

EN

# MA - MP

## DIAPHRAGM PUMPS

INSTRUCTIONS FOR USE AND MAINTENANCE

### INDEX

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A	DECLARATION OF CONFORMITY
B	FOREWORD
C	INTRODUCTION
D	PUMP IDENTIFICATION
E	IDENTIFICATION CODES
F	PUMP DESCRIPTION
G	TECHNICAL FEATURES
H	WARRANTY
I	SAFETY RULES
L	TRANSPORT AND POSITIONING
M	CONNECTING THE PRODUCT CIRCUIT
N	PNEUMATIC CONNECTION
O	COMMISSIONING
P	PRODUCT CIRCUIT MAINTENANCE
	<b>P1</b> CLEANING AND REPLACING BALLS AND BALL SEATS
	<b>P2</b> CLEANING AND REPLACING THE DIAPHRAGMS
Q	AIR CIRCUIT MAINTENANCE
	<b>Q1</b> REPLACING THE COAXIAL EXCHANGER
R	TROUBLESHOOTING
S	DECOMMISSIONING
T	DEMOLITION AND DISPOSAL

## A DECLARATION OF CONFORMITY



# PIUSI MA-MP

## DICHIARAZIONE DI CONFORMITÀ

DECLARATION DE CONFORMITE - DECLARACION DE CONFORMIDAD  
ERKLÄRUNG BEZÜGLICH EINHALTUNG DER VORSCHRIFTEN - DECLARATION OF CONFORMITY

### TIPO/SERIE

TYPE / SERIE- TIPO / SERIE - TYP / SERIE - TYPE / SERIES

POMPE PNEUMATICHE A DOPPIA MEMBRANA

### MARCATURA ATEX

MARKING ATEX - MARQUAGE ATEX - MARKIERUNG ATEX - MARCAR ATEX

 II 3/3 GD c IIB T135°C

### MODELLO

MODELE - MODELO - MODELL - MODEL

PIUSI MA 130, PIUSI MA 180, PIUSI MA 190, PIUSI MP 130,  
PIUSI MA 140, PIUSI MP 140, PIUSI MP 180, PIUSI MP 190

### CODICE

CODE - CODE - KODE - CODICE

F00208A00, F00208A10, F00208A20, F00208P00,  
F00208P10, F00208P20, F00208P30, F00208P40

**Questo prodotto è conforme alle seguenti direttive CE/EX e relativi standard armonizzati:**

This product complies with the following European Community Directives CE/EX and relating harmonized standards:

Ce produit est conforme aux directives de la Communauté européenne suivantes CE/EX et les normes correspondantes harmonisées:

Este producto cumple con las siguientes Directrices de la Comunidad Europea CE/EX y relativas normas armonizadas:

Dieses Produkt erfüllt die folgenden Vorschriften der Europäischen Gemeinschaft CE/EX und entsprechende harmonisierte Normen:

**2006/42/CE Direttiva Macchine / Machinery Directive / Maschinenrichtlinie / Directive Machines / Directiva Máquinas**

94/9/CE: 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.

94/9/EC: ATEX Directive, on the approximation of European Member States laws concerning protection equipments and systems to be used in potentially explosive environments.

94/9/CE : Directive ATEX, concernant le rapprochement des législations des états-membres relatives aux appareils et aux dispositifs de protection utilisés en environnement potentiellement explosif.

94/9 CE: ATEX Richtlinie über die Angleichung der Rechtsvorschriften der Mitgliedstaaten für Geräte und Schutzsysteme zur bestimmungsgemäßen Verwendung in explosionsgefährdeten Bereichen.

94/9/CE: Directiva ATEX, relativa al acercamiento de las legislaciones de los Estados Miembros relativas a los aparatos y sistemas de protección destinados a ser utilizados en atmósfera potencialmente explosiva.

UNI EN ISO 12100:2010 – Sicurezza del macchinario. Concetti fondamentali, principi generali di progettazione. Parte 1: terminologia di base, metodologia.

UNI EN ISO 12100:2010 – Safety of the machinery. Fundamental notions, design general principles. Part 1: Basic terminology, methods.

UNI EN ISO 12100:2010 – Sécurité des machines. Concepts fondamentaux, principes généraux de conception. Partie 1 : terminologie de base, méthodologie.

UNI EN ISO 12100:2010 – Sicherheit von Maschinen.. Grundbegriffe, allgemeine Gestaltungsleitsätze. Teil 1: Grundsätzliche Terminologie, Methodologie.

UNI EN ISO 12100:2010 – Seguridad de la maquinaria. Conceptos fundamentales, principios generales de diseño. Parte 1: terminología de base, metodología.

UNI EN ISO 12100:2010 – Sicurezza del macchinario. Concetti fondamentali, principi generali di progettazione. Parte 2: principi tecnici.

UNI EN ISO 12100:2010 – Safety of the machinery. Fundamental notions, design general principles. Part 2: Technical principles.

UNI EN ISO 12100:2010 – Sécurité des machines. Concepts fondamentaux, principes généraux de conception. Partie 2 : principes techniques.

UNI EN ISO 12100:2010 – Sicherheit von Maschinen. Grundbegriffe, allgemeine Gestaltungsleitsätze. Teil 2: Technische Leitsätze.

UNI EN ISO 12100:2010 – Seguridad de la maquinaria. Conceptos fundamentales, principios generales de diseño. Parte 2: principios técnicos.

UNI EN ISO 3746: 2011 – Acustica. Determinazione dei livelli di potenza sonora delle sorgenti di rumore mediante misurazione della pressione sonora. Metodo di controllo con una superficie avvolgente su un piano riflettente.

UNI EN ISO 3746: 2011 – Sound. Determination of sound power levels for noise sources by measuring the sound pressure. Monitoring method with an enveloping surface on a reflecting plate.

UNI EN ISO 3746: 2011 – Acoustique. Détermination des niveaux de puissance sonore des sources de bruit par mesure de la pression acoustique. Méthode de contrôle avec surface enveloppante sur plan réfléchissant.

UNI EN ISO 3746: 2011 – Akustik. Bestimmung der Schalleistungsspiegel von Geräuschquellen aus Schalldruckmessungen. Hüllflächenverfahren über einer reflektierenden Ebene.

UNI EN ISO 3746: 2011 – Acústica. Determinación de los niveles de potencia sonora de las fuentes de ruido mediante medición de la presión sonora. Método de control con una superficie envolvente sobre una superficie reflectante.

UNI EN ISO 11200: 2009 – Acustica. Rumore emesso dalle macchine e dalle apparecchiature. Linee guida per l'uso della norme di base per la determinazione dei livelli di pressione sonora al posto di lavoro e in altre specifiche posizioni.

