

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 this 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

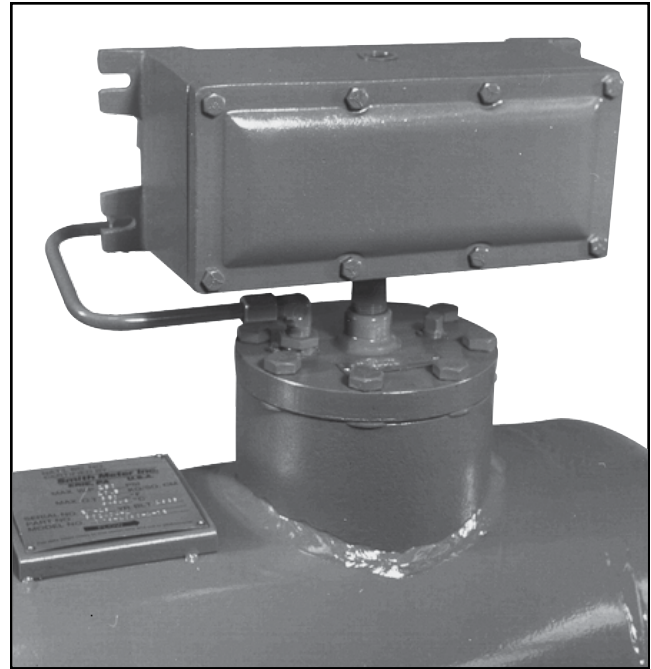
- **Efficient Air Elimination** – Performs under a wide range of operating conditions.
- **Versatile** – Can be used up through 12" systems on most new and existing air eliminator vessels.
- **Hazardous Areas** – Suitable for use in NEC Class I, Group D, Division 1.
- **Optional Downstream Venting**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

Principle 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 eventually 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 Smith Meter 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 Smith Meter Model RB, DB, UB, and B style Air Release Heads on existing air eliminator (or deaerator) vessels. Kits are available for field installation of DE Heads on most Brooks and Liquid Controls air eliminators. "Universal" connection versions, using 3" ANSI blind flanges, are also available for mounting on user-supplied piping risers.

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 Smith Meter Model 200-30A Block Valve (Figure 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 Smith Model 202 Bare Valve (Figure 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.

	Watts			
	Standard		High Capacity	
DE Head/Block Valve	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

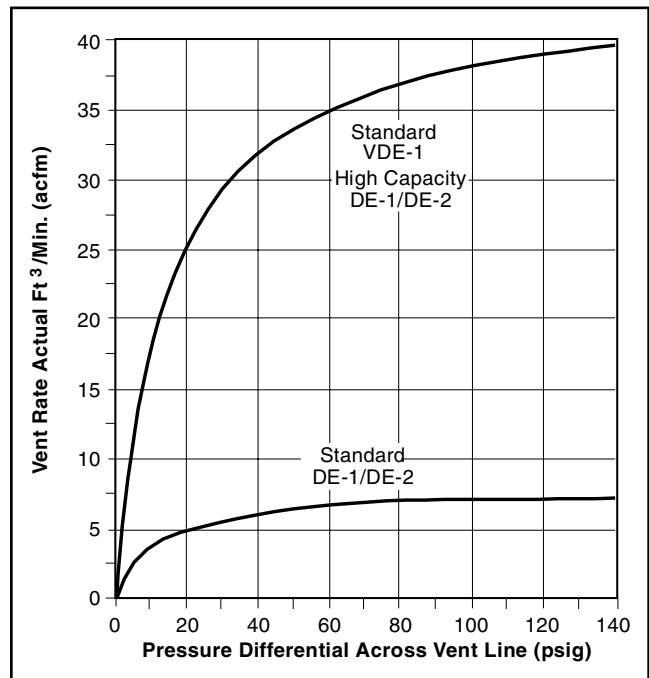
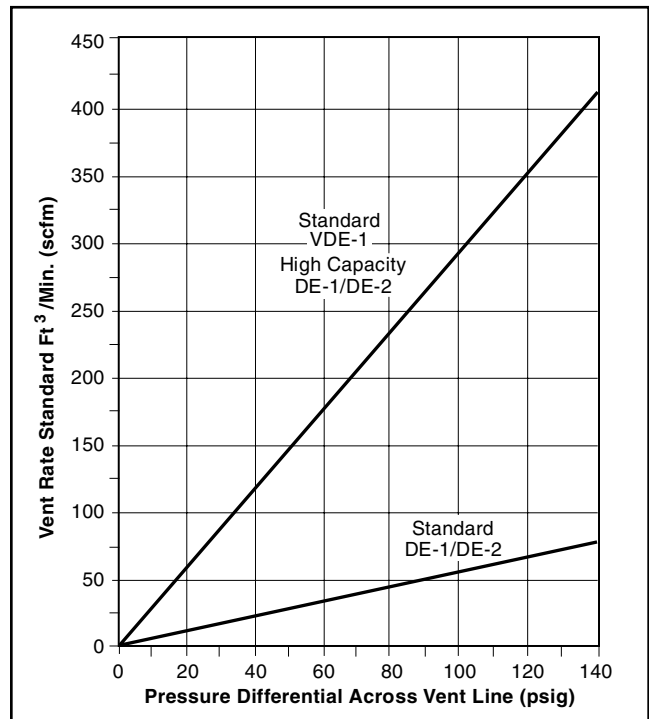
Weight

