

# OPERATING & MAINTENANCE MANUAL

## Original Instructions

### Pulsation Dampeners for Air-Driven Diaphragm Pumps

Metallic Construction



See page 13 for  
ATEX ratings



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# BLAGDON PUMP



## OPERATING & MAINTENANCE MANUAL

# Pulsation Dampener

## for Air-Driven Diaphragm Pumps

**Virtually pulsation-free flows.**

**Steadier pressures.**

**Less vibration and noise.**

**Simple installation.**

**Variety of sizes and materials.**

**Automatically self-charging and self-venting.**

### OPERATING PRINCIPLE

An air cushion is established by liquid pressure pushing the diaphragm upward. This allows air to enter the chamber. The balancing air cushion keeps the diaphragm centered at midstroke.

During operation, the diaphragm(s) flex within the mid-range position, absorbing and equalising discharge pulsation.

If pressure changes in the system, the air cushion pressure compensates, automatically increasing or decreasing. If liquid pressure is released, air in the suppressor chamber exhausts into the atmosphere.

Properly sized and installed, pulsation dampeners provide virtually pulse-free discharge flow.

Materials	Operating Temperatures		
	Maximum*	Minimum*	Optimum**
<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	50°F to 140°F 10°C to 60°C
<b>EPDM</b> Shows very good water and chemical resistance. Has poor resistance to oil and solvents, but is fair in ketones and alcohols.	212°F 100°C	-10°F -23°C	50°F to 212°F 10°C to 100°C
<b>NEOPRENE</b> All purpose. Resistant to vegetable oils. Generally not affected by moderate chemicals, fats, greases and many oils and solvents. Generally attacked by strong oxidizing acids, ketones, esters, nitro hydrocarbons and chlorinated aromatic hydrocarbons.	170°F 77°C	-35°F -37°C	50°F to 130°F 10°C to 54°C
<b>VIRGIN PTFE</b> Chemically inert, virtually impervious. Very few chemicals are known to react chemically 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.	212°F 100°C	-35°F -37°C	50°F to 212°F 10°C to 100°C
<b>FKM</b> 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) will attack FKM.	212°F 100°C	32°F 0°C	75°F to 212°F 24°C to 100°C
<b>SANTOPRENE®</b> Injection molded thermoplastic elastomer with no fabric layer. Long mechanical flex life. Excellent abrasion resistance.	212°F 100°C	-10°F -23°C	50° to 212°F 10°C to 100°C
For specific applications, always consult "Chemical Resistance Chart" Technical Bulletin			

\* Definite reduction in service life.

\*\* Minimal reduction in service life at ends of range.