UNI EN ISO 11200: 2009 – Sound. Noise done by the machines and the equipments. Guidelines for using the basic norms for determining the sound pressure levels in the working place and in other specific positions.

UNI EN ISO 11200: 2009 – Acoustique. Niveau de bruit émis par les machines et par les appareils. Directives concernant l'utilisation de la norme de base pour la détermination des niveaux de pression sonore sur poste de travail et dans d'autres situations spécifiques.

UNI EN ISO 11200: 2009 – Akustik. Geräuschabstrahlung von Maschinen und Geräten. Leitlinien zur Anwendung der Grundnormen zur Bestimmung von Emissions-Schalldruckpegeln am Arbeitsplatz und an anderen festgelegten Orten.

UNI EN ISO 11200: 2009 – Acústica. Ruido emitido por las máquinas y los aparatos. Líneas guía para el uso de las normas de base para la determinación de los niveles de presión sonora en el lugar de trabajo y en otras posiciones específicas.

UNI EN ISO 4414: 2012 - Sicurezza del macchinario. Requisiti di sicurezza relativi a sistemi e loro componenti per trasmissioni oleoidrauliche e pneumatiche. Pneumatica.

UNI EN ISO 4414: 2012 - Safety of the machinery. Safety requirements concerning the systems and their components for hydraulic and pneumatic transmissions. Pneumatic.

UNI EN ISO 4414: 2012 - Sécurité des machines. Impératifs de sécurité relatifs à des systèmes et à leurs composants pour les transmissions oléohydrauliques et pneumatiques. Pneumatique.

UNI EN ISO 4414: 2012 - Sicherheit von Maschinen. Sicherheitstechnische Anforderungen an fluidtechnische Anlagen und deren Bauteile. Pneumatik.

UNI EN ISO 4414: 2012 - Seguridad de la maquinaria. Requisitos de seguridad relativos a sistemas y sus componentes para transmisiones oleohidráulicas y neumáticas. Neumática.

EN 13463-1: 2009 - Apparecchi non elettrici destinati ad essere utilizzati in atmosfere potenzialmente esplosive. Parte 1: metodo e requisiti di base.

EN 13463-1: 2009 - Non-electrical equipments to be used in potentially explosive environments. Part 1: Method and basic requirements.

EN 13463-1: 2009 – Appareils non électriques destinés à être utilisés dans des environnements potentiellement explosifs. Partie 1 : méthodes et impératifs de base.

EN 13463-1: 2009 – Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen. Teil 1: Grundlagen und Anforderungen.

EN 13463-1: 2009 - Aparatos no eléctricos destinados a ser utilizados en atmósferas potencialmente explosivas. Parte 1: método y requisitos de base.

EN 13463-5: 2011 - Apparecchi non elettrici per atmosfere potenzialmente esplosive. Parte 5: protezione per sicurezza costruttiva "c".

EN 13463-5: 2011 – Non-electrical equipments for potentially explosive environments. Part 5: protection for building safety "c".

EN 13463-5: 2011 - Appareils non électriques pour environnements potentiellement explosifs Partie 5 : protection sécurité constructive "c".

EN 13463-5: 2011 – Nicht-elektrische Geräte für den Einsatz in explosionsgefährdeten Bereichen. Teil 5: Schutz durch konstruktive Sicherheit "C".

EN 13463-5: 2011 - Aparatos no eléctricos para atmósferas potencialmente explosivas. Parte 5: protección para seguridad constructiva "c".

LA SEGUENTE CONFORMITÀ È RIFERITA AL PROTOTIPO DELLA PIUSI MP 190.

THIS COMPLIANCE REFERS TO PIUSI MP 190.

LA NORME SUIVANTE SE RAPPORTE AU PROTOTYPE DE LA PIUSI MP 190.

DIE VORLIEGENDE KONFORMITÄTSERKLÄRUNG BEZIEHT SICH AUF DEN PROTOTYP DER PIUSI MP 190.

LA SIGUIENTE CONFORMIDAD SE REFIERE AL PROTOTIPO DE LA PIUSI MP 190.

ESTENSIONI: la presente dichiarazione si estende anche ai modelli, PIUSI MP 130, PIUSI MA 130, PIUSI MP 140, PIUSI MA 140, PIUSI MA 180, PIUSI MP 180, PIUSI MA 190, PIUSI MP 190.

EXTENSION: this declarations is also valid for the following versions, PIUSI MP 130, PIUSI MA 130, PIUSI MP 140, PIUSI MA 140, PIUSI MA 180, PIUSI MP 180, PIUSI MA 190, PIUSI MP 190.

EXTENSION: cette déclaration est également valable pour les modèles suivantes, PIUSI MP 130, PIUSI MA 130, PIUSI MP 140, PIUSI MA 140, PIUSI MA 180, PIUSI MP 180, PIUSI MA 190, PIUSI MP 190.

ERWEITERUNGEN: die vorliegende erklärung erstreckt sich auch auf die modelle, PIUSI MP 130, PIUSI MA 130, PIUSI MP 140, PIUSI MA 140, PIUSI MA 180, PIUSI MP 180, PIUSI MP 190, PIUSI MA 190, PIUSI MP 190.

EXTENSIONES: la presente declaración se extiende también a los modelos, PIUSI MP 130, PIUSI MA 130, PIUSI MP 140, PIUSI MA 140, PIUSI MA 180, PIUSI MP 180, PIUSI MA 190, PIUSI MP 190.



ATTENZIONE: data l'innumerabile varietà di prodotti e composizioni chimiche, l'utilizzatore è ritenuto il maggior conoscitore delle reazioni e compatibilità con i materiali costruttivi della pompa. Pertanto, prima dell'impiego, eseguire con perizia tutte le verifiche e prove necessarie al fine di evitare situazioni pericolose anche se remote che non possono essere conosciute ed imputabili al costruttore.



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



ATTENTION: compte tenu de la grande quantité de produits et de compositions chimiques, il appartient l'utilisateur, et à lui seul, de connaître les réactions et la compatibilité de ces produits avec les matériaux constituant la pompe. Avant d'utiliser la pompe, il est par conséquent conseillé d'effectuer avec maîtrise toutes les vérifications et les tests nécessaires afin d'éviter toute situation de danger, même lointaine, qu'il n'appartient pas au constructeur de connaître et dont en aucun cas la responsabilité ne pourra lui être attribuée.