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.

² Reduce to 100 psig (690 kPa) on DC circuits because of solenoids. High pressure, 300 psig (2068 kPa) working pressure requires high pressure solenoids.

Materials of Construction (Wetted Parts)

Model	Type	Float Assembly	Mounting Plate	Tubing & 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
CP – Standard Smith Meter/"RB" Bolt Circle/
Carbon Steel/PWHT⁷
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}
BC – Brooks Retrofit/Carbon Steel
LC – Liquid Controls Retrofit/Carbon Steel

Float Assembly – Working Pressure/Density

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 Application⁷

Voltage

1 – 120V/60Hz
2 – 240V/60Hz
3 – 12 Vdc⁵
4 – 24 Vdc⁵
5 – 110V/50Hz
6 – 220V/50Hz

Vertical Tank Modeling

Example: VDE-1 – CC – 1 – 1

Type

VDE-1 – Single Solenoid Configuration

Mounting Plate/Material

CC – 6" 150 ASME Flange/Carbon Steel

Float Assembly – Working Pressure/Density

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.

Voltage

1 – 120V/60Hz and 110V/50Hz
2 – 240V/60Hz and 220V/50Hz
3 – 12 Vdc⁵
4 – 24 Vdc⁵

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.

³ For non-Smith Meter vessels with ANSI 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 Post weld heat treat mounting plate and no sight glass.

⁸ Polytetrafluoroethylene (PTFE).

⁹ Consult factory for alternate materials.

