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PUMPS WE TRUST

INSTRUCTION MANUAL

PNEUMATIC DAMPENER - DAMPER

ENGLISH

Europe Advantage

ITALY EXCELLENCE · ISO 9001:2015 · ATEX · CE CONFORMITY · EAC CONFORMITY · UK CONFORMITY · IECEX · 1935/2004 CONFORMITY · FDA COMPLIANT CONFORMITY

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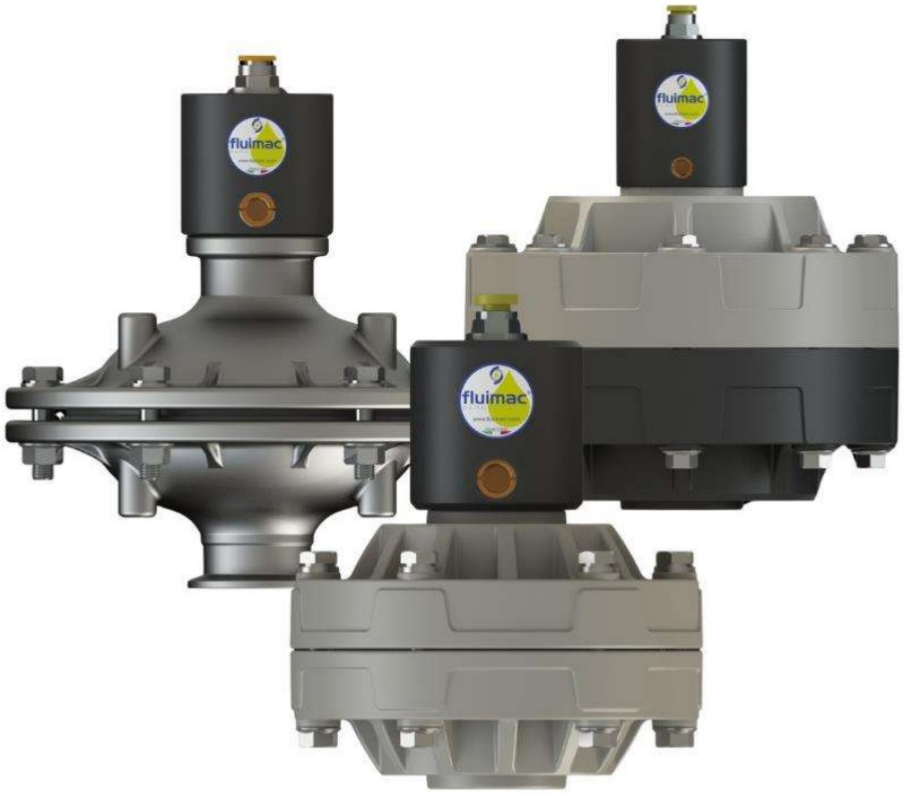
PNEUMATIC DAMPENER - DAMPER



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INTRODUCTION

The DAMPER dampeners have been manufactured in accordance with the Machinery Directive 2006/42/EC, and with the ATEX Directive 2014/34/EU. The relative criteria of the areas are indicated in the harmonised European standards UNI EN ISO 12100:2010, UNI EN ISO 3746:2011, UNI EN ISO 11200:2014, UNI EN ISO 4414:2012, UNI CEI EN ISO 80079-36:2016 and UNI CEI EN ISO 80079-37:2016. As such, they present no danger to the operator when used according to the instructions in this manual. The manual must be kept in a good condition and/or must accompany the machine for future maintenance consultancy. The Manufacturer assumes no responsibility in the event of modification, tampering, incorrect applications or in any case of operations carried out contrary to with is stated in this manual that could harm the health or safety of persons, animals or property near the dampener. All the technical values refer to the standard DAMPER dampeners (see "TECHNICAL CHARACTERISTICS) but remember that as part of the constant search for innovation and for technological quality the characteristics reported could change without notice. The drawings and any other documents delivered together with the device are the property of the Manufacturer who reserves all rights and PROHIBITS making them available to third parties without its written approval. THEREFORE, ANY TOTAL OR PARTIAL REPRODUCTION OF THE MANUAL, OF THE TEXT AND ILLUSTRATIONS IS STRICTLY PROHIBITED.

INFORMATION ABOUT THE MANUAL

This manual is an integral part of the pulsation dampener, is a SAFETY DEVICE and contains important information so that the purchaser and their personnel can install, use and maintain the dampener in a constant state of efficiency and safety throughout its life. For any clarification regarding the contents of this manual, contact the manufacturer's support service.

IDENTIFICATION OF THE PULSATION DAMPENER

Each pulse dampener shipped is marked with an identification plate showing the serial number, model and year of manufacture. The "model" identification code shows the specifications and construction materials of the dampener in order to determine suitability with the product. Please confirm the printed data as soon as possible following receipt of the goods. Any discrepancy between the order and the information printed on the label must be communicated immediately. ATTENTION: it is forbidden to remove and/or alter the identification number of the dampener and/or the data contained therein.

For models D0020 and D0025:

ATEX ZONE 2 CERTIFICATION:

II 3/3 G Ex h IIC T4 Gc

II 3 D Ex h IIIB T135°C Dc X

ATEX ZONE 1 CERTIFICATION:

II 2/2 G Ex h IIC T4 Gb

II 2 D Ex h IIIB T135°C Db X

For models D0040 and D0050:

ATEX ZONE 2 CERTIFICATION:

II 3/3 G Ex h IIB T4 Gc

II 3 D Ex h IIIB T135°C Dc X

ATEX ZONE 1 CERTIFICATION:

II 2/2 G Ex h IIB T4 Gb

II 2 D Ex h IIIB T135°C Db X

DECLARATION OF CONFORMITY

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CE

EU DECLARATION OF CONFORMITY

PRD.01-2a - Rev.1

MANUFACTURED BY: FLUIMAC SRL
VIA BRESCIA, 1
21049 TRADATE (VA) - ITALY

TYPE: PULSATION DAM... SERIES

SERIES: ...

