COGNITO™

INSTALLATION & OPERATING MANUAL

COGNITO DAMPENER

Certified Quality

CE Ex UKCA

- Nearly surge-free flow
- Maintain Steady Pressure
- Reduced vibration

1"

2"

3"

IDEX | *Trusted Solutions, Improving Lives™*

DAMPENER-22-IOM-XX
REVISED: 09-05-24
(REV: 00)

TABLE OF CONTENTS

SECTION 1:
1.1 Important Safety Information

⚠ IMPORTANT

Read the safety warnings and instructions in this manual before Dampener installation and start-up. Failure to comply with the recommendations stated in this manual could damage the pump and void factory warranty.

When the Dampener is used for materials that tend to settle out or solidify, the Dampener should be flushed after each use to prevent damage. In freezing temperatures the Dampener should be completely drained between uses.

When the dampener is used for the process fluid whose temperature is higher than the Ambient temperature or >50°C, the user should provide proper heat insulation or take necessary precautions to avoid burns.

⚠ WARNING

When used for toxic or aggressive fluids, the Dampener should always be flushed clean prior to disassembly.

Before doing any maintenance on the pulsation dampener, be certain all pressure in completely vented from the Dampener, suction, discharge, piping, and all other opening 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.

⚠ CAUTION

Before Dampener operation, inspect all fasteners for loosening caused by gasket creep. Retighten loose fasteners to prevent leakage. Follow recommended torques stated in this manual.

<u>WARNING</u>
The use of non-OEM replacement parts will void (or negate) agency certifications, IDEX cannot ensure nor warrant non-OEM parts to meet the stringent requirements of the certifying agencies.

RECYCLING
Many components of Cognito pumps are made of recyclable materials. We encourage pump users to recycle worn out parts and pumps whenever possible, after any hazardous pumped fluids are thoroughly flushed.

In the event of diaphragm rupture, pumped material may enter the air end of the Dampener, and be discharged into the atmosphere. If pumping a product that is hazardous or toxic, the air exhaust must be piped to an appropriate area for safe containment.

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

This Dampener is pressurized internally with air pressure during operation. Make certain that all fasteners are in good condition and are reinstalled properly during reassembly.

Use safe practices when lifting.

1.2 Dampener

All reciprocating pumps experience a pressure fluctuation during operation. Cognito Pulsation Dampener minimizes unwanted pressure fluctuation and pulsation by providing a supplementary pumping action.

Dampener Operation

It uses a flexible diaphragm to separate a liquid chamber from a compressed air chamber. A rod connected to the centre of the diaphragm triggers the addition or deletion of the air which automatically admits or exhausts air to the air chamber. This maintains the diaphragm in mid-range of the stroke to eliminate flow pulsation & Pressure spikes.

At initial start-ups - air cushion is quickly established by liquid pressure pushing diaphragm upward, permitting entrance of air into air chamber, until the balancing air cushion causes the diaphragm to center at its mid-stroke normal operating position.

During normal continuous operation - the diaphragm always flexes at its mid-range position to absorb discharge pulsations against the adjoining air cushion already established.

In event of change in pumped liquid pressure - the air cushion pressure is automatically increased or decreased as required to compensate for the change. Therefore maintains the constant volume of air cushion and the diaphragm always operates at its mid-position.

When liquid flow stops - air in the air chamber is also exhausted to atmosphere.

Cognito Dampener,

- Automatically maintains a constant volume of air cushion for most effective surge suppression, regardless of pump pressure.
- Automatically self-charging and self-venting to maintain most efficient air cushion pressure . . . no more precharge pressure calculations or guesswork, no manual pressurizing, no periodic pressure checking.
- Air cushion separated from product by flexible diaphragm . . . prevents product aeration.
- Simple to install, Maintenance-free.

COGNITO DAMPENER PERFORMANCE: Dampening 90+% for all the sizes

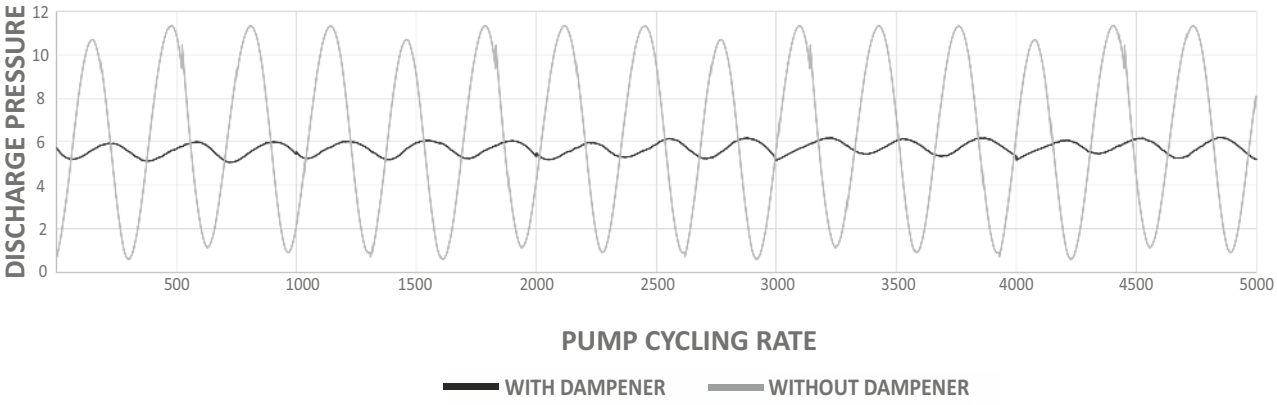


Figure - 1

Features & Benefits

- Smooth Pulsation Free Flow
- Hassle Free Automatic Controlling
- Stabilizes Pressure
- Reduction of Vibrations in Pipes
- Increases System Efficiency
- Compatible to Variable Pressure Application
- Help to Improve Pump Life

1.3 Technical Specification

Dampener Size	Compatible Pump Size	Air Inlet Size	Max. Pressure	Fluid Port
1''	1''	1/8'' NPT	8 bar	1'' NPT / BSP Female Threaded Port
2''	1.5''	1/8'' NPT	8 bar	2'' 150# ANSI
	2''	1/8'' NPT	8 bar	2'' 150# ANSI
	3''	1/8'' NPT	8 bar	2'' 150# ANSI
3''	4''	1/8'' NPT	8 bar	3'' 150# ANSI

Note : 1'' Dampener is not explosion proof certified. It should be used for safe area only.

1.3A Material of Construction

Model Number	Body	Diaphragm
COGNITO PULSATION DAMPENER 1''		
1AS / 25AS	ALUMINIUM	SANTOPRENE
1AP / 25AP	ALUMINIUM	PTFE + SANTOPRENE BACKUP
1SS / 25SS	STAINLESS STEEL	SANTOPRENE
1SP / 25SP	STAINLESS STEEL	PTFE + SANTOPRENE BACKUP
COGNITO PULSATION DAMPENER 2''		
2AS	ALUMINIUM	SANTOPRENE
2AP	ALUMINIUM	PTFE + SANTOPRENE BACKUP
2SS	STAINLESS STEEL	SANTOPRENE
2SP	STAINLESS STEEL	PTFE + SANTOPRENE BACKUP
COGNITO PULSATION DAMPENER 3''		
3AS	ALUMINIUM	SANTOPRENE
3AP	ALUMINIUM	PTFE + SANTOPRENE BACKUP
3SS	STAINLESS STEEL	SANTOPRENE
3SP	STAINLESS STEEL	PTFE + SANTOPRENE BACKUP

Maximum Temperature Limits		
	Min.	Max.
Ambient Temperature	-20 °C (-4 °F)	55 °C (131 °F)
Process Fluid Temperature	-10 °C (-14 °F)	120 °C (248 °F)
Fluid Temperature should be further limited for the following material of Diaphragm used in the wetted sections :		
Santoprene®	-10 °C (-14 °F)	92 °C (197 °F)
PTFE	-10 °C (-14 °F)	120 °C (248 °F)