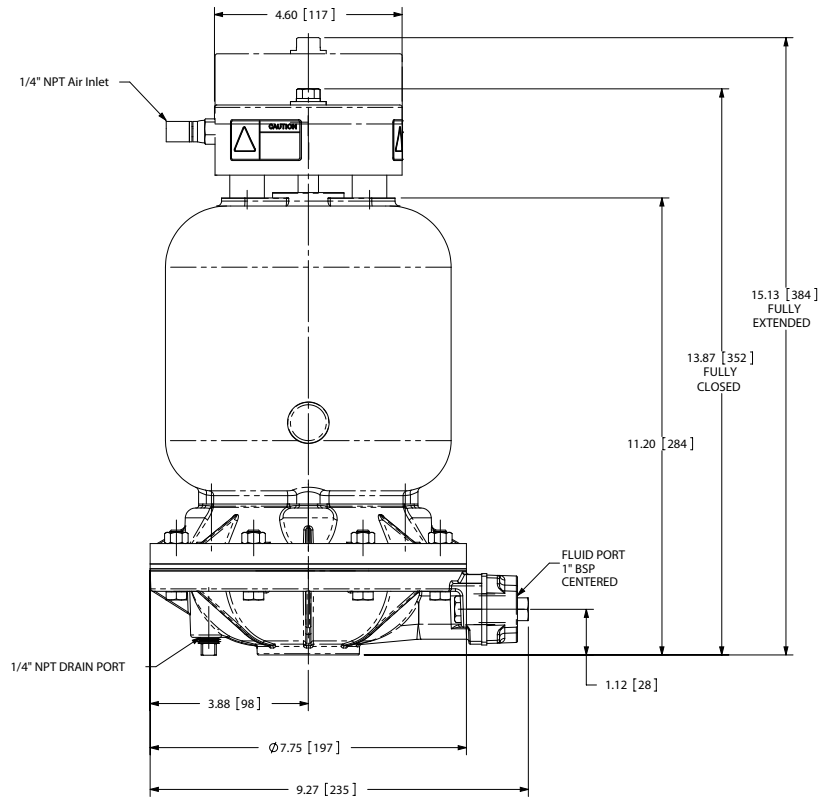
## Model PD25M

Air inlet

1/4" NPT (external) fitting

Fluid Port- 1" BSP

parallel thread



## Model PD40M

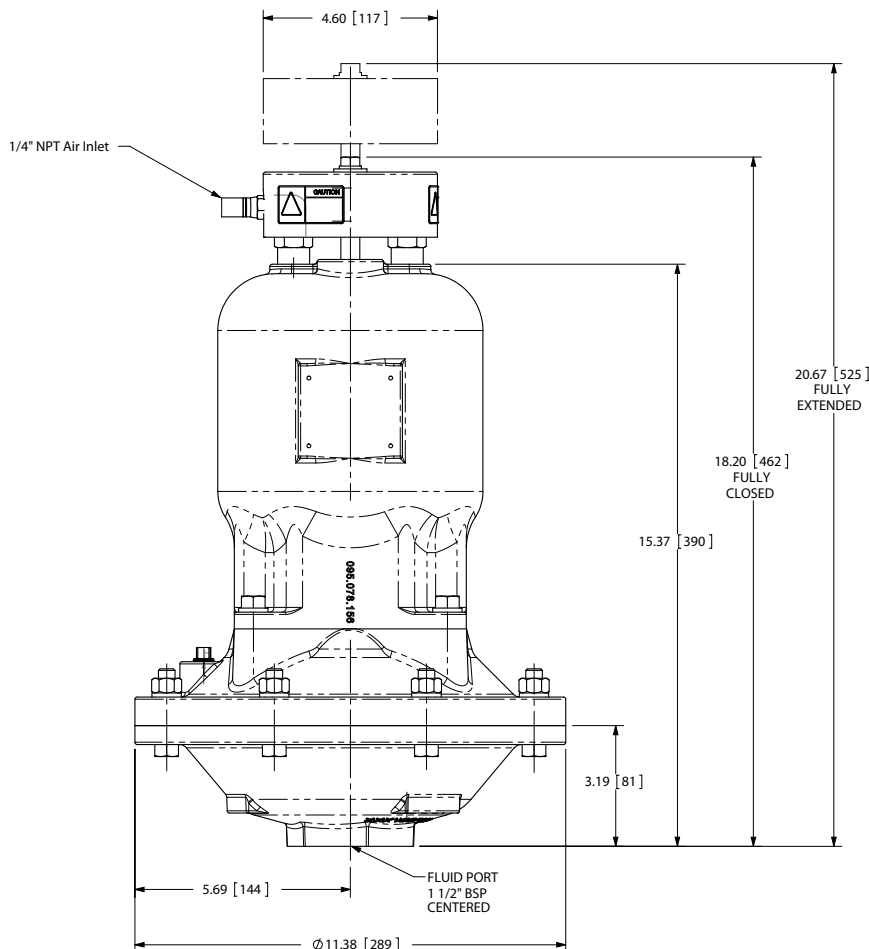
Design Level 2

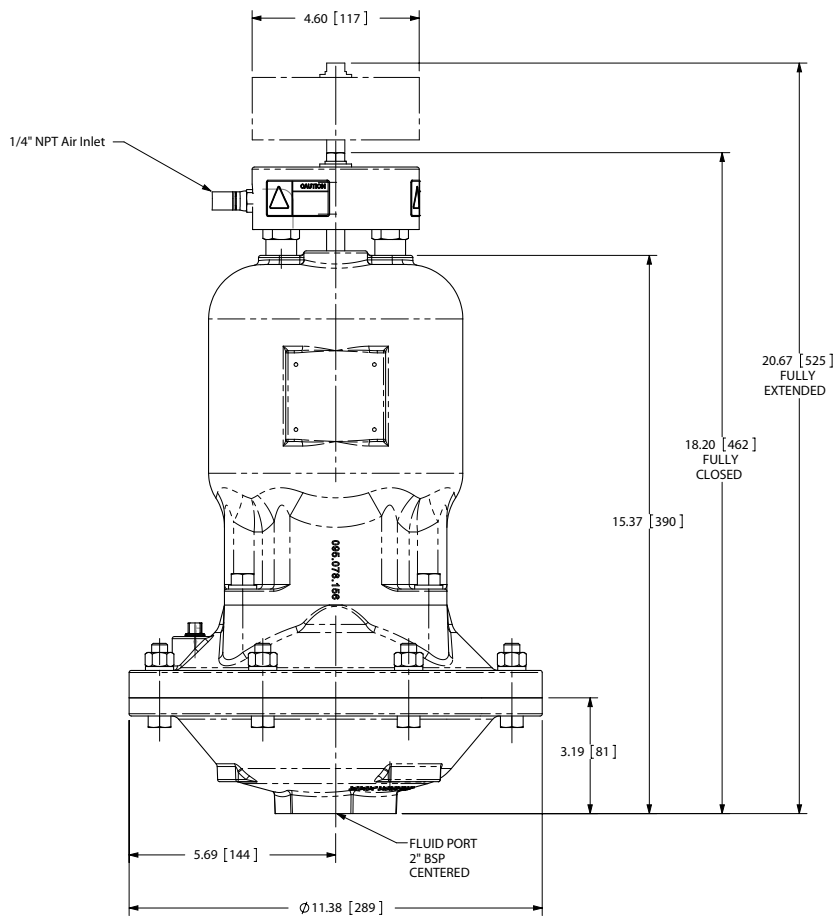
Air inlet

1/4" NPT (external) fitting

Fluid Port- 1 1/2" BSP

parallel thread





## Model PD50M

### Design Level 2

Air inlet

1/4" NPT (external) fitting

Fluid Port- 2" BSP  
parallel thread

## Model PD80M

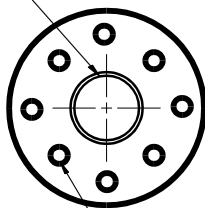
### Design Level 2

Air inlet

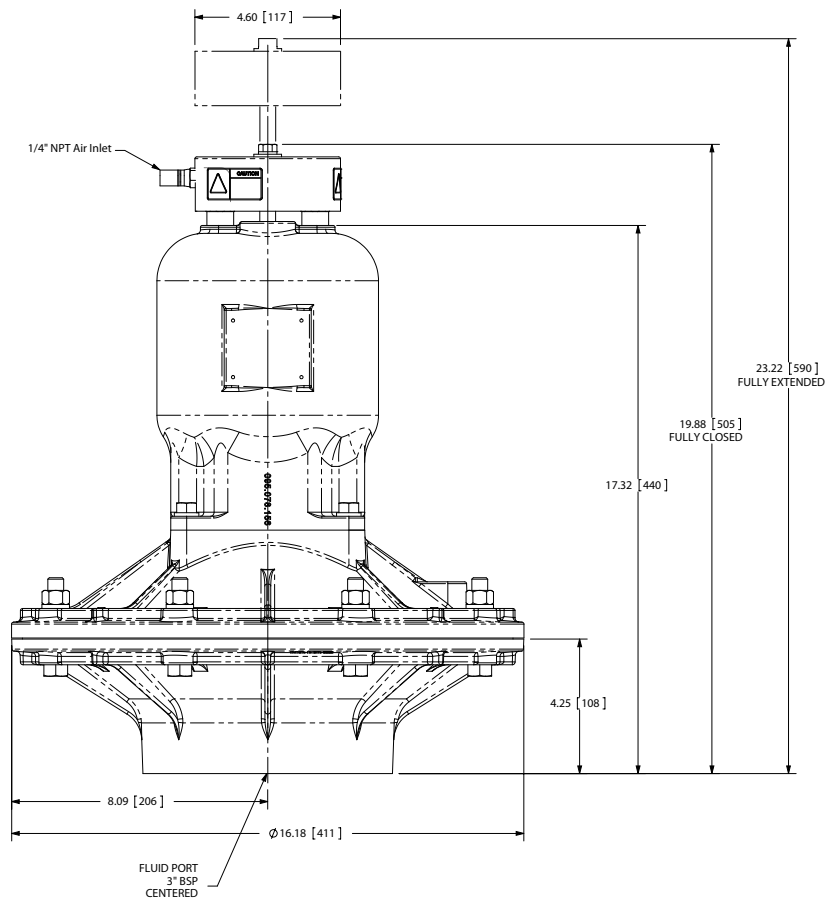
1/4" NPT (external) fitting

Fluid Port- 3" BSP  
parallel thread

3" BSP Parallel



PN10 80mm DIN Flange  
M16x2 8 holes on a  
160mm diameter Bolt Circle



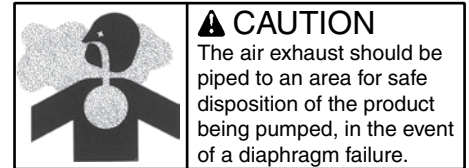
# BLAGDON PUMP®

**IDEX**  
FLUID & METERING

## INSTALLATION GUIDE

Available from  
Blagdon Pumps

- ① Pulsation Dampener
- ② Filter/Regulator
- ③ Lubricator



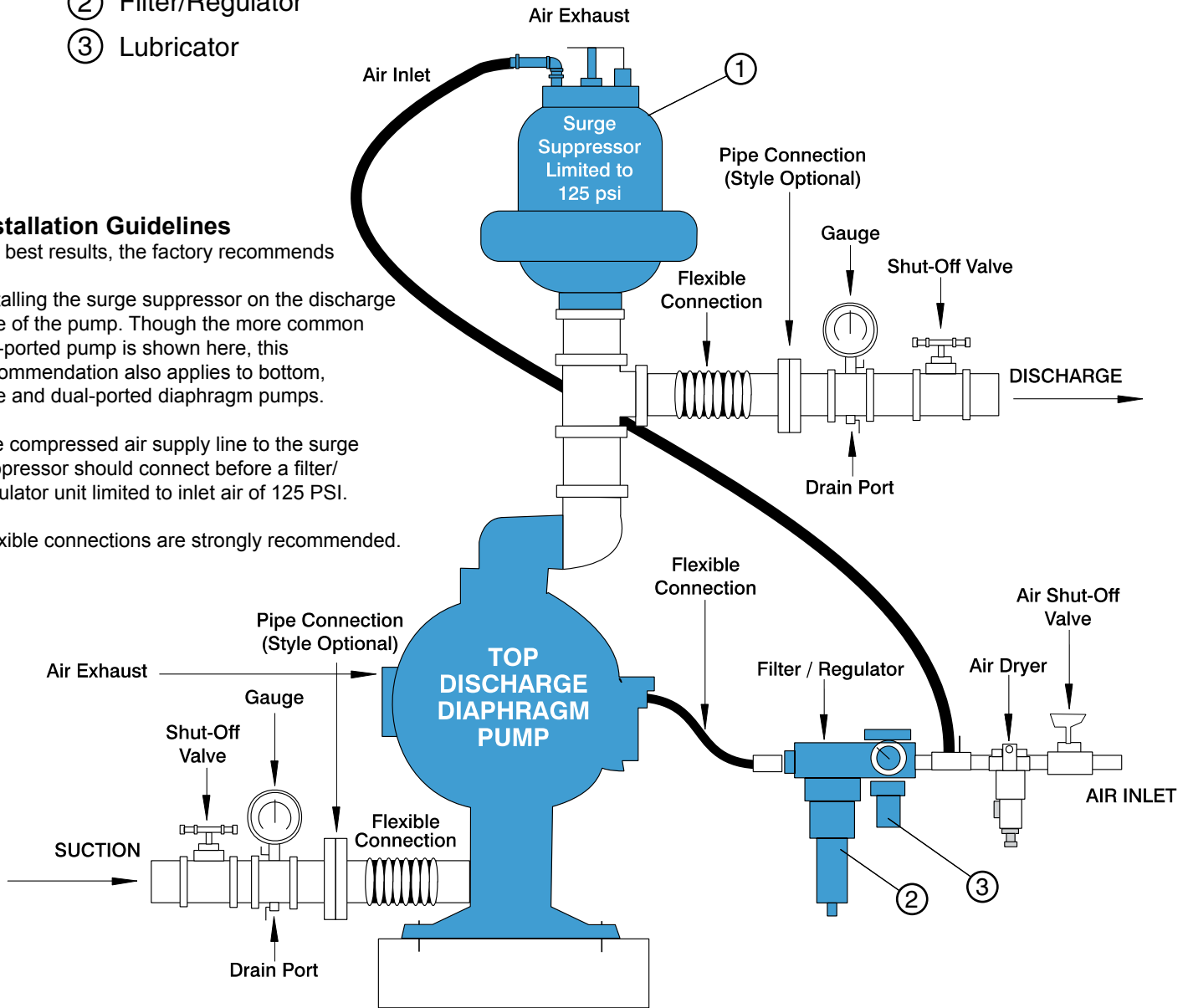