ACHTUNG: Aufgrund der Vielfalt der Produkte und der chemischen Zusammensetzungen sollte der Benutzer die Reaktionen und die Verträglichkeit mit den Konstruktionsmaterialien der Pumpe am besten kennen. Vor der Benutzung sollte er daher mit Sachverständnis alle notwendigen Prüfungen und Versuche durchführen, um gefährliche Situationen, auch wenn selten, zu vermeiden, die nicht dem Hersteller anzulasten sind.



ATENCIÓN: a raíz de la innumerable variedad de productos y composiciones químicas, el utilizador es la persona más indicada para conocer las reacciones y la compatibilidad con los materiales de fabricación de la bomba; por lo tanto, antes de emplearla, tendrá que llevar a cabo los correspondientes controles y las pruebas necesarias para evitar situaciones peligrosas, aún remotas, que el fabricante no puede prever ni, por consiguiente, considerarse responsable de las mismas.

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**PERSONA AUTORIZZATA A CUSTODIRE IL FASCICOLO:**

PERSON AUTHORISED TO KEEP THE FILE - PERSONNE AUTORISÉE POUR ENREGISTRER UN FICHIER - PERSONA AUTORIZADA PARA  
GUARDAR EL ARCHIVO - PERSON ZUM SPEICHERN DER DATEI

OTTO VARINI



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**LUOGO PRESSO CUI È CUSTODITO IL FASCICOLO:**

PLACE WHERE THE FILE IS KEPT - LIEU OÙ LE DOSSIER EST GARDE' - LUGAR DONDE ESTA' GUARDADO EL FASCICULO - ORT WO DIE  
DATEI VERWAHRT IST

PIUSI SPA  
VIA PACINOTTI 16/A - 46029 - SUZZARA (MN) - ITALY

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**APPROVATO DA:**

APPROVED BY - APPROUVÉ PAR - APROBADO POR - GENEHMIGT VON

OTTO VARINI



## B FOREWORD

Piisi MA and Piisi MP pumps have been manufactured to the 2006/42/CE, 94/9/CEE and 99/92/EC directives.

The relevant area criteria are indicated in the EN-60079-10 and EN 1127-1 harmonized European standards.

Therefore, if used according to the instructions contained in this manual, the Piisi MA and Piisi MP 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.

The Manufacturer trusts you will be able to make full use of the performances offered by Piisi MA and Piisi MP pumps. All the technical values refer to the standard version of Piisi MA and Piisi MP 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.

## C INTRODUCTION

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. At the head of every chapter an information field with symbols indicates the personnel who are authorized to perform the operation described in that page along with the individual protective devices that must be worn and/or the energetic state of the pump. Any residual risk that may occur during these operations is highlighted by special symbols embedded in the text.

Special symbols are also used to highlight and differentiate any particular information or suggestion concerning safety and correct use of the pumps.

PLEASE CONTACT THE MANUFACTURER'S CUSTOMER ASSISTANCE DEPARTMENT FOR ANY FURTHER INFORMATION REGARDING THE CONTENTS OF THIS MANUAL.



### WARNING

*this sign warns the personnel involved that failure to perform the operation described in compliance with the procedures and prescriptions related to safety regulations entails residual risks that may cause damage to health or injuries.*



### CAUTION

*this sign informs involved personnel that failure to perform the described operation in compliance with safety regulations may cause damage to the machine and/or its components hence risks for the operator and/or the environment.*



### REMARK

*this sign provides information regarding the current operation and its contents are very important.*



**COMPULSORY AND INDIVIDUAL PROTECTION SIGNS**

*These signs indicate that proper individual protection must also be used against energetic events because of the dangers that may arise during the operation.*



**OPERATOR**

*this function entails full knowledge and understanding of the information contained in the user manual issued by the Manufacturer as well as specific skills related to the sector of use.*



**INSTALLER AND MECHANICAL SERVICEMAN**

*This function entails full knowledge and understanding of information contained in the user manual issued by the manufacturer, specific expertise in installation and ordinary maintenance tasks as well as specific skills related to the sector of use.*

**WARNING**



*The personnel in charge of installing, testing and servicing the pump must have a suitable technical knowledge of potentially explosive atmospheres and of the relevant risks.*



**EXTRAORDINARY PROCEDURES**

*Identifies operations that can only be performed by the after-sales service technicians at the Manufacturer's premises.*



**INSTRUCTION MANUAL**

## D PUMP IDENTIFICATION

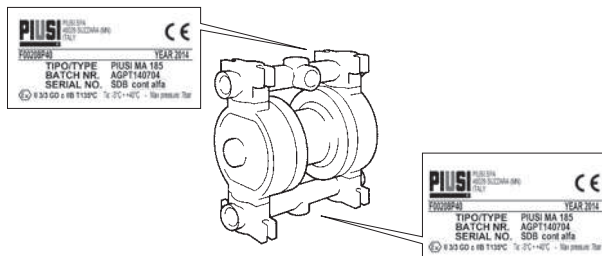
Each pump has an identification plate carrying its specification details and materials. Always refer to this data when contacting the manufacturer, dealer or customer service centers.

**WARNING**



*removing or altering this identification plate and or the data it contains is forbidden.*


Identification code \* on the plate against the "TYPE" 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.



## D1 MARKINGS AND GENERAL INFORMATION

In compliance with the 94/9/CEE standards, the pumps carry the following identification marks:



 : safety symbol to Din 40012 attachment A.

II 3/3GD: surface equipment used in areas where the presence of gas, vapors or mists in addition to clouds of combustible powder in the air is unlikely during normal operation both in external and internal areas and, if it does occur, it will only persist for a short period (ZONE 2).

c: protection by constructional safety (EN 13463-5).

IIB: Excluding the following products: hydrogen, acetylene, carbon disulphide.

T135°C: Class of admitted temperatures. The processed fluid temperature value must fall within such class range and the user must comply with the instructions contained in the manual and with the current laws. Furthermore, the user must take into account the ignition point of the gases, vapors and mists in addition to clouds of combustible powder in the air existing in the area of use.