WARNING

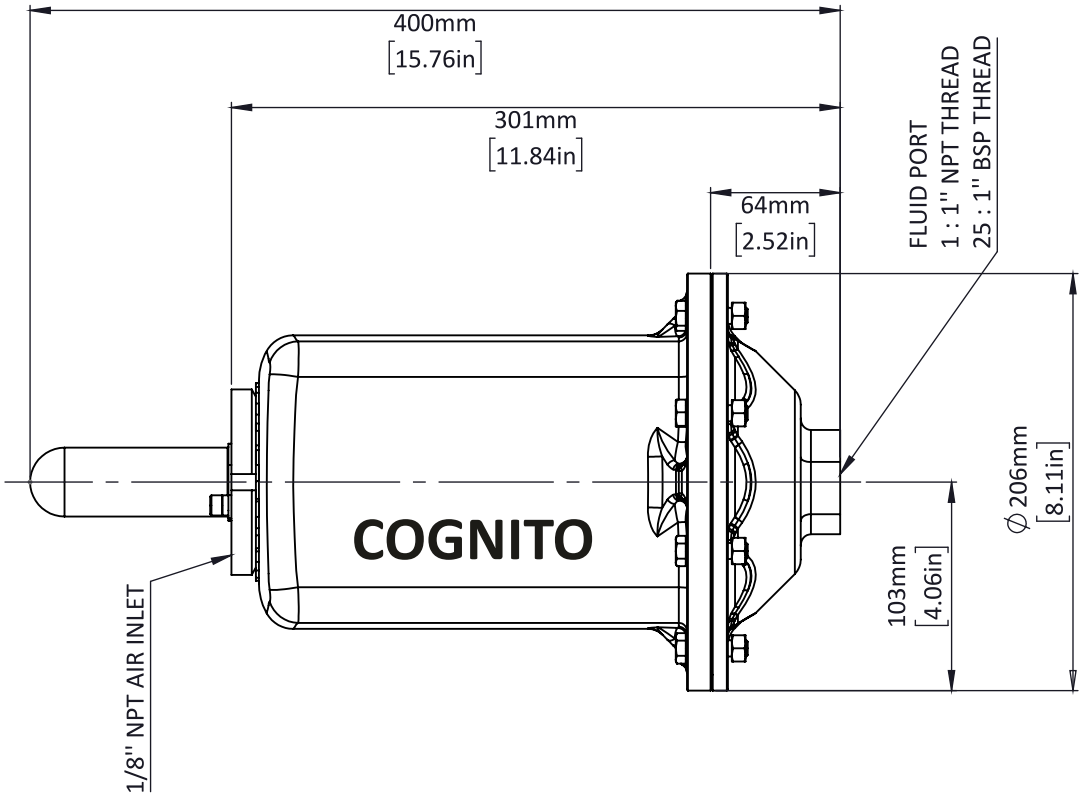
1. Maximum fluid temperature as specified in above table should never be exceeded to maintain hazardous area surface temperature nameplate rating.
2. Do not allow fluids to freeze inside the Dampener
3. Install COGNITO Pulsation Dampener in Vertical Position Only.

Santoprene® is a registered trademark of Celanese

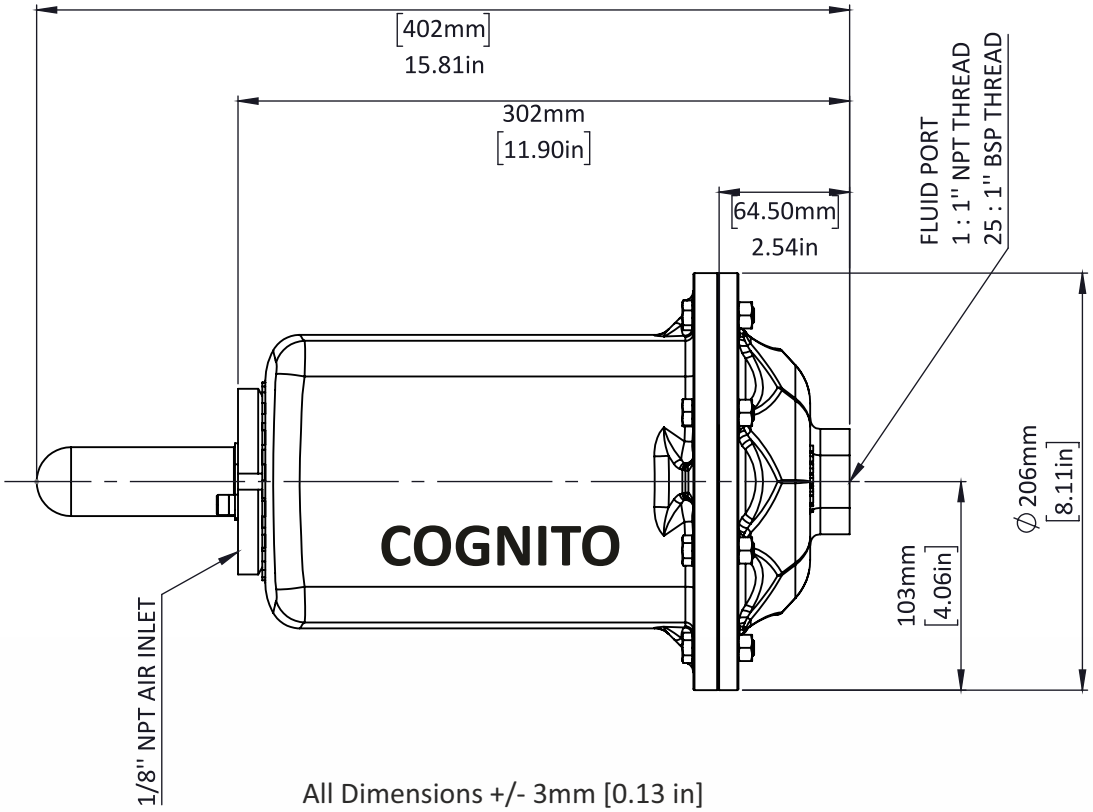
1.4 Dimensional Drawing:

