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## INTRODUCTION

PHOENIX pumps have been manufactured to the Machinery Directive 2006/42/CE and ATEX directive 2014/34/UE. The relevant area criteria are indicated in the 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 UNICEI EN ISO 80079-37:2016. harmonized European standards. Therefore, if used according to the instructions contained in this manual, the PHOENIX pumps will not represent any risk to the operator. This manual must be preserved in good condition and/or accompany the machine as reference for maintenance purposes. The manufacturer rejects any liability for any alteration, modification, incorrect application or operation not complying with the content of this manual and that may cause damage to the health and safety of persons, animals or objects stationing near the pumps. All the technical values refer to the standard version of PHOENIX pumps (please see “TECHNICAL FEATURES”). However, our continuous search for innovation and improvements in the technological quality means that some of the features may change without notice. All drawings and any other representation in the documents supplied with the pump are property of the Manufacturer who reserves all rights and FORBIDS distribution to third parties without his authorization in writing. THEREFORE REPRODUCTION, EVEN PARTIAL, OF THIS MANUAL, TEXT OR DRAWINGS ARE STRICTLY FORBIDDEN.

## ABOUT THIS MANUAL

This manual is an integral part of the pump, and represents a SAFETY DEVICE. It contains important information that will assist the purchaser and his personnel in installing, using and servicing the pumps in good condition and safety during service life. Please contact the manufacturer’s customer assistance department for any further information regarding the contents of this manual.

## PUMP IDENTIFICATION

Each pump is supplied with an identification label carrying its serial number, model and year of manufacture. The identification code “MODEL” heading specifies the composition and the materials used to build the pump. This data will help ascertain whether the pump is suitable for the product to be pumped. Check these data upon receiving the goods. Any discrepancy between the order and the delivery must be communicated immediately. WARNING: removing or altering this identification plate and or the data it contains is forbidden.

For models from P0003 to P0120:



### ZONE 2 ATEX CERTIFICATIONS:

- II 3/3 G Ex h IIC T4 Gb
- II 3 D Ex h IIIB T135°C Db X

### ZONE I ATEX CERTIFICATIONS:

- II 2/2 G Ex h IIC T4 Gb
- II 2 D Ex h IIIB T135°C Db X

For models from P00160 to P1000:



### ZONE 2 ATEX CERTIFICATIONS:

- II 3/3 G Ex h IIB T4 Gb
- II 3 D Ex h IIIB T135°C Db X

### ZONE I ATEX CERTIFICATIONS:





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

# DECLARATION OF CONFORMITY



## EU DECLARATION OF CONFORMITY

PRD.01-2a - Rev.I

<b>MANUFACTURED BY:</b>	FLUIMAC SRL VIA BRESCIA, 1 21049 TRADATE (VA) - ITALY
<b>TYPE:</b>	AIR OPERATED DOUBLE DIAPHRAGMS PUMP
<b>SERIES:</b>	...
<b>PUMP MODEL:</b>	...
<b>CODE:</b>	...
<b>SERIAL NUMBER:</b>	...
<b>ATEX MARKING:</b>	 II 3/3 G Ex h IIC T4 Gb  II 3 D Ex h IIIB T135°C Db X
<b>ATEX MARKING:</b>	 II 3/3 G Ex h IIB T4 Gb  II 3 D Ex h IIIB T135°C Db X

Questo prodotto è conforme alle seguenti direttive comunitarie e relativi standard armonizzati:  
This product complies with the following European Directives and relative 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 unità 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 liquidi - Requisiti di sicurezza - Procedure 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 CE EN ISO 80079-36:2016 - Atmosfere esplosive - Parte 36: Apparecchiature non elettriche per atmosfere esplosive - Metodo e requisiti di base

UNI CE EN ISO 80079-36:2016 - Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements

UNI CE 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 correnti di accensione "c", immersione in liquido "c".

UNI CE 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 "c", liquid immersion "c".

LA SEGUENTE CONFORMITA' È RIFERITA AL PROTOTIPO DELLA PHOENIX 100 (MATERIALE NR. P0001 DEL 16.01.2012).

THIS COMPLIANCE REFERS TO PHOENIX 100 PROTOTYPE, SERIAL NUMBER P0001 OF 16.01.2012.

ATTENZIONE: la presente dichiarazione si estende anche ai modelli PHOENIX 7, PHOENIX 18, PHOENIX 30, PHOENIX 50, PHOENIX 55, PHOENIX 60, PHOENIX 65, PHOENIX 100, PHOENIX 101, PHOENIX 120, PHOENIX 160, PHOENIX 170, PHOENIX 250, PHOENIX 320, PHOENIX 400, PHOENIX 500, PHOENIX 700, IN PLASTICA E METALLO.

EXTENSION: this declaration is also valid for the following versions: PHOENIX 7, PHOENIX 18, PHOENIX 30, PHOENIX 50, PHOENIX 55, PHOENIX 60, PHOENIX 65, PHOENIX 100, PHOENIX 101, PHOENIX 120, PHOENIX 160, PHOENIX 170, PHOENIX 250, PHOENIX 320, PHOENIX 400, PHOENIX 500, PHOENIX 700, MADE OF METAL OR PLASTIC.

ATTENZIONE: sono state verificate le compatibilità chimiche e di compatibilità con i materiali costruttivi della pompa.

WARNING: since there exists an endless variety of products and chemical compositions, the user is urged to have the best knowledge of their reaction and compatible 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 when the ultimate risk, an event that the manufacturer cannot foresee and of 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 Representative

Pietro Vaghiello

# MARKINGS AND GENERAL INFORMATION

## ATEX MARKING

For the product design and conformity evaluation we used following documents:

- 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 - Explosive atmospheres - Part 36: Non-electrical equipment for explosive atmospheres - Basic method and requirements
- 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".

**ZONA 1:** To follow the ATEX marking referred to the equipment for explosive GAS atmosphere:



**II 2/2 G Ex h IIC T4 Gb** (P01-P03-P07-P18-P30-P50-P55-P60-P65-P90-P100-P101- P120)



**II 2/2 G Ex h IIB T4 Gb** (P160-P170-P171-P250-P252-P400-P700-P1000)

To follow the ATEX marking referred to the equipment for explosive DUST atmosphere:



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

**ZONA 2:** To follow the ATEX marking referred to the equipment for explosive GAS atmosphere:



**II 3/3 G Ex h IIC T4 Gb** (P01-P03-P07-P18-P30-P50-P55-P60-P65-P90-P100-P101- P120)



**II 3/3 G Ex h IIB T4 Gb** (P160-P170-P171-P250-P252-P400-P700-P1000)

To follow the ATEX marking referred to the equipment for explosive DUST atmosphere:



**II 3 D Ex h IIIB T 135°C Db X** (tutti i modelli)

	Safety symbol		
<b>II</b>	Surface industries		
<b>2/2 G</b>	Category 2 equipment that can be installed in the presence of an explosive atmosphere consisting of zone I gas, even indoors.	<b>2 D</b>	Category 2 equipment that can be installed in the presence of an explosive atmosphere consisting of zone 2I dusts.
<b>3/3 G</b>	Surface equipment for use in areas where it is unlikely, or rare and for short periods, the presence of gases, vapors or mists in the air during operation both in the external and internal areas.	<b>3 D</b>	Surface equipment for use in areas where it is unlikely, or rare and for short periods, the presence of clouds of combustible dust in the air during operation.
<b>Ex</b>	Symbol to identify it as approved under the IECEx scheme		
<b>h</b>	Type of protection according to ISO IEC 80079-36:2016		
<b>IIB o IIC</b>	Product suitable for installation in the presence of Group IIB or IIC gas (depending on the model)	<b>IIIB</b>	Product suitable for installation in presence of Group IIIB dusts (excluding conductive dusts)
<b>T4</b>	Temperature class	<b>T135°C</b>	Maximum surface temperature
<b>Gb</b>	EPL Gb protection level in accordance with EN 60079-0: 12 and EN 80079-36: 16 Standards.	<b>Db</b>	EPL Gb protection level in accordance with EN 60079-0: 12 and EN 80079-36: 16 Standards.
<b>X</b>	Special Condition for safe use: the pump can't process explosive dust inside.		