PUMP MODEL:

CODE:

SERIAL NUMBER:

ATEX MARKING:
(D020-D025)
II 3/3 G Ex h IIC T4 Gc
II 3 D Ex h IIIB T135°C Dc X

ATEX MARKING
(D040-D050-D08...)
II 3/3 G Ex h IIB T4 Gc
II 3 D Ex h IIIB T135°C Dc X

Questo prodotto è conforme alle seguenti di... comunitarie e relativi standard armonizzati:
This product requirements the following Europe... ctives and relating harmonized standards:
2006/42/CE - Direttiva Macchine.
2006/42/CE - Machinery Directive
UNI EN ISO 12100:2010 – Sicurezza del macchinario - Principi generali di progettazione - Valutazione e riduzione del rischio.
UNI EN ISO 12100:2010 – Safety of machinery - General principles for design - Risk assessment and risk reduction.
UNI EN 809:2009 – Pompe e gruppi di pompaggio per liquidi: requisiti generali di sicurezza.
UNI EN 809:2009 – Pumps and pump units for liquids: common safety requirements.
UNI EN 12162:2009 - Pompe per liquido — Requisiti di sicurezza — Procedura per prove idrostatiche.
UNI EN 12162:2009 - Liquid pumps - Safety requirements - Procedure for hydrostatic testing
2014/34/EU: Direttiva ATEX, concernente il ravvicinamento delle legislazioni degli Stati Membri relative agli apparecchi e sistemi di protezione destinati a essere utilizzati in atmosfera potenzialmente esplosiva.
2014/34/EU: ATEX Directive, on the approximation of European Member States laws concerning protection equipment and systems to be used in potentially explosive environments.
UNI CEI EN ISO 80079-36:2016 - Atmosfere esplosive - Parte 36: Apparecchiature non elettriche per atmosfere esplosive - Metodo e requisiti di base
UNI CEI EN ISO 80079-36:2016 - Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements
UNI CEI EN ISO 80079-37:2016 - Atmosfere esplosive - Parte 37: Apparecchiature non elettriche per atmosfere esplosive - Protezione di tipo non elettrico, sicurezza costruttiva "c", controllo delle sorgenti di accensione "b", immersione in liquido "k".
UNI CEI EN ISO 80079-37:2016 – Explosive atmospheres - Part 37: Non-electrical equipment for explosive atmospheres - non-electrical type of protection constructional safety "c", control of ignition sources "b", liquid immersion "k".

LA SEGUENTE CONFORMITA' È RIFERITA AL PROTOTIPO DEL DAMPER 20 MATRICOLA NR. D001 DEL 15.03.2012.
THIS COMPLIANCE REFERS TO DAMPER 20 PROTOTYPE, SERIAL NUMBER D001 OF 15.03.2012.

ESTENSIONI: la presente dichiarazione si estende anche ai modelli DAMPER 20, DAMPER 25, DAMPER 40, DAMPER 50, DAMPER 80, IN PLASTICA E METALLO.
EXTENSION: this declaration is also valid for the following versions DAMPER 20, DAMPER 25, DAMPER 40, DAMPER 50, DAMPER 80 MADE OF METAL OR PLASTIC.

ATTENZIONE: data l'innumerevole varietà di prodotti e composizioni chimiche, l'utilizzatore è ritenuto il maggior conoscitore delle reazioni e compatibilità con i materiali costruttivi della pompa. Pertanto, prima dell'impiego, eseguire con perizia tutte le verifiche e prove necessarie al fine di evitare situazioni pericolose anche se remote che non possono essere conosciute ed imputabili al costruttore. Per ogni controversia il Foro Competente è quello di Varese.
WARNING: since there exists an endless variety of products and chemical compositions, the user is presumed to have the best knowledge of their reaction and compatibility with the materials used to build the pump. Therefore, before using the pump, all the necessary checks and tests must be performed with great care to avoid even the slightest risk, an event that the manufacturer cannot foreseee and for which he cannot be held responsible. Any controversy lies within competence of the Court of Varese.

The person authorized to constitute the technical file of the machine is the Legal representative of Fluimac S.r.l. domiciled at the registered office of the company. La persona autorizzata a costituire il fascicolo tecnico della macchina è il presidente della Fluimac S.r.l. domiciliato presso la sede legale della società

LEGAL RAPPRESENTATIVE
...

...SE AND INSTRUCTION MANUAL

MARKING AND GENERAL INFORMATION

ATEX MARKING

For the design and conformity assessment of the products we have used the following harmonised standards:

- **DIRECTIVE 2014/34/EU** on approximation of the laws of the Member States relating to equipment and protective systems intended for use in potentially explosive atmospheres.
- **UNI CEI EN ISO 80079-36:2016** non-electrical equipment intended for use in potentially explosive atmospheres. Part 36: Method and basic requirements.
- **UNI CEI EN ISO 80079-37:2016** non-electrical equipment for potentially explosive atmospheres. Part 37: Protection for construction safety "c"; control of the ignition source "b" and immersion in liquid "k".

ZONE 1: The result is the following product marking, in the case of use in the presence of an explosive atmosphere consisting of GASES:

 **II 2/2 G Ex h IIC T4 Gb** (D0020-D0025)

 **II 2/2 G Ex h IIB T4 Gb** (D0040-D0050-D0080)

In the case of use in the presence of an explosive atmosphere consisting of DUST:

 **II 2 D Ex h IIIb T 135°C Db X** (all models)

ZONE 2: The result is the following product marking, in the case of use in the presence of an explosive atmosphere consisting of GASES:

 **II 3/3 G Ex h IIC T4 Gc** (D0020-D0025)

 **II 3/3 G Ex h IIB T4 Gc** (D0040-D0050-D0080)

In the case of use in the presence of an explosive atmosphere consisting of DUST:

 **II 3 D Ex h IIIb T 135°C Dc X** (all models)

	Safety symbol		
II	Surface industries		
2/2 G	Equipment in category 2 that can be installed in the presence of an explosive atmosphere consisting of gas zone 1, even inside.	**2 D**	Equipment in category 2 that can be installed in the presence of an explosive atmosphere consisting of dust zone 21.
3/3 G	Surface equipment for use in areas where the presence of gases, vapours or mists in the air during operation in both the outdoor and indoor areas is unlikely, or rare and for short periods.	**3 D**	Surface equipment for use in areas where the presence of clouds of combustible dust in the air during operation is unlikely, or rare and for short periods.
Ex	Conventional Ex symbol		
h	Type of protection in reference to the ISO IEC 80079-36:2016 standard: Protection mode for construction safety "c"		
IIb or IIC	Product suitable for installation in the presence of Group IIB or IIC gases (depending on the model)	**IIIb**	Product suitable for installation in the presence of Group IIIB dusts (excluding conductive dusts)
T4	Temperature class.	**T135°C**	Maximum surface temperature
Gb	EPL Gb protection level in accordance with the EN 60079-0:12 and EN 80079-36:16 standards.	**Db**	EPL Db protection level in accordance with the EN 60079-0:12 and EN 80079-36:16 standards.

Gc	EPL Gc protection level in accordance with the EN 60079-0:12 and EN 80079-36:16 standards.	**Dc**	EPL Dc protection level in accordance with the EN 60079-0:12 and EN 80079-36:16 standards.
X	The internal area of the pulsation dampener is not ATEX, i.e. it cannot process explosive dusts.		