### Installation Guidelines

For best results, the factory recommends





installing the surge suppressor on the discharge side of the pump. Though the more common top-ported pump is shown here, this recommendation also applies to bottom, side and dual-ported diaphragm pumps.

The compressed air supply line to the surge suppressor should connect before a filter/regulator unit limited to inlet air of 125 PSI.

Flexible connections are strongly recommended.



# Pulsation Dampener Options

	Model & Description	Max. Pressure	Air Inlet Size	Liquid Inlet Size	Dimensions inches (mm)	Available Wetted Materials									
						Chamber				Diaphragm					
						A	S	C	Q	N	B	V	E	T#	R
	<b>PD25M</b> Designed for 1" pumps.	125 psi 8.6 bar  Self-charging. Self-venting.	¼" NPT	1" BSPP (parallel)	13.5/8" to 15.1/8" height (346mm to 384mm)  9" diameter (229mm)										
	<b>PD40M</b> Design level 2 Designed for 1" and 1½" pumps.	125 psi 8.6 bar  Self-charging. Self-venting.	¼" NPT	1½" BSPP (parallel)	19.7/8" to 21.3/8" height (505mm to 543mm)  10½" diameter (267mm)										
	<b>PD50M</b> Design level 2 Designed for 1½" and 2" pumps.	125 psi 8.6 bar  Self-charging. Self-venting.	¼" NPT	2" BSPP (parallel)	20¼" to 23.3/16" height (514mm to 589mm)  12½" diameter (317mm)										
	<b>PD80M</b> Design level 2 Designed for 3" and 4" pumps.	125 psi 8.6 bar  Self-charging. Self-venting.	¼" NPT	3" BSPP (parallel) and 80mm DIN-style Flange	20.1/8" to 23.1/8" height (511mm to 587mm)  16.3/16" diameter (411mm)										

AL= Aluminum  
B = Nitrile  
C = Cast iron

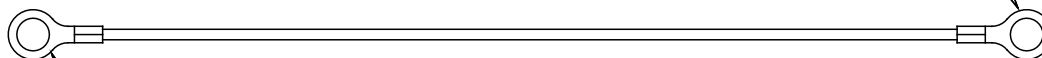
E = EPDM  
N = Neoprene  
T# = Overlay, Neoprene with Virgin PTFE

T = Virgin PTFE  
V = FKM  
Q = Alloy C (Hastelloy-C)

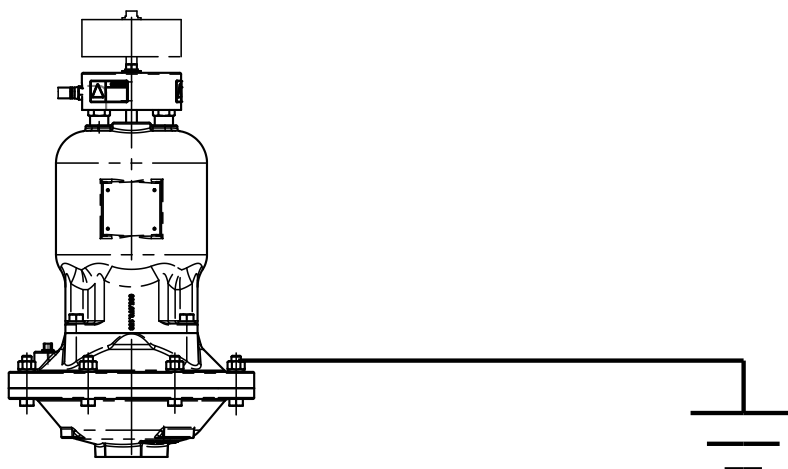
S = Alloy 316 stainless steel  
R = Santoprene

# Grounding The Pulsation Dampener

One eyelet end is fastened to the surge suppressor hardware.



The other end is installed to a true earth ground.