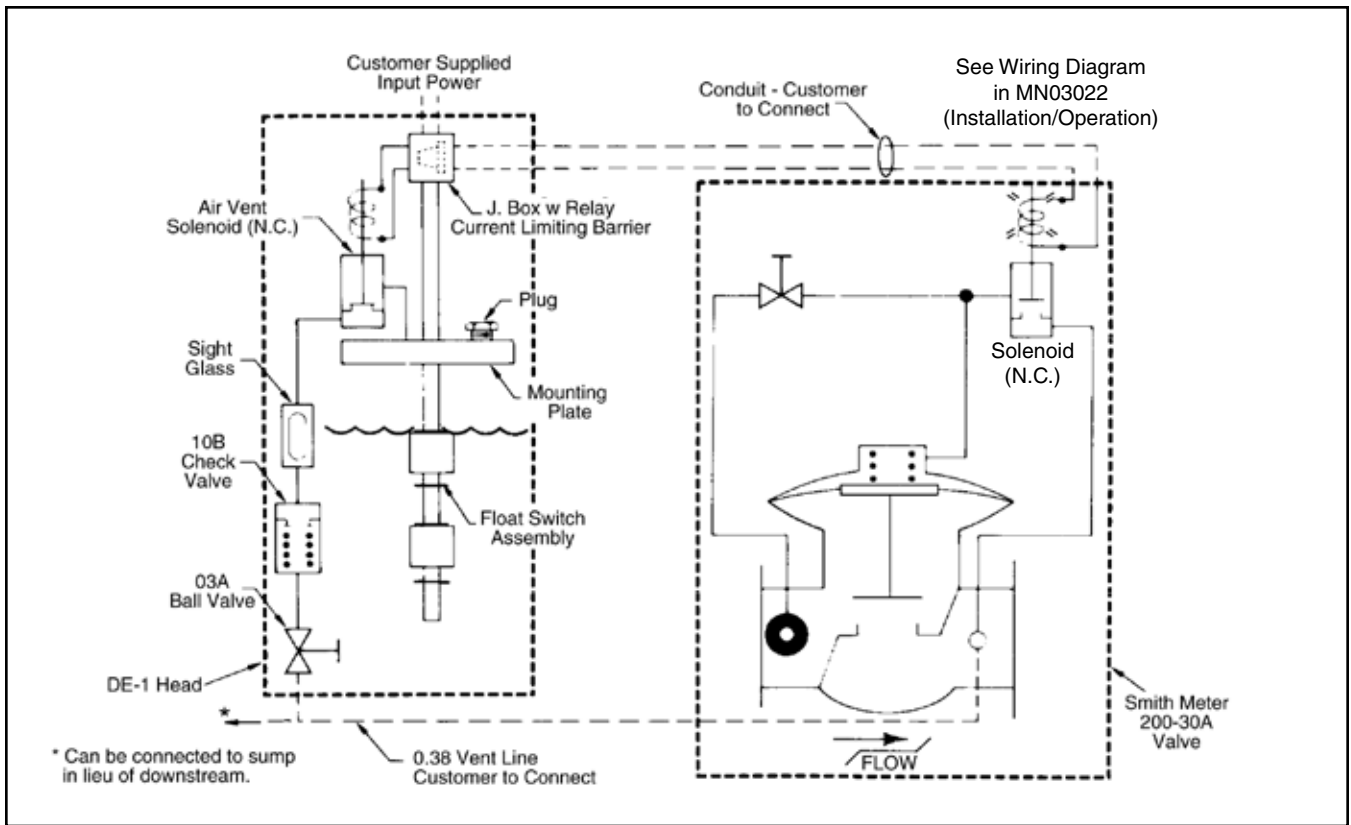


Figure 1 – Smith Meter Model DE-1 and VDE-1 with 200-30A Block Valve in open flowing position and no air sensed in the tank.

