ARGAL AIR

OPERATIONS & MAINTENANCE MANUAL

PULSATION DAMPERS
PDE-PXE

TRANSLATION FROM THE ORIGINAL LANGUAGE

DEALER

For Maintenance

Date of commissioning:

……

Position / system reference:

……

Service:

……

INDEX

0. GENERAL DESCRIPTION

If you have purchased an **ARGAL** product , follow below instructions and local/national rules for a safe use.
The personnel in charge of installation, operation and maintenance of dampers and accessories must be qualified to carry out the operations described in this manual.
ARGAL shall not be held responsible for the training level of personnel and for the fact that they are not fully aware of the contents of this manual.

0.1 IDENTIFICATION CODE

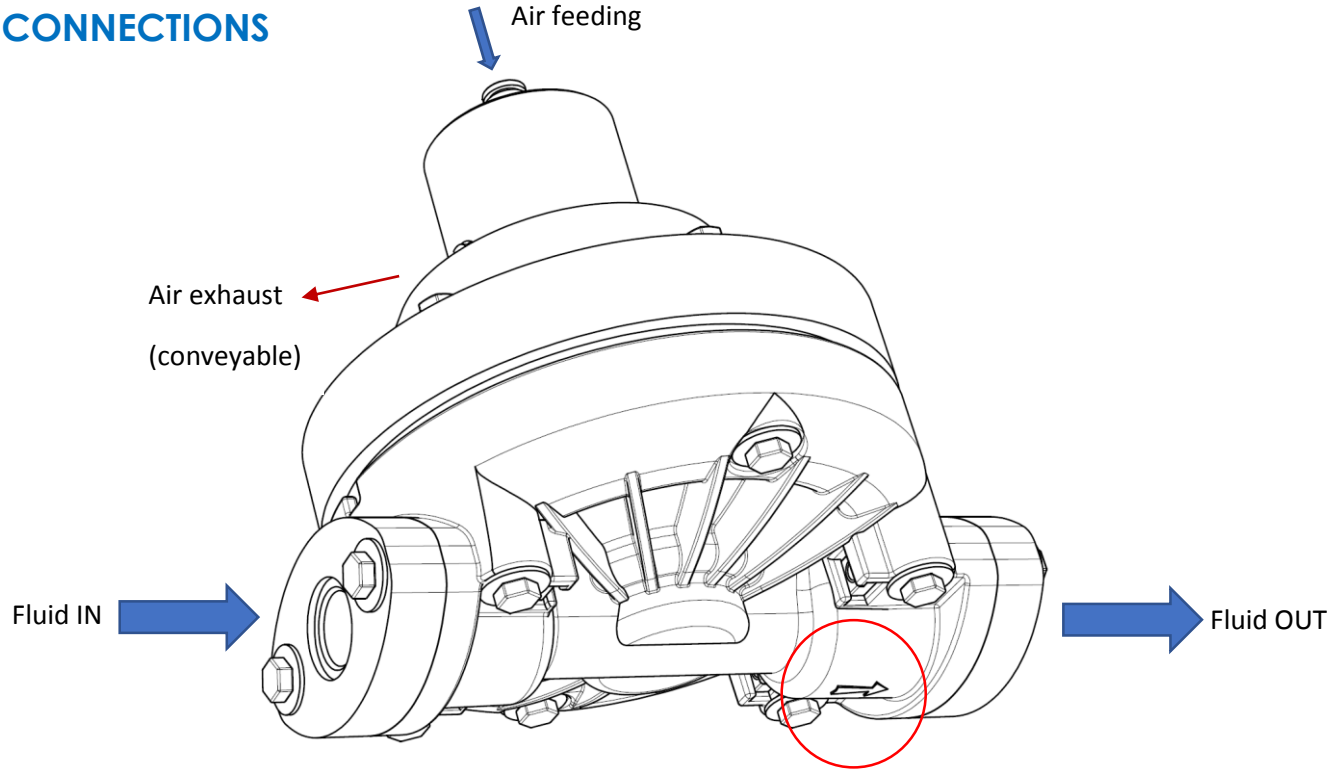
RANGE		MODEL		MATERIALS								CONNECTIONS	
				CHAMBERS		VERSION		DIAPHRAGMS		BALL VALVE		TYPE	
PDE		**160**		**WR**		**Z**		**Y**		**0**		**G**	
PDE	Std / ATEX zone 2	**15**	1/4"	**WR**	PP+GFR	**Z**	antistatic/ATEX air chamber	**H**	TPV (**)	**0**	without valve	**G**	bsp threads
		20	3/8"	**WC**	PP+C			**M**	TPE (***)	**1**	with valvola	**N**	npt threads
PXE	ATEX zone 1	**30**	1/2"	**FC**	PVDF+CF	**N**	PP air chamber	**L**	TPV+PTFE			**I**	flange iso
		60	1/2"	**FX**	PVDF+CF			**Y**	TPE+PTFE			**A**	flange ansi
		80	3/4"	**ER**	PE-UHMW			**D**	EPDM			**C**	CLAMP (*)
		100	1"	**AL**	AL			**N**	NBR				
		160	1"	**SS**	AISI 316L			**V**	FKM				
		400	1"1/2	**SP**	AISI 316L electropolished								
		650	2"										

(*) only configuration SPN/SPZ

(**) commercial designation: Santoprene® (ExxonMobil), Geolast® (ExxonMobil)

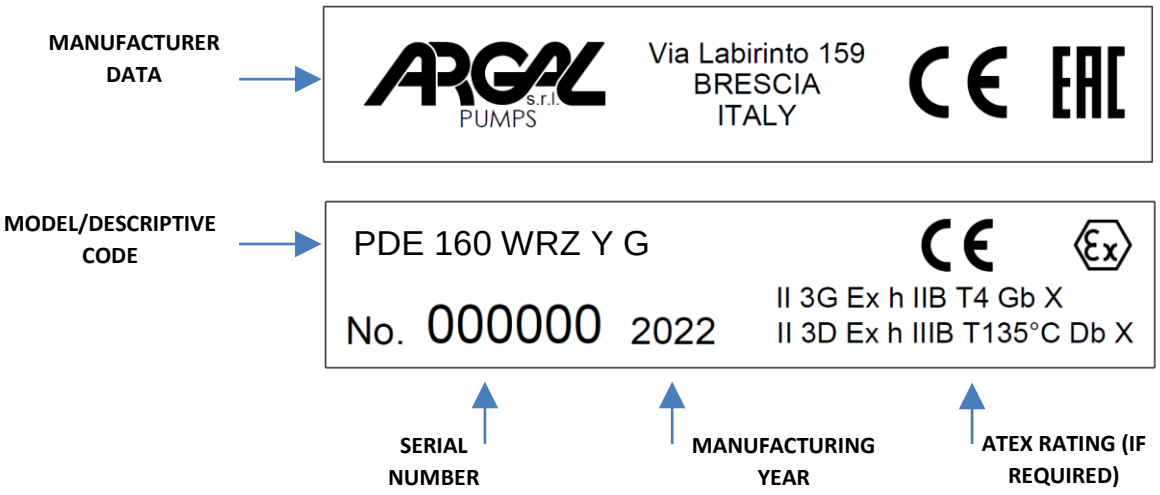
(***) commercial designation: Keyflex® (LG Chem Ltd.), Hytrel® (LG Chem Ltd.)

0.2 CONNECTIONS



0.3 DAMPER LABELING

Each damper is supplied with the serial and model abbreviation and the serial number on the rating plate, which is applied on the support side.
Check these data upon receiving the goods. Any discrepancy between the order and the delivery must be communicated immediately.
In order to be able to trace data and information, the abbreviation, model and serial number of the damper must be quoted in all correspondence.



0.4 STANDARDS REFERENCE

0.4.1 ENVIRONMENTS IN DANGER OF EXPLOSION - ATEX DIRECTIVE

PXE pulsation dampers, version **WCZ - FXZ - ALZ - SSZ - SPZ**, can meet the requirements of the **category 2** of the ATEX Directive 2014/34 / EU, therefore intended to operate in potentially explosive environments classified as **zone 1**, with the following characteristics:

CE **1370** Ex

II 2G Ex h IIB T4 Gb X
II 2D Ex h IIIB T135°C Db X

PDE pulsation dampers, version **WR_ - WC_ - ER_ - FC_ - AL_ - SS_ - SP_**, can meet the requirements of the **category 3** of the ATEX Directive 2014/34 / EU, therefore intended to operate in potentially explosive environments classified as **zone 2**, with the following characteristics:

CE Ex

II 3G Ex h IIB T4 Gc X
II 3D Ex h IIIB T135°C Dc X

Markings are explained in detail in the tables below:

ATEX 2014/34/EU

Simbol	Marking	Meaning
CE	CE marking	European Conformity
1370	Notified Body Number	
Ex	Specific Marking for Explosion Protection	Indicates that the equipment meets the requirements of the ATEX directive
II	Equipment Group	Equipment of Group II is intended for use in places with an explosive atmosphere other than mines susceptible to firedamp(typically atmospheres with the presence of gas and / or combustible dusts)
2	Equipment Category	Category of equipment designed to ensure a high level of protection and which are intended for environments in which there is likely to be an explosive atmosphere; equipment belonging to this category must ensure the required level of protection even in the event of recurring anomalies or operating defects which must usually be taken into account. Suitable for Zone 1, 2, 21, 22
3		Category of equipment designed to guarantee a normal level of protection and which are intended for environments in which there is little probability that explosive atmospheres will occur, and in any case only for a short time; equipment belonging to this category is sufficient to ensure the level of protection required during normal operation. Suitable for Zone 2 and 22
G	Environment	Suitable for areas where explosive gases, vapors, fog and air mixtures are present
D		Suitable for areas where explosive atmospheres due to dust can form