## **WARNING**

*Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers or other miscellaneous equipment must be grounded.*

This optional 8 foot long (244 centimeters) Ground Strap (920-025-000) is available for easy ground connection.

To reduce the risk of static electrical sparking, this surge suppressor must be grounded. Check the local electrical code for detailed grounding instruction and the type of equipment required.



### Operating and Maintenance Instructions

The Blagdon Pump PULSATION DAMPENER is a completely automatic diaphragm-fitted pulsation dampener to reduce the flow and pressure pulsations in a pumping system characteristic of reciprocating type pumps.

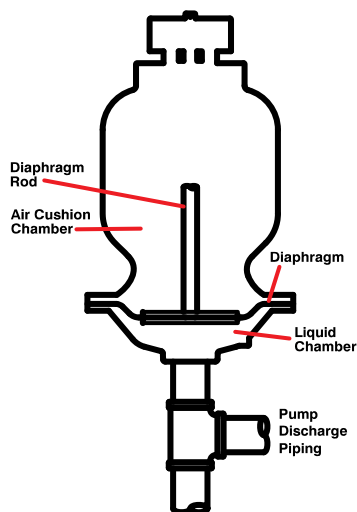
**Principle of Operation:** The PULSATION DAMPENER uses a flexible diaphragm to separate a liquid chamber from compressed air chambers. A rod connected to the center of one diaphragm activates the air inlet and exhaust valves, which automatically admits or exhausts air in the air chambers. This maintains the diaphragms in mid-range of stroke for maximum pulsation dampening.

**Installation:** Locate the PULSATION DAMPENER in discharge piping as close as possible to the pump. Measures must be taken to support the weight of the unit. Do not rely on piping connection for support of the unit. The unit will operate in any position. Connect the air inlet connection to an air supply line having the same air pressure as that at the air inlet connection to the pump. Do not exceed 8.6 Bar/125 PSI.

**Service Instructions:** When service is required, it is important to MAKE CERTAIN THAT INLET AIR PRESSURE AND LIQUID SYSTEM PRESSURES ARE VENTED. Before maintenance or repair, shut off the compressed air line, bleed the pressure, and disconnect the air line from the pump. The discharge line may be pressurized and must be bled of its pressure. When used for toxic or aggressive fluids, the unit should always be flushed clean prior to disassembly. The diaphragms are serviced by simply removing twelve hex nuts and removing the center spool casting.

When PTFE diaphragms are used in conjunction with the elastomeric diaphragms they are placed over the "wetted" sides of each elastomeric diaphragm. Inlet and exhaust air valves are located externally for easy access and service.

**Warranty:** This unit is guaranteed for a period of five years against defective material and workmanship.



### ⚠ CAUTION

*Read these safety warnings and instructions in this manual completely, before installation and start-up of the pulsation dampener. It is the responsibility of the purchaser to retain this manual for reference. Failure to comply with the recommendations stated in this manual will damage the pulsation dampener, and void factory warranty.*



### ⚠ CAUTION

*Before surge suppressor operation, inspect all gasketed fasteners for looseness caused by gasket creep. Re-torque loose fasteners to prevent leakage. Follow recommended torques stated in this manual.*



### ⚠ WARNING

*Before doing any maintenance on the pulsation dampener, be certain all pressure is completely vented from the pump, suction, discharge, piping, and all other openings and connections. Be certain the air supply is locked out or made non-operational, so that it cannot be started while work is being done on the pump. Be certain that approved eye protection and protective clothing are worn all times in the vicinity of the pump. Failure to follow these recommendations may result in serious injury or death.*



### ⚠ WARNING

*Take action to prevent static sparking. Fire or explosion can result, especially when handling flammable liquids. The pump, piping, valves, containers or other miscellaneous equipment must be grounded.*

### ⚠ HAZARD WARNING ⚠

*POSSIBLE EXPLOSION HAZARD can result if 1, 1, 1, -Trichloroethane, Methylene Chloride or other Halogenated Hydrocarbon solvents are used in pressurized fluid systems having Aluminum or Galvanized wetted parts. Death, serious bodily injury and/or property damage could result. Consult with the factory if you have questions concerning Halogenated Hydrocarbon solvents.*