The technical file is kept by the president of Fluimac S.r.l. domiciled at the registered office of the company

IECEx MARKING

For the design and conformity assessment of the products we have used the following harmonised standards:

- **UNI CEI EN ISO 80079-36:2016** non-electrical equipment intended for use in potentially explosive atmospheres. Part 36: Method and basic requirements.
- **UNI CEI EN ISO 80079-37:2016** non-electrical equipment for potentially explosive atmospheres. Part 37: Protection for construction safety "c"; control of the ignition source "b" and immersion in liquid "k".

The result is the following product marking, in the case of use in the presence of an explosive atmosphere consisting of GASES:
Ex h IIC T4 Gb (D0020-D0025)
Ex h IIB T4 Gb (D0040-D0050-D0080)

In the case of use in the presence of an explosive atmosphere consisting of DUST:
Ex h IIIb T 135°C Db X (all models)

Ex	Conventional Ex symbol		
h	Type of protection in reference to the ISO IEC 80079-36:2016 standard: Protection mode for construction safety "c"		
IIb or IIC	Product suitable for installation in the presence of Group IIB or IIC gases (depending on the model)	**IIIb**	Product suitable for installation in the presence of Group IIIB dusts (excluding conductive dusts)
T4	Temperature class.	**T135°C**	Maximum surface temperature
Gb	EPL Gb protection level in accordance with the EN 60079-0:12 and EN 80079-36:16 standards.	**Db**	EPL Gb protection level in accordance with the EN 60079-0:12 and EN 80079-36:16 standards.
X	The internal area of the pulsation dampener is not ATEX, i.e. it cannot process explosive dusts.		

The technical file is kept by the president of Fluimac S.r.l. domiciled at the registered office of the company

IDENTIFICATION CODE

MODEL	SIZE	DAMPENER BODY	MEMBRANES	O-RING (DAMPER 50 ONLY)	CONNECTIONS	ATEX ZONE CERTIFICATION
D=DAMPER DF=DAMPER FOOD	20 25 40 50 80	P=PP PC=PP+CF KC=PVDF+CF O=ACETALIC A=ALUMINIUM S= SS AISI 316	T=PTFE H=HYTREL M=SANTOPRENE	V=VITON D=EPDM N=NBR T=PTFE	I=BSP 2= FLANGED 3=TRI-CLAMP (PHOENIX FOOD) 5= NPT	-= ATEX ZONE 2 X = ATEX ZONE 1 SEE "MARKING AND GENERAL INFORMATION" PARAGRAPH

DESCRIPTION OF DAMPER

The dampeners of the "DAMPER " series are double membrane pneumatic pump accessories and are used to dampen, automatically, the variations in flow rate and head in delivery to the pumps. The characteristics of the dampeners (couplings, materials, minimum pressure) are established at the time of ordering and are shown on the identification plate.
Ensure that the physico-chemical characteristics of the liquid have been carefully evaluated and that they are compatible with the constituent components.
The maximum temperature referring to water in continuous operation depends on the version of the materials (shown on the plate) and on the environment in which the dampener will be installed

VERSION		MAX TEMP.	MIN TEMP.
PP / PC	P / PC	65°C / 149°F	-4°C / 24.8°F
PVDF+CF	KC	95°C / 203°F	-20°C / -4°F
ALU	A	95°C / 203°F	-20°C / -4°F
SS	S	95°C / 203°F	-20°C / -4°F
POMc	O	80°C / 176°F	-5°C / 23°F

TEMPERATURE CLASS FOR DAMPENERS TO BE INSTALLED IN AN EXPLOSIVE ENVIRONMENT (ZONE 1):
The reference temperature class for protection against the risk of explosion of pulsation dampeners intended for use in zone 1 with the presence of explosive atmospheres is T135°C (T4); the following data and operating conditions are indicated:

DEFINITION OF THE CALCULATION DATA:

T4 = ATEX temperature class 135°C
Ta = maximum ambient temperature 40°C;
TI = maximum pump temperature used dry in the work environment (50°C);
Δs = safety factor (5°C);
Tx = calculation factor (TI + Δs) for ZONE 1 only;
Tf = maximum permissible process temperature of the fluid.

Below is the formula to determine the maximum permissible process temperature of the pulsation dampener fluid to be installed in ATEX ZONE 1

For models D0020-D0025:
II 2/2 G Ex h IIC T4 Gb
II 2 D Ex h IIIb T 135°C Db X

For models D0040-D0050-D0080:
II 2/2 G Ex h IIB T4 Gb
II 2 D Ex h IIIb T 135°C Db X

In the case of use in the presence of an explosive atmosphere consisting of DUST:
(all models)

ATEX TEMPERATURE CLASS		CALCULATION FACTOR (Only for ZONE 1)		MAXIMUM PROCESS TEMPERATURE OF THE FLUID
T4	-	Tx	=	Tf

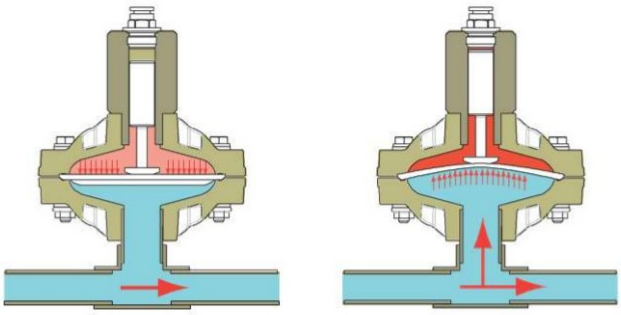
135°C	-	55°C	=	80°C

ATTENTION: in consideration of the permitted range of the ambient temperature in zone 1, process temperatures of the fluid higher than those indicated above, in addition to causing damage to the pump, prevent compliance with the corresponding temperature classes T4 (135°C). Where the user envisages the risk of exceeding the temperature limits provided for in this manual, a protective device must be installed on the system that prevents the maximum permissible process temperature of the fluid from being reached. The maximum temperature of the equipment was determined without depositing dust on the external and internal surfaces.

The maximum temperature referring to water in continuous operation depends on the version of the materials (shown on the identification plate) and on the environment in which the dampener will be installed. The ambient temperature range depends on the version of the materials (shown on the plate):

VERSION	MAX TEMP. ATEX ZONE 1	MAX Ø T (°C / °F)
PP / PC	65°C / 149°F	0÷40°C / 14÷104°F
PVDF+CF	80°C / 176°F	0÷40°C / 14÷104°F
ALU	80°C / 176°F	0÷40°C / 14÷104°F
SS	80°C / 176°F	0÷40°C / 14÷104°F
POMc	80°C / 176°F	0÷40°C / 14÷104°F

OPERATING PRINCIPLE



The dampener consists of two chambers separated by the membrane. One chamber is connected to the pump delivery while the second is loaded or discharged with air.
The pressure that the pumped liquid exerts on the wet side of the membrane deforms it. This deformation moves a dedicated sensor that drives the pneumatic valve that loads or discharges air according to the position assumed by the sensor. The frequency of the dampener pulsation is automatically adjusted by the actual needs of the circuit, without any intervention or setting, thus reducing harmful water hammering, avoiding preloading the dampener and minimising vibrations to safeguard the equipment in line.