a) 1” Dampener

Stainless Steel Dampener
Model: 1SX & 25SX



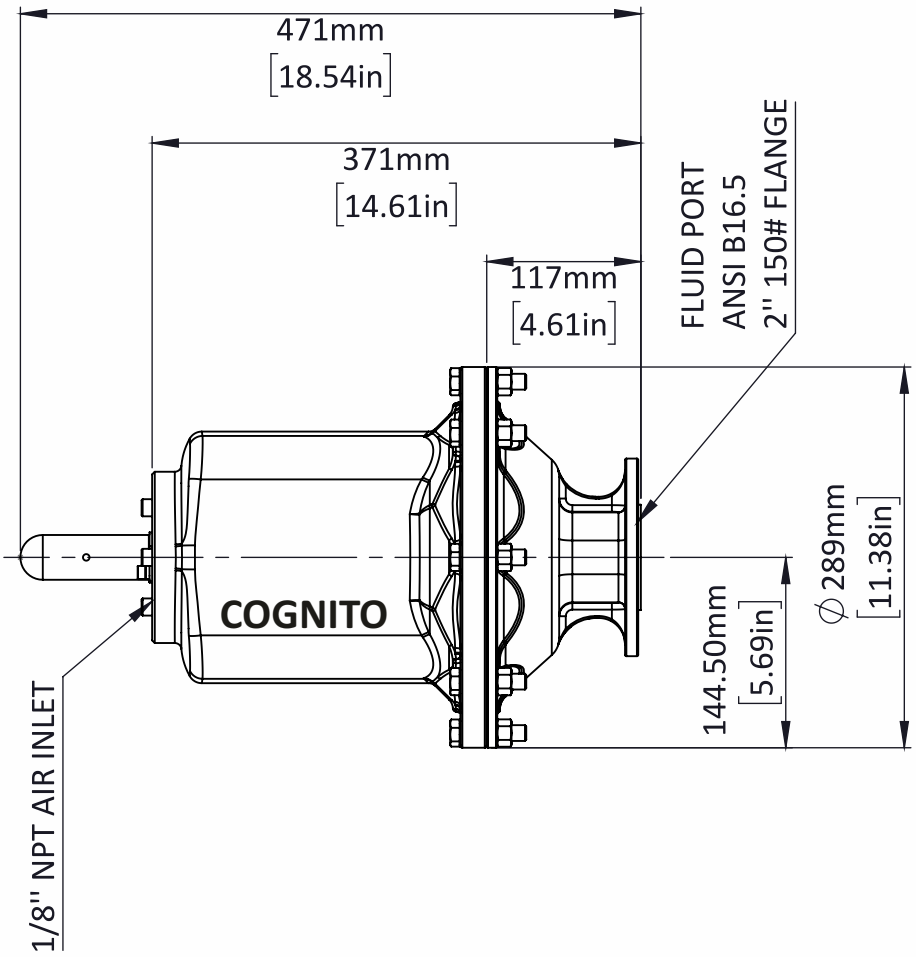
Aluminium Dampener
Model: 1AX & 25AX



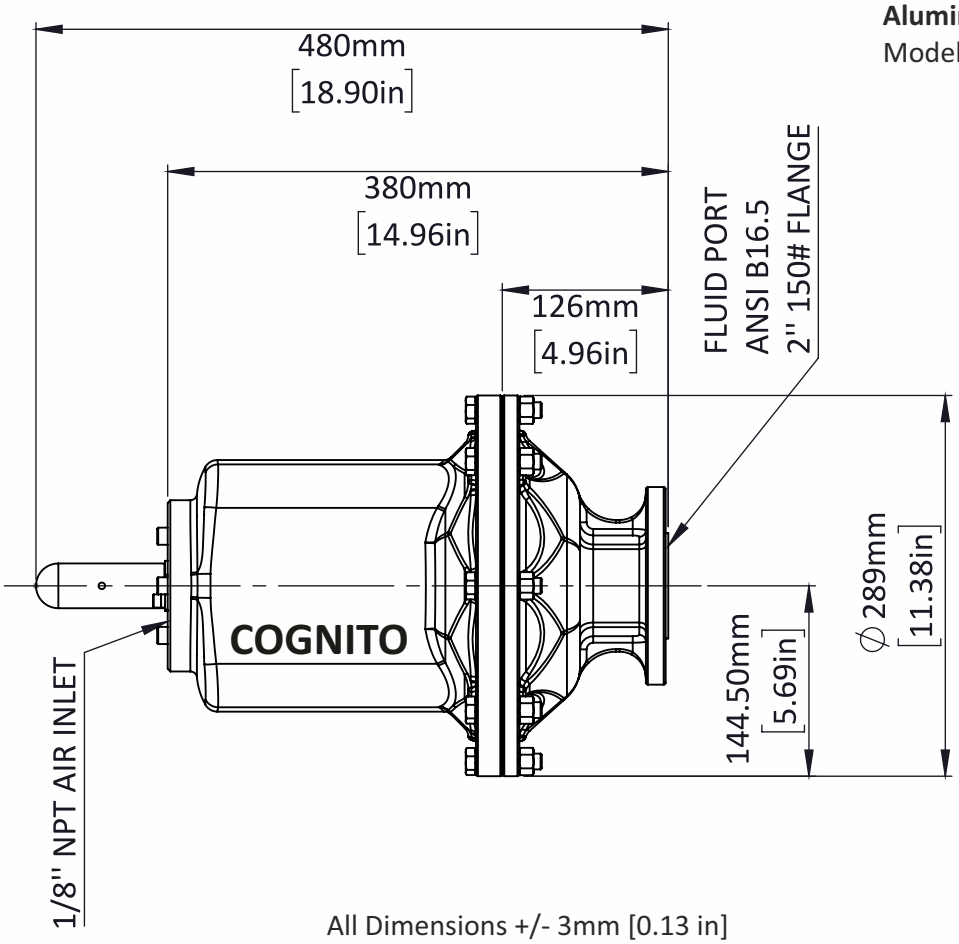
All Dimensions +/- 3mm [0.13 in]
Where X is Diaphragm Material

b) 2” Dampener

Stainless Steel Dampener
Model: 2SX



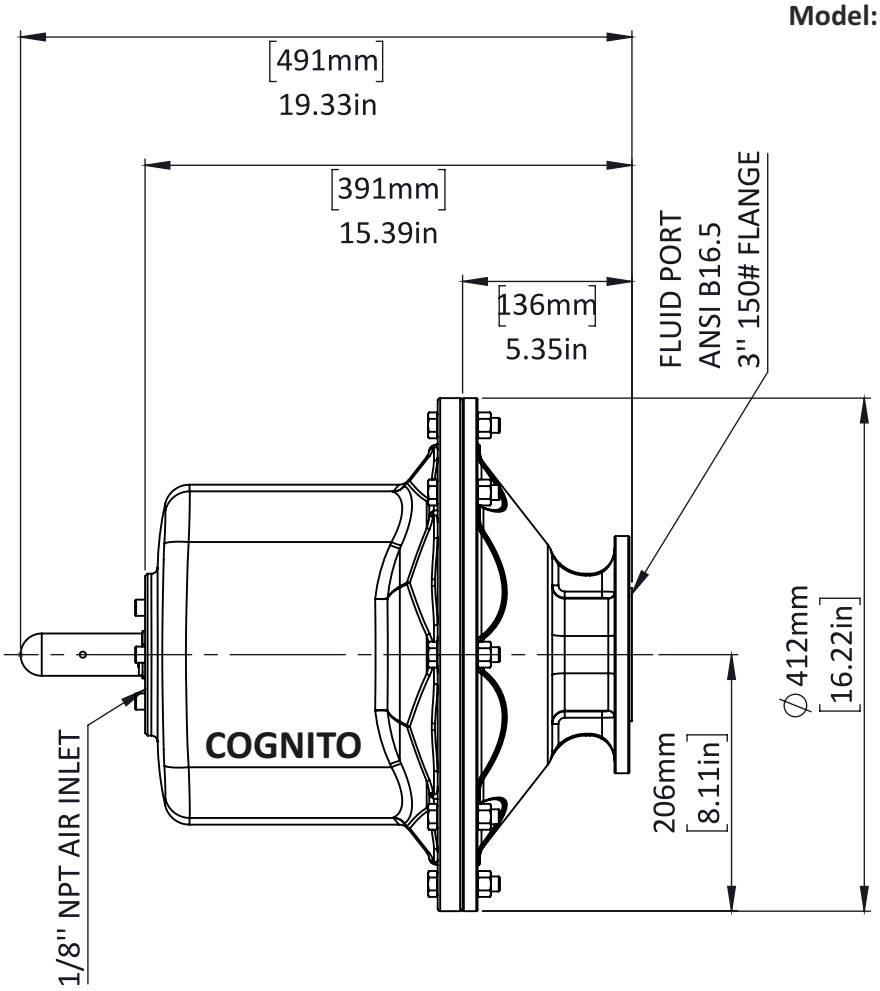
Aluminium Dampener
Model: 2AX



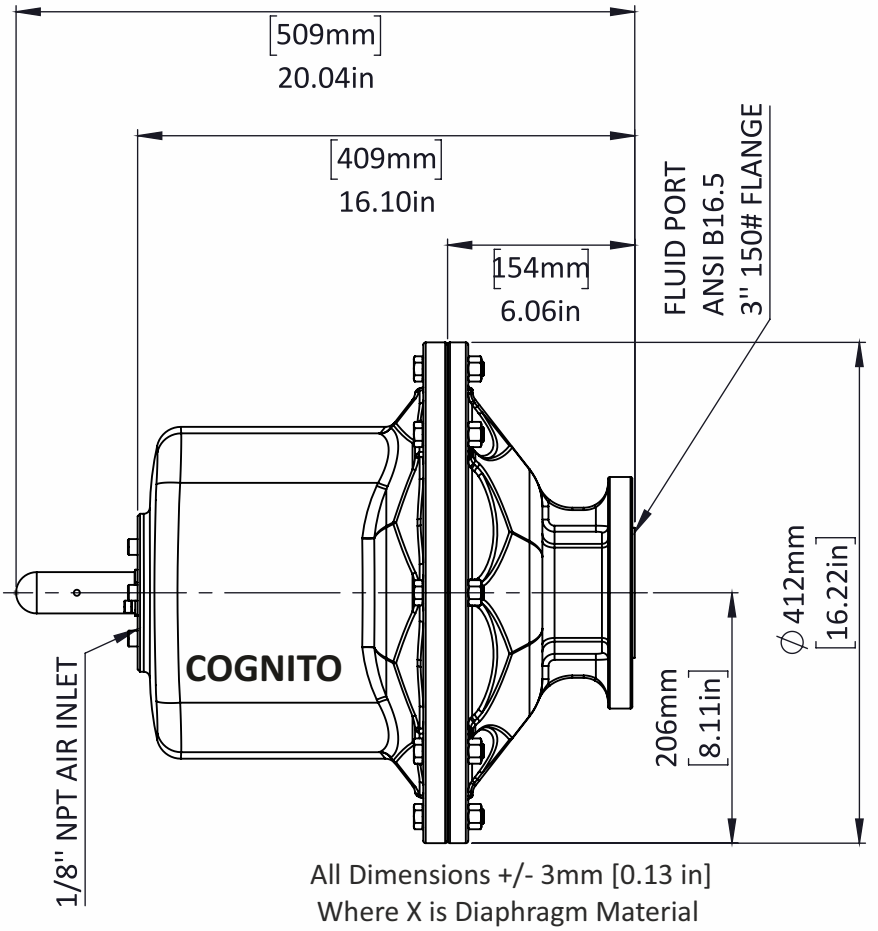
All Dimensions +/- 3mm [0.13 in]
Where X is Diaphragm Material