ISO 80079-36/37

Simbol	Marking	Meaning
Ex	Explosion Protection	Indicates the equipment is for use in an explosive atmosphere acc. To ISO80079-36/37
h	Type of protection	Non-electrical equipment for explosive atmospheres
IIB	Atmosfera consentita	GAS: atmospheres containing ethylene or gases of an equivalent hazard
IIIB		DUSTS: atmospheres containing combustible non-conductive dusts
T4	Maximum Surface Temperature	Temperature Code: Maximum Surface Temperature ≤ 135°C (referred to Gas atmosphere)
T135°C		Maximum Surface Temperature ≤ 135°C (referred to Dust atmosphere)
Gb	EPL (Equipment Protection Level)	Gb fos Gases, Db for DustsProtection from ignition sources during normal operation and during frequent disturbances or equipment in which faults usually need to be taken into account
Db		

Gc	EPL (Equipment Protection Level)	Gc for Gases, Dc for Dusts. Protection from ignition sources during normal operation
Dc		
X	Special operating conditions	Special operating temperature range – see next table

X = special operating conditions:

1. Permitted ambient temperature range for ATEX dampers:

VERSION	AMBIENT TEMPERATURE RANGE (Ta)
WR_ - WC_	-5°C (23°F) ≤ Ta ≤ +40°C (+104°F)
FC_ - FX_	-20°C (-4°F) ≤ Ta ≤ +40°C (+104°F)
AL_	
SS_	
SP_	

2. Maximum design temperature in continuous operation:

VERSIONE	TEMPERATURA MAX °C (°F)
WR_ - WC_	+60 (+140)
FC_ - FX_	+90 (+194)
AL_ *	+100 (+212)
SS_ *	
SP_ *	

* for configurations with diaphragms made of **TPV the temperature restriction is 90°C (194°F)**.

3. Maximum feeding pressure for ATEX applications: 8 bar (116 psi)

4. Intended use in an area with low risk of mechanical impact with other objects

All ATEX version dampers are covered by the **Declaration of Compliance to the Directive 2014/34/EU for use in potentially Explosive Atmospheres.**

CLASSIFICATION	VERSION	DESCRIPTION	SIZE
PXE ATEX **ZONE 1**	**WCZ** **FXZ** **ALZ** **SSZ** **SPZ**	Dampers made in conductive materials: ***WCZ:*** *Fluid Chamber = PP + Carbon Fiber (PP CFF20)* *Air chamber = antistatic PP / antistatic PP* ***FXZ:*** *Fluid Chamber = PVDF + Carbon Fiber (PVDF CFF15);* *Air chamber = antistatic PP / antistatic PP* ***ALZ:*** *Fluid Chambers/ Manifolds = ALUMINIUM (AL EN AC46100);* *Air chamber = antistatic PP / antistatic PP* ***SSZ:*** *Fluid Chambers = STAINLESS STEEL (AISI 316L);* *Air chamber = antistatic PP / antistatic PP* ***SPZ:*** *Fluid Chambers = STAINLESS STEEL (AISI 316L electro polished);* *Air chamber = antistatic PP / antistatic PP*	G 1/4" G 3/8" G 1/2" G 3/4" G 1" G 1 1/2" G 2

PDE ATEX **ZONE 2**	**WRZ/WRN** **WCZ/WCN** **ERZ*ERN** **FCZ/FCN** **ALZ /ALN** **SSZ/SSN** **SPZ/SPN**	Damper made in conductive materials: ***WRZ/WRN:*** *Fluid Chamber = PP + Glass Fiber (PP GF30);* *Air chamber = antistatic PE-PP / PP;* ***WCZ/WCN:*** *Fluid Chamber = PP + Carbon Fiber (PP CFF20);* *Air chamber = antistatic PE-PP / PP;* ***ERZ/ERN:*** *Fluid Chamber = PE UHMW;* *Air chamber = antistatic PE-PP / PP;* ***FCZ/FCN:*** *Fluid Chamber = PVDF + Carbon Fiber (PVDF CFF15);* *Air chamber = antistatic PE-PP / PP;* ***ALZ/ALN:*** *Fluid Chamber = ALUMINIUM (AL EN AC46100);* *Air chamber = antistatic PE-PP / PP;* ***SSZ/SSN:*** *Fluid Chamber = STAINLESS STEEL (AISI 316L);* *Air chamber = antistatic PE-PP / PP;* ***SPZ/SPN:*** *Fluid Chamber = STAINLESS STEEL (AISI 316L electro-polished);* *Air chamber = antistatic PE-PP / PP;;*	G 1/4" G 3/8" G 1/2" G 3/4" G 1" G 1 1/2" G 2

0.4.2 FDA COMPLIANT

Materials used in the equipment (only version **SPN/SPZ**) that are intended for food contact are **FDA compliant** concerning **CFR21.177 ***

***** United States Code of Federal Regulations (CFR) Title 21, Section 177

0.4.3 MACHINERY DIRECTIVE 2006/42/EC

The **PDE damper** is in conformity with the essential health and safety requirements and technical construction file requirements of the ***Machinery Directive 2006/42/EC***. Therefore these pumps are not dangerous for the operators if used according to the instructions contained within this Manual.

For safety purposes please be sure to read and follow the instructions, particularly the "warnings and cautions" contained within this Manual before pump installation and operation.

The manufacturer assumes no responsibility for any modification and/or incorrect applications that may cause damage to the security, the health of people or things in the vicinity of the pump.

All technical data are referred to a "***STANDARD damper"*** (see TECHNICAL FEATURES) but we remember that - for a constant technological innovation and quality research - the characteristics reported in this Manual may change without notice.

The drawings and all the other documents delivered with the machine are the property of the manufacturer, which reserves all rights and forbids making them available to third parties without his written consent.

All ARGAL dampers are covered by the following **Declaration of Conformity to Machinery Directive 2006/42/EC.**

ARGAL ITALY PUMPS

DICHIARAZIONE DI CONFORMITÀ CE
(Direttiva 2006/42/CE Allegato II.A)

CE

Ragione Sociale, sede legale e produttiva:

ARGAL SRL
Via Labirinto, 159
25125 Brescia - Italia

ARGAL produce e vende con il proprio marchio registrato:

Nome Prodotto:	**Smorzatore di pulsazione pneumatico a membrana**
Marchio Prodotto:	**ARGAL**
Modello:	**PDE**
Numero di Serie:	**123456.12**
Anno di Costruzione:	**2023**

La persona autorizzata a costituire il Fascicolo Tecnico è:

.....
.....
.....

ARGAL dichiara che la macchina è conforme a tutte le disposizioni pertinenti della ***Direttiva Macchine 2006/42/CE*** del Parlamento Europeo con riferimento alle seguenti norme armonizzate:

EN ISO 12100:2010, EN ISO 11200:2014, EN ISO 11201:2010, EN ISO 3746:2010, EN ISO 11688-1:2009, EN 12162:2001+A1:2009, EN 61310-1:2008, EN 61310-2:2008

BS, 25.09.2023

Omar Gabrieli
(Presidente)

Associazione Industriale Bresciana

IT – 25125 BRESCIA – Via Labirinto, 159
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0.5 MANUAL INTRODUCTION

This Use Manual is an integral part of the damper, it is a "*Safety Device*" and contains important information so that the buyer and his staff can install, use and maintain the damper in a constant state of efficiency.

When installing, operating and maintaining of the damper unit you must strictly follow the Use Manual. Otherwise injury or life hazard may occur.

In this Instruction Manual are present specific symbols used for the purposes of security and for a proper use of damper.

All the warnings and cautions will be indicated by the following symbols.

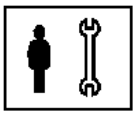
WARNING: this symbol indicates to the personnel that the described operation presents the risk of exposure to **residual dangers (with the possibility of damage to health)** if not done in accordance with the procedures and the safety regulations. If you ignore the warning described and operate the damper in an improper manner, there is the danger of serious **body injury or death**. This signal stands at points in this Instruction Manual of particular importance for compliance with regulations and directives, for the prevention of damage to destruction of the complete dampers or its subassemblies.

CAUTION: this symbol indicates to the personnel that the described operation may cause **damage to the machine and/or its components** and **consequent risks for the operator and/or the environment** if not carried out in compliance with the safety regulations. If you ignore the caution described and operate the damper in an improper manner, there is the danger of personal injury or property damage.

NOTE: this symbol provides information about the current damper operation. This symbol indicates that important directions are contained here.

OBLIGATION AND INDIVIDUAL PROTECTION: these symbols indicate that you must use suitable individual protections, as the energy status and the type of fluid transferred by the damper, could create a dangerous condition that occurs during the maintenance operation.

OPERATOR: this qualification requires a complete knowledge and understanding of the information contained in the Manufacturer's Use Manual - as well as specific skills on the type of use.



MECHANICAL MAINTAINER: this qualification requires a complete knowledge and understanding of the information contained in the Manufacturer's Use Manual, specific skills necessary to perform the installation and ordinary maintenance - as well as specific skills of each sector.

EXTRAORDINARY MAINTENANCE: this symbol identifies the actions reserved to the technical assistance which are carried out only at the manufacturer's workshops.

To indicate the type of danger and damage, the following symbols are also used along with those mentioned above:

This symbol indicates a **DON'T**, and will be accompanied by an explanation on something you must not do.

This symbol indicates a **DO**, and will be accompanied by instructions on something you must do in a certain situation.

0.6 GENERAL NOTES

0.6.1 CHARACTERISTICS OF THE DAMPER

The "PDE" dampers are accessories for the AODD pump and are used for dampen the variations in flow and pressure in the AODD pump discharge.
The damper performances (flow rate, head, and minimum pressure) are decided in the ordering phase and indicated on the nameplate.
Make sure that the physical-chemical characteristics of the fluid have been correctly evaluated.
The maximum temperature referred to water in continuous operation depends on the version of the materials (indicated on the nameplate) and on the environment in which the pump will be installed:

VERSION	MAX TEMPERATURE °C (°F)
WR_ - WC_	+60 (+140)
FC_ - FX_	+90 (+194)
AL_*	+100 (+212)
SS_*	+100 (+212)
SP_*	+100 (+212)

* for configurations with diaphragms made of TPV the temperature restriction is 90°C (194°F).