## IECEX MARKING

For the product design and conformity evaluation we used following documents:

- 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 – 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".

To follow the IECEx marking referred to the equipment for explosive GAS atmosphere:

**Ex h IIC T4 Gb** (P01-P03-P07-P18-P30-P50-P55-P60-P65-P90-P100-P101- P120)

**Ex h IIB T4 Gb** (P160-P170-P171-P250-P252-P400-P700-P1000)

To follow the IECEx marking referred to the equipment for explosive DUST atmosphere:

**Ex h IIIB T 135°C Db X** (all models)

<b>Ex</b>	Symbol to identify it as approved under the IECEx scheme		
<b>h</b>	Type of protection according to ISO IEC 80079-36:2016		
<b>IIB o IIC</b>	Product suitable for installation in the presence of Group IIB or IIC gas (depending on the model)	<b>IIIB</b>	Product suitable for installation in presence of Group IIIB dusts (excluding conductive dusts)
<b>T4</b>	Temperature class.	<b>T135°C</b>	Maximum surface temperature
<b>Gb</b>	EPL Gb protection level in accordance with EN 60079-0: 12 and EN 80079-36: 16 Standards.	<b>Db</b>	EPL Gb protection level in accordance with EN 60079-0: 12 and EN 80079-36: 16 Standards.
<b>X</b>	Special Condition for safe use: the pump can't process explosive dust inside.		

## IDENTIFICATION CODE

MODEL	SIZE	PUMP CASING	DIAPHRAGMS	BALLS	BALL SEAT	O-RING	CONNECTIONS	ATEX CERTIFICATIONS
P=PHOENIX	3 7	P=PP	N=NBR	N=NBR	P=PP	V=VITON	1=BSP	= ATEX ZONE 2
PF=PHOENIX FOOD	18 30 50	PC=PP+ CF	D=EPDM	D=EPDM	K=PVDF	D=EPDM	2= FLANGED	X = ATEX ZONE I
AP= ACCURATE PHOENIX	55 60 65	KC=PVD F+CF O=	T=PTFE	T=PTFE	A= ALLUMI NIO	N=NBR T=PTFE	3=TRI-CLAMP (PHOENIX FOOD)	SEE SECTION "MARKINGS AND GENERAL INFORMATION"
TP=TWIN PHOENIX	90 100 101	ACETALI CA	S= SANTOPRENE	S=SS	S=SS Z=PE		5= NPT	
PP= POWDER PHOENIX	120 160 170	OC= ACETALI CA +CF			O= ACETALI CA		6= BIN 11851/3 (PHOENIX FOOD)	
SP= SUBMERSIBLE PHOENIX	171 250 252 400 700 1000	A= ALLUMI NIO						
		S= SS AISI 316						

## PUMP DESCRIPTION

PHOENIX series pumps are air-operated, double-diaphragm positive-displacement pumps, designed and manufactured for pumping fluids that are chemically compatible with the constructive materials of the pump. The characteristics of the fluid (pressure, temperature, chemical reactivity, specific weight, viscosity, vapor pressure) and of the environment must be compatible with the pump characteristics and are defined in the

ordering phase. Fluimac is not responsible for the pumped liquid. The customer must ensure that there is compatibility between the pumped liquids and pump materials.

“PHOENIX” series pumps are self-priming; at the start-up the pipes can be empty.

The declared dry negative suction is referred to intake of water at a temperature of 20°C / 68°F. The priming time and the diaphragm’s life depend on:

- pipe total length and internal diameter;
- specific weight of the pumped fluid;
- viscosity of the pumped fluid;
- negative suction: max 5.000 cps (at 18°C / 64,4°F);
- below head suction: max 50.000 cps (at 18°C / 64,4°F).

The pump may be operated at a maximum pressure equal to 1.5 times the head value with closed delivery. The value of the vapor pressure of the pumped fluid must be greater (of at least 3 mwc - meters of water column) than the difference between the total absolute head value (pressure on suction level subtracted of the suction height) and the leakages of the suction section.

PHOENIX series pumps cannot be used to generate a vacuum.

Make sure that the physical-chemical characteristics of the fluid have been correctly evaluated.

Fluid service temperatures must range from -20°C to a maximum of 95°C according to the material of the components. The maximum temperature referred to water in continuous operation depends on the version of the materials (indicated on the nameplate):

MODEL		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

The pumped fluid may contain particles suspended in different concentrations in accordance with the type of valve assembled:

MODELLO	P3-P7	P18	P30	P50-55-60-65	P90-100-101-120	P160-170-171-250-252	P400	P700	P1000
MAX. DIM. mm	2	2,5	3	3,5	4	7,5	8	8,5	12

#### TEMPERATURE CLASSES FOR PUMPS TO BE INSTALLED IN AN EXPLOSIVE ENVIRONMENT (ZONE I):

T135°C (T4) is the temperature class corresponding to the protection against the risk of explosion of the pumps designed for use in explosive atmo-spheres; the data and operating conditions are shown here below:

#### DEFINITION OF THE CALCULATION DATA:

T4 = ATEX temperature class 135°C;
Ta = maximum ambient temperature 40°C;
Tl = maximum temperature for dry use of the pump in the workplace (50°C);
Δs = safety factor (5°C);
Tx = calculation factor (Tl + Δs) only for ZONE I;
Tf = maximum allowed fluid processing temperature.

The formula used to determine the maximum allowed fluid processing temperature for CONDUCT version pumps is shown here below.

For P01-P03-P07-P18-P30-P50-P55-P60-P65-P90-P100-P101-P120 models:

**Ex** II 2/2 G Ex h IIC T4 Gb

**Ex** II 2 D Ex h IIIB T 135°C Db X

For P160-P170-P171-P250-P252-P400-P700-P1000 models:

**Ex** II 2/2 G Ex h IIB T4 Gb

**Ex** II 2 D Ex h IIIB T 135°C Db X

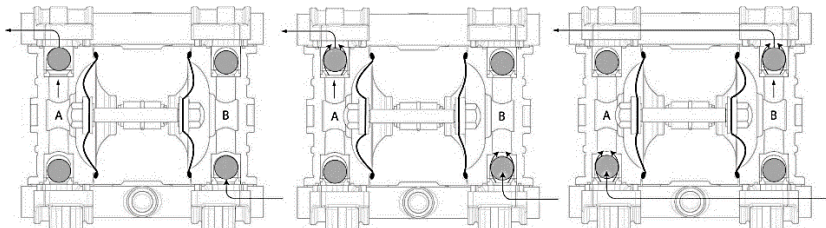
ATEX TEMPERATURE CLASS		CALCULATION FACTOR (Only for ZONE I)		MAXIMUM FLUID PROCESSING TEMPERATURE
T4	-	T <sub>x</sub>	=	T <sub>f</sub>
135°C	-	55°C	=	80°C

**WARNING:** In consideration of the admitted ambient temperature variation range in zone I, fluid service temperature values higher than those indicated above will not permit compliance to the corresponding T4 (135°C) temperature classes besides causing damages to the pump. Where the user presumes that the temperature limits set forth in this manual may be exceeded, a protective device must be installed on the system to prevent the maximum allowed fluid processing temperature from being reached. The equipment's maximum temperature has been determined with no powder deposits on the external and internal surfaces.

