

# DATA SHEET

## Specifications & Performance

Certified Quality



Quality System  
ISO9001 Certified



Environmental Management System  
ISO14001 Certified

Member of:  
**Hydraulic**  
INSTITUTE

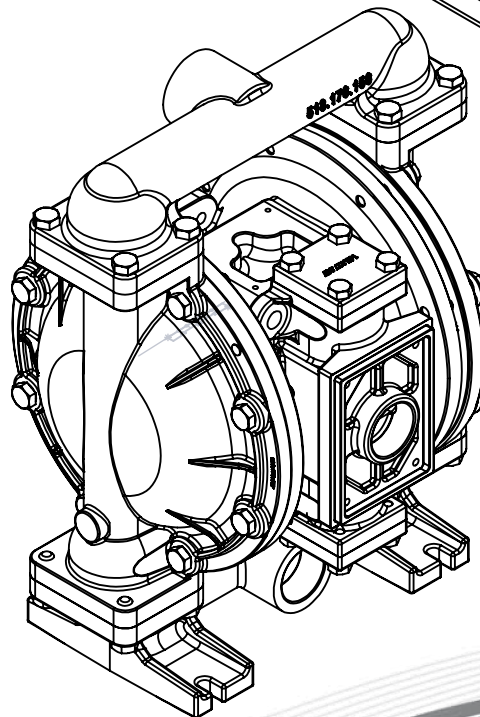
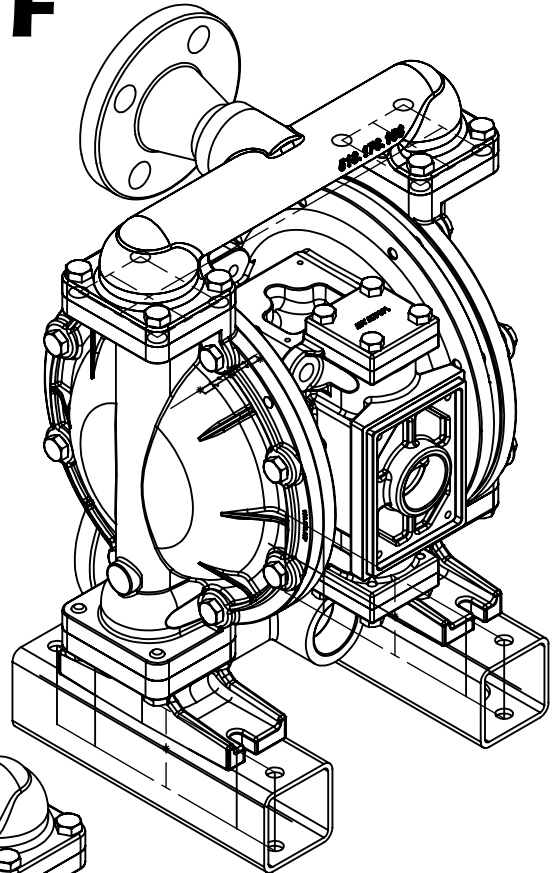
Warren Rupp, Inc.  
A Unit of IDEX Corporation  
800 N. Main St.,  
Mansfield, Ohio 44902 USA  
Telephone 419.524.8388  
Fax 419.522.7867  
WWW.SANDPIPERPUMP.COM



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# Model S1F

## Metallic Design Level 1



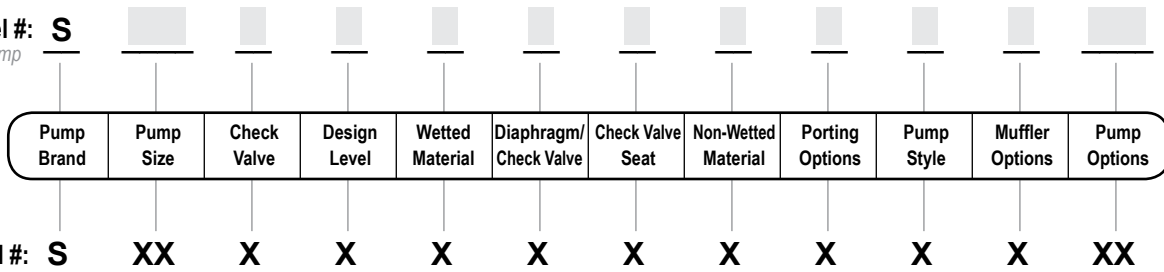
**SANDPIPER**<sup>®</sup>  
A WARREN RUPP, INC. BRAND