## E IDENTIFICATION CODE

CODE	PUMP	Pump casing	Diaphragm air side	Diaphragm fluid side	Balls	Balls seats	O-RINGS
F00208P00	PIUSI MP 130	PP	HYTREL	PTFE	PTFE	PP	PTFE
F00208A00	PIUSI MA 130	ALU	NBR	NBR	NBR	ALU	NBR
F00208P20	Piusi MP 140	PP	HYTREL	PTFE	PTFE	PP	PTFE
F00208P10	Piusi MA 140	PP	NBR	NBR	NBR	PP	NBR
F00208P30	Piusi MP 180	PP	HYTREL	PTFE	PTFE	PP	PTFE
F00208A10	Piusi MA 180	ALU	NBR	NBR	NBR	PPS-V	NBR
F00208P40	Piusi MP 190	PP	HYTREL	PTFE	PTFE	PP	PTFE
F00208A20	PIUSI MA 190	ALU	NBR	NBR	NBR	PPS-V	NBR

## F PUMP DESCRIPTION

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**Proposed use** The air-driven Piusi Ma and Piusi MP pumps have been designed and constructed to pump liquids with an apparent viscosity of between 1 and 50.000 cps at 20°C that are chemically compatible with the pump's components. Fluid service temperatures must range from +3°C to a maximum of 65/95°C according to the material of the components. Its use is defined by the type of material used to build the pump, the temperature class and the type of fluid. The maximum temperature allowed for process fluid or powder depends on and/or is declassified by the material of the pump; if exceeded, respect of the maximum temperature shown on the marking cannot be guaranteed.

### TEMPERATURE CLASSES FOR PUMPS TO BE INSTALLED IN AN EXPLOSIVE ENVIRONMENT

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);

Tf = maximum allowed fluid processing temperature

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### Functioning principles

The air introduced behind the diaphragm pushes the product to the delivery side. At the same time, it uses the shaft to draw the opposite diaphragm, which causes suction at the intake side. When complete, the cycle reverses.

Improper use:

### WARNING



***use of a Piusi MA and Piusi MP pumps 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 Piusi.***

In particular, it is FORBIDDEN to use Piusi MA and Piusi MP 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;

### 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.***




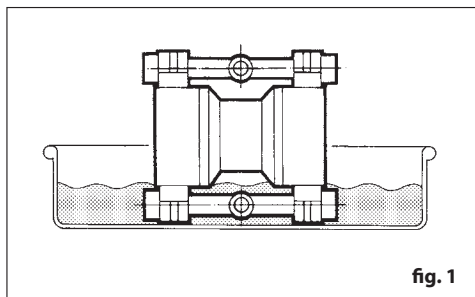
- WARNING**  *the user must consider the ratio between the pump's maximum surface temperature indicated on the marking and the minimum ignition temperature of the layers and clouds of powder as shown in the EN1227-1.*
- WARNING**  *Use of the pump that does not comply with the instructions indicated 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.*
- WARNING**  *ATEX: The user is responsible for classifying the area of use whilst identification of the equipment category is the responsibility of the manufacturer.*

## G TECHNICAL FEATURES

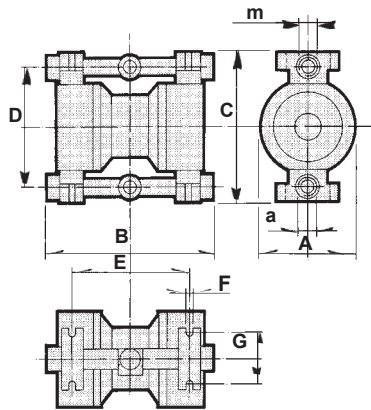
The performances data refers to standard versions. "MAX delivery" and "Suction capacity" values refer to the pumping of water at 18°C with a submersed manifold (please see fig. 1).<sup>(1)(2)</sup>



- 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



PUMP	m-a	A Ø	B	C	D	E	F Ø	G
Piuser MP 130 PP	1/2"	150	240	234	200	168	8	80
Piuser MA 130 ALU	1/2"	152	240	234	198	168	6,5	85
Piuser MP 140 PP	1"	170	308	274	219	213	6,5	92
Piuser MA 140 ALU	1"	170	303	277	222	213	8	100
Piuser MP 180 PP	1"	201	329	325	263	228	8	110
Piuser MA 180 ALU	1"	201	314	323	269	213	8	110
Piuser MP 190 PP	1 1/4"	220	400	387	302	267	8	122
Piuser MA 190 ALU	1 1/4"	225	405	385	305	265	8	125



## G1 TECHNICAL DATA

	unit	Piuser MA/MP 130	Piuser MA/MP 140	Piuser MA/MP 180	Piuser MA/MP 190
Intake/delivery fittings	inches	1/2"	1"	1"	1 1/4"
Air fitting	inches	3,8"	3,8"	3,8"	1/2"
Suction capacity whilst dry (1) (diaphragm PTFE)	mt.	5	6	5	5
Air pressure (MIN-MAX)	bar	2 - 7	2 - 7	2 - 7	2 - 7
Fluid max temp. press.	°C	65 95	65 95	65 95	65 95
Max capacity <sup>2)</sup> water at 18° C with submersed intake manifold	Lit/min.	50	100	150	220
Net weight	Kg	- PP 3,6 4	5 6,5	7,5 8,2	12 16
Noise (at 5bar with rubber balls)	dB (A)	82	82	82	82

## G2 COMPATIBLE FLUIDS

Piuser MP	water, windshield washer, antifreeze and urea
Piuser MA	oil, waste oil, diesel

## H WARRANTY

The high quality of Piusi MA and Piusi MP pumps is often confirmed to us by the end users.

However, should any defect appear, please contact the Manufacturer's After-Sales Service, your dealer or the nearest Customer Service Centre where you will receive assistance as quickly as possible. In any case, please provide:

**A. Your complete address**

**B. Pump identification**

**C. Explosion risk protection class**

**D. Anomaly description**



All Piusi MA and Piusi MP 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 the Manufacturer 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 his 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, and others.

The warranty does not cover parts damaged as a consequence of incorrect installation, 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.**

## I 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 94/9/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.***













<b>WARNING</b>		<b>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.</b>
<b>WARNING</b>		<b>the maximum allowed temperature for process fluids or powder is equal to 65/95°C depending on the construction materials; if exceeded, respect of the maximum temperature marked on the machine cannot be guaranteed.</b>
<b>WARNING</b>		<b>before intervening on the pump and/or servicing or repairing it, please note that you must:</b>  <b>A. Discharge any product that was being pumped</b> <b>B. Wash it internally using a suitable non-flammable fluid, then drain.</b> <b>C. Cut-off the air supply using the relevant valve and make sure that no residual pressure remains inside it.</b> <b>D. Close all on-off valves (delivery and intake sides) relative to the product;</b> <b>E. Disconnect the network air supply;</b> <b>F. Wear suitable individual protection before any maintenance or repair (goggles/face protection, gloves, closed shoes, aprons and others).</b>
<b>WARNING</b>		<b>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.</b>








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 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;
- 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;
- if the diaphragms are completely torn, the fluid may enter the air circuit, damaging it, and be discharged from the exhaust port. It is therefore necessary for the exhaust port to be conveyed by pipes to a safe area.