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

VERSION	MAX TEMP. ATEX ZONE I	MAX ΔT (°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

## OPERATIONG PRINCIPLE



The pneumatic distribution system sends compressed air behind one of the two diaphragms (A), which pushes the fluid towards the delivery circuit. Simultaneously, the opposite diaphragm (B) is in the intake phase since it is dragged by the shaft that connects it to the other diaphragm (A) under pressure; air present behind it is discharged into the environment, while a pressure drop is created in the fluid chamber which sucks the fluid from the suction circuit. When the diaphragm (A), under pressure, reaches the stroke limit,

the command switches the two inputs to the chamber on the diaphragms air side, putting diaphragm (B) under pressure and diaphragm(A) in discharge. When the pump reaches its original starting point, each diaphragm has carried out a complete pumping cycle.

#### IMPROPER USE:



**WARNING:** use of a PHOENIX pump for any other use other than that previously described in the chapter entitled “TECHNICAL CHARACTERISTICS” is to be considered improper use of the pump and is therefore

forbidden by FLUIMAC SRL. In particular, it is **FORBIDDEN** to use PHOENIX pumps for:

- production of vacuum;
- operation as an on-off valve, as a non-return valve or as a metering valve;
- operation with liquid that is chemically incompatible, with the materials of construction;
- operation with suspended products whose specific weight is higher than the liquid's (for example with water and sand);
- with air pressures, temperatures or product characteristics that do not comply with the pump's technical data;
- edible liquids.



**WARNING:** for the alimentary fluids for which a special certification is not required, we recommend to make use of pumps belonging to the PHOENIX FOOD series, according to FDA rules.



**WARNING:** since an endless variety of products and chemical compositions exist, the user is presumed to have the best knowledge of their reaction and compatibility with the pump's construction materials. Therefore, before using the pump, all necessary checks and tests must be performed with great care to avoid even the slightest risk, an event that the manufacturer cannot foresee and for which he cannot be held responsible.



**WARNING:** the user must consider the ratio between the pump's maximum surface temperature indicated on the marking and the minimum ignition temperature of the layers and clouds of powder as shown in the EN1227-1.



**WARNING.** Use of the pump that does not comply with the instructions indicated in the use and maintenance manual will cancel the safety and explosion protection requirements. The risks associated with use of the pumps under the exact conditions set forth in the use and maintenance manual have been analysed, whilst the analysis of the risks associated with the interface with other system components must be carried out by the installer.



**ATEX:** The user is responsible for classifying the area of use whilst identification of the equipment category is the responsibility of the manufacturer.

## **TECHNICAL FEATURES**

The performances data refers to standard versions. “MAX delivery” and “Suction capacity” values refer to the pumping of water at 18°C with a submersed manifold.



**WARNING:** the declared capacity of dry negative suction refers to the intake of fluids with a viscosity and specific weight equal to 1; the performance and duration of the pump's membrane depend on the following factors:

- the fluid's viscosity and specific weight;
- the length and diameter of the suction pipe.

**NEGATIVE SUCTION:** with fluids max. up to 5,000 cps at 18° C

**BELOW HEAD SUCTION:** with fluids up to 50,000 cps at 18° C

	FLUID CONNECTIONS	AIR CONNECTION	MAX FLOW RATE	MAX AIR PRESSURE	MAX DELIVERY HEAD	MAX SUCTION LIFT DRY	MAX SCTION LIFT WET	MAX SOLID PASSING	NOISE LEVEL	MAX VISCOSITY	DISPLACEMENT PER STROKE*
<b>P7</b>	1/4" BSP	4 mm	7 Lt/min	6 bar	60 m	3 m	9,8 m	2 mm	62 dB	5.000 CPS	18 CC~
<b>P18</b>	3/8" BSP	6 mm	20 Lt/min	7 bar	70 m	5 m	9,8 m	2,5 mm	65 dB	10.000 CPS	30 CC~
<b>P30</b>	1/2" BSP	6mm	35 Lt/min	7 bar	70 m	5 m	9,8 m	3 mm	65 dB	15.000 CPS	65 CC~
<b>P50</b>	1/2" BSP	1/4" BSP	55 Lt/min	8 bar	80 m	5 m	9,8 m	3,5 mm	68 dB	20.000 CPS	140 CC~
<b>P55</b>	1/2" BSP	1/4" BSP	55 Lt/min	8 bar	80 m	5 m	9,8 m	3,5 mm	70 dB	20.000 CPS	140 CC~
<b>P60</b>	1/2" BSP	1/4" BSP	65 Lt/min	8 bar	80 m	5 m	9,8 m	3,5 mm	72 dB	20.000 CPS	140 CC~
<b>P65</b>	1/2" BSP	3/8" BSP	70 Lt/min	8 bar	80 m	5 m	9,8 m	3,5 mm	72 dB	25.000 CPS	65 CC~
<b>P90</b>	3/4" BSP	3/8" BSP	100 Lt/min	8 bar	80 m	5 m	9,8 m	4 mm	72 dB	15.000 CPS	200 CC~
<b>P100</b>	3/4" BSP	3/8" BSP	110 Lt/min	8 bar	80 m	5 m	9,8 m	3,5 mm	72 dB	25.000 CPS	65 CC~
<b>P101</b>	1" BSP	3/8" BSP	110 Lt/min	8 bar	80 m	5 m	9,8 m	3,5 mm	72 dB	25.000 CPS	65 CC~
<b>P120</b>	1" BSP	3/8" BSP	120 Lt/min	8 bar	80 m	5 m	9,8 m	4 mm	72 dB	25.000 CPS	200 CC~
<b>P160</b>	1" BSP	1/2" BSP	170 Lt/min	8 bar	80 m	5 m	9,8 m	7,5 mm	75 dB	35.000 CPS	700 CC~
<b>P170</b>	1" BSP – DN25	1/2" BSP	170 Lt/min	8 bar	80 m	5 m	9,8 m	7,5 mm	75 dB	35.000 CPS	700 CC~
<b>P250</b>	1"1/4 BSP	1/2" BSP	250 Lt/min	8 bar	80 m	5 m	9,8 m	7,5 mm	75 dB	35.000 CPS	700 CC~
<b>P252</b>	1"1/4 BSP	1/2" BSP	250 Lt/min	8 bar	80 m	5 m	9,8 m	7,5 mm	75 dB	35.000 CPS	700 CC~
<b>P400</b>	1"1/2 BSP - DN40	1/2" BSP	380 Lt/min	8 bar	80 m	5 m	9,8 m	8 mm	78 dB	40.000 CPS	1200 CC~
<b>P700</b>	2" BSP – DN50	3/4" BSP	700 Lt/min	8 bar	80 m	5 m	9,8 m	8,5 mm	78 dB	50.000 CPS	3050 CC~
<b>P1000</b>	3" BSP – DN80	3/4" BSP	1050 Lt/min	8 bar	80 m	5 m	9,8 m	12 mm	82 dB	55.000 CPS	9750 CC~

\*Displacement per stroke may vary based on suction condition, discharge head, air pressure and fluid type.