IMPROPER USES:

ATTENTION: any other use of the DAMPER different from that previously described and specified in the chapter "TECHNICAL CHARACTERISTICS" is considered improper and therefore prohibited by FLUIMAC SRL.
In particular, the use of DAMPER dampeners is PROHIBITED for:

- Use with liquids to be pumped that are chemically incompatible with the construction materials;

- Use with suspension products with a specific weight greater than that of the liquid (e.g. water with sand);
- Use with pneumatic pressures, temperatures and product characteristics contrary to the technical data.

ATTENTION: for food fluids where no specific certification is required, we recommend using the DAMPER FOOD series dampener in accordance with the FDA regulations.

ATTENTION: given the innumerable variety of products and chemical compositions the user is considered to be the most knowledgeable subject about the reactions and compatibility with the construction materials of the dampener. Therefore, before use, carry out with expertise all the necessary checks and tests in order to avoid dangerous situations, even if remote, that cannot be known and attributable to the manufacturer.

ATTENTION: the user must evaluate the ratio between the maximum surface temperature of the dampener indicated in the marking and the minimum ignition temperature of the dust layers and dust clouds as indicated in EN 1127-1.

ATTENTION: any use of the dampener outside the instructions indicated in the use and maintenance manual will void the requirements of safety and protection against the danger of explosion. The risks associated with use of the dampener were analysed under the precise conditions prescribed by the user and maintenance manual: the risk analysis related to the interface with other components of the system is entrusted to the installer.

ATEX regulations: It is the responsibility of the user of the equipment to classify their area, while it is the responsibility of the manufacturer to identify the category of equipment.

TECHNICAL CHARACTERISTICS

	FLUID CONNECTIONS	AIR CONNECTION	AIR SUPPLY PRESSURE	VOLUME PER SHOT*
D0020	3/4" BSP	6mm	7 bar	80 CC~
D0025	1" BSP	8mm	7 bar	200 CC~
D0040	1"1/2 BSP	10mm	7 bar	700 CC~
D0050	2" BSP	12mm	7 bar	2900 CC~
D0080	3" BSP	16mm	7 bar	3050 CC~

*the volume per shot may vary based on the suction conditions, head, air pressure, and fluid type.

WARRANTY

In the event of an anomaly, contact Fluimac srl, the dealer or the service centre nearest to you and indicate the following:
A. identification of the dampener;
B. the class of protection against the risk of explosion;
C. a description of the defect found.
All dampeners are covered by the following formula:
1. The dampener is guaranteed for 12 months on all mechanical parts found to be defective. The warranty period will be calculated starting from the date of delivery.
2. Any defect must be communicated in writing to the Manufacturer within 8 days.
3. The intervention under warranty will only be carried out at our workshops upon shipment or sending of the defective product.
4. If parts of the dampener are repaired or replaced, the warranty will not be extended.
5. The defective parts must be sent back to the Manufacturer who reserves the right to check the same at its workshop in order to identify the actual defect or instead to identify the external reasons that may have

caused the damage. If the parts are not defective, the Manufacturer reserves the right to invoice the full cost of the parts previously replaced under warranty.
The Manufacturer will not bear the costs and risks of transporting defective parts and repaired or replacement parts, including any customs charges. Repair or replacement of defective parts constitutes full satisfaction of the warranty obligations. The warranty will NOT include any indirect damage and in particular any non-production. In addition, all materials of normal consumption and wear (membranes, air valve, etc.) are excluded from the warranty. Parts that may be damaged due to incorrect installation or use with fluids that are not compatible with the construction materials, neglect or negligence in use, incorrect maintenance, damage due to transportation and any circumstance that cannot refer to operating or manufacturing defects are not included in the warranty.
The warranty is excluded in all cases of improper use or incorrect applications and non-compliance with the information contained in this manual. For any dispute, the competent court is that of Varese.

SAFETY PRESCRIPTION

Hazardous practices, risky or contrary to the safety requirements and to what is covered in this manual can cause serious injury, material damage and even explosion and/or death, not attributable to the Manufacturer.


ATTENTION! These instructions are essential for the compliance of the dampener with the Machinery Directive 2006/42/EC. They must therefore be: available, known, understood and used.


ATTENTION! Personnel involved in the installation, inspection and maintenance of the pulsation dampener must have adequate technical training in addition to adequate knowledge of the potentially explosive atmosphere and of the risks associated with it.


ATTENTION! CHEMICAL RISK. The dampeners are intended for operation with different types of liquids and chemical solutions. Follow the specific internal instructions for decontamination during inspection or maintenance operations.


ATTENTION: the membrane (in contact with the product and external) is a component that is highly subject to wear. Its duration is highly influenced by the conditions of use and by chemical and physical stresses. From tests performed with a prevalence of 0 to 18°C, the normal duration exceeds 20,000 cycles. For safety reasons, in environments with a risk of explosion , the membrane must be disassembled and checked every 10,000 cycles and replaced every 20,000 cycles.


ATTENTION! In the event of total breakage of the membranes, the fluid can enter the pneumatic circuit and damage it. It is therefore necessary to convey the air discharge in a pipe to a safe area.


ATTENTION! Where the user envisages the risk of exceeding the temperature limits provided for in this manual, a protective device must be installed on the system that prevents the maximum permissible process temperature of the fluid from being reached. If the maximum marking temperature is exceeded, compliance is not guaranteed.

REMEMBER! Risks to the safety of persons mainly arise from improper use or in the event of accidental damage. These risks may be injury to the hands for those persons operating on the open dampener or they are due to the nature of the liquids that are conveyed by these types of dampeners. It is therefore extremely important to diligently carry out all the instructions contained in this manual in order to eliminate the causes of accidents that can lead to breakage of the dampener and the consequent leakage of liquid that could be hazardous for persons and for the environment.

For installation and use in a potentially explosive environment, comply with the following general precautions:

- check that the dampener is full;
- check that there are no or no large or harmful solid parts in the treated fluid;
- check that the connecting pipes are sufficiently strong and that they cannot deform under the weight of the dampener and that the dampener is able to bear the weight of the pipes;
- ensure that there are no restrictions on entry or exit;
- if the dampener is to remain inactive for long periods, clean it thoroughly by circulating a non-flammable cleaning fluid compatible with the dampener materials;
- if the dampener has been switched off for long periods, it is advisable to circulate clean water for a few minutes to avoid the risk of fouling;

- before starting, after long periods of non-use, clean the internal and external surfaces with a damp cloth;
- check the earthing;
- always protect the dampener from possible impacts caused accidentally by moving vehicles or by various blunt materials that could damage it and/or react to contact;
- protect the surrounding environment from splashes from accidental dampener faults;


ATTENTION: the air supply must never exceed 6 bar.