# MATERIAL CODES

## THE LAST 3 DIGITS OF PART NUMBER

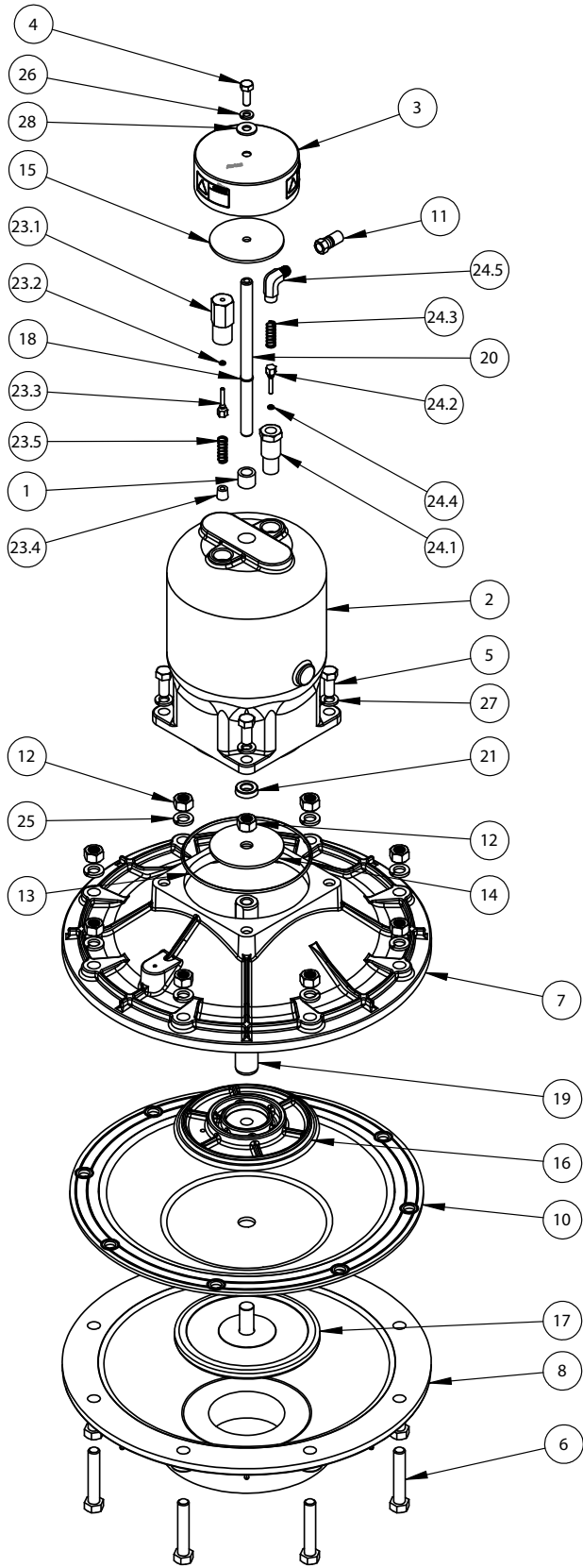
000	Assembly, sub-assembly; and some purchased items	337	Silver Plated Steel	555	Polyvinyl Chloride
010	Cast Iron	340	Nickel Plated	556	Black Vinyl
012	Powered Metal	342	Filled Nylon	558	Conductive HDPE
015	Ductile Iron	351	Food Grade Santoprene	570	Rulon II
020	Ferritic Malleable Iron	353	Geolast; Color: Black	580	Ryton
025	Music Wire	354	Injection Molded #203-40 Santoprene- Duro 40D +/-5; Color: RED	590	Valox
080	Carbon Steel, AISI B-1112	355	Thermal Plastic	591	Nylatron G-S
100	Alloy 20	356	Hytre	592	Nylatron NSB
110	Alloy Type 316 Stainless Steel	357	Injection Molded Polyurethane	600	PTFE (virgin material)
111	Alloy Type 316 Stainless Steel (Electro Polished)	358	Urethane Rubber (Some Applications) (Compression Mold)		Tetrafluorocarbon (TFE)
112	Alloy C			601	PTFE (Bronze and moly filled)
113	Alloy Type 316 Stainless Steel (Hand Polished)	359	Urethane Rubber	602	Filled PTFE
114	303 Stainless Steel	360	Nitrile Rubber Color coded: RED	603	Blue Gylon
115	302/304 Stainless Steel	361	Nitrile	604	PTFE
117	440-C Stainless Steel (Martensitic)	363	FKM (Fluorocarbon). Color coded: YELLOW	606	PTFE
120	416 Stainless Steel (Wrought Martensitic)	364	E.P.D.M. Rubber. Color coded: BLUE	607	Envelon
123	410 Stainless Steel (Wrought Martensitic)	365	Neoprene Rubber. Color coded: GREEN	608	Conductive PTFE
148	Hardcoat Anodized Aluminum	366	Food Grade Nitrile	610	PTFE Encapsulated Silicon
149	2024-T4 Aluminum	368	Food Grade EPDM	611	PTFE Encapsulated FKM
150	6061-T6 Aluminum	370	Butyl Rubber Color coded: BROWN	632	Neoprene/Hytrel
151	6063-T6 Aluminum	371	Philthane (Tuftane)	633	FKM/PTFE
152	2024-T4 Aluminum (2023-T351)	374	Carboxylated Nitrile	634	EPDM/PTFE
154	Almag 35 Aluminum	375	Fluorinated Nitrile	635	Neoprene/PTFE
155	356-T6 Aluminum	378	High Density Polypropylene	637	PTFE, FKM/PTFE
156	356-T6 Aluminum	379	Conductive Nitrile	638	PTFE, Hytrel/PTFE
157	Die Cast Aluminum Alloy #380	405	Cellulose Fibre	639	Nitrile/TFE
158	Aluminum Alloy SR-319	408	Cork and Neoprene	643	Santoprene®/EPDM
159	Anodized Aluminum	425	Compressed Fibre	644	Santoprene®/PTFE
162	Brass, Yellow, Screw Machine Stock	426	Blue Gard	656	Santoprene Diaphragm and Check Balls/EPDM Seats
165	Cast Bronze, 85-5-5-5	440	Vegetable Fibre	661	EPDM/Santoprene
166	Bronze, SAE 660	465	Fibre	666	FDA Nitrile Diaphragm, PTFE Overlay, Balls, and Seals
170	Bronze, Bearing Type, Oil Impregnated	500	Delrin 500	668	PTFE, FDA Santoprene/PTFE
175	Die Cast Zinc	501	Delrin 570		
180	Copper Alloy	502	Conductive Acetal, ESD-800		Delrin and Hytrel are registered tradenames of E.I. DuPont.
305	Carbon Steel, Black Epoxy Coated	503	Conductive Acetal, Glass-Filled		Gylon is a registered tradename of Garlock, Inc.
306	Carbon Steel, Black PTFE Coated	505	Acrylic Resin Plastic		Nylatron is a registered tradename of Polymer Corp.
307	Aluminum, Black Epoxy Coated	506	Delrin 150		Santoprene is a registered tradename of Exxon Mobil Corp.
308	Stainless Steel, Black PTFE Coated	520	Injection Molded PVDF Natural color		Rulon II is a registered tradename of Dixon Industries Corp.
309	Aluminum, Black PTFE Coated	540	Nylon		Ryton is a registered tradename of Phillips Chemical Co.
310	PVDF Coated	541	Nylon		Valox is a registered tradename of General Electric Co.
313	Aluminum, White Epoxy Coated	542	Nylon		
330	Zinc Plated Steel	544	Nylon Injection Molded		
331	Chrome Plated Steel	550	Polyethylene		
332	Aluminum, Electroless Nickel Plated	551	Glass Filled Polypropylene		
333	Carbon Steel, Electroless Nickel Plated	552	Unfilled Polypropylene		
335	Galvanized Steel	553	Unfilled Polypropylene		
336	Zinc Plated Yellow Brass				