## WARRANTY

If there is ever a defect, please contact the Flumac srl After-Sales Service, your dealer or the nearest Customer Service Centre where you will receive assistance as quickly as possible and please provide the following:

- A. Pump identification
- B. Explosion risk protection class
- C. Defect description

All PHOENIX pumps are covered by the following warranty:

1. Twelve months for any faulty mechanical parts. The warranty period starts from the date of supply.

2. Any fault or anomaly must be reported to Fluimac srl within eight days.
3. Warranty repair will be carried out exclusively at the Manufacturer's premises. Transportation charges will be at the client's expense.
4. Warranty shall not be extended in case of repair or replacement.
5. Faulty parts must be forwarded to the Manufacturer who reserves the right to test them in this own factory to identify the fault or any external reason that may have caused it. Should the parts be found not faulty, the Manufacturer reserves the right to invoice the total cost of the parts that had been replaced under this warranty.

Costs and transportation risks of faulty, repaired or replaced parts including custom charges will be borne entirely by the client. Repair or replacement of faulty parts cover any obligation under this warranty. The warranty DOES NOT cover any indirect damage and in particular any normal consumable material such as diaphragms, ball seats, balls and others. The warranty does not cover parts damaged as a consequence of incorrect installation, usage with fluids that not compatible with construction materials, carelessness, neglect, incorrect maintenance, or damages due to transportation or to any other reason or event that is not directly linked to functional or manufacturing defects. **The warranty excludes all cases of improper use of the pump or incorrect applications or non-observance of the information contained in this manual. Any controversy falls within the jurisdiction of the Court of Varese.**

## SAFETY RULES

Dangerous or hazardous practices or practice not complying with the safety rules and with the recommendations contained herein, may cause serious injuries, material damage and even explosions and /or death for which the manufacturer cannot be held responsible.



**WARNING:** these instructions are essential for the pumps' compliance to the requirements of the 2006/42/CE directive and must therefore be available, known, understood and applied.



**WARNING:** the personnel in charge of installing, inspecting and servicing the pumps must have suitable technical knowledge and training in matters concerning potentially explosive atmospheres and the related risks.



**WARNING:** Pumps 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.



**WARNING:** use of the pumps in a manner that does not comply with the instructions indicated in the use and maintenance manual will cancel all the requirements for safety and protection against of explosions.



**WARNING:** the maximum allowed temperature for process fluids or powder for zone 2 is equal to 65/95°C depending on the construction materials and for zone 1 is equal to 65/80°C depending on the construction materials; if exceeded, respect of the maximum temperature marked on the machine cannot be guaranteed.



**WARNING:** before intervening on the pump and/or servicing or repairing it, please note that you must:

- a. Discharge any product that was being pumped
- b. Wash it internally using a suitable non-flammable fluid, then drain.
- c. Cut-off the air supply using the relevant valve and make sure that no residual pressure remains inside it.
- d. Close all on-off valves (delivery and intake sides) relative to the product;
- e. Disconnect the network air supply;
- f. Wear suitable individual protection before any maintenance or repair (goggles/face protection, gloves, closed shoes, aprons and others).



**WARNING:** before using the pump, make sure that the fluid to be pumped is compatible with the explosion protection class and with construction materials of the pump: **DANGER OF CORROSION, PRODUCT SPILLS AND/OR EXPLOSIONS CAUSED BY CHEMICAL REACTIONS.**

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

- ascertain that the pump is full and if possible, that the level is above it by 0.5 m;
- ascertain that the fluid treated does not contain or cannot contain large solids or solids of a dangerous shape;

- ensure that the intake or delivery ports are not obstructed nor limited to avoid cavitation or pneumatic motor strain;
- also ascertain that the connection piping is strong enough and cannot be deformed by the pump weight or by the intake. Also check that the pump is not burdened by the weight of the piping.
- If the pump 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 pump's construction materials;
- if the pump was turned off for a long period of time, circulate clean water it in for some minutes to avoid incrustations.
- before starting, after long periods of disuse, clean the internal and external surfaces with a damp cloth;
- check the grounding for zone I;
- always protect the pump against possible collisions caused by moving objects or by various blunt materials that may damage it or react with its materials;
- protect the pump's surrounding ambient from splashes caused by accidental pump failure;



**WARNING:** the air supply pressure must never be over 7 bar or below 2 bar.



**WARNING:** when using the pump with aggressive or toxic liquids or with liquids that may represent a health hazard you must install suitable protection on the pump to contain, collect and signal any spills: **DANGER OF POLLUTION, CONTAMINATION, INJURIES AND/OR DEATH.**



**WARNING:** the pump must not be used with fluids that are not compatible with its construction materials or in a place containing incompatible fluids.



**WARNING:** installing the pumps without on-off valves on the intake and delivery sides to intercept the product in case of spillage is forbidden: danger of uncontrolled product spillage.



**WARNING:** installing the pumps without on-off, three-way or check valves on the air supply piping to prevent the pumped liquid from entering the pneumatic circuit if the diaphragms are broken is forbidden: danger of fluid entering the compressed air circuit and being discharged into the environment.



**WARNING:** Should the user think that the temperature limits set forth in this manual may be exceeded during service, a protective device must be installed on the system to prevent the maximum allowed process temperature from being reached. If exceeded, respect of the maximum temperature marked cannot be guaranteed.



**WARNING:** The pumps must always be grounded irrespective 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:** the use of pumps made with nonconductive material, which become charged with static, and without suitable grounding for flammable liquids is forbidden: **RISK OF EXPLOSIONS DUE TO STATIC CHARGE.**



**WARNING:** Aggressive, toxic or dangerous liquids may cause serious injuries or damage to health; therefore, it is forbidden to return a pump containing such products to the manufacturer or to a service center. You must empty the internal circuits from the product first and wash and treat it.



**WARNING:** Pumps containing aluminium parts or components coming into contact with the product cannot be used to pump III-trichloroethane, methylene chloride or solvents based on other halogenated hydrocarbons: danger of an explosion caused by a chemical reaction.



**WARNING:** The pumps PHOENIX cannot pump Acetylene, Hydrogen, Carbon disulfide.



**WARNING:** The components of the pneumatic exchanger, including the shaft are made from materials that are not specifically resistant to chemical products. If the diaphragm should break, replace these elements completely if they have come into contact with the product.



**WARNING:** The air-driven motor of the PHOENIX pumps is self-lubricating and will not require any greasing. Therefore, avoid using lubricated and non-dried air.



**WARNING:** ascertain that during service no anomalous noise appears. In that case, stop the pump immediately.



**WARNING:** ascertain that the fluid at the delivery side does not contain gas. Otherwise stop the pump immediately.



**WARNING:** the diaphragms (in contact with the product or the external ones) are highly subject to wear. Their duration is strongly affected by the conditions of use and by chemical and physical stress. Field tests carried out on thousands of pumps with a head value equal to 0 meters at 18°C have shown that normal service life exceeds one hundred million cycles. However, in places at risk

of explosion, the diaphragm must be disassembled and checked every 5 million cycles and replaced every 20 million cycles.



**WARNING:** in the case of diaphragms total breaking, the fluid may enter in the pneumatic circuit, damage it and come out from the discharge port. Therefore, it is necessary to convey the air discharge in a piping up to a safe area.



**WARNING:** Periodic controls must be made to ensure that there is no powder and/or deposits on the external and internal surfaces of the pump and, if necessary, they must be cleaned with a damp cloth.



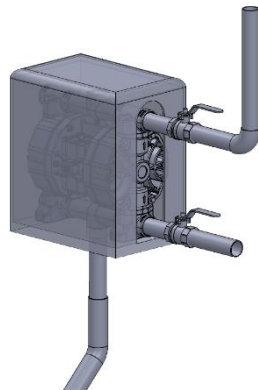
**WARNING:** removal of the silencer and the air supply fitting must be done when free from powder. Before restarting the pump, ensure that no powder has entered the pneumatic distributor.