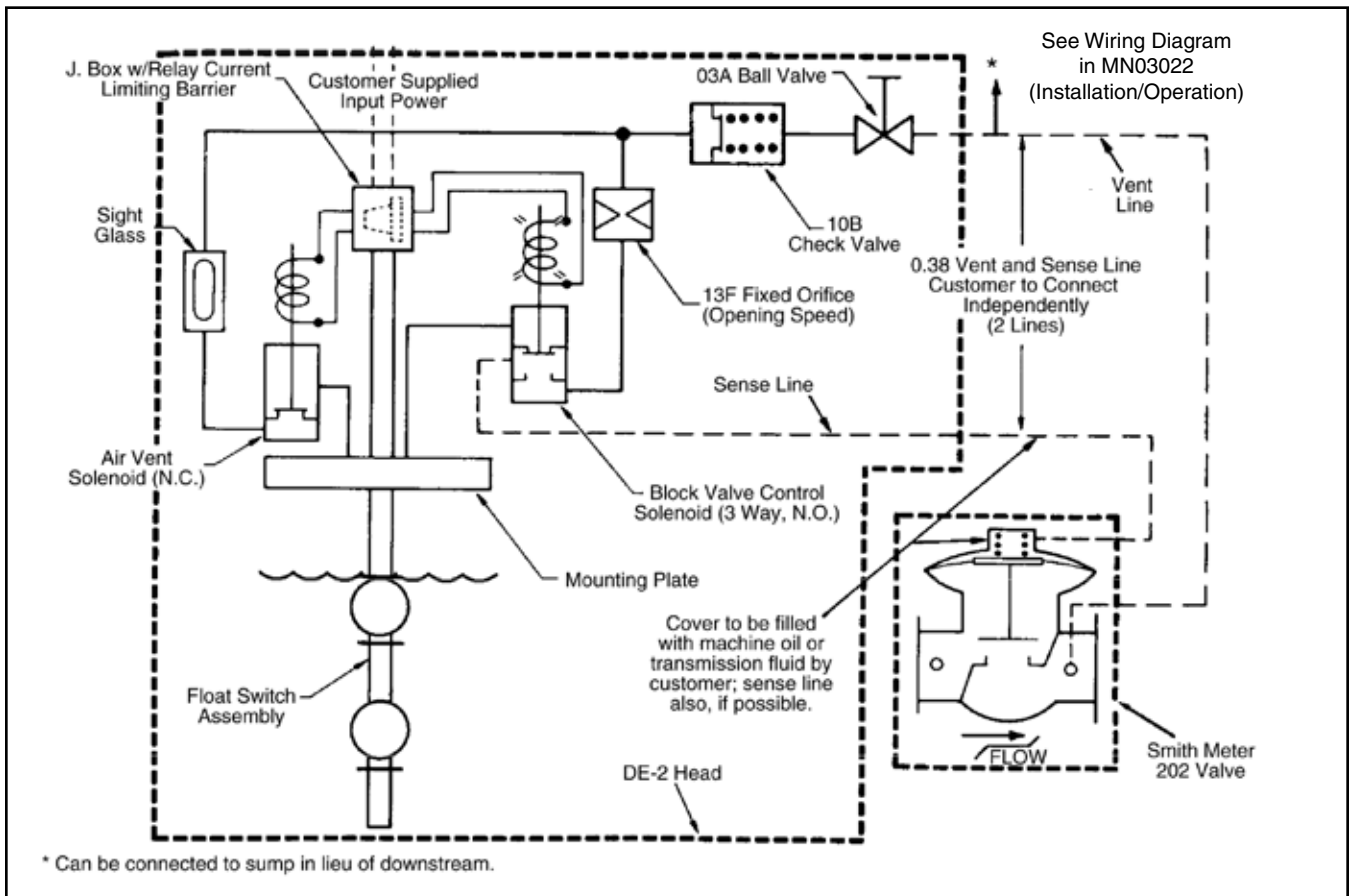
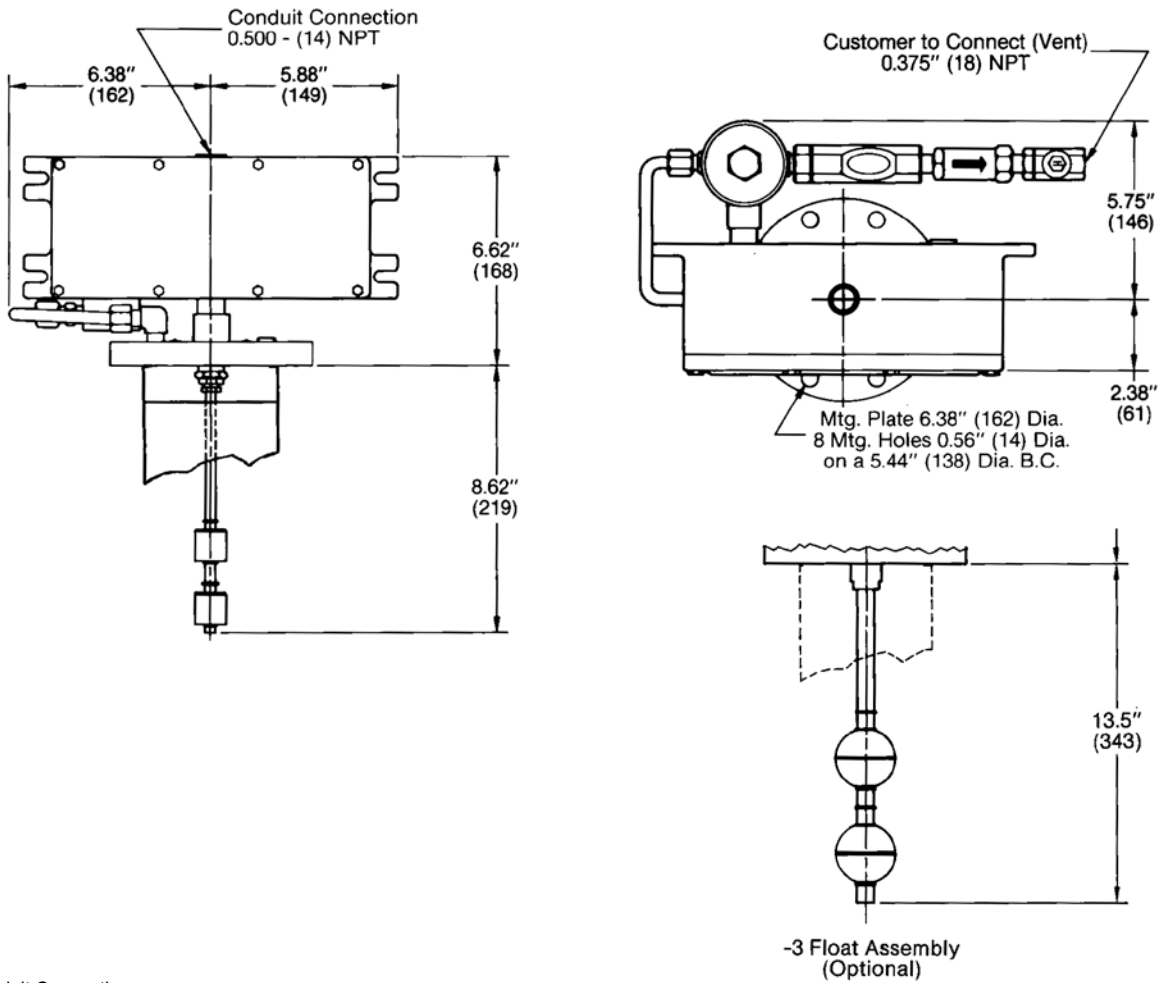