---

WARNING		<i>the air supply pressure must never be over 7 bar or below 2 bar.</i>
WARNING		<i>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.</i>
WARNING		<i>the pump must not be used with fluids that are not compatible with its construction materials or in a place containing incompatible fluids.</i>
WARNING		<i>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.</i>
WARNING		<i>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.</i>
WARNING		<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 maximum allowed process temperature from being reached. If exceeded, respect of the maximum temperature marked cannot be guaranteed.</i>
WARNING		<i>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.</i>
WARNING		<i>the use of pumps made with non-conductive material, which become charged with static, and without suitable grounding for flammable liquids is forbidden: risk of explosions due to static charge.</i>
WARNING		<i>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.</i>
WARNING		<i>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.</i>

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<b>WARNING</b>		<i>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.</i>
<b>WARNING</b>		<i>The air-driven motor of the Piusi MA and Piusi MP pumps is self-lubricating and will not require any greasing. Therefore avoid using lubricated and non-dried air.</i>
<b>WARNING</b>		<i>ascertain that during service no anomalous noise appears. In that case, stop the pump immediately.</i>
<b>WARNING</b>		<i>ascertain that the fluid at the delivery side does not contain gas. Otherwise stop the pump immediately.</i>
<b>WARNING</b>		<i>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 from 0° to 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.</i>
<b>WARNING</b>		<i>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.</i>
<b>WARNING</b>		<i>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.</i>

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.**

## **L 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.

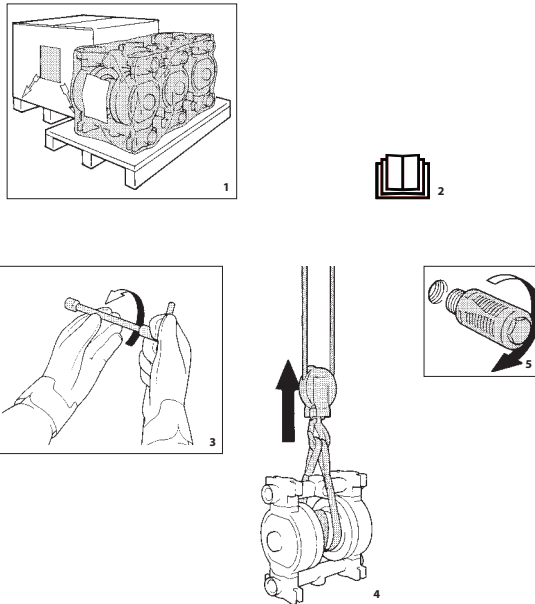
The noise levels of the machine correspond to:

- 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. Make sure that all of the pump's screws are well tightened.
4. Hoist the pump using suitable equipment according to the weight shown on the plate.
5. If the pump has been forwarded with drain silencer disassembled, mount the same.

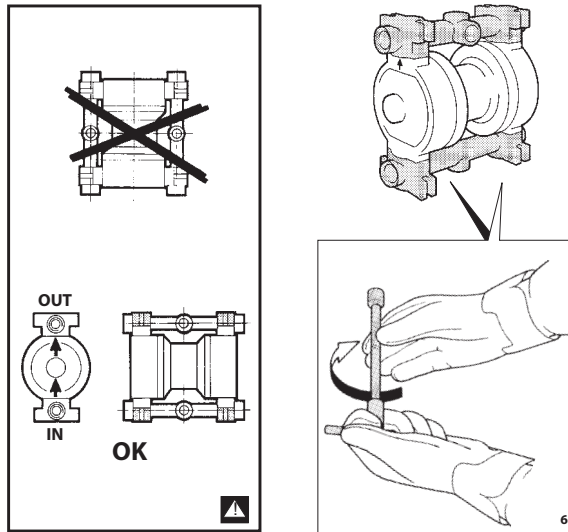
**WARNING**

**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 according to the signs:  
 "OUT" = DELIVERY (up)  
 "IN" = INTAKE (down) or according to the pump model, check that the arrows shown onto the 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;  
 - 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.**



**WARNING**



*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.*

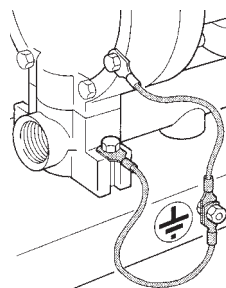
7. If the pump is made from conductive materials and is suitable for flammable products, each pump casing must be equipped with a suitable earthing cable: DANGER OF EXPLOSION AND/OR FIRE.

**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.*

This completes positioning.





## M CONNECTING THE PRODUCT CIRCUIT

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

### WARNING

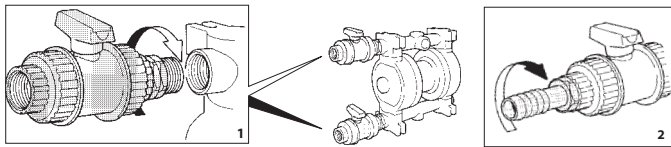


*only fittings with cylindrical gas threads in materials compatible with both the fluid to be pumped and the pump's construction materials must be used. For example:  
Pump made from PP = PP fitting*

1. 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.

2. Install the sleeves to secure the flexible hoses on both valves.

3. 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.



### 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, ALU with ALU)*

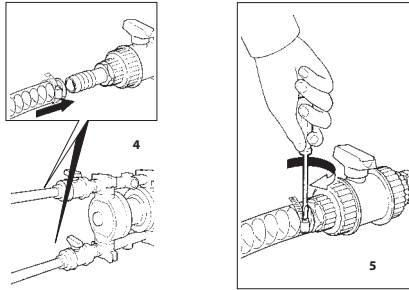
*Do not use threadlockers and/or Teflon paste. The installer must ensure that the fittings are centred during assembly to prevent cracks and/or to prevent the threads from yielding.*

*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.*

4. Connect the product intake and delivery hoses to their respective fittings whilst taking into consideration the signs on the pump:  
 "IN" = INTAKE (down) and  
 "OUT" = DELIVERY (up)  
 or according to that indicated by the arrows.
5. Secure the hoses using the relevant clamps.



**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.**

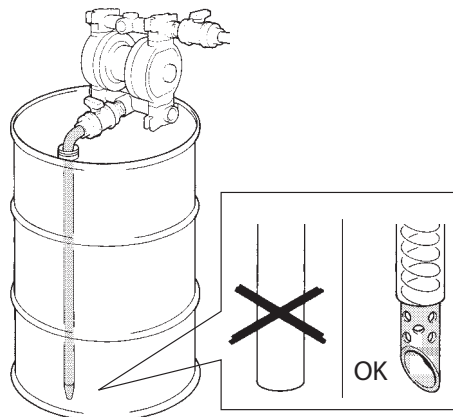
6. If used for drum suction (not below head), the submersed end of the intake hose must be provided with a diagonally cut fixing to prevent it from adhering to the drum bottom.