WWW.SANDPIPERPUMP.COM

# Explanation of Pump Nomenclature

Your Model #: **S**

(fill in from pump nameplate)



**Pump Brand**  
S SANDPIPER®

**Pump Size**  
1F 1"

**Check Valve Type**  
B Ball

**Design Level**  
1 Design Level

**Wetted Material**  
A Aluminum  
I Cast Iron  
S Stainless Steel  
H Alloy C  
X Unpainted Aluminum

**Diaphragm/Check Valve Materials**  
1 Santoprene/Santoprene  
2 PTFE Santoprene/PTFE  
B Nitrile/Nitrile  
C FKM/PTFE  
I EPDM/Santoprene  
G PTFE-Neoprene/PTFE  
N Neoprene/Neoprene  
Z One-Piece Bonded/PTFE

**Check Valve Seat**  
A Aluminum  
C Carbon Steel  
S Stainless Steel  
T PTFE  
W UHMW

**Non-Wetted Material Options**  
A Painted Aluminum  
I Cast Iron  
Y Painted Aluminum with Stainless Steel Hardware  
Z Cast Iron with Stainless Steel Hardware

**Porting Options**  
N NPT Threads  
B BSP (Tapered) Threads  
R Raised Face 150# Threaded ANSI Flange  
W Welded Raised Face 150# ANSI Flanged Manifolds

**Pump Style**  
S Standard

**Muffler Options**  
0 None  
1 Sound Dampening Muffler  
2 Mesh Muffler  
3 High temperature Air Valve w/Encapsulated Muffler  
4 High temperature Air Valve w/Sound Dampening Muffler  
5 High temperature Air Valve w/Mesh Muffler  
6 Metal Muffler  
7 Metal Muffler with Grounding Cable

**Pump Options**  
⚠ 00. None  
◇ P1. Intrinsically-Safe 5.30VDC, 110/120VAC 220/240 VAC Pulse Output Kit  
P2. 110/120 or 220/240VAC Pulse Output Kit  
E0. Solenoid Kit with 24VDC Coil  
△ E1. Solenoid Kit with 24VDC Explosion-Proof Coil  
E2. Solenoid Kit with 24VAC/12VDC Coil  
△ E3. Solenoid Kit with 12VDC Explosion-Proof Coil  
E4. Solenoid Kit with 110VAC Coil  
△ E5. Solenoid Kit with 110VAC Explosion-Proof Coil  
E6. Solenoid Kit with 220VAC Coil  
△ E7. Solenoid Kit with 220VAC Explosion-Proof Coil  
△ E8. Solenoid Kit with 110VAC, 50 Hz Explosion-Proof Coil  
△ E9. Solenoid Kit with 230VAC, 50 Hz Explosion-Proof Coil  
SP. Stroke Indicator Pins

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◆ A1. Solenoid Kit with 12 VDC ATEX Compliant Coil  
◆ A2. Solenoid Kit with 24 VDC ATEX Compliant Coil  
◆ A3. Solenoid Kit with 110/120 VAC 50/60 Hz ATEX Compliant Coil  
◆ A4. Solenoid Kit with 220/240 VAC 50/60 Hz ATEX Compliant Coil

Your Serial #: (fill in from pump nameplate) \_\_\_\_\_

## ATEX Detail

(1) II 1G c T5 Models equipped with Wetted Options I, S or H, Non-Wetted Options I or Z Pump Options 6 or 7, and Kit Option 0.  
II 3/1 G c T5  
II 1D c T100°C  
⚠ I M1 c  
I M2 c  
**Note:** See ATEX Explanation of EC-Type Certificate

II 2G c T5 Models equipped with Wetted Options A, I, S, or H, Non-Wetted Options A, I, Y, or Z, Pump Options 6 or 7, and Kit Option 0.  
II 3/2 G c T5  
II 2D c T100°C  
**Note:** See page 19 for ATEX Explanation of Type Examination Certificate

(2) II 2G Ex ia c IIC T5  
II 3/2 G Ex ia c IIC T5  
II 2D Ex c ia 20 IP67 T100°C

◇ **Note:** Pumps ordered with the options listed in (1) to the left are ATEX compliant when ordered with kit option P1.