Figure 2 – Smith Meter Model DE-2 with 202 Bare Valve in open flowing position and no air sensed in the tank.

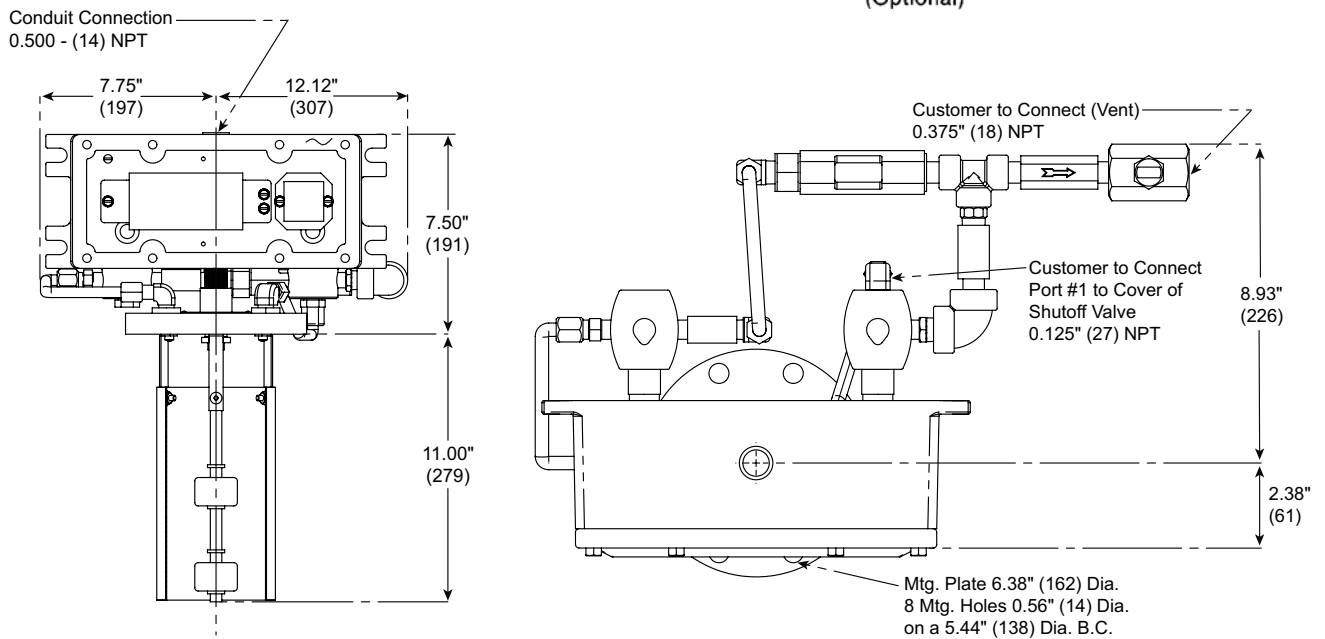
Dimensions

Inches (mm)