**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.**

Connection of the product circuit finishes here.




## N PNEUMATIC CONNECTION

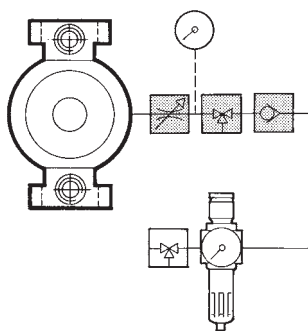
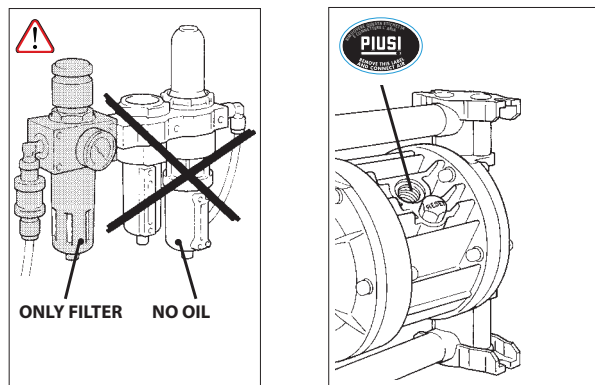
To connect the pump to the pneumatic circuit, you must:

**WARNING**  **pneumatic supply to the Piusi MA and Piusi MP pumps must be made using FILTERED, DRIED, NON LUBRICATED OIL FREE AIR at a pressure of not less than 2 bars and not more than 7 bars.**

**WARNING**  **do not remove RESET for any reason and/or do not connect the air supply to the RESET channel.**

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 1.

**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.**



---

3. Connect the supply hose from the net work to the pump circuit.

**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.**

**WARNING**



**most snap-on fittings cause pressure drops.**

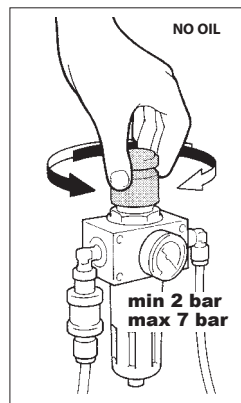
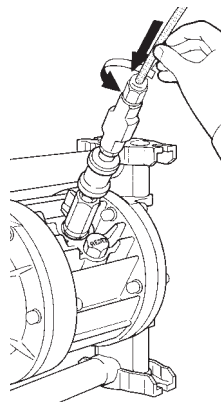
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4. Adjust the network pressure of the compressed air to guarantee a pressure of NOT LESS THAN 2 bars AND NOT MORE THAN 7 bars when the pump is running. For Piusi MA and Piusi MP pumps equipped WITH RUBBER BALLS, DO NOT EXCEED 5 bars. Lower or higher 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.**



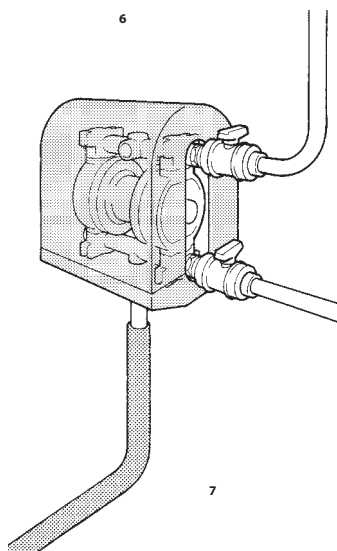
5. In the event that the pump stalls, whatever may have caused the stall must be eliminated (see page 66), after which reset by rotating the manual device by half a turn in an anti-clockwise direction. Wait for the pump to re-start and re-screw the reset device.

6. If the number of pump cycles needs to be recorded or displayed, install the STROKE COUNTER.

7. 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.

8. 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.

9. 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.



## O COMMISSIONING

The user must always use materials that are compatible with the pumped liquid according to the pump's design conditions.

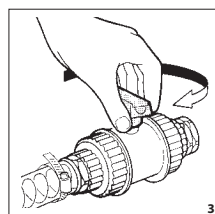
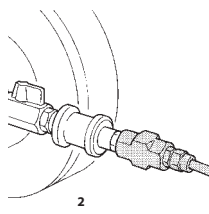
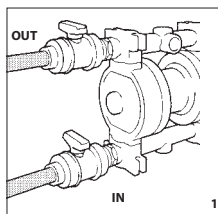
### WARNING



***it is forbidden to use the pump with fluids that are not compatible with the pump's construction materials or in a place that contains incompatible fluids.***

To commission the pump, proceed as follows:

1. Make sure that the product delivery and intake hoses are correctly connected - check the signs on the pump:  
"IN" = INTAKE (down) and  
"OUT" = DELIVERY (up)
2. Check that the pump's pneumatic circuit valves are correctly installed (on-off ball valve, three-way valve and check valve).
3. Open the fluid intake and delivery valves.



**WARNING**



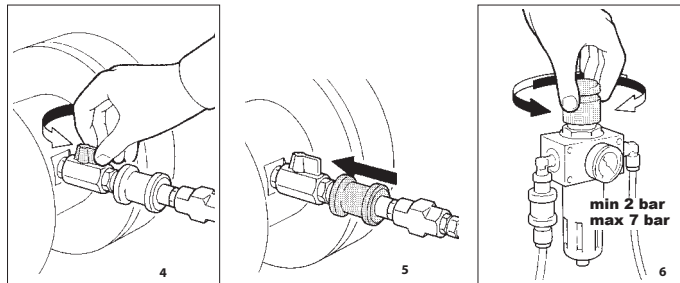
**never start the pump with the product valves (intake and delivery) closed: DANGER OF DIAPHRAGM BREAKAGE.**

4. Open the on-off ball valve mounted on the pump connection.
5. Open the three-way valve.
6. Check and regulate the network air pressure when the pump is running: MIN 2 bar MAX 7 bar; max 5 bar for pumps with rubber balls.