c) 3” Dampener

Stainless Steel Dampener
Model: 3SX



Aluminium Dampener
Model: 3AX



All Dimensions +/- 3mm [0.13 in]
Where X is Diaphragm Material

1.5 Dampener Nomenclature

XX	X	X

FLUID INLET SIZE

1: 1'' NPT

25: 1'' BSP

2: 2'' 150# ANSI FLANGE

3: 3'' 150# ANSI FLANGE

WETTED PARTS

A: ALUMINIUM

S: STAINLESS STEEL

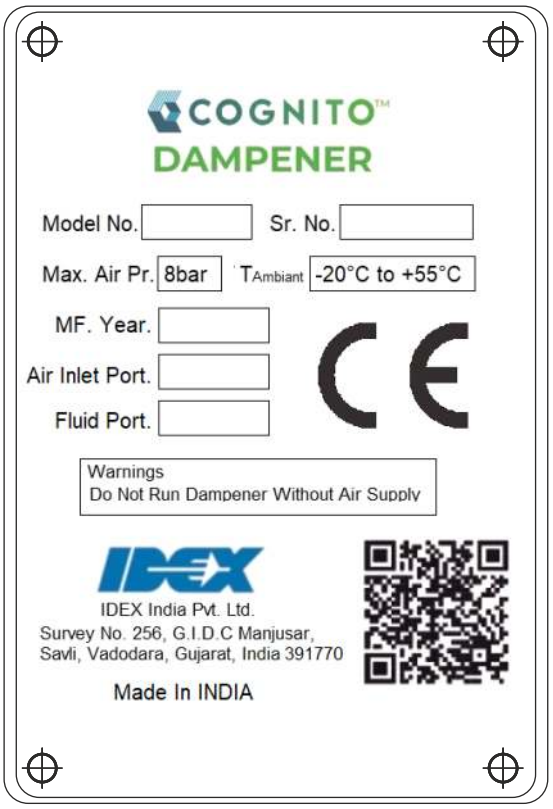
DIAPHRAGM

S: SANTOPRENE

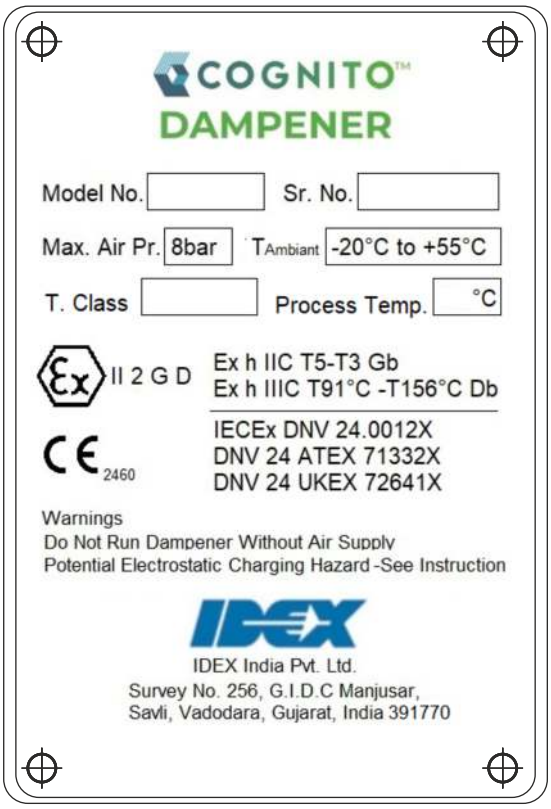
P: SANTOPRENE BACKUP WITH PTFE OVERLAY

1.6 Name Plate Details

1.6.1 Standard Name Plate



1.6.2 Hazardous Nameplate



Definitions,

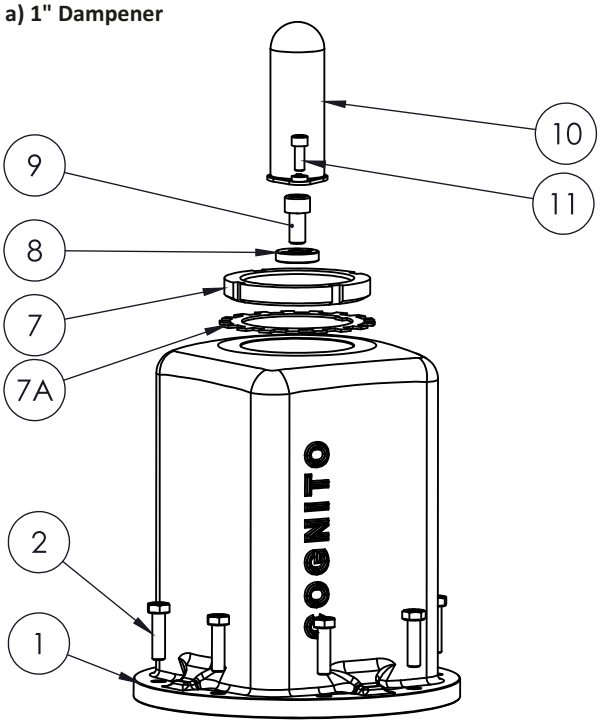
1. Model No. - Configured Dampener Model Number
2. Serial No. - Dampener Serial No.
3. Max. Air Pr. - Max. Allowable Air Inlet Pressure.
4. Month of MFG. - Manufacturing Month & Year
5. Process Temp. - Allowable Process Fluid Temperature Range
6. Tambiant - Allowable ambiant Temperature Range
7. Manufacturer's Location & Details
8. T. Class : Temperature Class of the Equipment at Process fluid Temperature.
9. Warning Markings

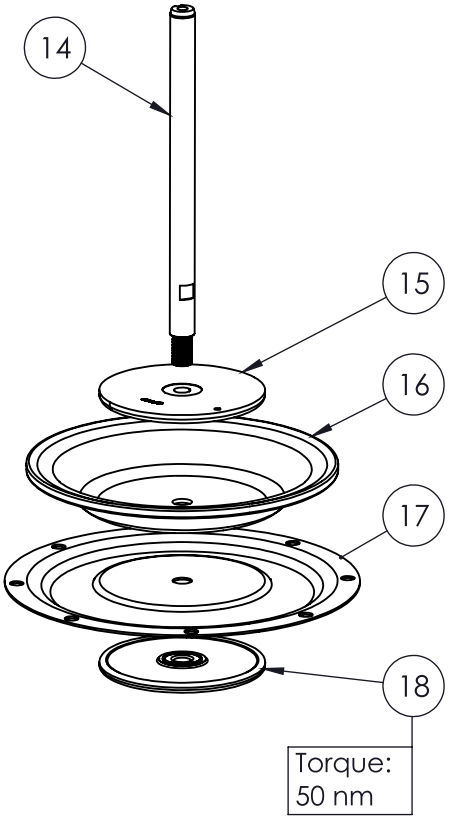
Dampener's Temperature Class Tabulation Based on Process Fluid Temperature