(3) II 2G EEx m c II T5  
II 3/2 2G EEx m c II T5  
II 2D c IP65 T100°C

◆ **Note:** Pumps ordered with the options listed in (1) to the left are ATEX compliant when ordered with kit option A1, A2, A3, or A4. Compressed Air Temperature Range: Maximum Ambient Temperature to plus 50°C.  
*\*Note: See page 16 for Special Conditions For Safe Use.*

(4) IEC EEx m T4



△ **Note:** Pump models equipped with these explosion-proof solenoid kit options E1, E3, E5, E7, E8 or E9, are certified and approved by the above agencies. They are NOT ATEX compliant.

### Special condition for safe use:

Conductive polypropylene, conductive acetal, or conductive PVDF pumps are not to be installed in applications where the pumps may be subjected to oil, greases and hydraulic liquids.

# Performance

## S1F METALLIC

### SUCTION/DISCHARGE PORT SIZE

- 1" NPT (internal)
- 1" BSP Tapered (internal)
- 1" ANSI 150# Raised Face Flanges

### CAPACITY

- 0 to 45 gallons per minute (0 to 170 liters per minute)

### AIR DISTRIBUTION VALVE

- No-lube, no-stall design

### SOLIDS-HANDLING

- Up to .25 in. (6mm)

### HEADS UP TO

- 125 psi or 289 ft. of water (8.6 Kg/cm<sup>2</sup> or 86 meters)

### DISPLACEMENT/STROKE

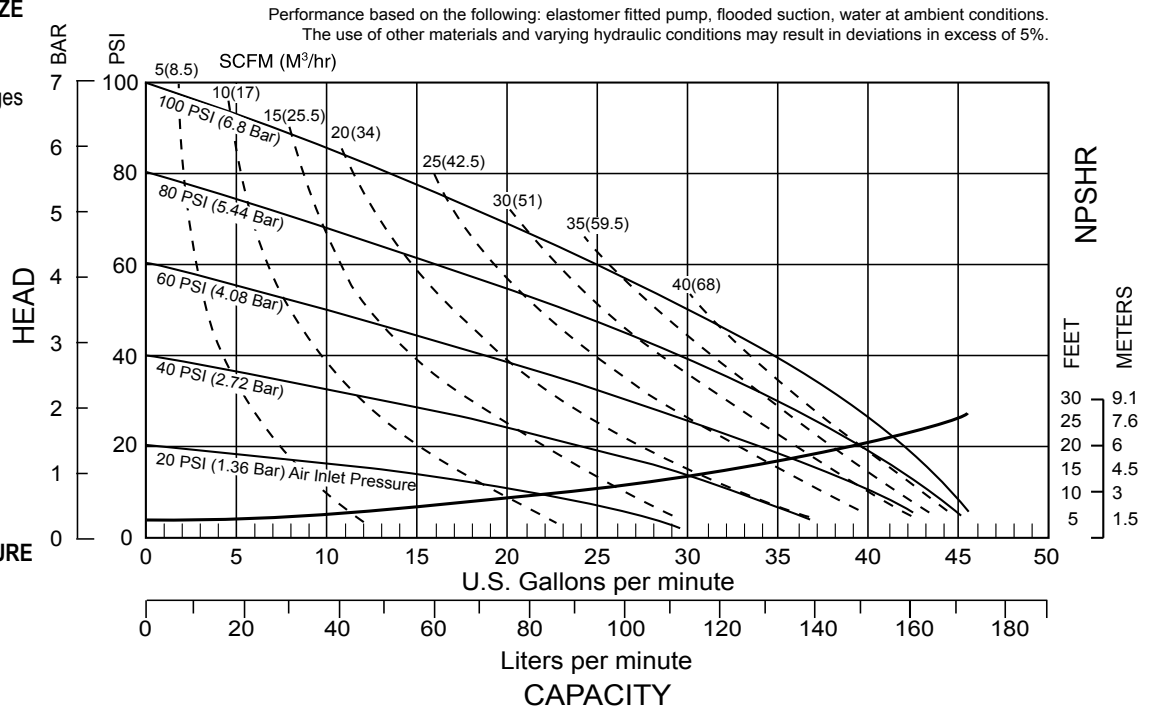
- .11 Gallon / .42 liter

### MAXIMUM OPERATING PRESSURE

- 125 psi (8.6 bar)

### SHIPPING WEIGHT

- Aluminum 28 lbs. (13kg)
- Cast Iron 46 lbs. (21kg)
- Stainless Steel 43 lbs. (20kg)