The ambient temperature interval is related to the choice of materials (specified on the identification plate):

VERSION	MIN TEMPERATURE °C (°F)	MAX TEMPERATURE °C (°F)
WR_ - WC_	-5 (23)	+40 (+104)
FC_ - FX_	-20 (-4)	+40 (+104)
AL_	-40 (-40)	+40 (+104)
SS_	-40 (-40)	+40 (+104)
SP_	-40 (-40)	+40 (+104)

The pumped fluid may contain particles suspended in different dimensions in accordance with the constructive materials of the damper:

MODEL	15-20-30		60		80-100	160	400	650
MATERIAL	WR-WC-ER-FC-FX-AL	SS-SP	WR-WC-ER-FC-FX-AL	SS-SP	WR-WC-ER-FC-FX-AL-SS-SP	WR-WC-ER-FC-FX-AL-SS-SP	WR-WC-ER-FC-FX-AL-SS-SP	WR-WC-ER-FC-FX-AL-SS-SP
Max dimension (mm)	3	3,5	3,2	3,8	5,5	6	7	9

0.6.2 AIR TREATMENT SYSTEM

WARNING: the pneumatic supply of **PDE dampers** must be carried out with **oil-free**, **filtered**, **dry and un-lubricated air.** Avoid pressure drops by using pipes and controlling elements having characteristics suitable for the damper.

WARNING: in case of installation in **ATEX zone**, the compressor must suck air from outside the area classified as ATEX or use inert gas.

We recommend to use an appropriate **air treatment system** in order to maintain the damper's efficiency.
If the air humidity is high, it can be used an air dryer, to lower the dew point. Otherwise, ice may form at the silencer, causing the narrowing of the air expelling surface. The possible formation of ice on the muffler cover is normal, since the temperature of the same can be of several degrees below zero, thus freezing the humidity present in the air. We recommended to pre-heat the air before it reaches the pump to raise its dew point.

The air temperature does not exceed 50°C (122°F).

Take care that no dirt or particles can intrude into the pump during the connection, as these can accumulate inside the pump and can cause malfunctions.

It is recommended to use a filtration of the air by a **5 micron filter** to prevent the entry of bulk particles. The filter removes harmful dirt and moisture from the compressed air supply.

Air quality (according to ISO 8573-1:2010. Contaminants and purity classes):

- Particles class IV;
- Water class IV;
- Oil class IV;

For most demanding applications (H ≥ 40 m.c.w for extended periods) the water content in the air must not exceed the specifications dictated by class II.

WARNING: Dirt in the air can under unfortunate circumstances be the cause of a premature wear and/or blockages.

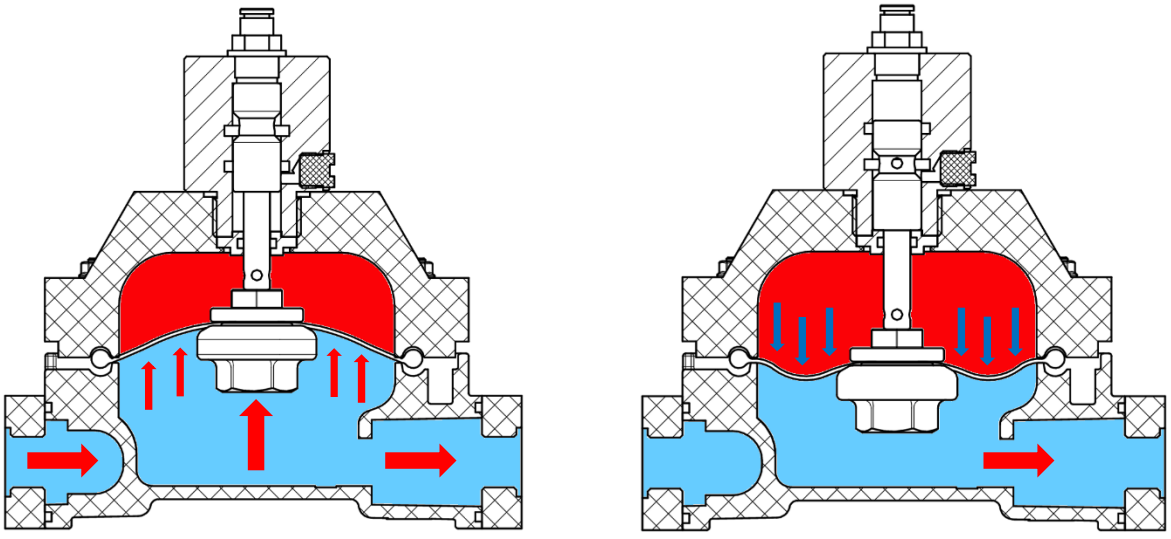
Compressed air supply pipes: **minimum EXTERNAL dimensions** are reported in the following table.

The maximum length of pipes may be **5m.**

model	Ø air pipe
015	Ø 6 mm
020 - 030	Ø 6 mm
060	Ø 8 mm
080 - 100 - 160	Ø 10 mm
400	Ø 12 mm
650	Ø 14 mm

0.6.3 OPERATING PRINCIPLE

The damper consists of two chambers separated by a diaphragm. One chamber is connected to the damper outlet and the other is charged or discharged of air.
The pressure that the dampened liquid exerts on the wet side of the diaphragm deforms the same. This deformation moves a probe that controls the pneumatic valve, that charge or discharge air, as a function of the position assumed by the probe. The head frequency and capacity are automatically adjusted without any intervention or set up according to the actual product circuit requirements.



1. SAFETY: WARNINGS FOR TRANSPORT - USE - INSTALLATION – STOP

1.0 TRANSPORT

- cover the hydraulic connections
- lift the hydraulic plastic parts without mechanical stress
- for transport on irregular roads, cushion the bumps with suitable support plane
- blows and impacts may damage parts that are important for the machine operation and safety

1.1 RECEIVING INSPECTION

- Check the shipment on receipt.
- Check that the packing and the pump are intact and they have not been damaged - make sure that all parts and accessories listed on the packing list are accounted for.
- Take the Use Manual and operate as described.

1.2 STORAGE

- If the equipment is to be stored prior to installation, place it in a clean location.
- Do not remove the protective covers from the fluid connections and air connection which have been fastened to keep damper internals free of debris.
- The damper has to be protected from wetness, coldness, dirtying, UV-radiation.
- Store the damper in the original packaging. The package should be stored raised from the ground, in a closed, clean and dry environment.
- In the event that the package is not whole at the time of receipt, it is necessary to release the damper from the package, verify its integrity and restore a new package.
- The storage location must be a closed room with a temperature not lower than -5°C not exceeding 40°C and with a moisture content not exceeding 90%.
- The packing event should not be subjected to shocks, vibrations and overloads.

1.3 BEFORE INSTALLING THE DAMPER

Check the tightening torque of the external screws. See par. 3.13.2 TIGHTENING TORQUES

1.4 SUCTION AND DISCHARGE PIPING

WARNING: The suction and discharge piping should be *flexible* to prevent undue stress and strain on the pump connections. Alternatively use *flexible joints* between the fluid connections and any rigid fixed piping.

Rigid pipes can cause strong vibrations and consequently damage to the damper and above all to the system, also leading to leaks or dangerous situations for the environment and personnel.

All components (hose, pipe, valves etc.) on the discharge piping must be designed for PN10

1.5 AIR CONNECTION

- We recommend that the diameter of the flexible hose must be conform to the connection on the damper's valve
- Maximum pipe length between air plant and pump: 5m.