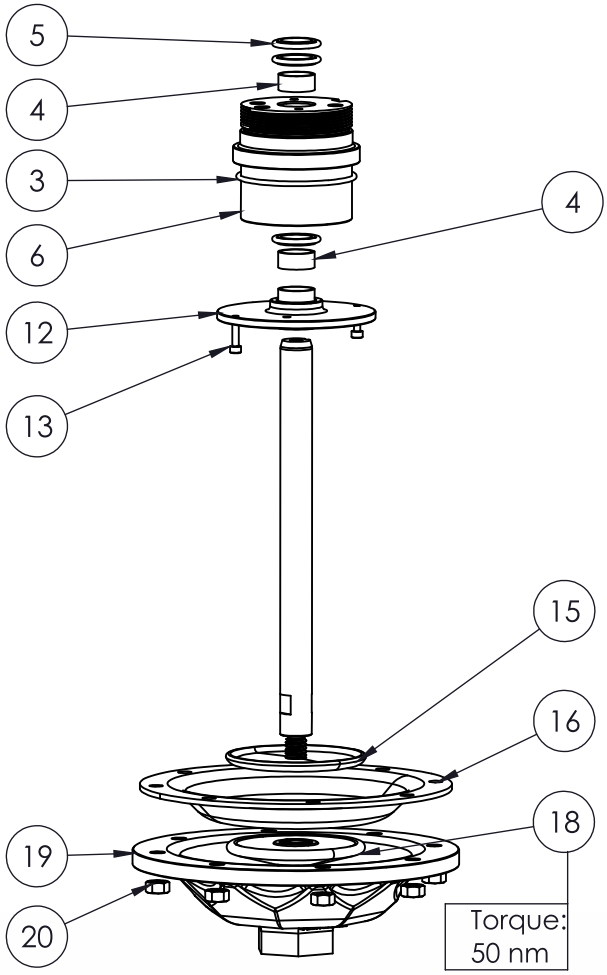
Process Fluid Temperature	Temperature Class of the Dampener	
	GAS	DUST
- 10°C to +120°C	T3	156°C
- 10°C to +105°C	T3	141°C
- 10°C to +100°C	T4	136°C
- 10°C to +90°C	T4	126°C
- 10°C to +70°C	T4	106°C
- 10°C to +65°C	T5	101°C
- 10°C to +55°C	T5	91°C

SECTION 2:

2.1 Exploded View:
a) 1" Dampener



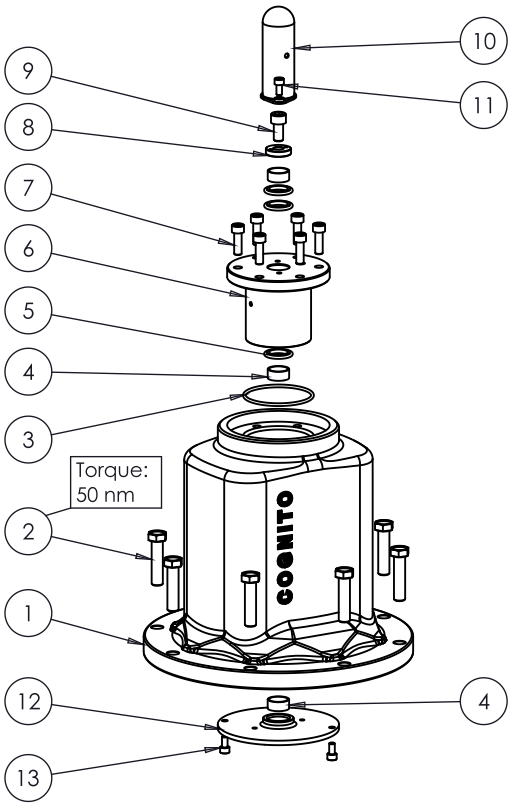


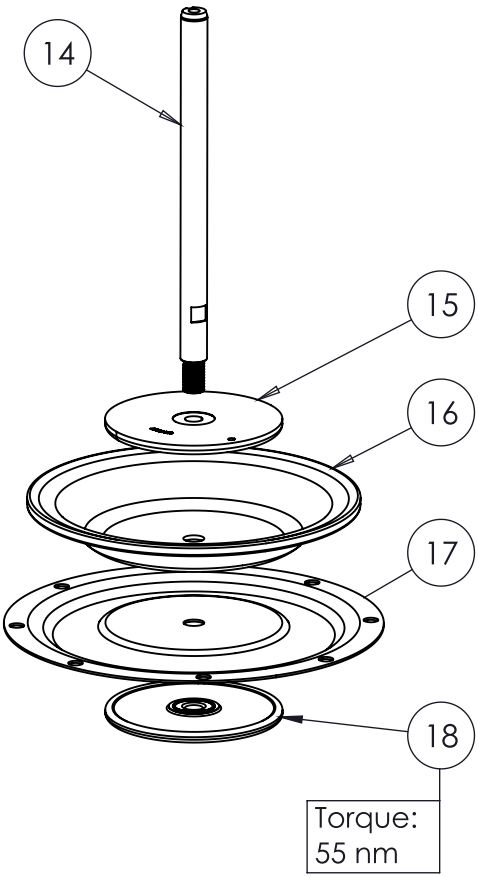


Part List

Model : 1" & 25			
Item No	**Part Code**	**Description**	**Qty**
1	**88950001**	TOP DOME, ALUMINIUM	1
2	**26650003**	M8 HEX BOLT, BLACKODIZED	8
	26650005	M8 HEX BOLT, SS	8
3	**26630001**	Sleeve O-RING	1
4	**26610001**	BUSH BEARING	3
5	**26610002**	SEALS	3
6	**88950004**	DAMPENER SLEEVE	1
7	**26650002**	LOCK NUT	1
7A	**26600091**	LOCK WASHER	1
8	**88930006**	STOPPER PIN	1
9	**26630003**	M10 SOCKET HED CAP SCREW	1
10	**88930008**	DUST CAP, BLACK	1
11	**26600045**	M6 SOCKET HEAD CAP SCREW	2
12	**88950003**	BUSH PLATE, ALUMINIUM	1
13	**26650001**	M4 SOCKET HEAD CAP SCREW	2
14	**88950005**	DAMPNER ROD	1
15	**88950008**	INNER PLATE, DIAPHRAGM	1
16	**286.008.354**	DIAPHRAGM, SANTOPRENE	1
17	**286.015.604**	DIAPHRAGM, PTFE OVERLAY	1
18	**612.107.157**	OUTER PLATE, DIAPHRAGM, ALUMINIUM	1
	612.100.110	OUTER PLATE, DIAPHRAGM, STAINLESS STEEL	1
19	**88950013**	BOTTOM DOME, ALUMINIUM (NPT)	1
	88950002	BOTTOM DOME, ALUMINIUM (BSP)	1
	88950012	BOTTOM DOME, STAINLESS STEEL (NPT)	1
	88950011	BOTTOM DOME, STAINLESS STEEL (BSP)	1
20	**26650004**	M8 HEX NUT, BLACKODIZED	8
	26650005	M8 HEX NUT,SS	8