# Materials

Material Profile:	Operating Temperatures:	
	Max.	Min.
<b>Conductive Acetal:</b> Tough, impact resistant, ductile. Good abrasion resistance and low friction surface. Generally inert, with good chemical resistance except for strong acids and oxidizing agents.	190°F 88°C	-20°F -29°C
<b>EPDM:</b> Shows very good water and chemical resistance. Has poor resistance to oils and solvents, but is fair in ketones and alcohols.	280°F 138°C	-40°F -40°C
<b>FKM:</b> (Fluorocarbon) Shows good resistance to a wide range of oils and solvents; especially all aliphatic, aromatic and halogenated hydrocarbons, acids, animal and vegetable oils. Hot water or hot aqueous solutions (over 70°F(21°C)) will attack FKM.	350°F 177°C	-40°F -40°C
<b>Hytrel®:</b> Good on acids, bases, amines and glycols at room temperatures only.	220°F 104°C	-20°F -29°C
<b>Neoprene:</b> All purpose. Resistance to vegetable oils. Generally not affected by moderate chemicals, fats, greases and many oils and solvents. Generally attacked by strong oxidizing acids, ketones, esters and nitro hydrocarbons and chlorinated aromatic hydrocarbons.	200°F 93°C	-10°F -23°C
<b>Nitrile:</b> General purpose, oil-resistant. Shows good solvent, oil, water and hydraulic fluid resistance. Should not be used with highly polar solvents like acetone and MEK, ozone, chlorinated hydrocarbons and nitro hydrocarbons.	190°F 88°C	-10°F -23°C
<b>Nylon:</b> 6/6 High strength and toughness over a wide temperature range. Moderate to good resistance to fuels, oils and chemicals.	180°F 82°C	32°F 0°C

**Ambient temperature range:** -20°C to +40°C  
**Process temperature range:** -20°C to +80°C for models rated as category 1 equipment  
 -20°C to +100°C for models rated as category 2 equipment

In addition, the ambient temperature range and the process temperature range do not exceed the operating temperature range of the applied non-metallic parts as listed in the manuals of the pumps.

<b>Polypropylene:</b> A thermoplastic polymer. Moderate tensile and flex strength. Resists strong acids and alkali. Attacked by chlorine, fuming nitric acid and other strong oxidizing agents.	180°F 82°C	32°F 0°C
<b>PVDF:</b> (Polyvinylidene Fluoride) A durable fluoroplastic with excellent chemical resistance. Excellent for UV applications. High tensile strength and impact resistance.	250°F 121°C	0°F -18°C
<b>Santoprene®:</b> Injection molded thermoplastic elastomer with no fabric layer. Long mechanical flex life. Excellent abrasion resistance.	275°F 135°C	-40°F -40°C
<b>UHMW PE:</b> A thermoplastic that is highly resistant to a broad range of chemicals. Exhibits outstanding abrasion and impact resistance, along with environmental stress-cracking resistance.	180°F 82°C	-35°F -37°C
<b>Urethane:</b> Shows good resistance to abrasives. Has poor resistance to most solvents and oils.	150°F 66°C	32°F 0°C
<b>Virgin PTFE:</b> (PFA/TFE) Chemically inert, virtually impervious. Very few chemicals are known to chemically react with PTFE; molten alkali metals, turbulent liquid or gaseous fluorine and a few fluoro-chemicals such as chlorine trifluoride or oxygen difluoride which readily liberate free fluorine at elevated temperatures.	220°F 104°C	-35°F -37°C

*Maximum and Minimum Temperatures are the limits for which these materials can be operated. Temperatures coupled with pressure affect the longevity of diaphragm pump components. Maximum life should not be expected at the extreme limits of the temperature ranges.*

### Metals:

**Alloy C:** Equal to ASTM494 CW-12M-1 specification for nickel and nickel alloy.

**Stainless Steel:** Equal to or exceeding ASTM specification A743 CF-8M for corrosion resistant iron chromium, iron chromium nickel and nickel based alloy castings for general applications. Commonly referred to as 316 Stainless Steel in the pump industry.