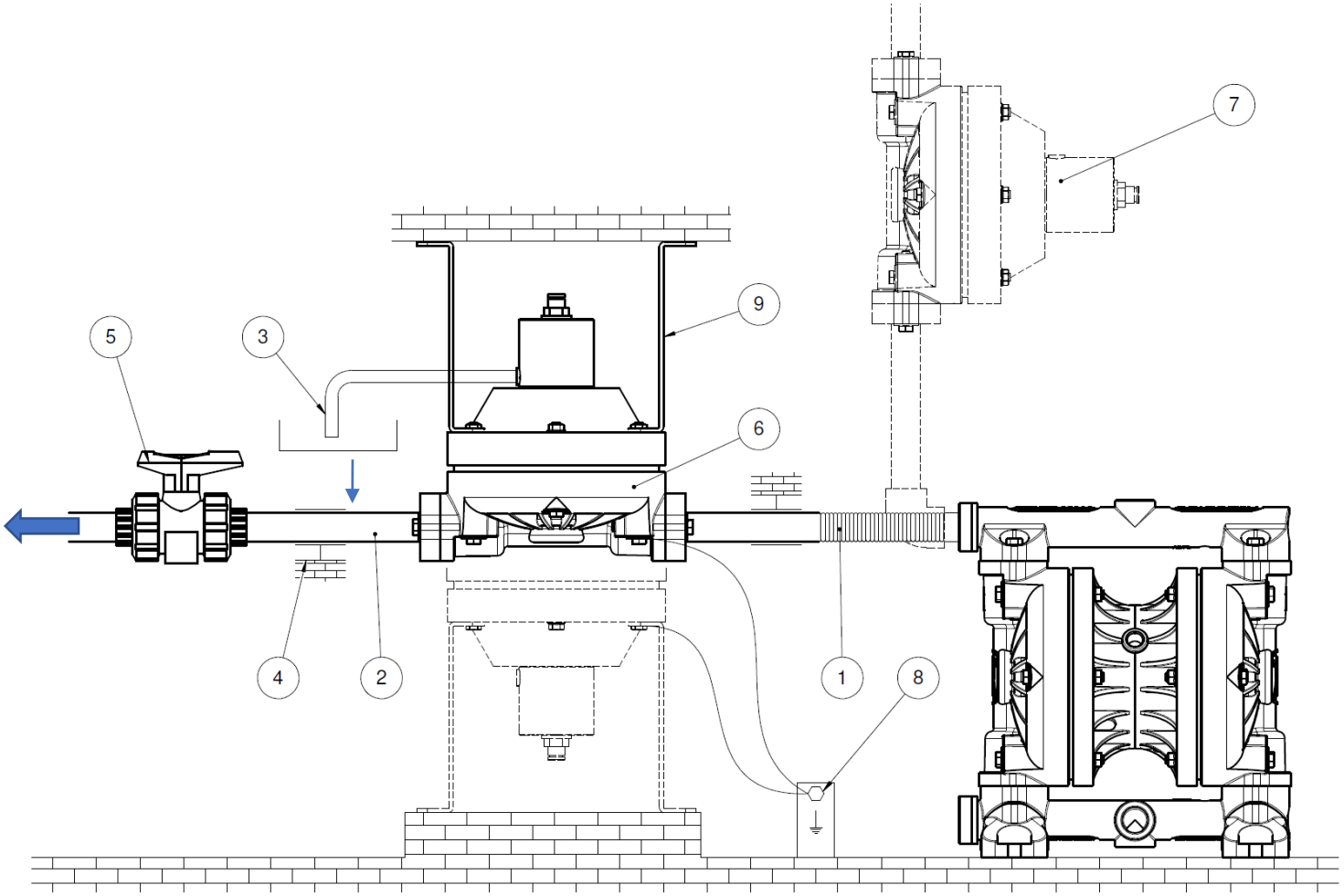
1.6 RECOMMENDED INSTALLATION

- Clean the plant before connecting the damper and damper
- make sure that no foreign bodies are left in the damper. Remove safety caps on the hydraulic connections.
- make sure that all of the damper's screws are properly tightened.
- position and secure the damper horizontally
- place the damper and the damper nearest at the suction point
- only fittings with cylindrical gas threads in materials compatible with both the fluid to be dampered and the damper's construction materials must be used for the connections to the damper's collectors
- pneumatic supply to the damper must be made using filtered, died and not lubricated oil free at a pressure of not less than 2 bars and not more than 8 bars.
- can use the same pneumatic supply of the pump
- ensure drainage of fluids which may come out of the damper
- fix the damper avoid that the pipe weight down up it
- arrange for enough room around the damper for the movements of an operator
- inform about the presence of aggressive fluid with suitable coloured labels in accordance with the related standard hydraulic connection
- do not install the damper (built with thermoplastic material) near heat sources
- do not install the damper in places with risk of fall of solids or fluids
- do not install the damper close to fixed workplaces or visited areas
- install additional protection shield, for the damper or for the persons as appropriate. If the diaphragm breaks the fluid may enter into the pneumatic circuit and come out from the damper discharge port

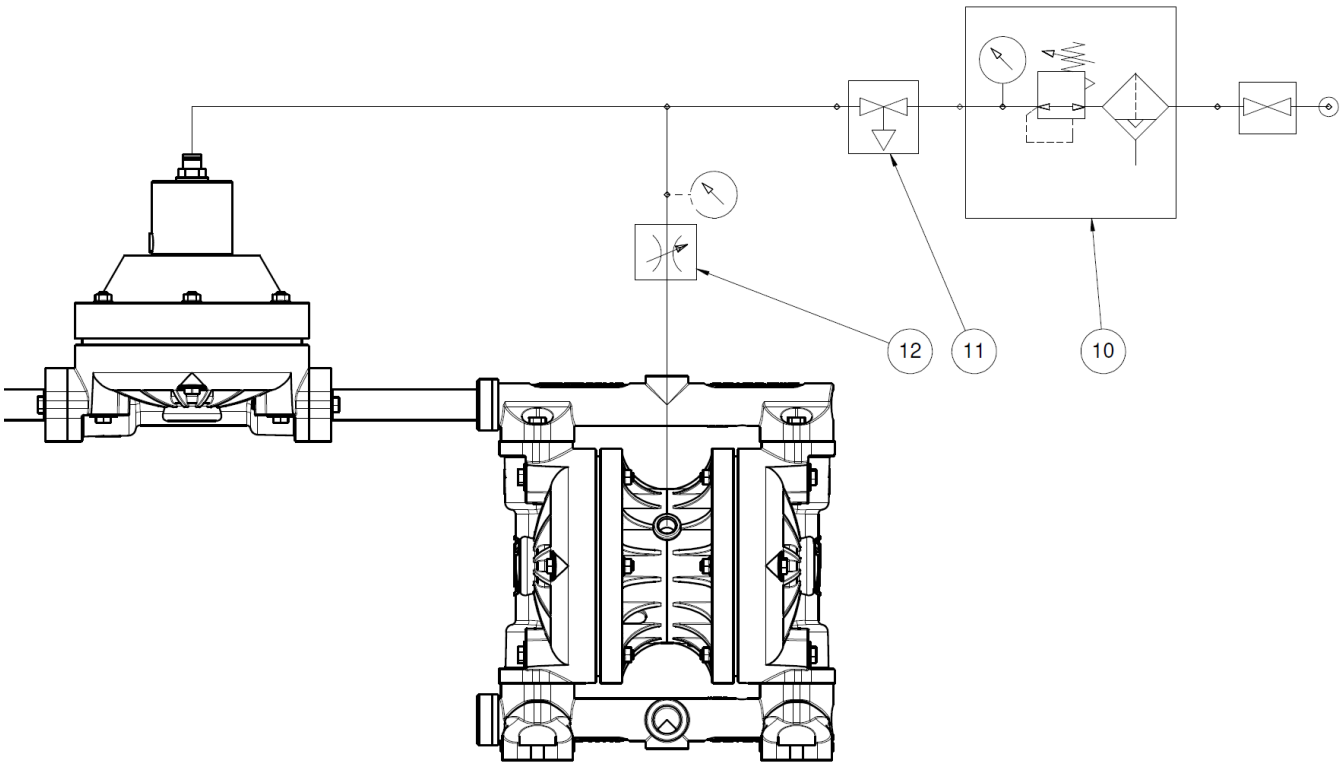
Follow the instructions indicated in the following diagram:

1. YES: use flexible pipes reinforced with rigid spiral to connect the hydraulic circuit of the damper. Rigid piping may cause strong vibrations and manifolds breaking. Do not use pipes with nominal diameter smaller than the diameter of the damper connections. For negative installations and/or viscous fluids use pipes with greater diameter related to the nominal diameter of the damper
2. YES: install and connect the pipe downstream from the pulsation damper. Its diameter must never be smaller than the connection. The pipe downstream from the damper can be rigid and made from material compatible with the fluid to be dampened
3. YES: pipe for safety discharge; if the diaphragms are completely torn, the fluid may enter the air circuit damage it, and be discharged through the exhaust port. It is therefore necessary that the air exhaust be conveyed by pipes into a piping reaching a safe area
4. YES: pipe anchoring; the piping must be sufficiently strong to avoid deformation and must never weigh down on the damper in any way or viceversa
5. YES: shut-off valve of the same diameter as the damper inlet (never smaller) to intercept the fluid correctly in case of spills and/or when servicing the damper
6. YES: horizontal placement
7. YES: vertical placement
8. YES: carry out effective grounding using a suitable size of cable on each damper casing to discharge static currents
9. YES: damper anchoring
10. YES: Air filter and pressure regulator with condensate drain and manometer
11. YES: three-way valve
12. YES: flow regulator

HYDRAULIC CONNECTIONS:



PNEUMATIC CONNECTIONS:



WARNING: if the damper is made from conductive materials and is suitable for flammable products, each casing must be equipped with a suitable earthing cable: **DANGER OF EXPLOSION AND/OR FIRE**

WARNING: The damper must always be grounded indipendently of any organ to which they are connected. Lack of grounding or incorrect grounding will cancel the requirements for safety and protection against the risk of explosion

WARNING: Always secure the damper installed in the ATEX zone with its supporting brackets so that its weight does not burden the hydraulic connections

WARNING: for dampers installed in the ATEX zone, route the air exhaust from the pneumatic valve, using a suitable hose, to a safe zone outside the explosive atmosphere

For installation and use in a **potentially explosive environment**, comply with these general precautions:

- ascertain that the damper is full
- ascertain that the fluid treated does not contain or cannot contain large solids or solids for a dangerous shape
- ensure that the intake or delivery ports are not obstructed
- also ascertain that the connection piping is strong enough and cannot be deformed by the damper's weight or by the intake. Also check that the damper is not burdened by the weight of the piping
- if the damper is to stay in disuse for a long period of time, clean it carefully by running a non-flammable liquid detergent through it that is compatible with the damper's construction materials
- if the damper was turned off for a long period of time, circulate clean water in it for some minutes to avoid incrustations
- WARNING: The use of dampers for flammable liquids
- is forbidden if they are made of non-conductive
- materials that charge statically (plastic materials) and without suitable grounding DANGER OF EXPLOSION CAUSED BY STATIC CHARGES

1.7 FIRST START UP

- **Before the first start up, check the tightening torque of the external screws. See par 3.13.2 TIGHTENING TORQUES**
- check the correct execution of what indicated in the RACOMMENDED INSTALLATION paragraph
- check that the intake and delivery pipes of the hydraulic circuit are correctly connected
- open the intake and delivery valves of the pump hydraulic circuit
- open the 3-way valve on the air circuit
- set the operation point requested for the pump: properly adjust the air pressure and delivery that supplies the pump.