b) 2" Dampener





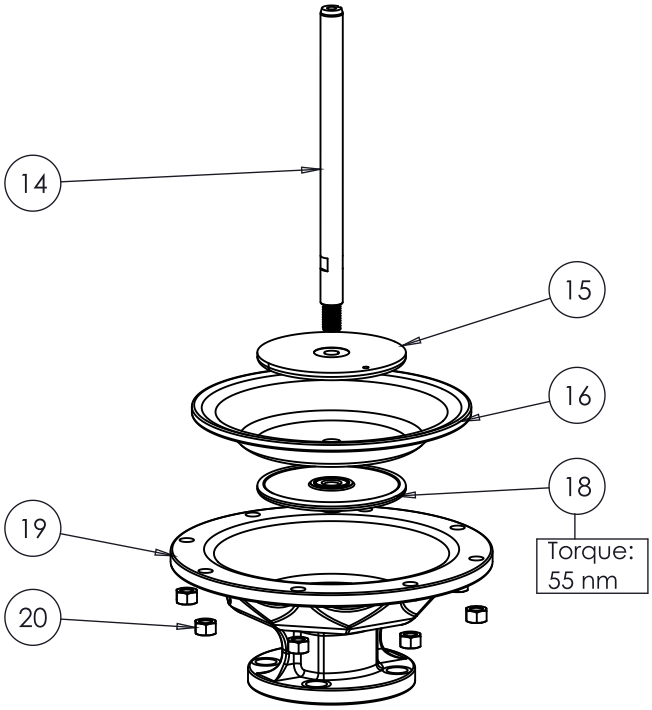
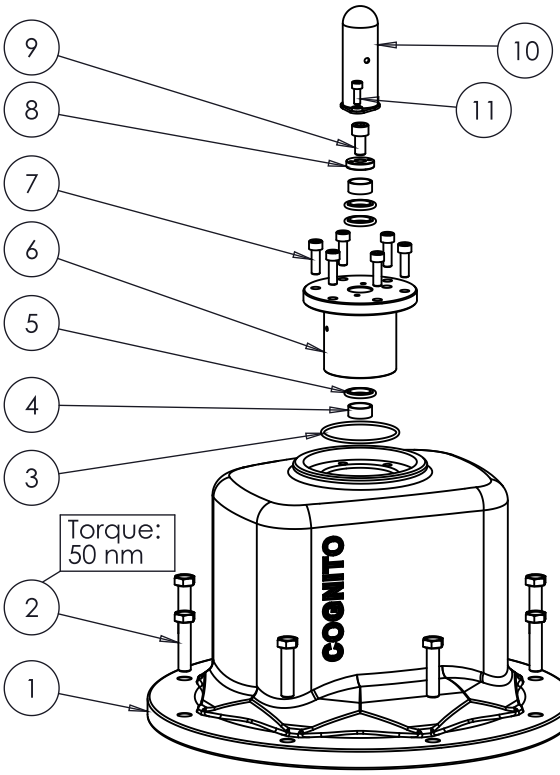


Figure - 6

Part List

Model : 2''			
Item No	Part Code	Description	Qty
1	88930001	TOP DOME, ALUMINIUM	1
2	26600025	M12 HEX BOLT, BLACKODIZED	8
	26600048	M12 HEX BOLT, SS	8
3	26630001	Sleeve O-RING	1
4	26610001	BUSH BEARING	3
5	26610002	SEALS	3
6	88930004	DAMPENER SLEEVE	1
7	26630002	M8 SOCKET HED CAP SCREW	6
8	88930006	STOPPER PIN	1
9	26630003	M10 SOCKET HED CAP SCREW	1
10	88930008	DUST CAP, BLACK	1
11	26600045	M6 SOCKET HEAD CAP SCREW	2
12	88930003	BUSH PLATE, ALUMINIUM	1
13	26600045	M6 SOCKET HEAD CAP SCREW	2
14	88930005	DAMPENER ROD	1
15	88930007	INNER PLATE, DIAPHRAGM, ALUMINIUM	1
	88930013	INNER PLATE, DIAPHRAGM, STAINLESS STEEL	1
16	286.005.354	DIAPHRAGM, SANTOPRENE	1
17	286.020.604	DIAPHRAGM, PTFE OVERLAY	1
18	612.033.157	OUTER PLATE, DIAPHRAGM, ALUMINIUM	1
	612.088.110	OUTER PLATE, DIAPHRAGM, STAINLESS STEEL	1
19	88930002	BOTTOM DOME, ALUMINIUM	1
	88930012	BOTTOM DOME, STAINLESS STEEL	1
20	26600023	M12 HEX NUT, BLACKODIZED	8
	88930016	M12 HEX NUT,SS	8

c) 3" Dampener



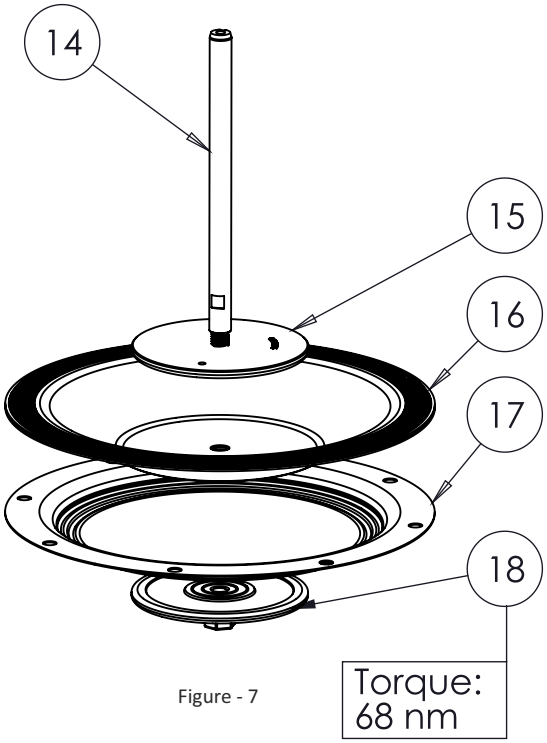
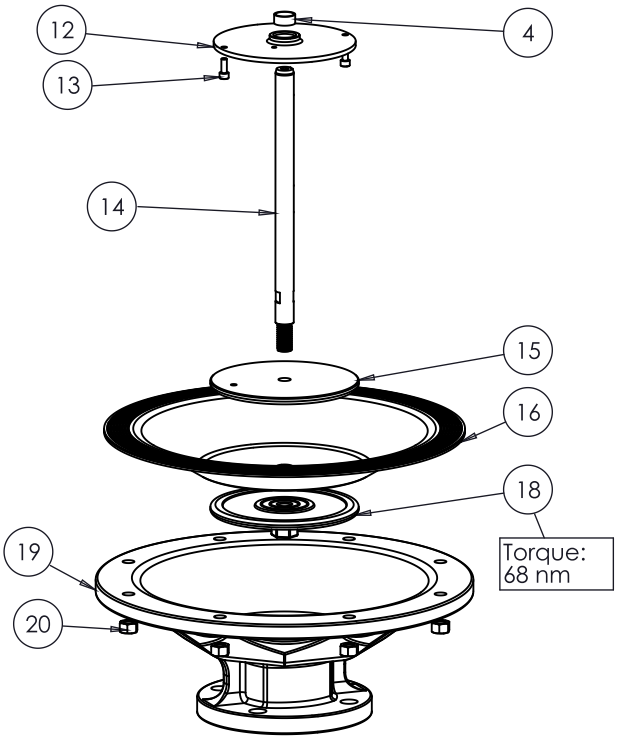


Figure - 7



Part List

Model : 3"			
Item No	Part Code	Description	Qty
1	88910012	TOP DOME, ALUMINIUM	1
2	26600025	M12 HEX BOLT, BLACKODIZED	8
	26600048	M12 HEX BOLT, SS	8
3	26630001	Sleeve O-RING	1
4	26610001	BUSH BEARING	3
5	26610002	SEALS	3
6	88930004	DAMPENER SLEEVE	1
7	26630002	M8 SOCKET HED CAP SCREW	6
8	88930006	STOPPER PIN	1
9	26630003	M10 SOCKET HED CAP SCREW	1
10	88930008	DUST CAP, BLACK	1
11	26600045	M6 SOCKET HEAD CAP SCREW	2
12	88910014	BUSH PLATE, ALUMINIUM	1
13	26600045	M6 SOCKET HEAD CAP SCREW	2
14	88910015	DAMPENER ROD	1
15	88910016	INNER PLATE, DIAPHRAGM, ALUMINIUM	1
	88910020	INNER PLATE, DIAPHRAGM, STAINLESS STEEL	1
16	286.098.354	DIAPHRAGM, SANTOPRENE	1
17	286.098.604	DIAPHRAGM, PTFE OVERLAY	1
18	612.193.157	OUTER PLATE, DIAPHRAGM, ALUMINIUM	1
	612.193.110	OUTER PLATE, DIAPHRAGM, STAINLESS STEEL	1
19	88910013	BOTTOM DOME, ALUMINIUM	1
	88910019	BOTTOM DOME, STAINLESS STEEL	1
20	26600023	M12 HEX NUT, BLACKODIZED	8
	88930016	M12 HEX NUT,SS	8

SECTION 3:

Installation & Maintenance

3.1 Recommended Installation Guidelines:

1. Install the dampener in the pump discharge line as close as possible to the pump discharge to absorb pulses at their source, before any downstream equipment such as risers, valves, elbows, meters, or filters.