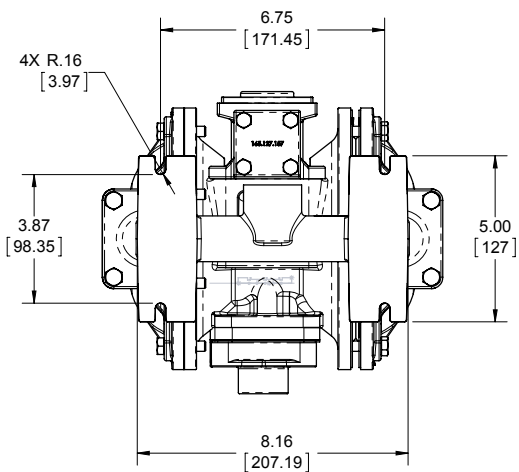
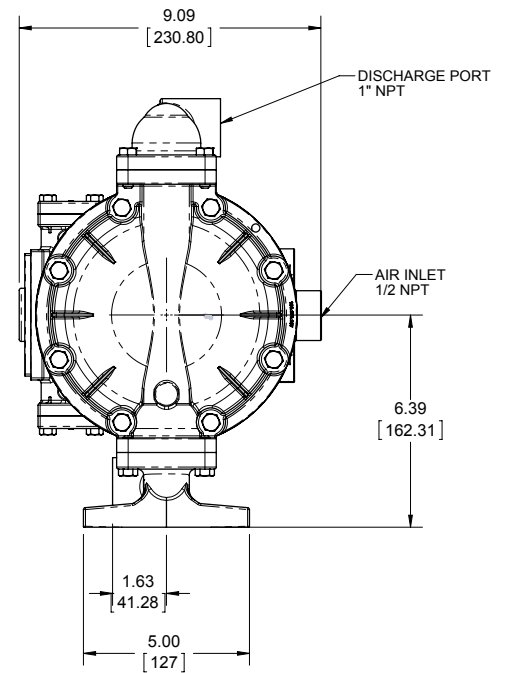
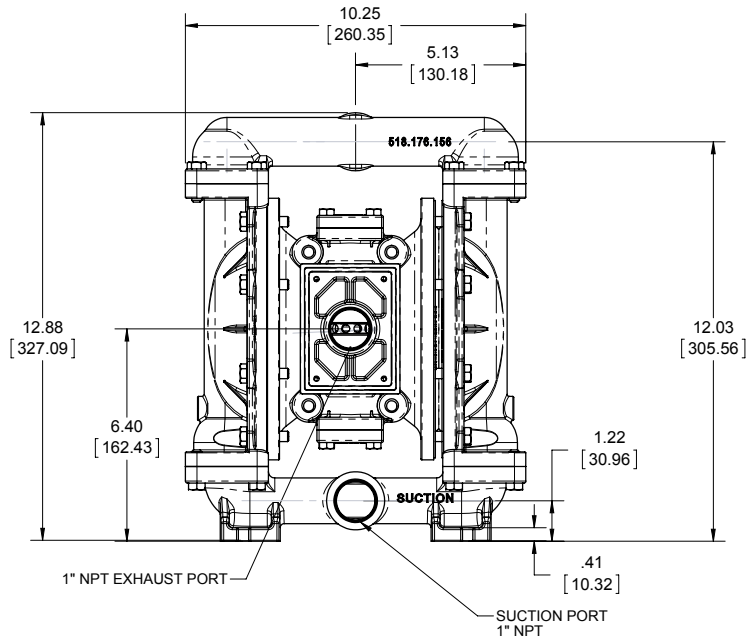
For specific applications, always consult the Chemical Resistance Chart.

# Dimensional Drawings

## S1F Metallic - NPT

Dimensions in inches (mm dimensions in brackets). Dimensional Tolerance:  $\pm 1/8"$  ( $\pm 3\text{mm}$ )

The dimensions on this drawing are for reference only. A certified drawing can be requested if physical dimensions are needed.