ATTENTION: in case of use for the pumping of fluids that could be aggressive, toxic or dangerous for health, it is necessary to install on the dampener adequate protection for the containment, collection and signalling of the product in case of spillage: DANGER OF POLLUTION, CONTAMINATION, INJURY AND/OR DEATH.


ATTENTION: it is forbidden to use the dampener with fluids that are not compatible with the materials of the components or in an environment with the presence of incompatible fluids.


ATTENTION: it is forbidden to install the dampener in the absence of valves to intercept the product on the suction and delivery to perform disconnection in case of leakage: danger of uncontrolled leakage of the product.


ATTENTION: it is forbidden to install the dampener in the absence of a shut-off valve, 3/2 directional control valve and non-return valve on the air supply duct to prevent the pumped fluid from entering the pneumatic circuit in the event of membrane breakage: danger of the fluid entering the compressed air circuit and it being discharged into the environment.


ATTENTION: where the user envisages the risk of exceeding the temperature limits provided for in this manual, a protective device must be installed on the system that prevents the maximum permissible process temperature of the fluid from being reached. If the maximum marking temperature is exceeded, compliance is not guaranteed.


ATTENTION: the dampener must always be earthed independently of any other part connected to it. The absence of earthing or of incorrect earthing causes the requirements of safety and protection from the danger of explosion to lapse.


ATTENTION: it is forbidden to use the dampener in non-conductive material for flammable liquids, which is charged statically and without adequate earthing: DANGER OF EXPLOSIONS DUE TO STATIC CHARGES.


ATTENTION: aggressive, toxic or dangerous fluids can cause serious physical injury and/or harm to health. It is therefore forbidden to return to the manufacturer or to a service centre a dampener containing products of this type: empty and wash the internal circuit of the product and arrange for washing and treatment before returning the dampener.


ATTENTION: models of dampeners containing aluminium components or parts in contact with the product may not be used for the pumping of III-trichloroethane, chlorine methylene or solvents based on other halogenated hydrocarbons: DANGER OF EXPLOSION DUE TO CHEMICAL REACTION.


ATTENTION: DAMPER series dampeners cannot be used with acetylene, hydrogen and carbon sulphide.


ATTENTION: the components of the pneumatic valve, including the shaft, are made of materials that are not specifically resistant to chemicals. In case of breakage of the membrane, if they come into contact with the fluid, replace them completely.


ATTENTION: avoid the use of lubricated and non-dried air.


ATTENTION: check that no abnormal noise occurs during operation. In this case, immediately stop the dampener and the pump to which it is connected.


ATTENTION: check that there is no gas in the outlet fluid. In this case immediately stop the dampener and the pump to which it is connected.


ATTENTION: The absence of dust and/or deposits from the external and internal surfaces of the dampener must be periodically checked and, if necessary, cleaned with a damp cloth.

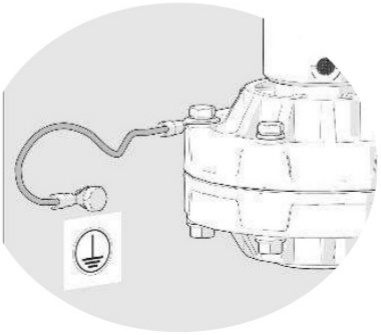

ATTENTION: disassembly of the hydraulic fittings and of the air supply fitting must be carried out in the absence of dust. Before restarting the dampener, make sure that no dust has entered the pneumatic valve.

ATTENTION! Any use of the dampener aside from the instructions indicated in the use and maintenance manual will void the requirements of safety and protection against the danger of explosion.

For the replacement of worn parts, use only original spare parts.
Failure to comply with the above may result in hazards to the operator, technicians, persons, the dampener and/or to the environment not attributable to the manufacturer.

In any case, five general elements are important:

A. all operations must be carried out either by specialist personnel or supervised by qualified personnel as appropriate
B. carry out protection works for persons (when the dampener is installed in places that are not occasionally frequented) against any jets of leaking liquid due to accidental breakage and works of conveying (always) of any leaks of liquid to collection tanks
C. wear anti-acid clothes and protections whenever operating on the pump
D. ensure the closing condition of the valves on Suction and Delivery during disassembly
E. guarantee the condition of absence of power to the pneumatic circuit during disassembly



INSTALLATION AND USE INSTRUCTIONS

TRANSPORTATION AND POSITIONING

The operators assigned to assembly/disassembly operations must be trained on the hazards associated with the use of mechanical tools, including small ones.
Upon receipt, check that the packaging and the pulsation dampener are intact and have not been damaged, after which it is necessary to:

1. Depending on the size and weight, the supply is shipped in cardboard packaging or in a crate: on receipt, open and remove the packaging.
2. Take the use and maintenance manual and operate as described.
3. Carry out a check of the tightening of all the dampener screws. Repeat the operation every 3 months.

MODEL	SCREW TIGHTENING (Nm)
D0020	2-3 Nm
D0025	4-5 Nm
D0040	5-6 Nm
D0050	16-17 Nm
D0080	16-17 Nm

4. If the dampener is made of conductive material and suitable for the pumping of flammable fluids, an adequate earthing cable must be installed on the pump body: explosion and/or fire hazard.
5. Lift the packaging and/or the dampener with suitable loading equipment according to the weight shown in the serial number

ATTENTION: the dampener must always be earthed independently of other parts connected to it. Non- or incorrect earthing will result in loss of the requirements of safety and protection against the danger of explosion.

ATTENTION: the dampeners cannot be installed in areas exposed to sandstorms due to the abrasive nature of the phenomenon that could damage the external plastic parts.

STORAGE

If it is necessary to store the pulsation dampeners for a period of time before installation, keep them in the original crates. The crates must be stored lifted from the ground, in a closed, clean and dry environment. In the event that upon receipt the possible packaging is not intact, it will be necessary to free the dampener

from the packaging, check its integrity and arrange for new packaging. The storage place must be an enclosed environment with a temperature not lower than –5°C, not higher than 40°C and with a humidity rate not exceeding 80%; any packaging must not be subjected to shocks, vibrations or loads stacked on top.