2. Connect the air inlet port of the dampener to the full plant air supply line, ensuring not to exceed 125 psi.

3. The dampener should be installed within a distance of no more than 10 pipe diameters away from the pump discharge.

4. If using a flexible connector on the discharge side of the pump between the pump and the system piping, install the dampener at the start of the pump discharge manifold. Attach the flexible connector to the dampener's tee and the system piping (see FIGURE 8).Vertical installation is recommended for better drainage of the dampener.

5. Limitations for horizontal and upside-down mounting include high specific gravity, high viscosity, settling of solid material, or possible air entrapment, which could result in shortened diaphragm life and/or reduced dampening performance.

6. Installing an isolation valve at the dampener inlet is suggested for easy maintenance (see FIGURE 8).It is recommended to install a check valve as shown in FIGURE 8 to prevent backflow of product into the air chamber in case of diaphragm failure.

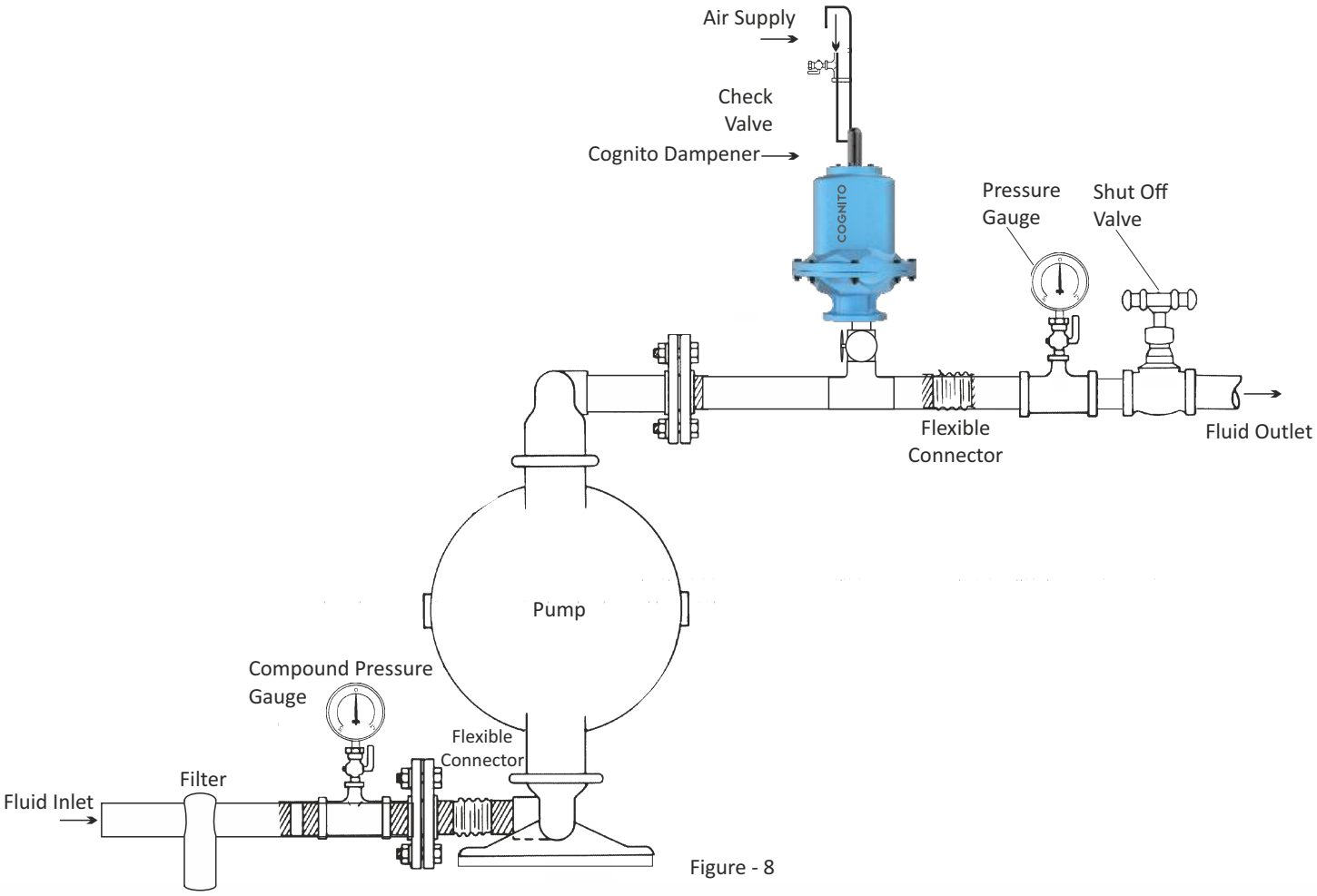


Figure - 8

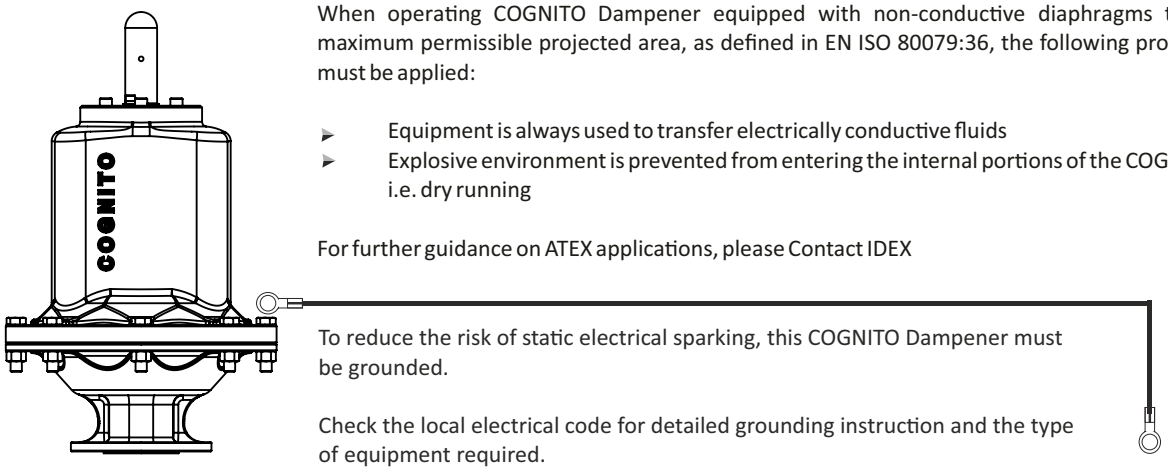
3.2 Dampener Grounding details

Cognito Dampeners will be mounted on the pump according to the installation procedure outlined in Section 3 of the Cognito Dampener Instruction & Operation Manual.

- Please follow grounding details of the pump as mentioned in this document

ATEX compliant COGNITO Dampeners are suitable for use in explosive atmospheres when the equipment is properly grounded in accordance with local electrical codes.

COGNITO Dampeners equipped with electrically conductive diaphragms are suitable for the transfer of conductive or non-conductive fluids of any explosion group.