DE-1



DE-2

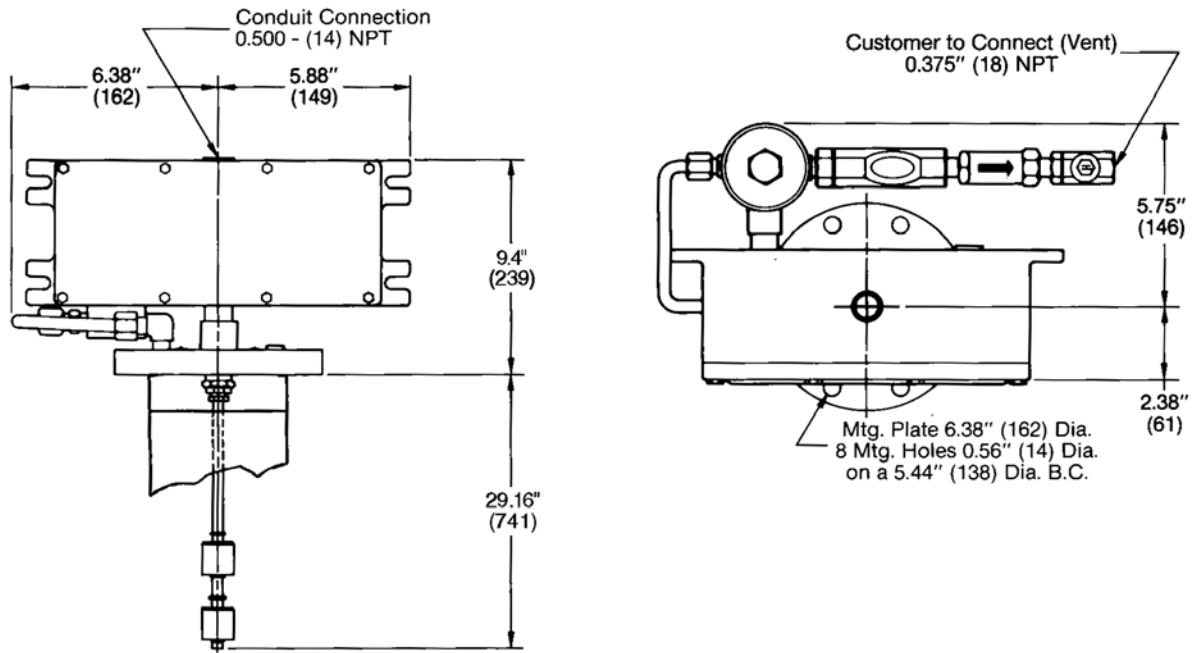


Note: Dimensions – Inches to the nearest tenth (millimetres to the nearest whole mm), each independently dimensioned from respective engineering drawings.

Dimensions

Inches (mm)

VDE-1



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

Revisions included in SS03030 Issue/Rev. 0.5 (1/14):

Page 2: Added VDE-1 to Viscosity, Weight and Vent Rate charts.

Page 3: Added VDE-1 to Materials table and Modeling Type.

Page 4: Added VDE-1 to Figure description.

Page 5: Revised height dimensions in DE-1, left diagram.

Page 6: Added VDE-1 dimension diagrams.

Throughout document: Tubing and Fittings/Pilot Valves material was changed to PTFE.

Headquarters:

500 North Sam Houston Parkway West,
Suite 100, Houston, TX 77067 USA
Phone: +1 (281) 260 2190
Fax: +1 (281) 260 2191

Operations:

Measurement Products and Equipment:
Ellerbek, Germany +49 (4101) 3040
Erie, PA USA +1 (814) 898 5000

Integrated Measurement Systems:

Corpus Christi, TX USA +1 (361) 289 3400
Kongsberg, Norway +47 (32) 286700

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