  With pressure values under 2 bar the pump may stall, with pressure values above 8 bar it is possible that breakdowns and/or yields may occur with consequent spillage of the pumped fluid
- do not operate at the limits of the operation curves: the maximum head or maximum delivery (total absence of leaks and intake height in the delivery circuit)
- check that there are no anomalous vibrations or noise due to the too elastic support structure, unsuitable fastening or cavitation
- **after 2 hours of operation stop the damper and check the tightening of all the bolts**

WARNING: never start the damper with the product valves closed: danger of diaphragm breakage

WARNING: before starting after long periods of rest, clean the internal and external surfaces with a damp cloth

1.8 OPERATION

- After a week of use and periodically, check the tightness of all screws to prevent any leaks.
- Do not operate valves or shunts during the damper operation
- risk of harmful water hammers in case of incorrect or sudden operations (valves must be operated only by trained personnel)
- empty and wash accurately inside the damper in case different fluids must be pumped
- insulate or empty the damper if the fluid crystallization temperature is equal to or below the ambient temperature
- stop the pump if the fluid temperature exceeds the maximum allowed temperature indicated in the GENERAL NO- TES; if the exceeding temperature is about 20% it is necessary to inspect the status of the internal parts
- stop the pump and close the valves in case of leaks
- wash with water only if chemical compatibility allows it ; alternatively use the suitable solvent that does not generate hazardous exothermic reactions
- consult the fluid supplier to decide the most suitable fire-prevention method
- empty the damper in case of long periods of disuse (particularly with fluids which are particularly tending to crystallize)
- check that there is no gas in the delivering fluid, if there is stop the pump

WARNING: never stop the damper and the pump when it is running and/or when the pneumatic circuit is under pressure by closing the intake and/or delivery valves on the fluid circuit: danger of premature wear and/or breakage of the diaphragm

1.9 STOP OF THE DAMPER

To stop the damper, operate exclusively on the air supply by closing the 3-way valve. Discharge residual pressure from the pneumatic system of the damper.

WARNING: Never stop the damper by completely closing the suction and/or discharge valves on the hydraulic circuit.

2. SAFETY RISKS

2.0 GENERAL PRESCRIPTION

The damper must be installed according to local and national safety rules.

The dampers are constructed for particular applications. Do not use the damper on applications different from that for which it was sold without consulting ARAGL to ascertain its suitability.

WARNING! CHEMICAL RISK. Dampers are intended for operation with different types of fluids and chemical solutions. Follow the specific internal instructions for decontamination during the inspection or maintenance operations. If the damper has been used to damper aggressive, dangerous or toxic liquids, in case of diaphragm rupture the fluid may enter and damage the pneumatic circuit, and emerge from the discharge port. **Therefore, it is necessary to pipe the air discharge to a safe area. ARGAL recommends to use appropriate individual safety equipment and protection equipment for the environment.**

WARNING! ELECTRICAL RISK: The damper installed in an explosive atmosphere must always be earthed independently from other members connected to it. Connect a suitable earth wire to the stainless steel earth connection that is placed on the inside of two damper casings. Connect the other end of the earth wire to earth and also make sure that other equipment like hoses/pipes/containers are properly earthed/connected. To avoid ignition hazards the formation of dust deposits on the dampers must be prevented. In explosion proof areas, maintenance/repair operations must be carried out only after a careful evaluation of the practicability and with appropriate tools.

WARNING! Safety requirements and explosion risk prevention, in case the damper was installed in an explosive atmosphere are not fulfilled if the damper is not earthed or is incorrectly earthed or the other equipment like hoses/pipes/containers are properly earthed/connected.

WARNING! The diaphragms (in contact with the fluid dampened) are components highly subjected to wear. The diaphragm service life is strongly affected by the operating conditions and chemical and physical stresses. From the tests carried out on thousands of dampers installed with temperature value from 0° to 18°C, the ordinary life of a diaphragm exceeded a lot of million cycles. For safety reasons, in environment with explosion risk, it is necessary to disassemble and check the diaphragms every 5 million cycles and replace them every 15 million cycles.

WARNING! In situations where the user foresees the possibility of exceeding the temperature limits indicated in this manual, it is necessary to install a protection device on the equipment to prevent exceeding the maximum operating temperature allowed. If exceeded, respect to the maximum marked temperature is not guaranteed.

CAUTION! Safety risks to persons are mainly caused by improper usage or accidental damage of the damper. These risks may be personal injury caused by operators working on an open damper, or the nature of the fluids dampened by this type of damper. Therefore, it is extremely important to diligently carry out all the instructions contain in this manual in order to eliminate the causes of accidents that may lead to the damper failure. The consequential spillage of fluid may be hazardous to persons and the environment.


It is essential to wear protective clothing and safety goggles when operating, and/or working in the vicinity of ARGAL dampers.

WARNING! The maximum air pressure for **PDE** dampers is *8 bar*. Higher air pressure than 8 bar can damage the damper and may cause injury to the machinists in proximity of the damper. The air supply pressure must also never be below *2 bar*.

CAUTION! ARGAL declares that the damper **NOISE LEVEL** does not exceed **85 dB(A)**. ARGAL performed the noise test with the source undergoing a characteristic work cycle under defined conditions. The noise level of the damper is influenced by the different modes of operation. So under different modes of operation, for example if the damper is operating under high air pressure at low discharge head, the noise can be hazardous for the operators working for long periods near the equipment.

WARNING! You must wear adequate ear protection in case of exceeding the Sound Pressure value equal to 85 dB (A). Alternatively lower the air pressure and/or increase the discharge head.

When installation is new or reinstalled, check the damper casing screws tightening torque. After one week operation, the torque should be checked again. This is important to prevent leakage.

CAUTION! The increase in temperature can cause damage to the damper and/or pipes. **DANGER for the personnel in vicinity of the plant (damper and piping)!**

Avoid rapid temperature variations and do not exceed the maximum temperature specified when ordering the damper. **RESPECT THE MAX TEMPERATURE VALUES (BASED ON WATER) WITHIN THIS MANUAL.** If a hot or cold (temperature below 0°C) product is dampened, the damper must not remain still, having the fluid inside it. We recommend to empty and clean the damper
thoroughly.

WARNING! For installation and operation of damper in a **potentially explosive environment**, comply with these general precautions:

- ascertain that the dampened fluid does not contain large solids and/or abrasives (see the technical features)
- ensure that the intake or discharge ports are not obstructed nor limited to avoid cavitation and decrease in damper efficiency
- check that the piping weight, including the internal fluid weight, will not damage the damper connections
- if the damper is not in use for a long period of time, clean it carefully by running non-flammable liquid detergent that is compatible with the construction materials through it
- if the damper must be turned off for a long period of time, circulate clean water in it for some minutes to avoid incrustations
- after the damper is not in use for a long period of time, clean the internal and external surfaces with a damp cloth before starting, after eliminating any deposits
- check the efficiency of the grounding; grounding provides an escape wire for the electrical current;
- use only grounded hoses with a minimum length and having a cross-section of not less than 4 mm^2
- always protect the damper against blunt objects or various materials that may damage it or react with the construction materials
- protect the surrounding environment of the damper from splashes in case of accidental damper failure

WARNING! When dampening aggressive or toxic liquids or liquids that may represent a health hazard, install suitable protection on the damper to contain, collect and signal any spillage: **DANGER OF POLLUTION, CONTAMINATION, INJURIES AND/OR DEATH!**

WARNING! The damper must not be used to damper fluids that are not compatible with its construction materials or install in places containing incompatible fluids.

IT IS THE BUYER'S RESPONSIBILITY TO EVALUATE THE CHEMICAL COMPATIBILITY OF THE DAMPER'S CONSTRUCTION MATERIALS WITH THE DAMPERED FLUID!

CAUTION! Installing damper without on-off valves on intake and discharge sides to intercept the dampened fluid in case of spillage is forbidden: **DANGER OF UNCONTROLLED PRODUCT!**

WARNING! It is forbidden installing the dampers without on-off and three way valves on the air supply piping to prevent that the dampened fluid, entering into the pneumatic circuit in case of the diaphragms breakage, is expelled into the compressed air circuit: **DANGER OF FLUID ENTERING COMPRESSED AIR CIRCUIT AND DISCHARGING INTO THE ENVIRONMENT!**

WARNING! The use of dampers made with non-conductive material, which become charged with electrostatic, and without suitable grounding for flammable liquids is forbidden: **RISK OF EXPLOSIONS DUE TO ELECTROSTATIC CHARGE.**

CAUTION! Aggressive, toxic or dangerous liquids may cause serious injuries or damage to health. Therefore, **IT IS FORBIDDEN TO RETURN DAMPER CONTAINING SUCH PRODUCTS TO MANUFACTURER OR SERVICE CENTER.** Empty the internal circuits. Wash and treat the damper before returning the damper. To empty the damper, remember that the special knobs mounted on the damper must be unscrewed.

CAUTION! PDE dampers cannot be used to damper *Acetylene, Hydrogen and Carbon Disulfide*.

CAUTION! The air distributor of the **PDE** dampers is self-lubricating and does not require any greasing. Therefore, avoid using lubricated and non-dried air.

WARNING! Ascertain that no abnormal noise or vibrations appears during operation. Otherwise, stop the damper immediately.

WARNING! Ascertain that the fluid at the discharge side does not contain gas. Otherwise, stop the damper immediately.

WARNING! Periodic control must be made to ensure that there is no powder and/or deposits on the external and internal surfaces of the damper. They must be cleaned with a damp cloth, if necessary.

WARNING! Removal of the silencer and the air supply fitting must be done when the damper is free of powder. Before restarting the damper, ensure that no powder has entered the pneumatic distributor.

To replace worn parts, use only genuine spare parts.

Failure to comply with the above may increase the risks of injuries to the operator, technicians, persons and damages to the damper and/or the environment that cannot be ascribed to the manufacturer.

However five general elements are important:

1. all the operations must be carried out by skilled personnel or monitored by qualified personnel as appropriate
2. implement personal protection works (when the damper is installed in places with high human traffic) against splashes of fluorescent fluid in case of accidental breakage and always direct possible leakages towards collection tanks
3. wear appropriate Protective Person Equipment (PPE) when operating on the damper
4. make sure that the intake and discharge valves are correctly closed during the disassembly
5. make sure that no air is supplied to the pneumatic circuit and discharge the residual air from the pneumatic circuit during disassembly

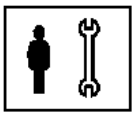
It is very important to realize systems with well arranged, identifiable piping, suitably equipped shut-off valves and comfortable compartments and passages for operators who must inspect the damper (since the pressure developed by the damper may promote failures in the system if it is defective or worn).