When operating COGNITO Dampener equipped with non-conductive diaphragms that exceed the maximum permissible projected area, as defined in EN ISO 80079:36, the following protection methods must be applied:

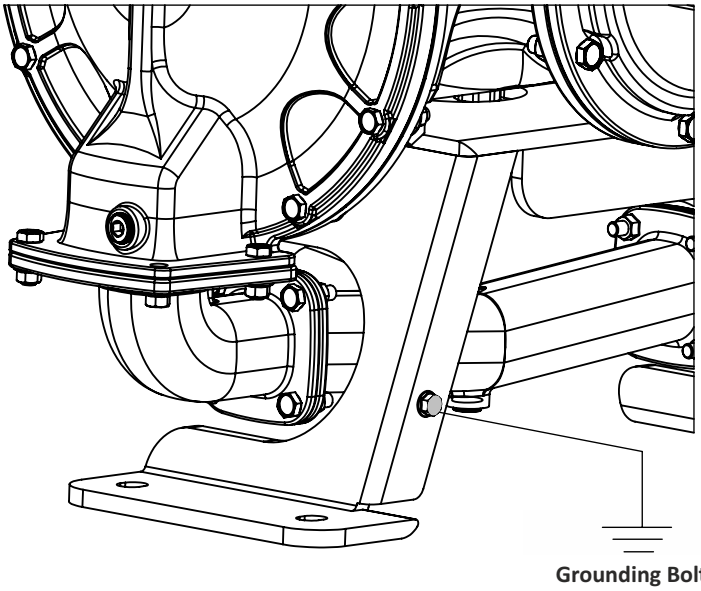
- Equipment is always used to transfer electrically conductive fluids
- Explosive environment is prevented from entering the internal portions of the COGNITO Dampener, i.e. dry running

For further guidance on ATEX applications, please Contact IDEX

To reduce the risk of static electrical sparking, this COGNITO Dampener must be grounded.

Check the local electrical code for detailed grounding instruction and the type of equipment required.

Pump Grounding



Grounding Bolt

- All pumps have a ground screw installed at the pump support bracket
- Protective paint is applied to prevent rust
- The size of the grounding screw is M8
- Connect one end of the grounding wire to the grounding screw, and the other end should be connected to a suitable earth ground
- Ensure the grounding wire connection is kept as short as possible
- The cross-section of the grounding wire must be at least 4mm².
- Ensure the earthing cable connection is properly tightened with the cabling lug
- Refer to the local electrical code for detailed grounding instructions and requirements for the type of equipment needed

3.3 Maintenance Guidelines

PPEs To be required during service & maintenance of COGNITO Dampeners

a) Seal Replacement

- Remove the dust cap and disassemble stopping pin by unscrewing the top bolt.
- Take out seal housing by unscrewing 6 bolts.
- Remove the damaged seals using appropriate tool.
- Place new seals in the proper sequence.
- There are two parts of seals – O-ring and seat-ring. First position O-ring in grooves and then insert seat ring using appropriate tool.

b) Diaphragm Replacement

- Remove dampener from pump. Disassemble dampener by opening bolts of two halves.
- Remove the dust cap and disassemble the stopping pin by unscrewing the top bolts.
- Takeout diaphragm assembly. Unscrew the outer plate using grip and holding space provided on the shaft.
- Replace damaged diaphragms. Note that air side should face up wards.
- Fix the outer plate with appropriate tool and using specified torque according to size.
- Reassemble diaphragm rod assembly through the sleeve by applying grease to avoid frictional damage of seals & screw the stopper pin.
- Assemble the dampener halves sandwiching the diaphragm using appropriate torque.

C) Wear Parts Recommended Replacement Intervals or Change Frequency

Part	Part No.	Description	Recommended Replacement Intervals
Diaphragm	286.098.354	Diaphragm Santoprene	Once in 1-Year or under Failed Condition
	286.098.604	Diaphragm PTFE Overlay	Once in 1-Year or under Failed Condition
	286.005.354	Diaphragm Santoprene	Once in 1-Year or under Failed Condition
	286.020.604	Diaphragm PTFE Overlay	Once in 1-Year or under Failed Condition
	286.008.354	Diaphragm Santoprene	Once in 1-Year or under Failed Condition
	286.015.604	Diaphragm PTFE Overlay	Once in 1-Year or under Failed Condition
Seals	26610002	Seals	Once in 2-Year or under Failed Condition
Bush Bearing	26610001	Bush Bearing	Under Failed Condition
O-Ring	26630001	Sleeve O-Ring	Once in 2-Year or under Failed Condition

D) Lubricate the Equipment

- The dampener is *grease-lubricated at the factory. Relubricate the dampener when replacing the diaphragms or seals.
- Apply grease to the diaphragm rod and bushings when replacing the diaphragm or seals

** Recommended Grease for lubrication : Jet-Lube White Lithium Grease with PTFE or Nye Fluorocarbon Gel 880*

E) Dusting of the COGNITO Dampener

- Dust layers should not accumulate on outer surfaces or inner parts of the dampener
- Dust or clean the dampener's outer surfaces regularly according to local plant guidelines
- No dust should accumulate or be trapped between moving parts inside the dampener, as O-rings and seals protect against entry. Clean any dust found inside the *dust cap on top of the dampener.

** Dust Cap : Provides Safety & Dust Exposure Protection.*

SECTION 4:

CE-EU CERTIFICATION

4.1 Certification Standards & Markings

CE Directives	2006/42/EC on Machinery, Annex Vll	EN 809 :1998+A1:2009/AC:2010	CE
ATEX Directive	2014/34/EU	EN ISO 80079-36:2016 EN ISO 80079-37:2016 EN ISO 60079-0:2018	Ex

Hazardous location Markings:

The non-electrical Ex h protection type used for the Dampener system is constructional safety type 'c'.

ATEX Marketing	Ex II 2 G D	Ex h IIC T5-T3 Gb Ex h IIIC T91°C -T156°C Db	DNV 24 ATEX 71332X
IECEx Marketing		Ex h IIC T5-T3 Gb Ex h IIIC T91°C -T156°C Db	IECEx DNV 24.0012X
UKCA Marking	Ex II 2 G D	Ex h IIC T5-T3 Gb Ex h IIIC T91°C -T156°C Db	DNV 24 UKEX 72641X

Note : 1'' Dampener is not explosion proof certified. It should be used for safe area only.

4.2 Specific Condition of Use

1. The recommended air inlet pressure should be 1 bar higher than the discharge pressure
2. Do not operate the dampener without an air supply
3. Prevent electrostatic charges in potentially explosive areas: do not polish or rub nonconductive surfaces with a dry cloth. Warning: Potential electrostatic charging hazard. Refer to safety instructions - Section 1
4. Dampeners shall always be connected to EODD/AODD pumps only. Refer to safety instruction manual for pumps' earthing provisions and connections - Section 3 (3.2).
5. To prevent thermite sparks, avoid direct impact or friction on equipment parts containing light metals
6. The equipment temperature class depends on the various process fluid temperatures specified in this certificate

SECTION 5:

Cognito Standard Warranty

Cognito warrants to the original end-use purchaser that the products are free from defects in material and workmanship, as determined by Cognito's inspection.

Cognito will provide a new or repaired part in the event that any part is found defective upon inspection.

The original end-use purchaser must present proof of purchase (including purchase date), model number, and serial number at the time of exercising this warranty and ship the product pre-paid authorized repair facility.

This warranty does not apply to failures resulting from abuse, misuse, negligent repairs, corrosion, erosion, normal wear and tear, alterations or modifications made to the Products without the express written consent of Cognito, or failure to follow the recommended operating practices and maintenance procedures as provided in the product's operating and maintenance manual. Additionally, equipment, parts, and accessories not manufactured by Cognito but furnished with Cognito products are not covered by this limited warranty.

This product warranty is Cognito's sole and exclusive warranty and supersedes all other warranties, whether express or implied, including, but not limited to, warranties of merchantability and fitness for a particular purpose, all of which are expressly excluded

Under no circumstances shall Cognito have any liability for any claim, loss, damage, injury, liability, obligation, cost, or expense directly or indirectly related to or arising out of the use or failure of any product. This includes liability for indirect, special, punitive, or consequential damages, such as loss of sales, loss of profits, loss of material being pumped, downtime, loss of production, loss of contracts, or damage to reputation or goodwill, whether or not Cognito was aware of or advised of the possibility of such damages.

COGNITO™

Distributed by:

Cognito Contact Details: IDEXCOGNITO.com cognito@idexcorp.com +91-72289 22198

IDEX / Trusted Solutions, Improving Lives™

Registered Office & Plant:
IDEX India Pvt. Ltd.
Survey No. 256, GIDC Manjusar,
Savli, Near Bombardier Circle,
Distr. Vadodara - 391770, India

Corporate Office:
S14 Solitaire Corporate Park,
167 Guru Hargovindji Road,
Chakala, Andheri East,
Mumbai - 400093, India

www.idexindia.in
Toll free: 1800 267 9955
info.fmt.idexcorp.com