**WARNING:** Safety risks to persons are mainly caused by improper use or accidental damage. These risks may be of hand injury for operators working on the open pump, or caused by the nature of the fluids that are conveyed by this type of pump. Therefore, it is extremely important to diligently carry out all the instructions contained in this manual in order to eliminate the causes of accidents that may lead to the pump failure and to the subsequent outcome of fluid hazardous to persons and to the environment.



**WARNING:** Protect always the site and the persons from accidental failure by installing a protection guard to old and collect any product leakage. Danger of serious injuries and damage to health and/or objects.



To replace worn parts, use only original spare parts.

Failure to comply with the above may give rise to risks for the operator, the technicians, the persons, the pump and/or the environment that cannot be ascribed to the manufacturer.

## INSTALLATION AND USE INSTRUCTIONS

### TRANSPORT AND POSITIONING

The operators in charge of the assembly / disassembly must be informed and trained on the dangers relating to the use of mechanical tools, even small ones. The noise levels of the machine correspond to:

- The sound pressure level of the A weighted emission, in the working place, is less than 78 dB.

Upon receipt, please check that the packing and the pump are intact and have not been damaged. Then:

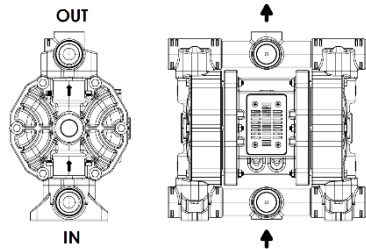
1. Depending on the size and weight, the material is forwarded packed in cardboard cases on a pallet or in a crate: on receipt open and remove the packing.
2. Read the User and Maintenance Manual and proceed as explained.
3. Check the tightness of all pump screws. Repeat the operation every 3 months.

MODEL	SCREW TIGHTNESS (Nm)	
	PUMP CASING	MANIFOLD
<b>P03-07</b>	2-3 Nm	1-2 Nm
<b>P18</b>	4-5 Nm	3-4 Nm
<b>P30</b>	4-5 Nm	3-4 Nm
<b>P50-55-60</b>	7-8 Nm	4-5 Nm
<b>P65-90-100-101-120</b>	5-6 Nm	5-6 Nm
<b>P160-170-171-250-252</b>	5-6 Nm	7-8 Nm
<b>P400</b>	11-12 Nm	11-12 Nm
<b>P700</b>	16-17 Nm	16-17 Nm

4. Hoist the pump using suitable equipment according to the weight.
5. If the pump has been forwarded with drain silencer disassembled, mount the same.



**WARNING:** Position and secure the pump horizontally using hangers fixed to the ceiling or feet resting on the ground. The product delivery manifold must always be positioned on the upper part, arrows shown onto the pump casing are always pointing upwards.

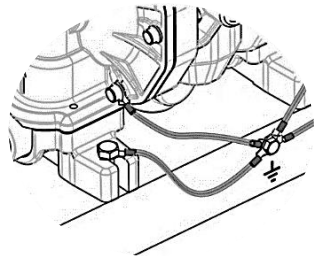


6. Position the pump correctly on the site chosen for installation, as close as possible to the point of collection and secure onto the feet using the bolts supplied. Arrange for enough room to carry out maintenance.



**WARNING:** diaphragm pumps with negative suction are affected by the following factors: viscosity and specific weight of the fluid and suction diameter and length. Position the pump as close as possible to the point of collection (within 2,5 m.) and in any case never more than 5 m. The diameter of the intake pipe must never be smaller than the connection of the pump, but must be increased as the distance increases. Fluid to be pumped with negative suction must never exceed a viscosity of 5,000 cps at 20° C and a specific weight of 1.4 Kg/l. These elements can cause derating and reduce the duration of the diaphragm: **DANGER OF PREMATURE BREAKAGE.**

7. If the pump is made from conductive materials and is suitable for flammable products, each pump casing must be equip-ped with a suitable earthing cable: **DANGER OF EXPLOSION AND/OR FIRE.**



**WARNING** The pumps must always be grounded irrespective of any organ to which it is connected. Lack of grounding or incorrect grounding will cancel the requirements for safety and protection against the risk of explosion.



**WARNING:** The pumps cannot be installed in areas exposed to sandstorms due to the abrasive nature of the phenomenon which could damage the external plastic parts.

## **STORAGE**

In case you need to get away for a period of time before installation, store in original boxes. The boxes should be stored off the ground, in a closed, clean and dry. In the event that the packaging has not received any is intact, it will be necessary to free the pump from it-Checking the integrity and restore a new packaging. The storage place should be closed environment with a temperature not lower than -5 ° C, not more than 40 ° C and with a moisture content not exceeding the value of 80%; any packaging must not be subjected to shocks, vibrations and loads above you.

## **INSTALLATION**

After positioning the pump, you can now connect it to the product circuit as follows:

- A. It is essential for the pump self-priming operation that the hydraulic system is leak-proof, clean the system before connecting the pump.
- B. The pump must not contain foreign bodies and all the seals on the hydraulic connections must be removed.

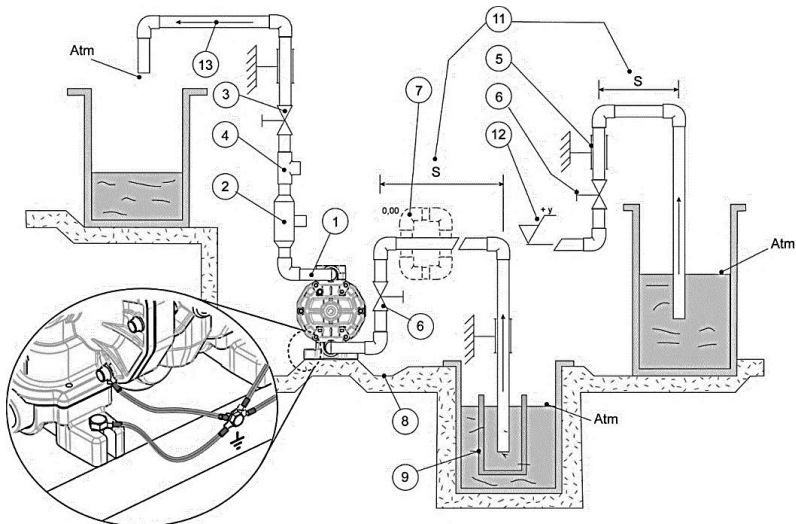


**WARNING:** only fittings with cylindrical gas threads in materials compatible with both the fluid to be pumped and the pump's construction materials must be used.

- C. On the delivery and discharge manifold install a manual valve of the same diameter as the pump inlet (never smaller) to intercept the fluid correctly in case of spills and/or when servicing the pump.
- D. Install the sleeves to secure the flexible hoses on both valves.
- E. In the event of a vertical delivery higher than 5 meters, we advise to use a check valve to prevent the fluid from returning into the pump.
- F. Connect the product intake and delivery hoses to their respective fittings whilst taking into consideration the signs on the pump.
- G. Secure the hoses using the relevant clamps.