INSTALLATION

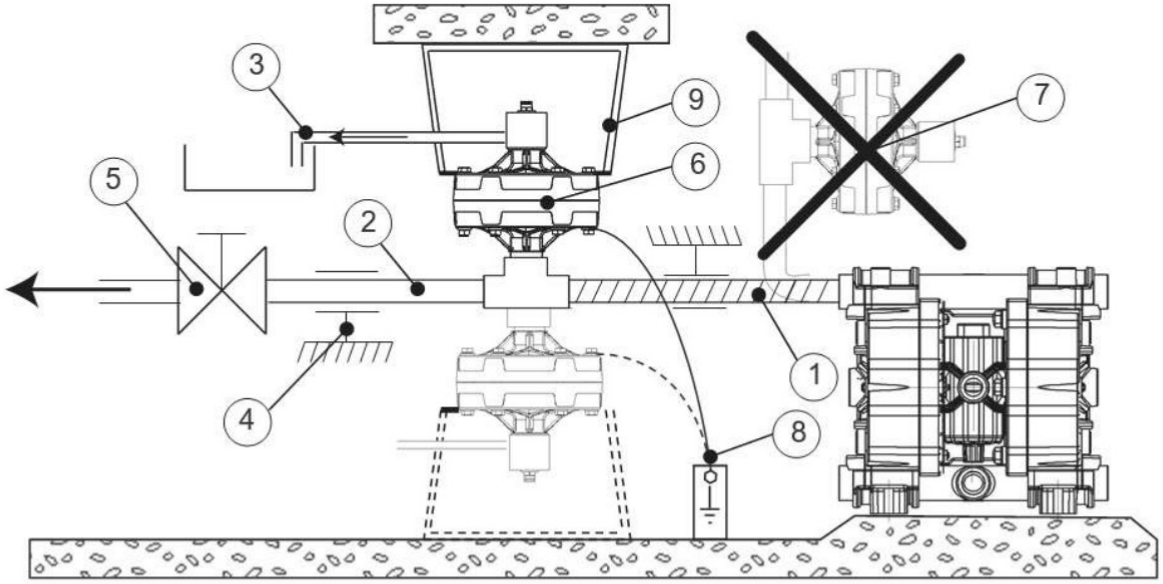
After performing the positioning, it is possible to connect the dampener to the product circuit by operating as follows:

- it is essential that the hydraulic system is perfectly sealed, so clean the system before connecting the dampener
- the dampener must not contain foreign bodies and the seals on the hydraulic connections must be removed

ATTENTION: for the connections only use fittings with cylindrical gas threads of material compatible with the fluid to be pumped and with the construction material of the dampener.

- check the tightening of all the screws;
- the positioning of the dampener is horizontal with dedicated bracketing;
- the pneumatic supply of the dampener must be carried out with filtered, dried, deoiled and unlubricated air with pressures not less than 2 bar and not more than 7 bar;
- the pneumatic supply is the same as the pneumatic pump upstream of the dampener.

USE THE SYSTEM SOLUTIONS INDICATED IN THE FOLLOWING DIAGRAM:



1. YES: use flexible hoses reinforced with a rigid spiral to connect the dampener to the pump. Rigid pipes and/or pipes with conical threads can cause strong vibrations and stress causing breakage of the connections, of other parts of the dampener and of the pump connected to it. Their use is therefore FORBIDDEN. Do not use pipes with a nominal diameter smaller than that of the pump connections. For viscous fluids, use pipes with larger diameters.
2. YES: downstream of the dampener, the pipe can be of a rigid type and of a material compatible with the fluid to be pumped.
3. YES: connection of the safety discharge; in case of breakage of the membranes the liquid is thus conveyed to a collection container.
4. YES: piping anchorage; the pipes must not deform and must not weigh on the dampener and vice-versa.
5. YES: manual shut-off valve downstream of the dampener of the same diameter of the connection (never smaller) to ensure interception of the fluid in case of leaks and/or of future maintenance.
6. YES: horizontal positioning.
7. NO: vertical positioning.

8. YES: earthing connection through one of the closing bolts of the bodies.
9. YES: dedicated bracket to support the dampener.
10. YES: condensate drain.
11. YES: pressure regulator with pressure gauge.
12. YES: non-return valve to prevent in case of membrane breakage a situation whereby the pumped fluid enters the compressed air circuit and is discharged into the environment.
13. YES: 3/2 directional control valve to stop dampener operation.
14. YES: flow regulator.

ATTENTION: in case of vertical delivery greater than 5 m it is advisable to use a non-return valve to prevent return of the fluid inside the dampener and/or the pump connected to it

- ensure the drainage of any liquids leaking from the dampener
- use flexible joints with fittings of the same material as the dampener and as the pump connected to it
- secure the dampener, preventing it from weighing on the pipes
- it is FORBIDDEN to use thread braking substances and/or Teflon paste
- attach the pipes with dedicated clamps
- leave free space around the dampener for a person's movements
- warn of the presence of aggressive liquid with appropriate coloured plates according to the specific regulations
- in the event of a total breakage of the membranes, the fluid can enter the pneumatic circuit, damage it and exit the drain. It is therefore necessary to convey the air discharge in a pipe to a safe area.
- do not install the dampener (made of thermoplastic material) near heat sources
- do not install the dampener in places where there is a risk of falling solid or liquid bodies
- do not install the dampener in the immediate vicinity of fixed workplaces or busy areas

ATTENTION: the dampener must always be earthed independently of other parts connected to it. Non- or incorrect earthing will result in loss of the requirements of safety and protection against the danger of explosion.

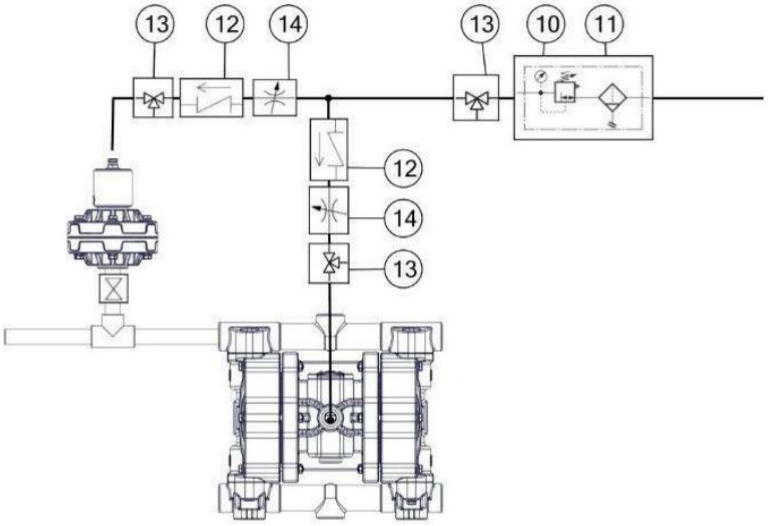
ATTENTION: during operation the dampener is PRESSURISED. Appropriately signal the danger condition.

ATTENTION: the installer must centre the fittings during assembly to avoid cracks and/or failure of the threads.

ATTENTION: check that any excess PTFE tape and excessive tightening pressure does not strain the connection or other parts of the dampener.

