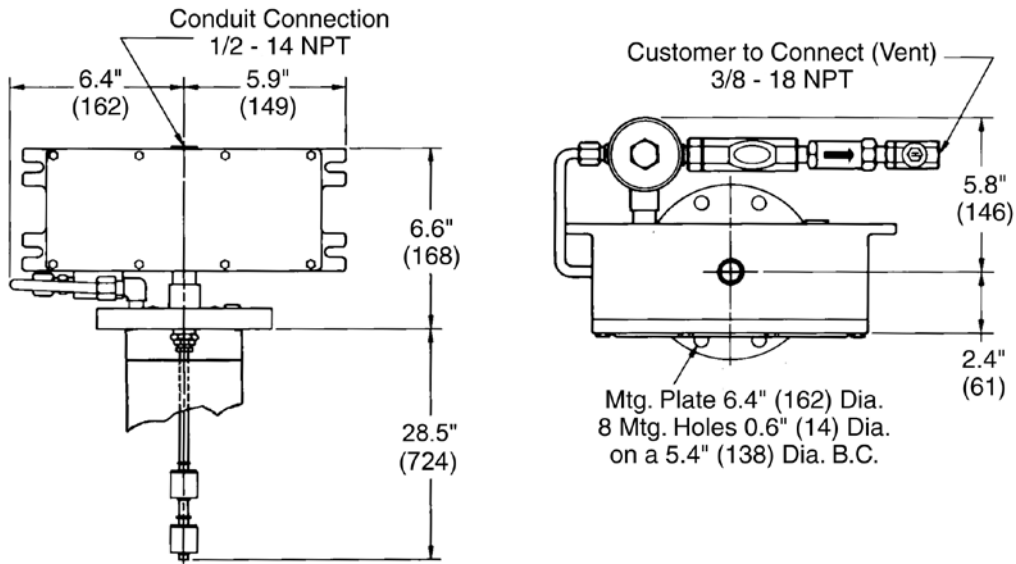


Dimensions

Inches (Millimeters)

Note: Dimensions – Inches to the nearest tenth (millimeters to the nearest whole mm), each independently dimensioned from respective engineering drawings.

VDE-1



Revisions included in SS03030 Issue/Rev. 0.7 (8/17):

Editorial change January 2023. Updated dimensions on the VDE-1.

The specifications contained herein are subject to change without notice and any user of said specifications should verify from the manufacturer that the specifications are currently in effect. Otherwise, the manufacturer assumes no responsibility for the use of specifications which may have been changed and are no longer in effect.

Contact information is subject to change. For the most current contact information, visit our website at TechnipFMC.com and click on the "Contact Us" link.

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