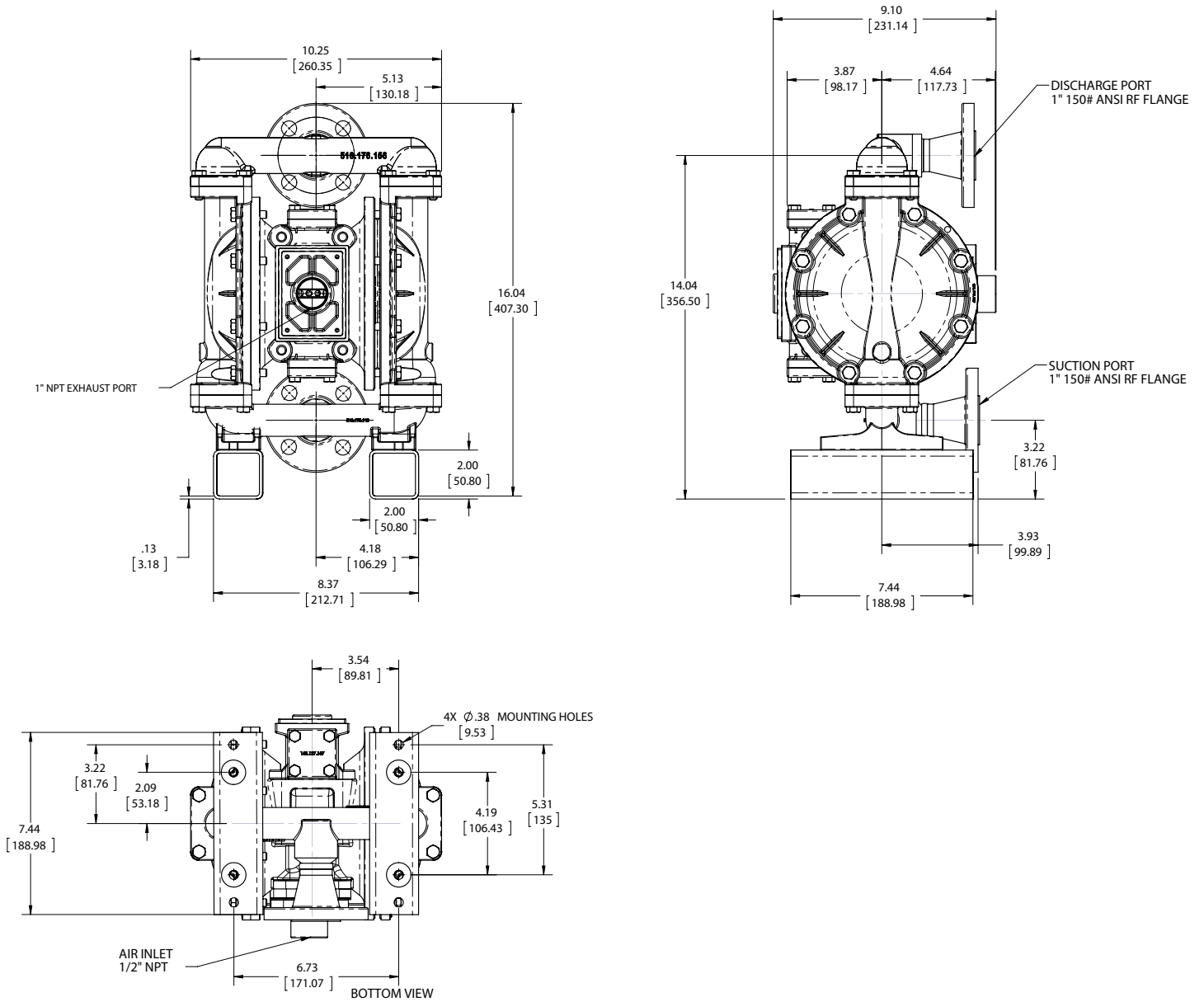


# Dimensional Drawings

## S1F Metallic - ANSI Flange

Dimensions in inches (mm dimensions in brackets). Dimensional Tolerance:  $\pm 1/8"$  ( $\pm 3\text{mm}$ )

The dimensions on this drawing are for reference only. A certified drawing can be requested if physical dimensions are needed.



# Written Warranty

## 5 - YEAR Limited Product Warranty

Quality System ISO9001 Certified • Environmental Management Systems ISO14001 Certified

Warren Rupp, Inc. ("Warren Rupp") warrants to the original end-use purchaser that no product sold by Warren Rupp that bears a Warren Rupp brand shall fail under normal use and service due to a defect in material or workmanship within five years from the date of shipment from Warren Rupp's factory. Warren Rupp brands include SANDPIPER®, MARATHON®, PortaPump®, SludgeMaster™ and Tranquilizer®.