USE THE PLANT SOLUTIONS INDICATED IN THE FOLLOWING DIAGRAM:

1. YES: use flexible pipes reinforced with rigid spiral to connect the hydraulic circuit of the pump. Rigid piping may cause strong vibrations and manifolds breaking. Do not use pipes with nominal diameter smaller than the diameter of the pump connections. For negative installations and/or viscous fluids use pipes with greater diameter related to the nominal diameter of the pump.
2. YES: pulse damper
3. YES: gate valve for delivery adjustment
4. YES: intake for gauge or protection pressure switch
5. YES: pipe anchoring
6. YES: shut-off valve
7. NO: air pockets; the circuit must be linear and short
8. YES: discharge duct around the base. Liquid discharge and collection devices must always be present in case of flammable, toxic, corrosive fluids, at temperatures above 60 ° C or in general dangerous.
9. YES: wide and rigid filtering separator in case of open tanks
10. YES: wide and rigid filtering separator in case of open tanks
11. Make it as short as possible the length of the horizontal S no vent for the air
12. Slope of the pipe to the pump



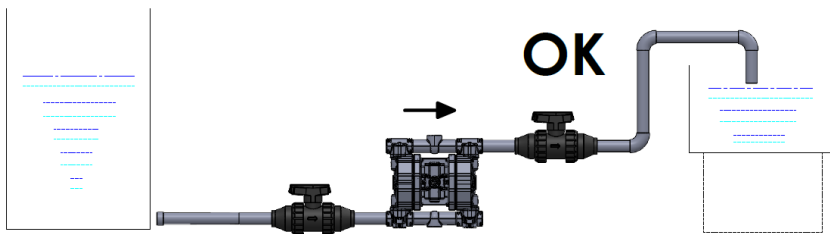
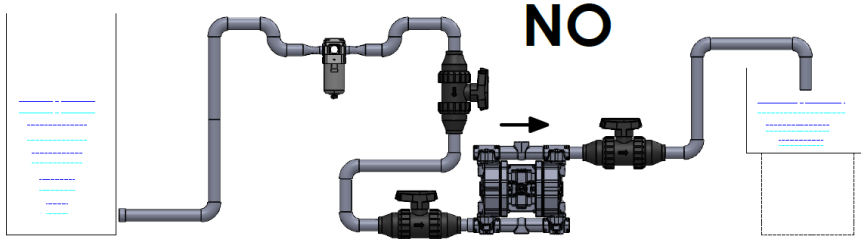
13. in the flow velocity of the fluid max. 3.5 m/s



**WARNING:** the pump must be connected with FLEXIBLE HOSES REINFORCED WITH A RIGID SPIRAL of a diameter never smaller than the pump's connection. The filters or other equipment installed at the intake side must be suitably dimensioned in order to avoid pressure drops. For negative installations and/or viscous fluids, use hoses with an OVERSIZE DIAMETER, especially on the intake side. Do not attach the pump DIRECTLY with rigid metal pipes (on plastic pumps) and/or pipes with tapered thread, as they can cause severe stress and/or vibrations and breakage of the manifolds and other parts of the pump. Always use flexible joints with fittings made of the same material of the pump (PP with PP, INOX with INOX) Do not use threadlockers and/or Teflon paste. The installer must ensure that the fittings are centred during assembly to prevent cracks and/or to prevent the threads from yielding. Also check that any excess PTFE tape and excessive clamping pressure does not place stress on the manifold or other parts of the pump. Pay particular attention to stress corrosion cracking. The pump material may deteriorate due to the combined

action of corrosion and application of a load, which may cause parts subjected to stress to break suddenly and unexpectedly, especially at low temperatures. Check if the connection tubes to the pump are clean inside and do not contain any working residue.

Apart from the check valve that enables cutting off the pump if there is a fault, do not install any other components on the pump suction (couplings, elbows, valves, filters, etc.) which could compromise the pump suction performance and cause the premature breakage to the membrane. The pump must be powered progressively using a “progressive start-up” valve.



**!** **WARNING:** Provide appropriate support for the piping. **THE PIPING MUST BE STRONG ENOUGH TO AVOID DEFORMATION DURING THE SUCTION PHASE AND MUST NEVER WEIGH DOWN ON THE PUMP IN ANY WAY OR VICE VERSA.**

If used for drum suction (not below head), the submersed end of the intake hose must be provided with a diagonally cut fixing to prevent it from adhering to the drum bottom.

**!** **WARNING:** Ascertain that the fluid treated does not contain or cannot contain large solids or solids of a dangerous shape and that the intake or delivery ports are not obstructed nor limited to avoid either cavitation or pneumatic motor strain.

- !** **WARNING:** keep in mind the following recommendations:
- ensure drainage of fluids which may come out of the pump;
  - fix the pump using all the available locking holes, the support points must be levelled;
  - arrange for enough room around the pump for the movements of an operator;
  - arrange for free space above the pump for lifting it;
  - inform about the presence of aggressive fluid with suitable colored labels in accordance with the related standard;
  - do not install the pump (built with thermoplastic material) near heat sources;
  - do not install the pump in places with risk of fall of solids or fluids;
  - do not install the pump close to fixed workplaces or visited areas;
  - install additional protection shield, for the pump or for the persons as appropriate. If the diaphragm breaks the fluid may enter into the pneumatic circuit and come out from the pump discharge port;
  - install a spare equivalent pump connected in parallel;
  - the pump must be always electrically earthed;

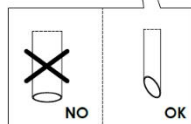
- if the pump is made from conductive materials and is suitable for flammable products, each pump casing must be equipped with a suitable earthing cable: **DANGER OF EXPLOSION AND/OR FIRE.**



**WARNING** The pumps must always be grounded irrespective of any organ to which it is connected. Lack of grounding or incorrect grounding will cancel the requirements for safety and protection against the risk of explosion



**WARNING:** the pump during operation is in **PRESSURE**, check appropriately report the hazardous conditions.



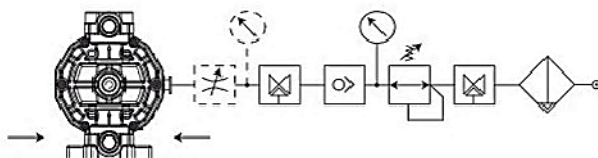
To connect the pump to the pneumatic circuit, you must:



**WARNING:** pneumatic supply to the PHOENIX pumps must be made using **FILTERED, DRIED, NO LUBRICATED OIL FREE AIR** at a pressure of not less than 2 bars and not more than 7 bars.

1. Remove the adhesive sticker from the air connection.
2. Install an on-off valve, a three-way valve and a check valve on the pneumatic circuit connection on board the pump according to the layout shown in figure.

**REMARK:** to measure the actual air pressure, install a pressure gauge on the air connection of the pump and check the value while the pump is running.



Pressure regulator with gauge

Shut-off valve

Way valve

Flow regulator

3. Provide for the connection of the mains supply pipe to the pump circuit.

MODEL	Ø
P07	4 mm
P18/P30/P50	6 mm
P65/P100/P101	8 mm
P160/P170/P250/P400	10 mm
P500	12 mm
P700	14 mm

**Maximum length between tube and pump plant: 5m**



**WARNING:** To avoid in pressure drops, use hoses, accessories and control and regulation elements whose delivery and pressure characteristics are suitable to the pump's own characteristics.

4. Adjust the network pressure of the compressed air to guarantee a pressure of **NOT LESS THAN 2 bars AND NOT MORE THAN 7 bars** when the pump is running. For PHOENIX pumps equipped WITH RUBBER BALLS, DO NOT EXCEED 5 bars. Lower or higher pressure may cause functional problems or pump breakage, product spills and damages to persons or objects.

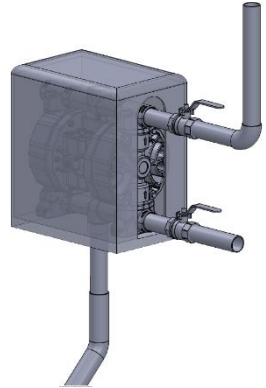
**REMARK:** to feed more than one pump with the same air control device, please ask our engineers

5. If the number of pump cycles needs to be recorded or displayed, install a stroke counter.



**WARNING:** For installation in Zone I, should the user think that the temperature limits set forth in this manual may be exceeded during service, a protective device must be installed on the system to prevent the global temperature (fluid + ambient) from reaching temperatures higher than 95°C in the case of class T4 metallic or PVDF pumps or 65°C for T4 class PP (polypropylene) pumps. Always pay attention to the external hot surfaces of the pump.