WARNING! Raised temperature can cause damage on the damper and/or piping and may also be hazardous for personnel in the vicinity of the damper/piping. Avoid quick temperature changes and do not exceed the maximum temperature specified. The damper should not remain stopped for long time with a hot fluid inside. When the damper is stopped we recommend emptying it from the fluid. We recommend checking frequently the tightening torques of the damper casing screws, if the damper is subjected to high variations in the ambient temperature.

3. MAINTENANCE

- All the operation must be carried out by qualified personnel;
- do not carry out maintenance and/or repairs when the air circuit is pressurized;
- carry out periodic inspections (2-30 days in accordance with the fluid pumped) on the filter element of the suction strainer (if any) and remove any trapped filtrate when pumping fluids with solids;
- carry out periodic inspections (3-5 months in accordance with the fluid pumped and the environment conditions);
- ensure correct operation of the system start/stop units;
- the presence of fluid under damper casing may indicate failure of the damper;
- damaged parts must be replaced with complete original parts and not repaired parts;
- the replacement of damaged parts must be carried out in a clean and dry place.

3.1 OPERATORS FOR INSTALLATION AND START-UP

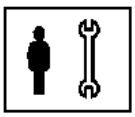


Interventions to be carried out only by **skilled personnel who may delegate operations to others in accordance with specific evaluations** (required technical skills: plumbing, pneumatic and/or electric qualification as appropriate).

3.2 OPERATORS FOR OPERATION AND MAINTENANCE

Interventions to be carried out by **generic operators** (after being instructed on the correct use of the equipment):

- damper start-up/stop;
- valves opening / closing when the damper is stopped;
- emptying and washing of pump casing by means of the prearranged valves and pipes;
- filtering elements cleaning;



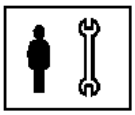
Interventions to be carried out by **skilled personnel** (required technical skills: general knowledge of the mechanical, electrical, chemical aspects of the pump and fluid pumped):

- environmental condition check;
- pumped fluid condition check;
- inspections of start-up/stop devices;
- detection of malfunction;

3.3 OPERATORS FOR REPAIR

Work to be carried out by **generic operators** supervised by skilled personnel:

- pump/damper stopping;
- valves closing;
- emptying of pump casing;
- disconnecting piping from connections;
- unlocking of fastening screws to the base;
- washing with water or suitable solvent as appropriate;
- transporting;



Work to be carried out by **skilled personnel** (required technical skills: notions of mechanical processing, sensitivity to damaged parts due to impact or abrasion during handling, familiar with tightening bolts on different plastic/metal materials, use of precision measuring instruments):

- opening and reclosing of pump casing;
- removing and replacing of damaged parts;

3.4 DAMPER INSPECTION

WHEN THE DAMPER IS NEW OR REASSEMBLED:

- **We recommend to re-tighten the Fluid Chamber screws after a few days of operation**. Make sure to use the right torque, see chapter "Tightening torques".
- We recommend to conduct a **ROUTINE INSPECTION** on the damper to detect any problems (for example a change in sound during the running can be an indication of wearing parts). Through this test we can see the presence of liquid leaks and variations in the performance of the damper itself.

3.5 COMPLETE INSPECTION

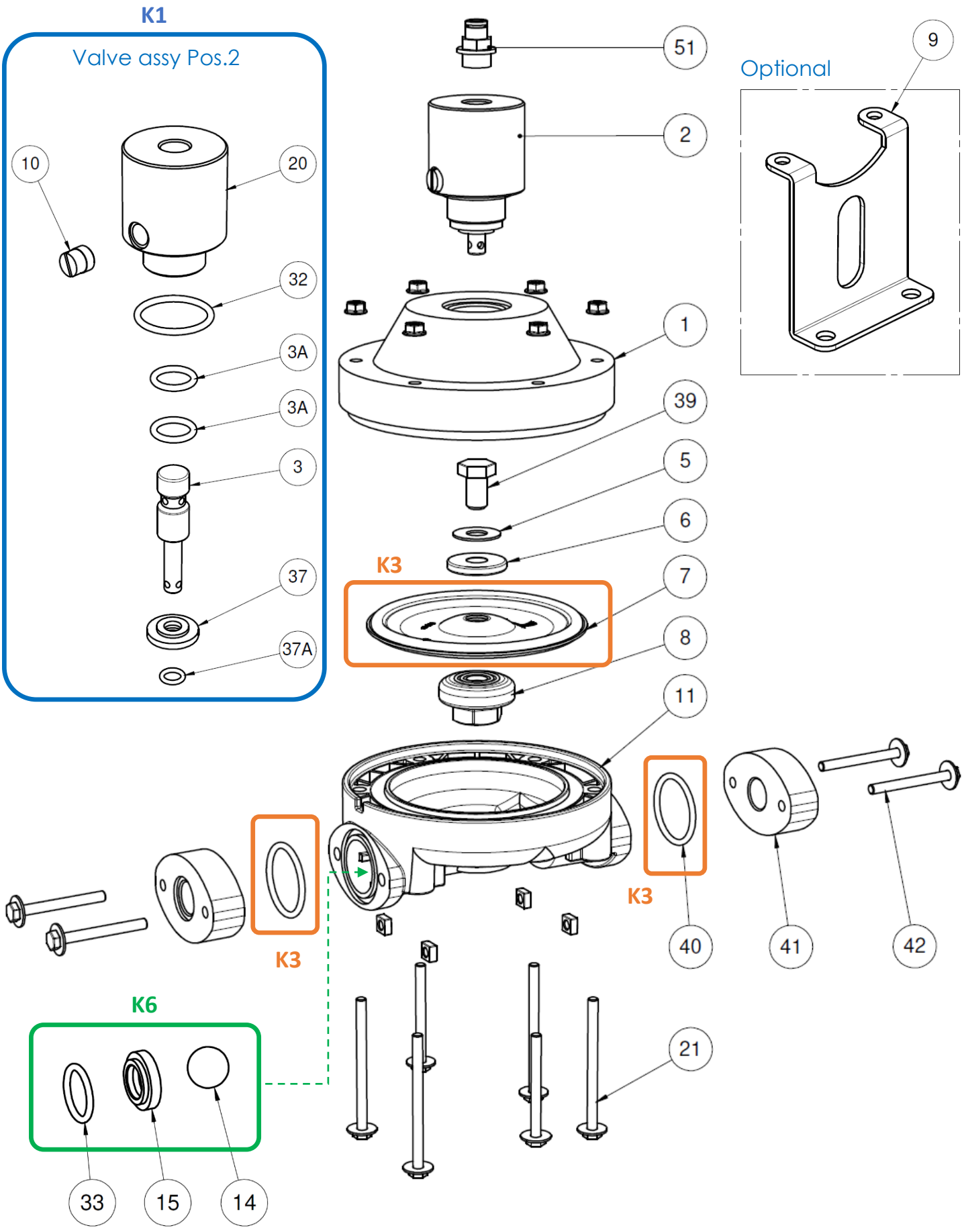
The intervals for a **COMPLETE INSPECTION** depend upon the characteristics of the liquid, temperature, materials used in the pump and running time.

- Please contact our Technical Office for any questions and / or requests regarding the need for a complete inspection. Refer to the paragraph TROUBLESHOOTING AND POSSIBLE CAUSES within this manual.
- In the manual we indicate also which parts are most subject to wear (ARGAL provides them as spare parts for start up and 2 years).

3.6 TROUBLESHOOTING AND POSSIBLE CAUSES

	DEFECT	CAUSE	SUGGESTION
1	The damper doesn't run and/or it doesn't start	No air in the circuit	Check circuit, valves and connections
		Insufficient air pressure	Adjust pressure on the relevant reducer
		Insufficient air flow rate	Check that piping and accessories have suitable passage
		Damaged control valve	Check and replace
		Broken diaphragm	Check if any air comes out from the product delivery pipe. If so, replace diaphragm.
2	The damper is not performing at its best	There is an air leak in the valve.	Replace the air valve
		The product pipe is clogged and ob- structed	Disassemble the product pipe and clean it
		The product being pumped is too viscous	
		The air is dirty, full of condensate or oil	Check the air feed line.
		Air volume or pressure is insufficient	Ensure that all the air control equipment has sufficient flow

3.7 PART LIST & RECOMMENDED SPARE PARTS: PDE 15-20-30-60-100-160-400



LEGEND: PDE/PXE 15-20-30-60-80-100-160-400

pos.	Part name		Q.ty	Disassembling steps sequence									
				1	2	3	4	5	6	7	8	9	10
1	Air chamber		1		•								
2	Valve assy		1	•									
	3	Probe	1			•							
	3A	Gasket (probe)	2			•							
	10	Silencer	1	•									
	20	Valve body	1		•								
	32	O-Ring (valve body)	1			•							
	37	Stop ring (valve body)	1			•							
	37A	O-Ring (stop ring)					•						
5	Belleville washer		1					•					
6	Cap (Air Side)		1				•						
7*	Air Diaphragm		1					•					
8	Cap (Fluid Side)		1				•						
9	Fixing bracket (optional)		2	•									
11	Fluid chamber		1		•								
14**	Ball		1					•					
15**	Ball valve		1				•						
21	Fixing set (Fluid Chamber)		4 (15-20-30) 6 (60-100) 8 (160-400)	•									
33**	Gasket (ball valve)		1			•							
39	Screw (cap air side)		1			•							
40	Gasket (threaded adaptor)		2			•							
41	Threaded adaptor		2		•								
42	Fixing set (threaded adaptor)		4 (15÷160) 8 (400)	•									
51	Air Connection		1	•									

* Note: configurations "Y" and "L" respectively provide coupled diaphragm: TPE + PTFE / TPV + PTFE