**CAUTION**



**if the pressure is below 2 bars when the pump is running, the pump may STALL. At a pressure higher than the MAXIMUM threshold, yielding and leakages of the product under pressure may occur and/or the pump may break.**



**7. To regulate the speed of the pump according to the fluid viscosity, you can operate in two ways:**

- A. regulate the network air pressure
- B. choke the air volume (flow rate) by means of the on-off valve mounted on the pump

**REMARK**

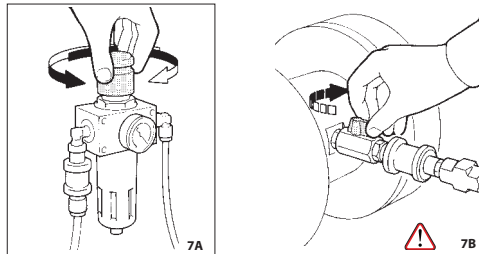


**unprimed pumps have a negative suction head capacity that varies according to the type of diaphragm and packing mounted. PLEASE CONTACT THE MANUFACTURER'S CUSTOMER ASSISTANCE SERVICE FOR FURTHER DETAILS.**

**WARNING**



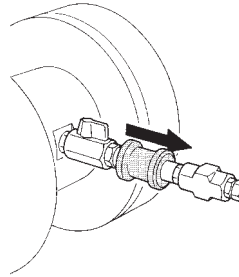
**If the pump has negative suction, reduce the speed of the pump using the ball valve on the air supply.**



**WARNING**

***In pumps with split manifold, DO NOT USE TWO FLUIDS WITH DIFFERENT VISCOSITIES as STALL, PREMATURE DIAPHRAGM AND PNEUMATIC CIRCUIT WEAR may occur.***

8. 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.***

Besides being damaging for the pump, cavitation is dangerous in a potentially explosive atmosphere: You must ascertain that the pump has been sized correctly. In case of doubt, please contact PIUSI.

**WARNING**

***ascertain that no anomalous noises occur during operation. If so, stop the pump immediately.***

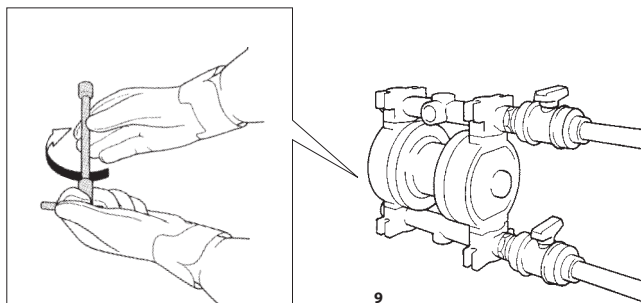
**WARNING**

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

**WARNING**

***In the case of high viscosity fluids, do not use under-sized filters or piping, especially on the intake side. Furthermore, you must decrease the pump speed by choking the volume of air whilst leaving pressure unchanged.***

After two hours of operation, and after stopping the pump correctly, check that all of the bolts are tight.



9

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



General  
Danger Sign



Danger  
Corrosive  
Material



Danger  
Flammable  
Material



Danger  
Explosive  
Material



Danger Toxic  
Material



Danger  
Incandescent  
Liquid  
Sprinkles



Prohibition  
on Open  
Flames' Use



No smoking

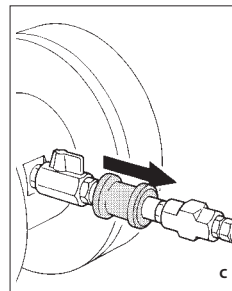
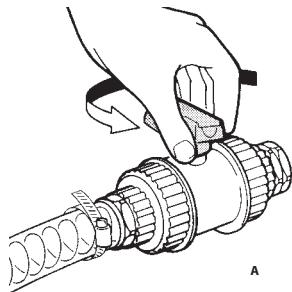
## P PRODUCT CIRCUIT MAINTENANCE

### WARNING

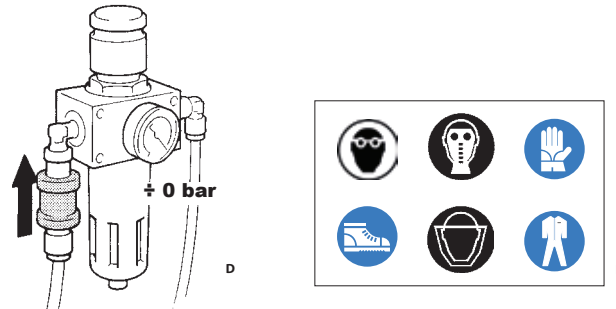


**before intervening on the pump and/or performing any maintenance or repair, you must:**

- 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. Wait for the pump to cool down for at least fifteen minutes;
- F. Perform the necessary operations while wearing protection gloves and any other appropriate personal protection equipment (face masks, gloves, closed shoes, etc.):  
**DANGER OF BURNING AND EJECTION OF LIQUID UNDER PRESSURE.**





**WARNING**

**remove deposits of powder from the external surfaces of the pump with a cloth soaked in suitable neutral detergents.**

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.
4. Periodically control and clean the internal surfaces with a damp cloth.

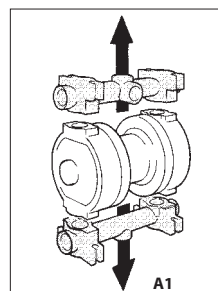
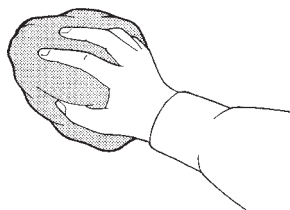
## **P1 CLEANING AND REPLACING THE BALLS AND BALLS SEATS**

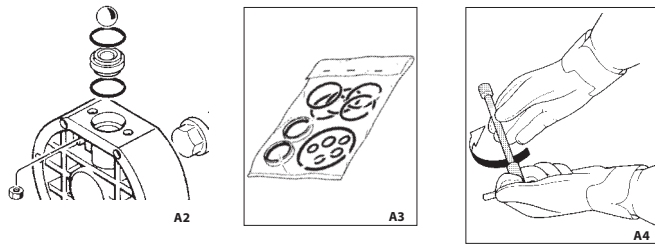
To clean and/or replace the balls and ball seats, proceed as follows:

**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.

**Cleaning and/or replacement of balls and ball seats finishes here. You can now reposition the pump and reconnect it as described in the previous sections.**

**P2 CLEANING AND REPLACING THE DIAPHRAGMS**

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 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. Fields 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 like exceeds 100,000,000 (one hundred million) cycles. For safety reasons, in environments at risk of explosion, the diaphragms must be replaced every 20,000,000 (twenty million) cycles.**

OBLIGATORY OPERATION	OPERATION TIME (nr. of cycles)		
	every 500.000	every 5 million	after 20 million
CONTROL AND INTERNAL CLEANING	•		
DIAPHRAGM CHECK	–	•	–
DIAPHRAGM REPLACEMENT	–	–	•

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**

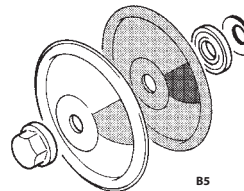
**ascertain that the inner part of the pump is free from all types of deposits, and if they are present proceed with their removal.**

B6. Reassemble the pump following the disassembly sequence described earlier in reverse order. Tighten the fixing bolts evenly.