6. Always protect the pump from possible accidental collisions with moving objects or various blunt materials that may damage it or react on contact with it.
7. Protect the site and the persons from accidental failures by installing a protection guard to hold and collect any product leakage: **DANGER OF SERIOUS INJURIES AND DAMAGE TO HEALTH AND/OR OBJECTS.**
8. If the diaphragms are completely torn, the fluid may enter the air circuit, damaging it, and be discharged through the exhaust port. It is therefore necessary that the air exhaust be conveyed by pipes to a safe area.



## **START-UP**



**WARNING:** It is forbidden to use the pump 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 indicated in the **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 (it is compulsory);



**WARNING:** never start the operation of the pump with the product valves (suction and delivery) closed: **DANGER OF BREAKING MEMBRANES.**

- 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 7 bar it is possible that breakdowns and/or yields may occur with consequent spillage of the pumped fluid;
- for pumps with split manifold the two pumped fluids must have the same viscosity value, very different viscosity values may lead to stall problems and/or diaphragms breaking;
- 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 pump correctly and check the tightening of all the bolts on the pump;











**WARNING:** in the case of a pump mounted with negative suction, reduce the speed of the pump by acting on the air ball valve.

## **USE**

- do not operate valves or shunts during the pump 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 pump in case different fluids must be pumped;
- insulate or empty the pump 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; 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 pump 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;
- Besides being damaging for the pump, cavitation is dangerous in a potentially explosive atmosphere: check that the pump has been correctly sized;

Put the following prohibition and danger signs near the place where the pump is installed:

General danger sign	Danger explosive material	Danger incandescent liquid sprinkles	No smoking	Prohibition on open flames' use	Danger flammable material
					
Danger corrosive material	Danger toxic material				
					

## **STOP**

Only the air supply must be used to stop the pump, by closing the three-way valve to discharge any residual pressure from the pump's pneumatic circuit.



WARNING: never stop 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 PUMP STALLING AND PREMATURE WEAR AND/OR BREAKAGE OF THE DIAPHRAGM.

## **PRODUCT CIRCUIT MAINTENANCE**

### **RECOMMENDATIONS**

- All the operation must be carried out by qualified personnel;
- Do not carry out maintenance and/or repairs with the air circuit under pressure;
- Carry out periodic inspections (2 ÷ 30 days in accordance with the fluid pumped) to check the filtering elements cleaning;
- Carry out periodic inspections (3 ÷ 5 months in accordance with the fluid pumped and with the environment conditions) to ensure the correct operation of the system start/stop units;
- The presence of fluid under the pump casing may indicate failures to the pump;
- Damaged parts must be replaced with complete original parts and not with repaired parts;
- The replacement of damaged parts must be carried out in a clean and dry place;
- Use gloves, goggles and acid-resistant clothing when disconnecting from the system and washing the pump;
- Wash the pump before carrying out maintenance operations;
- Do not disperse the washing waste into the environment;
- Remove deposits of powder from the external surfaces of the pump with a cloth soaked in suitable neutral detergents;
- Check for the absence of excessive abrasion of the parts in thermoplastic material;
- Check for the absence of lumps and / or agglomerates due to the pumped liquid;
- Check for the absence of deformations and / or superficial lesions of the membranes;

- Check for the absence of deformations and / or breakages on the valve seats;

## **BALLS AND BALLS SEATS MAINTENANCE**

To clean and/or replace the balls and ball seats, proceed as follows:



**WARNING:** before carrying out this operation all external surfaces of the pump must be cleaned using a damp cloth.

- A1. disassemble the intake and delivery manifolds by removing the fixing elements.
  - A2. Remove the seats and the balls and clean them with a damp cloth and/or replace them with genuine spare parts of the same type.
  - A3. Check the condition of the gasket and, if necessary, replace with original spare parts of the same type.
- CAUTION:** check that there are no deposits of any kind inside the pump, and if found remove them with a damp cloth.
- A4. Reassemble by repeating the previous sequence in reverse order. Tighten the fixing bolts evenly.

## **DIAPHRAGMS MAINTENANCE**

For good operation of the pump and to guarantee that all the safety and protection requirements against explosion risks have been taken, it is indispensable that the controls, cleaning and/or replacement of the diaphragms are carried out in accordance with the intervals shown in the table.




**WARNING:** the diaphragms (in contact with the product) are highly subject to wear. Their duration is strongly affected by the conditions of use and by chemical and physical stress. Field tests carried out on thousands of pumps installed with a head equal to 0 and with fluid at 18° C have shown that normal service life exceeds 20,000,000 cycles. For safety reasons, in environments at risk of explosion, the diaphragms must be replaced every 20,000,000 (twenty million) cycles.


CONTROL AND INTERNAL CLEANING	Every 100.000 cycles
DIAPHRAGMS CHECK	Every 1 million cycles
DIAPHRAGMS REPLACEMENT	After 20 milion cycles

To replace product diaphragms, proceed as follows:



**WARNING:** The components of the pneumatic exchanger, including the shaft, are made from materials that are not specifically resistant to chemicals. Should the diaphragms break and the components come into contact with the fluid, replace them completely.

- B1. Disassemble the intake and delivery manifolds by removing the fixing elements.
- 

**WARNING:** Periodic controls must be made to ensure that there are no deposits of powder on the internal surfaces and, if necessary, they must be cleaned with a damp cloth.
- B2. Remove any deposits on the internal surfaces with a damp cloth.
  - B3. Disassemble the two pump casings by removing the fixing screws.
  - B4. Remove the external diaphragm locking cap from both circuits.
  - B5. Check and/or replace the diaphragms on both sides of the pump with original spare parts of the same type.
- CAUTION:** ascertain that the inner part of the pump is free from all types of deposits, and if they are present proceed with their removal.
- B6. Reassemble the pump following the disassembly sequence described earlier in reverse order. Tighten the fixing bolts evenly.
- 

**WARNING:** Should the pump be returned to the manufacturer or to a service center, you must first empty it out completely. If toxic, noxious or other types of dangerous products have been used, the pump must be suitably treated and washed before it is sent.

## **PNEUMATIC EXCHANGER MAINTENANCE**



**WARNING:** before intervening on the pump and/or performing any maintenance or repair, you must:

- A. discharge the product being pumped and close the product on-off valves (both on the intake and delivery sides).
- B. Circulate a suitable non-flammable washing fluid then drain it off and close the product shut-off valve.
- C. Shut-off the air supply using the relevant three-way valve whilst making sure that no residual pressure subsists.
- D. Shut-off air supply upstream;

E. Wear suitable individual protective devices before intervening (goggles/masks, gloves, closed shoes, aprons, and others): DANGER OF FLUID EJECTION UNDER PRESSURE.

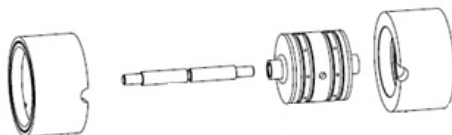


**WARNING:** Before removing the air supply pipe or fitting, clean the external surfaces of the pump. Before restarting the pump, ensure that no powder has entered the pneumatic distributor.

1. Disconnect fluid intake and delivery hoses from pump.
2. Disconnect the compressed air supply pipe from the pump.
3. Disassemble and remove the pump from its place of installation using suitable hoisting equipment.