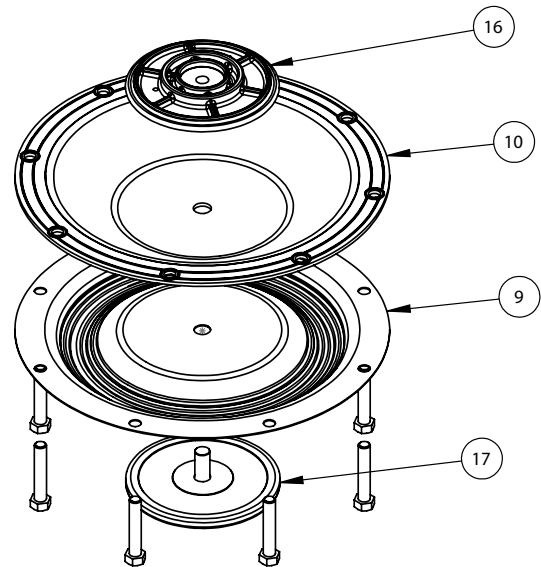
**REPAIR PARTS LIST and DRAWING**  
**Pulsation Dampener Model PD80M**  
**Design Level 2**  
**Metallic Construction**

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	070.014.170	Bearing, Sleeve	1
2	095.078.156	Body	1
3	165.023.000	Cap	1
4	170.005.330	Capscrew, Hex Hd - 5/16-18 X 7/8	1
5	170.024.330	Capscrew, Hex Hd - 7/16-14 X 1	4
6	170.082.330	Capscrew, Hex Hd, 1/2-13UNC X 2.75	8
7	196.100.015	Chamber, Inner	1
8	196.176.156	Chamber, Outer, 3" BSP Parallel - 80mm DIN	1
	196.176.010	Chamber, Outer, 3" BSP Parallel - 80mm DIN	1
	196.176.110	Chamber, Outer, 3" BSP Parallel - 80mm DIN	1
9	<b>286.098.604</b>	<b>Diaphragm, Overlay</b>	<b>1</b>
10	<b>286.098.360</b>	<b>Diaphragm</b>	<b>1</b>
	<b>286.098.363</b>	<b>Diaphragm</b>	<b>1</b>
	<b>286.098.364</b>	<b>Diaphragm</b>	<b>1</b>
	<b>286.098.365</b>	<b>Diaphragm</b>	<b>1</b>
	<b>286.098.354</b>	<b>Diaphragm</b>	<b>1</b>
	<b>286.098.351</b>	<b>Diaphragm</b>	<b>1</b>
11	866.078.330	Tube Fitting	1
12	545.008.330	Nut, Hex - 1/2-13	9
13	560.022.360	O-Ring	1
14	612.043.330	Plate, Activator	1
15	612.044.330	Plate, Activator	1
16	612.192.157	Plate, Inner Diaphragm	1
17	612.194.157	Plate, Outer Diaphragm Assy. (Alum Units Only)	1
	612.194.010	Plate, Outer Diaphragm Assy. (Cast Iron Units Only)	1
	612.194.110	Plate, Outer Diaphragm Assy. (Stainless Units Only)	1
18	675.054.080	Ring, Retainer	1
19	685.066.120	Rod, Diaphragm	1
20	685.048.120	Rod, Activator	1
21	<b>720.012.360</b>	<b>U-cup, Shaft Seal</b>	<b>1</b>
23	893.021.000	Valve Assembly	1
23.1	095.020.162	Body, Valve	1
23.2	560.001.360	O-Ring	1
23.3	622.002.162	Poppet	1
23.4	670.007.162	Spring Retainer	1
23.5	780.013.115	Spring, Compression	1
24	893.023.000	Valve Assembly	1
24.1	095.019.162	Body, Valve	1
24.2	622.002.162	Poppet	1
24.3	780.013.115	Spring, Compression	1
24.4	560.001.360	O-Ring	1
24.5	866.010.162	Elbow, Male	1
25	900.003.330	Washer, Lock - 1/2	8
26	900.004.330	Washer, Lock - 5/16	1
27	900.006.330	Washer, Lock - 7/16	4
28	901.009.115	Washer, Flat - 5/16	1