~ See complete warranty at [www.sandpiperpump.com/About/guaranteesandwarranties.html](http://www.sandpiperpump.com/About/guaranteesandwarranties.html) ~

**WARREN  
RUPP®**

### Declaration of Conformity

Manufacturer: Warren Rupp, Inc.®, 800 N. Main Street, P.O. Box 1568,  
Mansfield, Ohio, 44901-1568 USA

Certifies that Air-Operated Double Diaphragm Pump Series: HDB, HDF, M Non-Metallic, S Non-Metallic, M Metallic, S Metallic, T Series, G Series, U Series, EH and SH High Pressure, RS Series, W Series, SMA and SPA Submersibles, and Tranquilizer Surge Suppressors comply with the European Community Directive 2006/42/EC on Machinery, according to Annex VIII. This product has used Harmonized Standard EN 809, Pumps and Pump Units for Liquids - Common Safety Requirements, to verify conformance.

David Roseberry  
Signature of authorized person

David Roseberry  
Printed name of authorized person

Revision Level: E

October 20, 2005  
Date of issue

Engineering Manager  
Title

May 27, 2010  
Date of revision

**IBEX**  
FLUID & METERING

**CE**





# EC Declaration of Conformity

In accordance with ATEX Directive 94/9/EC,  
Equipment intended for use in potentially explosive environments.

**Manufacturer: Warren Rupp, Inc.®, A Unit of IDEX Corporation**  
800 North Main Street, P.O. Box 1568, Mansfield, OH 44901-1568 USA

**EN 60079-25: 2004**

For pumps equipped with Pulse Output ATEX Option  
KEMA Quality B.V. (0344)

**Applicable Standard:**  
EN13463-1: 2001,  
EN13463-5: 2003



**AODD Pumps and Surge Suppressors**

For Type Examination Designations

**AODD (Air-Operated Double Diaphragm) Pumps**

EC Type Examination Certificate No. Pumps: KEMA 09ATEX0071 X  
KEMA Quality B.V.  
Utrechtseweg 310  
6812 AR Arnhem, The Netherlands



DATE/APPROVAL/TITLE:  
27 MAY 2010

*David Roseberry*  
David Roseberry, Engineering Manager

## ATEX Summary of Markings

Type	Marking	Listed In	Non-Conductive Fluids	
Pump types, S1F, S15, S20, and S30 provided with the pulse output option	II 2 G Ex ia c IIC T5 II 3/2 G Ex ia c IIC T5 II 2 D Ex c iaD 20 IP67 T100°C	KEMA 09ATEX0071 X CE 0344	KEMA 09ATEX0071 X KEMA 09ATEX0071 X KEMA 09ATEX0071 X	No Yes Yes
Pump types, S1F, S15, S20, and S30 provided with the integral solenoid option	II 2 G EEx m c II T5 II 3/2 G EEx m c II T5 II 2 D c IP65 T100°C	KEMA 09ATEX0071 X CE 0344	KEMA 09ATEX0071 X KEMA 09ATEX0071 X KEMA 09ATEX0071 X	No Yes Yes
Pump types, HDB1½, HDB40, HDB2, HDB50, HDB3, HDF1, HDF25, HDF2, HDF3M, PB¼, S05, S1F, S15, S20, S30, SB1, SB25, ST1½, ST40, G15, G20, and G30, without the above listed options, no aluminum parts	II 1 G c T5 II 3/1 G c T5 II 1 D c T100°C I M1 c I M2 c	KEMA 09ATEX0071 X KEMA 09ATEX0072 X CE 0344	KEMA 09ATEX0071 X KEMA 09ATEX0071 X KEMA 09ATEX0071 X KEMA 09ATEX0071 X KEMA 09ATEX0072 X	No Yes Yes No Yes
Pump types, DMF2, DMF3, HDB1½, HDB40, HDB2, HDB50, HDB3, HDF1, HDF25, HDF2, HDF3M, PB¼, S05, S1F, S15, S20, S30, SB1, SB25, SE½, ST1, ST25, ST1½, ST40, U1F, G05, G1F, G15, G20, and G30	II 2 G c T5 II 3/2 G c T5 II 2 D c T100°C	KEMA 09ATEX0072 X CE	KEMA 09ATEX0072 X KEMA 09ATEX0072 X KEMA 09ATEX0072 X	No Yes Yes
Surge Suppressors all types	II 2 G T5 II 3/2 G T5 II 2 D T100°C	KEMA 09ATEX0073 CE	KEMA 09ATEX0073 KEMA 09ATEX0073 KEMA 09ATEX0073	No Yes Yes

EC Type Certificate No. Pumps: KEMA 09ATEX0071 X  
Type Certificate No. Pumps: KEMA 09ATEX0072 X  
Type Certificate No. Suppressors: KEMA 09ATEX0073