ATTENTION: pay the utmost attention to stress-corrosion phenomena. The dampener material can degrade due to the combined action of corrosion and application of a load causing sudden and unexpected breakage of the parts under stress, especially at limit temperatures.

TO CONNECT THE DAMPENER TO THE PNEUMATIC CIRCUIT, IT IS NECESSARY TO:



10. Condensate drain
11. Pressure regulator with pressure gauge
12. Non-return valve
13. 3/2 directional control valve
14. Flow regulator (optional)

- install near use, but upstream of the dampener and of the pneumatic pump connected to it, a shut-off valve, a 3/2 directional control valve and a non-return valve
- installation on the automatic valve connection of the pulsation dampener of a dedicated pneumatic connection

ATTENTION: use pipes, accessories and control and adjustment elements with dampener characteristics to avoid causing pressure drops.
Fittings with quick couplings in most cases cause pressure drops

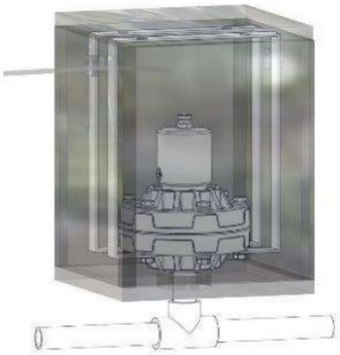
ATTENTION: the pneumatic supply of the dampener must be carried out with DEOILED, FILTERED, DRIED and UNLUBRICATED AIR with a pressure of NOT LESS THAN 2 bar and NOT MORE THAN 7 bar. Lower or higher pressures can cause operating problems, dampener breakage, product leakage and damage to persons and/or property.

ATTENTION: for installations in zone 1, where the user envisages the risk of exceeding the temperature limits provided for in this manual, it is necessary to install a protective device on the system that prevents reaching of the global temperature (fluid and environment) of 95°C for metallic or PVDF class T4 dampeners or 65°C for class T4 dampeners but in PP (polypropylene). Always pay attention to the hot outer surfaces of the dampener.

ATTENTION: for installations in zone 1, the compressor must draw air from outside the ATEX classified area or use inert gas.

In general:

1. Always protect the dampener from possible shocks caused accidentally by moving vehicles or various blunt materials that could damage it and/or react to contact.
2. Protect the environment and persons with the installation of a protective guard, in the event of accidental dampener faults, for containment and collection in the event of product leakage: DANGER OF SERIOUS PHYSICAL, HEALTH-RELATED AND/OR PROPERTY DAMAGE.
3. In the event of a total breakage of the membranes, the fluid can enter the pneumatic circuit, damage it and exit the drain. It is therefore necessary to convey the air discharge in a pipe to a safe area.



START-UP

- The user must always use materials compatible with the pumped liquid with reference to the design conditions of the dampener itself. It is therefore FORBIDDEN to use the dampener with fluids that are not compatible with the materials of the components or in an environment with the presence of incompatible fluids.
- check the correct execution of what is indicated in "INSTALLATION"
- check that the suction and delivery pipes of the hydraulic circuit are correctly connected
- check the correct installation of the dampener pneumatic circuit (shut-off valve, 3/2 directional control valve and non-return valve)
- open the inlet and outlet valves of the hydraulic circuit, then the valves of the fluid pipes
- open the choking ball valve fitted upstream of the dampener and pump
- open the 3/2 directional control valve on the air circuit
- check and adjust the pressure and flow rate of the air supplying the dampener: MIN 2 bar – MAX 7 bar

  WARNING: with pressures outside the maximum threshold, there may be failures and leakage of product under pressure and/or dampener breakages
- ascertain the absence of abnormal vibrations or noise due to overly elastic load-bearing structure, inadequate fixing or cavitation
- after 2 hours of operation, correctly stop the dampener and the pump connected to it and check the tightening of all the dampener bolts
- **NOTE!** The pulsation dampener is equipped with an automatic pneumatic valve that self-regulates the speed and the necessary head required by the system

ATTENTION: never start operation with the hydraulic circuit valves closed. Possible breakage of the membranes

ATTENTION: before starting, after long periods of non-use, clean the internal and external surfaces with a damp cloth

USE

ATTENTION: check that there are no or that there can be no solid parts that are excessively large or harmfully shaped in the treated fluid and that there are no restrictions on the dampener ducts to avoid cavitation and stress phenomena respectively of the pneumatic part of the dampener and of the pneumatic motor of the pump upstream.

- do not operate valves or shunts during dampener operation

- risks of damaging water hammer in the event of incorrect or sudden manoeuvres (activation of valves only by trained personnel)
- empty and wash thoroughly with suitable products the inside of the dampener in the event of pumping of different liquids
- isolate or empty the dampener if the liquid crystallisation temperature is equal to or lower than the ambient temperature
- stop the dampener and the pump connected to it if the liquid temperature exceeds the maximum permissible temperature indicated in this manual; if the increase is of the order of 20%, it is necessary to inspect the condition of the internal parts
- stop the dampener and the pump connected to it and close the valves in case of leaks
- only wash with water if the chemical compatibility allows it; alternatively use the appropriate solvent that does not generate dangerous exothermic reactions
- contact the liquid supplier to establish the most appropriate fire-fighting method
- empty the dampener in case of long periods of non-use (in particular with liquids with a high tendency to crystallise)
- check that there is no gas in the delivery fluid; in such case stop the dampener and the pump connected to it

ATTENTION: it is forbidden to stop the dampener and the pump in operation and/or with the pneumatic circuit under pressure by closing the suction and/or delivery valves of the fluid circuit: possible breakage of the membranes

Place the following prohibition and danger signs near the place of installation of the dampener:

Generic hazard sign	Hazard of explosive material	Danger of splashing of incandescent liquid material	No smoking	Prohibition of the use of naked flames	Danger of flammable material
					
Hazard of corrosive material	Hazard of toxic material				
					

SHUTDOWN

To stop the dampener, act exclusively on the air supply by closing the 3/2 directional control valve thus discharging the residual pressure **of the pump pneumatic system .**

ATTENTION it is forbidden to stop the dampener and the pump connected to it with the pneumatic circuit under pressure by closing the intake and/or delivery valves of the fluid circuit: DANGER OF PREMATURE WEAR AND/OR OF BREAKAGE OF THE MEMBRANES

PRODUCT CIRCUIT MAINTENANCE

RECOMMENDATIONS

- all interventions must be supervised by qualified personnel
- do not carry out maintenance and/or repairs with the air circuit under pressure: act on the appropriate 3/2 directional control valve
- drain the fluid being pumped and close the product shut-off valves