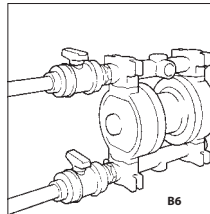
**WARNING**

**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.**

Replacing the diaphragms finishes here. You can now reposition the pump and reconnect it as described in the previous sections.



B5



B6

## Q AIR CIRCUIT MAINTENANCE

**WARNING**

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

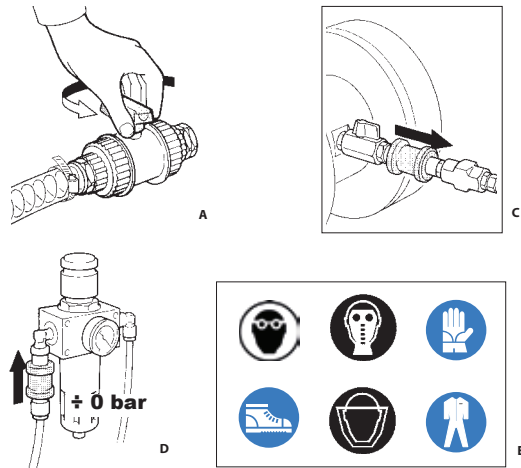
A. discharge the product being pumped and close the product on-off valves (both on the intake and delivery sides).

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.

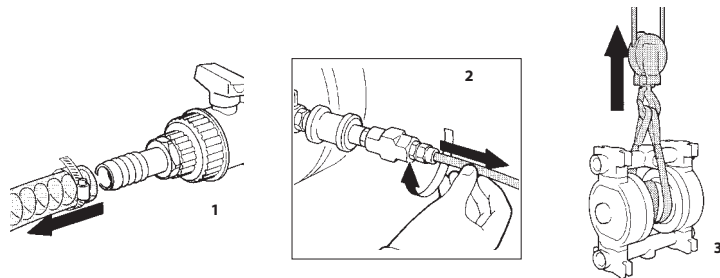


**WARNING**



**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.



**Q1 REPLACING THE COAXIAL PNEUMATIC EXCHANGER**

All Piusi MA and Piusi MP pumps have a coaxial pneumatic exchanger; to replace it proceed as follows:

**WARNING**



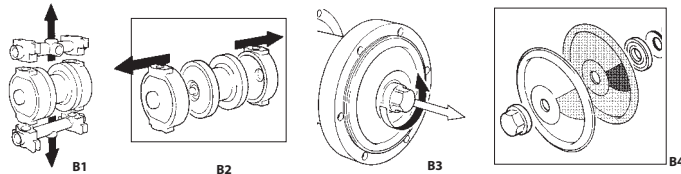
**Should the pump be returned to the manufacturer or to a service center, you must empty it out completely. If toxic, noxious or other types of dangerous products have been used, the pump must be suitably treated and washed before it is sent.**

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

B2. Disassemble the two pump casings by removing the relevant fixing screws.

B3. Remove the external diaphragm locking cap from both the circuits.

B4. Remove the diaphragms from both sides of the pump.



B5. Disassemble the pneumatic exchanger by removing the relevant fixing elements.

B6. Replace the exchanger and the connection shaft with original spare parts having the same characteristics.

B6.1 For pumps with manual reset on the main casing, the air exchanger must be placed so that the reference bevel is turned towards the resetting duct.

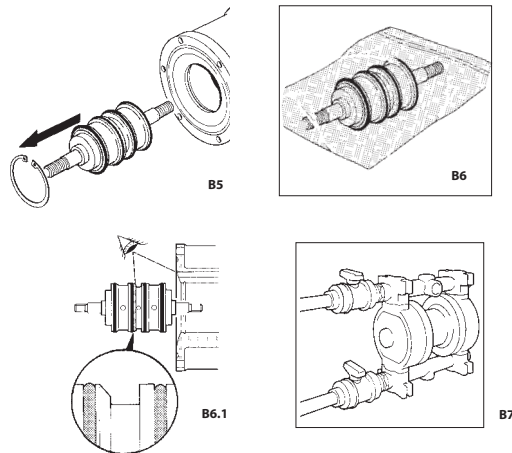
**WARNING**



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

B7. Reassemble the pump according to the previously described sequence but in reverse order and tighten the fixing bolts evenly.

**Replacement of the coaxial pneumatic exchanger finishes here. You can now reposition the pump and reconnect it as described in the previous sections.**



## R 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.



### WARNING



***For more serious problems, we strongly recommend that you contact the PIUSI SERVICE DEPARTMENT; our engineers will provide you assistance as quickly as possible.***

PROBLEM	POSSIBLE SOURCE	ADVICE
<b>The pump does not start</b>	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.
	Pump intake or delivery closed.	Disconnect intake and delivery hoses and check if the pump starts.
	Pneumatic exchanger damaged.	Replace exchanger; check whether the air discharge is obstructed by ice. If so, clear it. See air supply paragraph.
	Broken diaphragm.	Check if any air comes out from the product delivery pipe. If so, replace diaphragm.
	Pump stalled.	Reset (page 56).
<b>The pump runs but does not pump</b>	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.
	Intake side is obstructed.	Check and clean.

PROBLEM	POSSIBLE SOURCE	ADVICE
<b>Pump cycles are slow</b>	Fluid is too viscous.	No remedy.
	Delivery hose is obstructed.	Check and clean.
	Intake is obstructed.	Check and clean.
<b>Pump functions irregularly</b>	Internal pneumatic exchanger is worn or faulty.	Replace pneumatic exchanger.
	Shaft is worn.	Replace pneumatic exchanger.
	Ice on discharge gate.	Dehumidify and filter air.
	Lack of air flow.	Check all air control devices and in particular Snap-On couplings.
	Internal exchanger dirty.	Replace.
<b>The pump stalls</b>	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: see page 56, 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. WARNING: in 90% of cases, stall occurrences are caused by snap-on fittings.
	Faulty distributor.	Replace.
	Stop procedure not complied with.	Comply with stop procedure.
<b>Pump does not distribute delivery value stated on table</b>	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: see page 56. 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. WARNING: in 90% of cases, stall occurrences are caused by snap-on fittings.



## S DECOMMISSIONING

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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.***

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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%.***

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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.

## T DEMOLITION AND DISPOSAL

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The Piusi MA and Piusi MP 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.***

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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.***

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