# Model PD80M, Design Level 2



PTFE Fitted Units



U.S. PATENT NO. 3741692

# Declaration of Conformity

DECLARATION DE CONFORMITE • DECLARACION DE CONFORMIDAD • ERKLÄRUNG BEZÜGLICH EINHALTUNG DER VORSCHRIFTEN •  
DICHIARAZIONE DI CONFORMITÀ • CONFORMITEITSVERKLARING • DEKLARATION OM ÖVERENSSTÄMMELSE •  
EF-OVERENSSTÄMMELSESERKLÆRING • VAATIMUSTENMUKAISUUSVAKUUTUS • SAMSVARERKLÄRING • DECLARAÇÃO DE CONFORMIDADE •  
Δήλωση Συμμόρφωσης

## MANUFACTURED BY:

FABRIQUE PAR:  
FABRICADA POR:  
HERGESTELLT VON:  
FABBRICATO DA:  
VERVAARDIGD DOOR:  
TILLVERKAD AV:  
FABRIKANT:  
VALMISTAJA:  
PRODUSENT:  
FABRICANTE:  
Κατασκευαστής:  
IDEX Pump Technologies (Ireland) Ltd.,  
A Unit of IDEX Corporation,  
R79, Shannon, Co Clare,  
IRELAND.  
TEL. : +353 61 471933  
FAX. : +353 61 475046  
Web Site : www.blagdonpump.com  
E-Mail : sales@blagdonpump.com



**BLAGDON  
PUMP**

## PUMP

### MODEL, TYPE

MODELE, TYPE  
MODELO, TIPO  
MODELL, TYPE  
MODELLO, TIPO  
MALLI, TYYPPI:  
ΜΟΝΤΕΛΟ, ΤΥΠΟΣ:

## SERIAL NO.:

NO. SERIE:  
NO. DE SERIE:  
SERIEN-NR.:  
NUMERI DI SERIE  
SERIENUMMERS:  
TILLVERKNINGS NUMMER:  
SERIENR.:  
SARJA NO.:  
SERIE NR.:  
ΑΡ. ΣΕΙΡΑΣ:

## This product complies with the following European Community Directives:

Ce produit est conforme aux directives de la Communauté européenne suivantes:  
Este producto cumple con las siguientes Directrices de la Comunidad Europea:  
Dieses produkt erfüllt die folgenden Vorschriften der Europäischen Gemeinschaft:  
Questo prodotto è conforme alle seguenti direttive CEE:  
Dit produkt voldoet aan de volgende EG-richtlijnen:  
Denna produkt överensstämmer med följande EU direktiv:  
Blagdon Pump, erklærer herved som fabrikant, at ovennævnte produkt er  
i overensstemmelse med bestemmelserne i Direktive:  
Tämä tuote täyttää seuraavien EC Direktiivien vaatimukset:  
Dette produkt oppfyller kravene til følgende EC Direktiver:  
Este produto está de acordo com as seguintes Directivas comunitárias:  
Το παρόν προϊόν πληροί τις εξής οδηγίες της ΕΕ:

**2006 / 42 / EC**

## This product has used the following harmonized standards to verify conformance:

Ce matériel est fabriqué selon les normes harmonisées suivantes, afin d'en garantir la conformité:  
Este producto cumple con las siguientes directrices de la comunidad europea:  
Dieses produkt ist nach folgenden harmonisierten standards gefertigt worden, die Übereinstimmung wird bestätigt:  
Questo prodotto ha utilizzato i seguenti standards per verificare la conformità:  
De volgende geharmoniseerde normen werden gehanteerd om de conformiteit van dit produkt te garanderen:  
För denna produkt har följande harmoniserande standarder använts för att bekräfta överensstämmelse:  
Harmoniserede standarder, der er benyttet:  
Tässä tuotteessa on sovellettu seuraavia yhdenmukaistettuja standardeja:  
Dette produkt er produsert i overensstemmelse med følgende harmoniserte standarder:  
Este produto utilizou os seguintes padrões harmonizados para verificar conformidade:  
Το παρόν προϊόν χρησιμοποιεί τα ακόλουθα μέτρα και σταθμά εναρμονισμού για την επιβεβαίωση της συμμόρφωσης:

**EN 809**

## AUTHORIZED / APPROVED BY:

Approuvé par:  
Aprobado por:  
Genehmigt von:  
approvato da:  
Goedgekeurd door:

Underskrift:  
Valtuutettuna:  
Bemyndiget av:  
Autorizado Por:  
Εγκρίθηκε από:

*D. Monaghan*

Des Monaghan,  
Production & Technical Manager

Date : December 01 2009

FECHA:  
DATUM:  
DATA:  
DATO:  
PÄIVÄYS:  
Ημερομηνία:





# EC Declaration of Conformity

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

**Manufacturer: IDEX Pump Technologies (Ireland) Ltd., A Unit of IDEX Corporation.  
R79, Shannon, Co Claire, IRELAND. TEL.: +353 61 471933 Fax.: +353 61 475046**

**Model PD25M, PD40M, PD50M and PD80M  
Pulsation Dampeners**

**Applicable Standard:**

EN13463-1: 2001

II 2 GT5

II 3/2 GT5

II 2 D T100°C

KEMA 09ATEX0073



DATE/APPROVAL/TITLE:  
18 May 2010

  
Des Monaghan, Production & Technical Manager