- carry out periodic inspections (2 ÷ 30 days depending on the liquid being conveyed) of the state of cleanliness on the filter elements
- carry out periodic inspections (3 ÷ 5 months depending on the liquid being conveyed and on the environmental conditions) on the functionality of the consent/shutdown devices of the system; ensure their efficiency
- the presence of liquid under the dampener body could be an indication of pump faults
- damaged parts must be replaced with original parts that are intact and that have not been repaired
- the replacement of damaged parts must be carried out in a clean and dry environment
- remove dust deposits from the outer surfaces of the pulsation dampener with a cloth dampened with suitable neutral detergents
- periodically check and clean the internal surfaces with a damp cloth

ATTENTION: before working on the dampener for any maintenance or repair:

- discharge the product being pumped and circulate a suitable, non-flammable washing fluid. After which discharge the latter and close the manual product shut-off valves
- disconnect the air supply by means of a dedicated 3/2 directional control valve, make sure that there are no residual pressures then disconnect the supply air line from the dampener
- wait for the dampener to cool down for at least fifteen minutes
- to disconnect the hydraulic connections from the system, use gloves, glasses and anti-acid clothing when disconnecting from the system
- do not disperse the body wash discharge into the environment

DANGER OF EJECTION OF FLUID UNDER PRESSURE AND BURNS

DISMANTLING

- disconnect the product pipes from the dampener
- disconnect the compressed air supply hose
- disassemble and remove the dampener from the installation site with suitable lifting equipment
- Arrange for external cleaning from dust deposits of all surfaces of the dampener with a cloth moistened with suitable neutral detergents

REMOVAL OF MEMBRANES

- separate the dampener bodies by removing the fixing screws
- remove any deposits from the internal surfaces with a damp cloth
- where present, remove the membrane locking plates
- check and/or replace the dampener membranes with original spare parts of the same type
- reassemble the dampener operating in the reverse order and perform uniform tightening of the bolts as shown in "TRANSPORTATION AND POSITIONING" section 3

REMOVAL OF THE PNEUMATIC VALVE

- disassemble the dampener body by removing the screws and then remove the membranes with the relative shaft
- unscrew the valve from the air side body of the dampener
- reassemble a new valve
- reassemble the dampener following the order in reverse and perform uniform tightening of the bolts as indicated in "TRANSPORTATION AND POSITIONING" section 3

ATTENTION: the automatic valve must not be opened to prevent incorrect reassembly and consequent malfunction of the dampener.

INSPECTION

Verify the absence of:

- excessive abrasion of the thermoplastic parts
- lumps and/or agglomerations due to the pumped liquid
- deformation and/or superficial damage of the membranes

- deformations and/or breakages on the dampener bodies
- deformations and/or breakages on the probe
- Replace any parts that are: broken, cracked, deformed.
- Reopen all obstructed ducts and remove any chemical agglomerates.
- Clean all surfaces prior to reassembly, in particular the O-ring seats (risk of leakage due to dripping).

ATTENTION: if the dampener must be returned to the manufacturer or to a service centre, the product must be emptied out of it beforehand. In the case of products that are toxic, harmful or dangerous to health, the dampener must be suitably treated and washed before shipment

CLEANING AND REPLACING THE MEMBRANES

For the correct functioning of the pulsation dampener, as well as to ensure the requirements of safety and protection against the risk of explosion, it is essential to carry out the checks, cleaning and/or replacement of the membranes according to the times shown below:

- internal inspection and cleaning every 50,000 cycles
- verification of membrane wear every 100,000 cycles
- membrane replacement every 500,000 cycles

TROUBLE-SHOOTING

The following indications are only reserved for qualified and authorised maintenance technicians. In the event of an anomaly and to resolve malfunctions, use the following indications to identify the anomaly.

ATTENTION: for any major intervention contact the FLUIMAC assistance service; our technicians will help you as soon as possible

	DEFECT	CAUSE	SUGGESTION
1	The dampener does not start and/or does not work	No air in the circuit	Check the circuit (valves, connections, regulators, etc.)
		Insufficient air pressure	Adjust the air pressure
		Insufficient air flow	Check that pipes and accessories have adequate passages
		Control valve damaged	Replace
			Check if there is ice on the air discharge then check that the system air is dried and filtered and if any issues are found, proceed accordingly.
		Broken membrane	Check if air comes out of the product delivery pipe; replace the membrane if necessary.
2	Dampener has poor performance	The pneumatic valve is leaking air.	Replace the pneumatic valve
		The fluid pipe is clogged and obstructed	Disassemble and clean
		Fluid too viscous.	Install larger pipes especially in suction and reduce the pump cycles.
		Air not dried and/or lubricated	Check the air supply line
		Insufficient volume or air pressure	Check that all the air control devices have sufficient flow. If the pressure is too low with respect to the mains, check all the air connections, especially the quick couplings of the air (90% of the cases of pressure drops are linked to the quick couplings)

DECOMMISSIONING

In the event of long periods of inactivity of the dampener, proceed as follows:

ATTENTION: discharge any fluid still present from the dampener. Perform suitable washing and treatment by circulating a non-flammable cleaning fluid compatible with the dampener materials. DANGER OF FIRE, INJURY, DAMAGE TO HEALTH AND/OR DEATH.

1. Perform an internal wash using products suitable for the type of fluid being pumped.
2. Close the intake and delivery fluid valves.

3. Close the air supply with the 3/2 directional control valve; this will discharge the residual pressure.
4. To store the pump in the warehouse, proceed as follows:

ATTENTION: any storage must be carried out in an enclosed and protected environment with temperatures between 5 and 45°C, with a degree of humidity not exceeding 90%.

5. If the dampener has been inactive for long periods, it is advisable to circulate clean water for a few minutes before being put back into service to avoid deposits of scale.

DISPOSAL AND DEMOLITION

The DAMPER dampener is not composed of hazardous parts or parts that require preventive conditioning; in all cases, at the end of its life, to carry out disposal it is necessary to:

ATTENTION: discharge any fluid still present from the dampener. In the case of fluids that are dangerous, toxic and/or harmful to health, perform suitable washing and treatment: danger of injury, damage to health and/or death.

1. Section and disconnect the pneumatic power supply of the dampener.
2. Remove the dampener from the installation site.
3. Separate the components by type (see dampener composition codes).

ATTENTION: the polypropylene components must be disposed of as special waste. In all cases, for disposal, contact dedicated authorised companies being sure not to abandon or disperse in the environment small or large components that can cause pollution, accidents or direct and/or indirect damage.

SPARE PARTS

Contact Advantage Europe: info@advantage-eu.com

Europe Advantage

NOTES

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Official partner and repair center

Europe Advantage

info@advantage-eu.com
www.advantage-eu.com

The user manual must be delivered to the user of the pump, who is required to read it carefully and keep it for future reference. Any changes do not imply updating the manuals already distributed.

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