** Optional

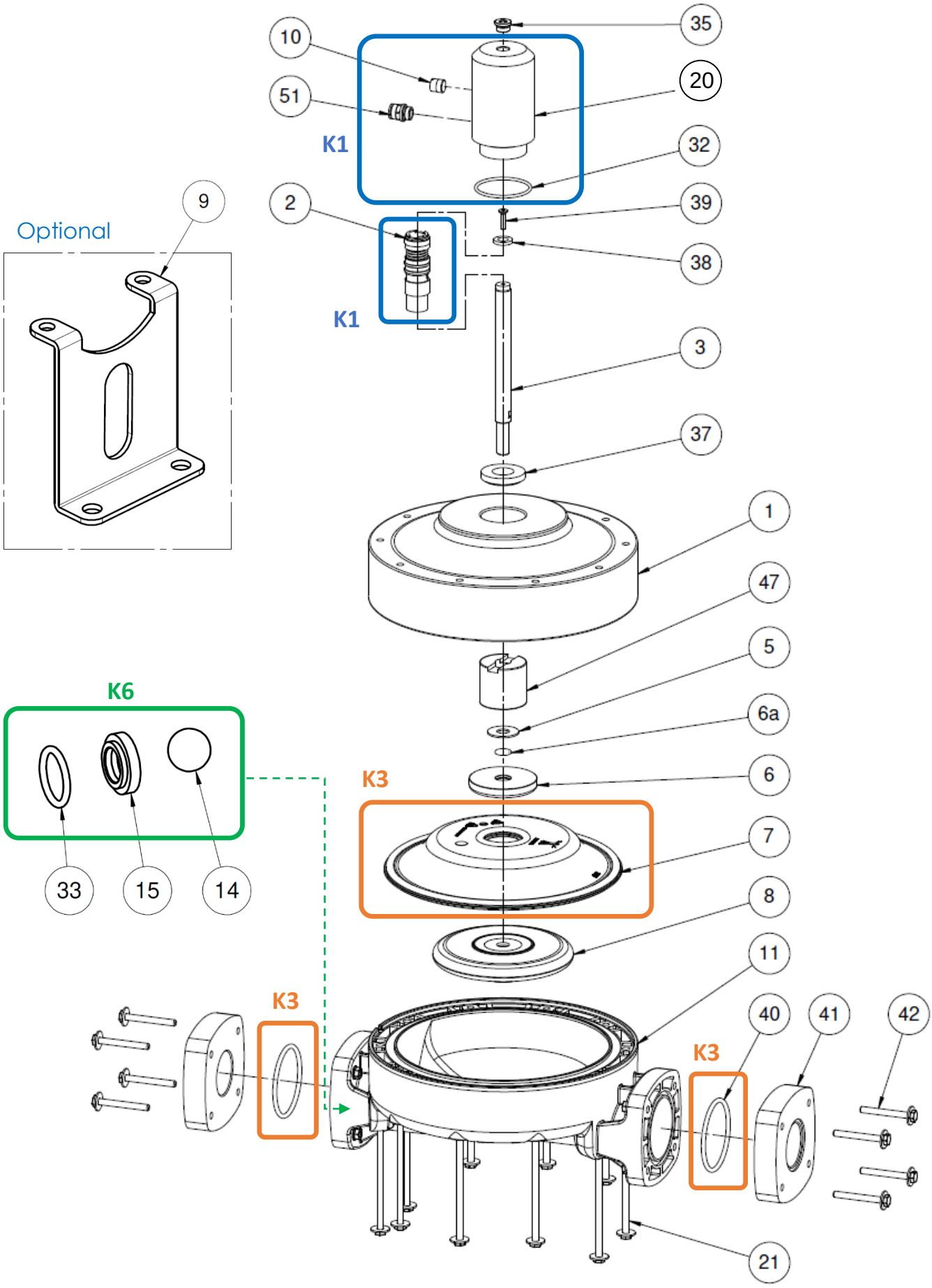
3.8 SPARE PARTS KITS: PDE 15-20-30-60-80-100-160-400

During the operation of the pump it is normal that some parts are subject to wear.

ARGAL recommends having spare parts in stock, and offers various KITs.

SPARE PARTS		start up	2 years
K1	Pneumatic valve Pos.2 (gaskets and silencer included)		1
K3	Wetted parts	1	1
K6	Ball valve kit (optional)		

3.9 PART LIST & RECOMMENDED SPARE PARTS: PDE/PXE 650



LEGEND: PDE 650

pos.	Part name	Q.ty	Disassembling steps sequence									
			1	2	3	4	5	6	7	8	9	10
1	Air chamber	1	•									
2	Valve	1				•						
3	Shaft	1							•			
5	Belleville Washer	1						•				
6	Cap (Air Side)	1					•					
6a	Cap O-Ring	1						•				
7*	Air Diaphragm	1				•						
8	Cap (Fluid Side)	1			•							
9	Fixing bracket (optional)	2	•									
10	Silencer	1	•									
11	Fluid chamber	1		•								
14**	Ball	1					•					
15**	Ball valve	1				•						
21	Fixing set (Fluid Chamber)	10	•									
20	Valve body	1	•									
32	O-Ring (valve body)	1		•								
33**	Gasket (ball valve)	1			•							
35	Plug (gauge connection)	1	•									
37	Valve stop ring	1								•		
38	Shaft stop ring	1			•							
39	Screw (Shaft stop ring)	1		•								
40	Gasket (threaded adaptor)	2			•							
41	Threaded adaptor	2		•								
42	Fixing set (threaded adaptor)	8	•									
47	Stroke Spacer	1										
51	Air Connection	1	•									

* Note: configurations "Y" and "L" respectively provide coupled diaphragm: TPE + PTFE / TPV + PTFE

** Optional

3.10 SPARE PARTS KITS: PDE 650

During the operation of the pump it is normal that some parts are subject to wear.

ARGAL recommends having spare parts in stock, and offers various KITs.

SPARE PARTS		start up	2 years
K1	Pneumatic valve		1
K3	Wetted parts	1	1
K6	Ball valve kit (optional)		

3.11 RECOMMENDATIONS

WARNING: before performing any maintenance or repair work on the pump and damper, disconnect the pump from the air supply line. Disconnect the hydraulic connections and discharge the product that is being pumped.

- All the operation must be carried out by qualified personnel
- use gloves, goggles and acid-resistant clothing when disconnecting from the system and washing the damper wash the damper before carrying out maintenance operations
- do not disperse the washing waste into the environment

3.12 DAMPER DISASSEMBLY

Before the damper disassembly, perform the shutdown procedure:

- disconnect the air connection and discharge from damper all fluid;
- clean carefully the damper;
- disconnect the connections.

Check that the tools are compatible with the damper clamping elements. Than follow the instructions below:

- Check that the damper is completely empty (turn it upside down and collect any leaking);
- Clean all the damper external surfaces with a damp cloth.

Bolts are the type with right thread

DIAPHRAGMS REMOVAL

- separate the damper's casing removing the fixed screws
- clean all the damper surfaces using a damp cloth remove the cap (if present)

CLEANING AND REPLACING THE DIAPHRAGMS

- control and internal cleaning every 500.000 cycles;
- diaphragm check every 5.000.000 cycles;
- diaphragm replacement every 15.000.000 cycles.

PNEUMATIC VALVE REMOVE

unscrew the valve from the casing

WARNING: to avoid incorrect reassembly and subsequent malfunction of the damper the automatic valve must not be open

OPERATION RESERVED FOR ARGAL PERSONNEL OR AUTHORIZED BY ARGAL!

INSPECTION

Check for the presence of:

- excessive abrasion on the thermoplastic parts;
- clogged materials and/or agglomerates caused by pumped fluid;
- deformations and/or surface lesions on the diaphragms;
- deformations and/or breakages on the valve seats.

Replace the parts: broken, cracked, deformed. Reopen all the clogged ducts and eliminate any chemical agglomerates. Clean all the surfaces before reassembly, particularly the OR gaskets seats (risk of leakage).

3.12.1 TOOLS REQUIRED:

- **PDE/PXE 015 – 020 – 030 – 060 – 080 – 100 – 160**: hex. spanners 10mm - 27mm
- **PDE/PXE 400**: hex. spanners 13mm – 21mm (SS_-SP_) / 27mm (AL_) / 30mm (WR_- WC_- FC_-FX_);
- **PDE/PXE 650**: hex. spanners 13mm – 25mm (SS_-SP_) / 32mm (AL_) / 50mm (WR_- WC_- FC_-FX_);
- Torque wrench
- O-ring pick

3.13 DAMPER ASSEMBLY

To reassemble the damper, follow the instructions given in this paragraph.

- clean all the parts with a damp cloth;
- replace the worn parts with genuine spare parts;
- stainless steel bolts should be lubed to reduce the possibility of seizing (suggested copper grease);
- to reassemble the pump, follow the disassembly instructions in the reverse order.

3.13.1 PROCEDURE FOR TIGHTENING THE FLUID CHAMBER ON THE AIR CHAMBER

With empty damper:

1. Manually tighten the fluid chamber's bolts (pos.21).

2. Connect the air supply line, set the air pressure to 5 bar (72.5 psi), then start the damper.

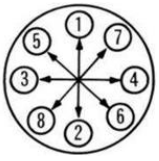
3. In most cases air leaks will occur. This is normal.

4. Gradually tighten the bolts (pos.21), according to a cross pattern*, until there are no more leaks.

5. Evenly tighten the bolts (pos.21) to the prescribed torque (see table 7), again according to a cross pattern *

* Diametrically opposite sequence.