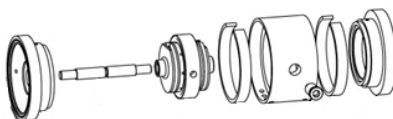
#### PNEUMATIC EXCHANGER MAINTENANCE FOR MODELS P3-P7

- Remove manifolds and pump casing;
- Remove both the external diaphragm locking cap;
- Remove the diaphragms, the air side caps, the belleville washers and the spacer strokes from both sides of the pump.
- Remove the shaft;
- Unscrew the air connection;
- Separate the half central blocks;
- Replace the pneumatic exchanger;
- Reassemble the pump according to the previously described sequence but in reverse order.



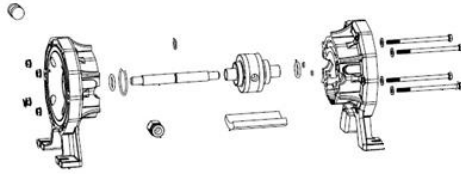
#### PNEUMATIC EXCHANGER MAINTENANCE FOR MODELS P18-P30

- Remove manifolds and pump casing;
- Remove both the external diaphragm locking cap;
- Remove the diaphragms, the air side caps, the belleville washers and the spacer strokes from both sides of the pump.
- Remove the shaft;
- Unscrew the air connection;
- Remove the pneumatic exchanger from the central block;
- Replace the pneumatic exchanger;
- Reassemble the pump according to the previously described sequence but in reverse order.



#### PNEUMATIC EXCHANGER MAINTENANCE FOR MODELS P50-P55

- Remove manifolds and pump casing;
- Remove both the external diaphragm locking cap;
- Remove the diaphragms, the air side caps, the belleville washers and the spacer strokes from both sides of the pump.
- Remove the shaft;
- Remove the half central blocks locking nuts and separate them.
- Replace the pneumatic exchanger;
- Reassemble the pump according to the previously described sequence but in reverse order.



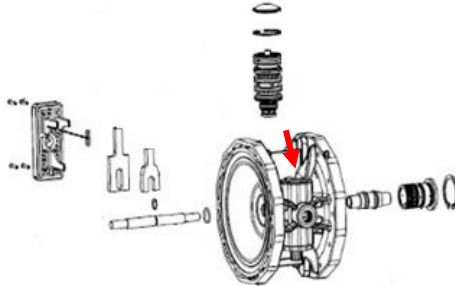
### PNEUMATIC EXCHANGER MAINTENANCE FOR MODELS P60-P65-P90-PI00-PI01-PI20-PI60-PI70-PI71-P250-P252-P400-P700

- Remove the pneumatic exchanger cover;
- Overturn the pump and with the aid of a Ø6 mm punch and a press, pull off the distributor (this operation may be carried out with pump casings assembled);



**WARNING:** to avoid incorrect reassembly and subsequent malfunction of the pump the pneumatic exchangers must not be open.

- Replace the pneumatic exchanger;
- Reassemble the pneumatic exchanger cover.



## TROUBLESHOOTING

The following instructions are intended exclusively for authorised skilled maintenance engineers. In event of abnormal behaviour and in order to fix faults, please refer to the following troubleshooting instructions.

	PROBLEM	SOURCE	ADVICE
1	The pump does not start	No air in the circuit	Check circuit (valves, connections, regulators, etc.)
		Insufficient air pressure	Adjust the air pressure
		Insufficient air flow rate	Check that piping and accessories have suitable passage
		Damaged control valve	Replace
		Pneumatic exchanger damaged	Replace
		Pump intake or delivery closed	Open some valves, or remove the pipes and check if the pump starts
		Damaged discharge cover	Replace
2	The pump runs but does not pump	Broken diaphragm	Check if any air comes out from the product delivery pipe. If so, replace diaphragm.
		The balls do not close	Disassemble the manifolds and clean the ball seats or replace both balls and their seats
		Intake too high	Reduce intake height
		Fluid is too viscous	Install larger piping especially on the intake side and decrease the pump cycles.
3	The pump works with slow cycles	Intake side is obstructed	Check and clean
		Fluid is too viscous	No remedy
		Delivery hose is obstructed	Check and clean
		Intake is obstructed.	Check and clean

4	The pump works irregularly	Pneumatic exchanger clogged or defective	Replace the pneumatic exchanger
		Worn shaft	Replace the shaft
		Ice on discharge gate	Dehumidify and filter air
		Lack of air flow	Check all air control devices and in particular Snap-On Couplings
		Pneumatic exchanger dirty	Replace
5	The pump stalls	Intake obstructs during operation.	Replace intake hose.
		Dirty air, containing condensation or oil.	Check air line
		Insufficient air flow or pressure.	Check pressure using a pressure gauge installed on the pump when it is running. If the pressure at that point is too low in relation to the network pressure, check all air fittings, especially snap-on ones. Check if all air control devices have sufficient flow rate. <b>WARNING:</b> in 90% of cases, stall occurrences are caused by snap-on fittings
		Faulty pneumatic exchanger	Replace
		Stop procedure not complied with	Comply with stop procedure
6	Pump does not distributedelivery value stated on table	Product intake hose is badly connected.	Check
		Piping is clogged.	Check and clean
		Fluid is too viscous.	Install larger piping especially on the intake side and decrease pump cycles
		Balls do not close properly.	Disassemble the manifolds and clean the seats or both the balls and the ball seats.
		Insufficient air flow.	Check pressure using pressure gauge installed on the pump when it is running. If the pressure at that point is too low in relation to network pressure, check all the air fittings, especially snap-on ones. Check if all air control devices have a sufficient flow rate. <b>WARNING:</b> in 90% of cases, stall occurrences are caused by snap-on fittings.

## DECOMMISSIONING

Should the pump remain inactive for long periods, proceed as follows



**WARNING:** Discharge any residual fluid from the pump. In case of dangerous, toxic fluids and/or otherwise noxious products, wash and treat as suitable: danger of injuries, damage to health and/or death.

1. Wash internally using products suitable for to the fluid being pumped.
2. Close the fluid intake and delivery valves mounted on the pump.
3. Close the air supply using the three-way valve; this will discharge any residual pressure.
4. If you want to store the pump in the warehouse, you must respect the following:



**WARNING:** Storage must be in a closed and protected environment at temperatures ranging from 5 to 45°C, and a humidity level not above 90%.

5. If the pump was in disuse for a long period of time, circulate clean water through it for some minutes before restarting it to avoid incrustations.

## DEMOLITION AND DISPOSAL

The PHOENIX pump does not contain dangerous parts; however, when they are worn out, they must be disposed of in the following manner.



**WARNING:** Discharge any residual fluid from the pump. In case of dangerous, toxic fluids and/or otherwise noxious products, wash and treat as suitable: danger of injuries, damage to health and/or death.

1. Disconnect pneumatic supply from pump.
2. Disassemble and remove the pump from its position.
3. Separate elements according to type (see the pump's composition codes).



**WARNING:** For disposal, please contact specialized disposal businesses and make sure that no small or large components are dispersed in the environment which may cause pollution, accidents or direct and/ or indirect damage.

## **SPARE PARTS**

To obtain the list of spare parts for each PHOENIX pump model, write an email to FLUIMAC assistance ([info@fluimac.com](mailto:info@fluimac.com)), indicating the type of pump and serial number.



- The INSTRUCTION MANUAL must be delivered to the pump-user, who takes diligent note of it, keeps the file for subsequent reference. Possible modifications do not imply updating of the existing manuals
- MANUALE D'USO deve essere consegnato all'utilizzatore della pompa, il quale deve prenderne attenta visione, e conservarlo per successive consultazioni. Eventuali modifiche non comportano l'aggiornamento dei manuali preesistenti.

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