Example :

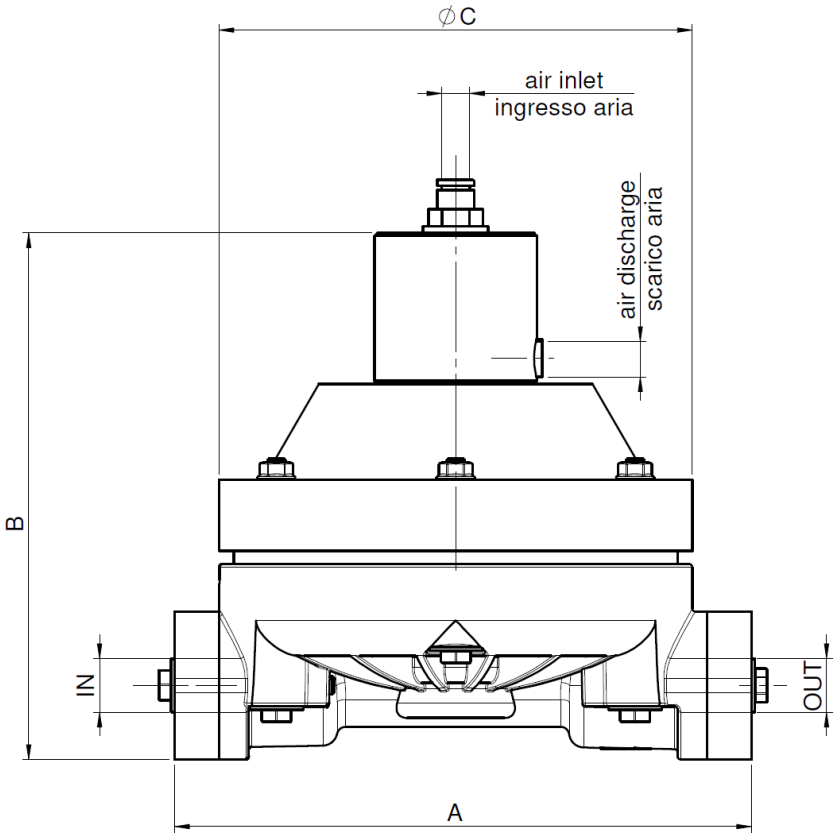


3.13.2 TIGHTENING TORQUES

Please respect the maximum applicable torque specifications for the respective threaded connections:

MODEL	POS.	CONNECTION	TIGHTENING TORQUE (Nm)
15 20 30	21	Connection: Fluid Chamber/ Air Chamber	6÷8
	42	Connection: Fluid Chamber/ Threaded adaptor	6÷8
	8	Cap (Fluid side)	15
60 80 100 160	21	Connection: Fluid Chamber/ Air Chamber	6÷8
	42	Connection: Fluid Chamber/ Threaded adaptor	6÷8
	8	Cap (Fluid side)	30
400	21	Connection: Fluid Chamber/ Air Chamber	10÷12
	42	Connection: Fluid Chamber/ Threaded adaptor	10÷12
	8	Cap (Fluid side)	30
650	21	Connection: Fluid Chamber/ Air Chamber	10÷12
	42	Connection: Fluid Chamber/ Threaded adaptor	10÷12
	8	Cap (Fluid side)	50

4. DIMENSIONAL DRAWINGS



MODEL		15	20	30			60		
MATERIAL		PLASTIC	PLASTIC	PLASTIC	ALU	SS	PLASTIC	ALU	SS
IN bsp/npt	inch	1/4"	3/8"	1/2"			1/2"		
OUT bsp/npt	inch	1/4"	3/8"	1/2"			1/2"		
A	mm	157	157	157	157	138	205	205	175
B	mm	150	150	150	150	152	179	179	176
Ø C	mm	104	104	104			160		
AIR INLET bsp	inch	1/4"	1/4"	1/4"			3/8"		
AIR TUBE (Ø ext.)	mm	6	6	6			8		
AIR DISCHARGE bsp	inch	1/4"	1/4"	1/4"			1/4"		

MODELLO		80			100			160			400			650		
MATERIALE		PLASTIC	ALU	SS	PLASTIC	ALU	SS	PLASTIC	ALU	SS	PLASTIC	ALU	SS	PLASTIC	ALU	SS
IN bsp/npt	inch	3/4"			1"			1"			1"1/2			2"		
OUT bsp/npt	inch	3/4"			1"			1"			1"1/2			2"		
A	mm	220	220	184	220	220	184	263	263	216	408	408	323	487	487	450
B	mm	195	195	185	195	195	185	202	202	202	299	299	297	398	398	373
Ø C	mm	170	170	170	170	170	170	203	203	203	263	263	263	345	345	345
AIR INLET bsp	inch	3/8"			3/8"			3/8"			3/8"			3/8"		
AIR TUBE (Ø ext.)	mm	10			10			10			12			12		
AIR DISCHARGE bsp	inch	1/4"			1/4"			1/4"			1/4"			3/8"		

5. DAMPER DISPOSAL

The damper is not composed of hazardous materials or pieces. In all cases, at the end of life of the same, to perform the disposal you must:

WARNING! Drain from the damper the fluid still present. In the case of dangerous fluids, toxic and/or harmful to health and environment you must carry out a correctly cleaning and treatment: risk of injury, damage to health and/or death.
1. Disconnect the air supply from the damper
2. Disassemble the damper from the installation
3. Sort the damper components according to the type of material
4. Separate the plastic parts from the metal parts

WARNING! for disposal contact the appropriate authorized companies. Sure not to leave or disperse in the environment large or small parts that can cause pollution, accidents or any direct or indirect damages. For different types of materials: separate plastic parts from metal parts and dispose by authorized companies.

6. WARRANTY & REPAIR

The **PDE damper** is a product of high quality. If a defect occurs contact the MANUFACTURER'S ASSISTANCE SERVICE, that will help you as soon as possible.

Indicate in each case as follows:

1. The full address of firm;
2. The identification of the pump (serial number);
3. The description of the anomaly;
4. Detailed description of the use/system/installation;

All ARGAL dampers are covered by WARRANTY, shown on the next page.

Note: The Warranty Service will only be carried out at our workshop, upon agreement, receipt of a completed guarantee questionnaire and when the defective pump has been sent. In the event of repair or replacement of pump parts the warranty will not be prolonged.

RETURNING PARTS

Follow this procedure:

- Consult the use manual for the packing instructions;
- Prevent any damage under transport;
- The returning parts must be completely empty from fluid;

Warranty is excluded in all cases of misuse or incorrect applications and noncompliance of the information contained in this manual. For any dispute the competent Court is Brescia (Italy).

www.argalpumps.com - info@argal.it

GENERAL CONDITIONS OF SALE

1. COMPLAINTS

Complaints of any type must be made upon receiving the goods and within on week of discovering the defect. Complaints about incomplete orders or deterioration during transit must be made to us immediately and all the proofs of the irregularity must be collected in order to substantiate any claims against the carrier.

2. WARRANTY

Specifications, dimensions and any other information contained in our catalogues is to the best of our knowledge accurate. However, the above information is merely illustrative and is subject to modification without warning. In all cases we reserve the right to at any moment make any changes to our products that we deem to be appropriate and such changes shall not entitle the purchaser to make any claims against us. All drawings remain our exclusive property and may not be passed on to third parties or be reproduced without our written approval.

DURATION OF WARRANTY: ARGAL manufactures its products from first-class materials, uses qualified personnel and tests the different production stages. Within **twelve months from the time of installation** and no more than **eighteen months from delivery** ARGAL undertakes to examine any defective parts and to promptly replace any faulty parts free of charge if it is responsible for the fault. Such faults must not be due to wear, inexpert use or carelessness on the purchaser's part, fortuitous events or force majeure. The warranty period is shortened to *six months if the machines work continuously twenty-four hours a day*. Even machines that are under warranty must be sent to ARGAL carriage paid. Once the machines have been repaired they will be returned to the purchaser carriage forward. The replaced parts remain the property of ARGAL and must be returned to ARGAL. The warranty is voided: 1a) if the machines have not been properly maintained; 1b) if they have not been used in accordance with the technical standards set out in the manuals supplied with the delivery; 1c) if the machines are dismantled without our prior authorization; 1d) if the machines are 'mistreated'; 1e) if the machines are used to circulate liquids in applications that are different from those which have been specifically approved beforehand by ARGAL. We shall not be liable for the downtime arising from repairs to or the replacement of any machines of ours that are under warranty.

ARGAL shall not be responsible for any direct, accidental or indirect damage, injury or loss (including, but not limited to accidental or indirect damage arising from loss or profit or sales, or for any personal injury or damage arising or any other accidental or indirect loss) or for damage and injury caused by use of the machine or inability to use the machine. Before using the machine the user must check the suitability of the machine for its intended purpose and shall use the machine entirely at his own risk and responsibility. The user notes that the pumps supplied to him by us oblige him, in accordance with Article 2050 of the Italian Civil Cod, to comply with all the legislative and regulatory standards governing dangerous activities such as using, storing and conveying aggressive and polluting chemical products. The user also undertakes to comply with the prescriptions that apply to the system (such as guards, washers, seals etc.) in which the pumps will be used and to comply with the installation instructions, checks and maintenance prescribed for pumps and installations.

The user must also allow us, if necessary, to check the operating efficiency of the systems and to subsequently check that the pump has been correctly installed. If the user fails to comply with the prescriptions laid down by us or prevents us from carrying out the above inspection, he voids all contractual warranty rights and warranty rights under the terms of Articles 1667 and 1668 of the Italian Civil Code.

BS, 31.10.2017

ARGAL S.r.l

Rev. 0 - 2017

ARGAL S.R.L. – Via Labirinto, 159 – 25125 BRESCIA (ITALY) – Tel. +390303507011 Fax. +3903003507077
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www.argalpumps.com - info@argal.it

WARRANTY FORM

Company:_____

Telephone:_____ Fax:_____

Address:_____

Country:_____ Contact Name:_____

E-mail:_____

Delivery Date:_____ Pump was installed (date):_____

Pump type:_____ Serial no.:_____

Description of the fault:_____

_____

_____

The installation

Liquid:_____

Temperature (°C):_____ Viscosity (cPs):_____ Spec. grav. (Kg/m^3):_____ PH-value:_____

Contents of particles:_____ %, of max size (mm):_____

Flow (l/min):_____ Duty (h/day):_____ No. of starts per day:_____

Discharge head (mwc):_____ Suction head/lift (m):_____

Air pressure (bar):_____

Other:_____

_____

_____

Place for sketch of the installation

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7. MANUFACTURER DATA

Production head and legal office:

Via Labirinto, 159 - 25125 BRESCIA - ITALY

Tel: +39 030 3507011

Web: www.argalpumps.com
E-mail: sales@argalpumps.com