VIP4Air/continuous air

Continuous Air Air-Oil Lubrication System

User and Maintenance Manual

Original text translation

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CE

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1. INTRODUCTION

This *User and Maintenance Manual* refers to **VIP4*Air/continuous air - Continuous Air Air-Oil Lubrication System***.
You can find additional copies and newer revisions of this document from our website http://www.dropsa.com. Alternatively contact one of our Sales Offices.
This manual contains important information on health and safety issues for the personnel. It is recommended to attentively read this manual and carefully keep it in good condition so that it is always available to personnel requiring to consult it.

2. GENERAL DESCRIPTION

The lubrication system **VIP4*Air /continuous air*** has been designed to guarantee high performance at low price and is characterised by compactness. It has been conceived for use on:

- spindles;
- machine tool;

The panel is composed of a central unit which manages the entire system regulating and controlling the operation of the dividing and mixing modules, which are made up of pneumatically controlled mini-pumps and the mixing bases. Mini-pumps can be arranged with different spacers in order to vary the flow rate and satisfy any requirement. A flow control is integrated inside the mixing base, which is used by the central unit to verify the correct functioning of the equipment.
Modularity makes the system extremely versatile: up to 8 mixing bases can be mounted on each unit.
The high technology allows a total control of the lubrication while the simplicity of installation makes unnecessary the use of movable connections.

3. PRODUCT-MACHINE IDENTIFICATION

Machine identification yellow label is located on the front side of the reservoir and contains product serial number, input voltage and details of the operating parameters.

4. TECHNICAL SPECIFICATIONS

Power supply voltage	24 VDC - 110 VAC
Electrical input	10 W
Air supply pressure	5 - 8 bar (73.5÷117.6 PSI)
Lubricant	Synthetic mineral Oil
Oil viscosity (at working temperature)	32÷220cSt (149.9÷1018 SUS)
Output signal	Remote alarm contact: max. 250 V 1 A NO/NC
Working temperature	+5 ÷ +55 °C (+41÷+131°F)
Working humidity	90% max.
Protection class	IP-44
Storage temperature	-20÷+65 °C (-4÷+149°F)

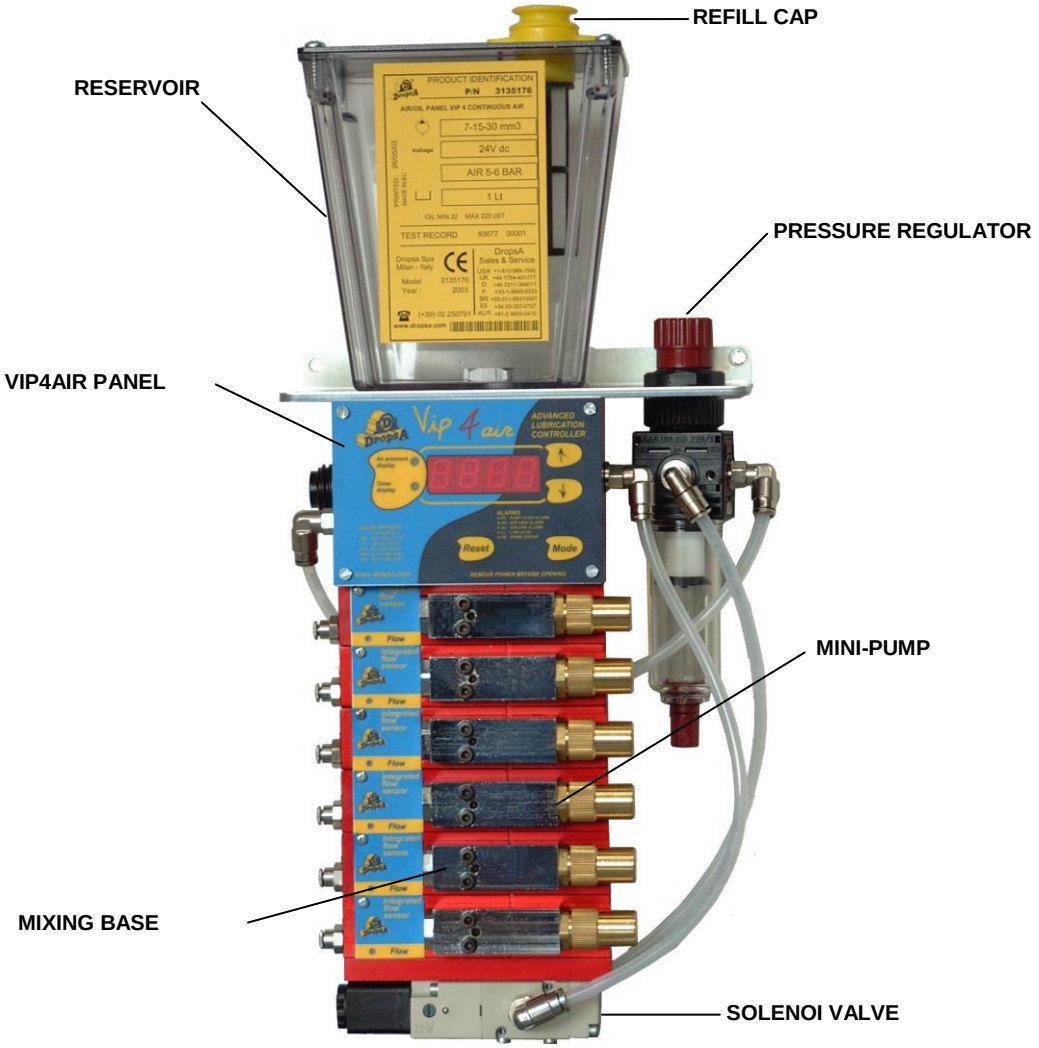
WARNING: ***Operate the unit only according to the input voltage and pressure indicated on the product label.***

5. PANEL COMPONENTS

5.1 VIP4*Air* CENTRAL UNIT

System central unit consists in the following components:

- ***Reservoir***, made of transparent plastic material;
- **Apparatus for air control**, made up of a pressure regulator on the side and a solenoid valve which stops pump control air-drive;
- ***Vip4Air Panel*** which manages and controls the entire lubrication process (time intervals, lubrication flow rate, air pressure and oil level). It also provides *priming* cycles (air venting).
- ***Pneumatic Mini-pumps*** (from 1 to 8 elements), extremely small-sized, which are assembled to the mixing bases. Provided with different spacers to change flowrate: 7-15-30 mm³/cycle.
- ***Mixing base with proximity sensor***. Mixing bases are integrated with a lubrication detector system and auto-setting sensor. This sensor does not require any regulation or calibration as it automatically adjusts according to the operative conditions and the type of lubricant. The detection system is interfaced with the VIP*4*Air panel mounted on the central unit, by means of an electrical connection completely integrated into the mixing base unit. In the event of anomalies, the central unit detects the error and the external alarm (a LED on the base itself) is activated.



6. UNPACKING AND INSTALLATION

6.1 UNPACKING

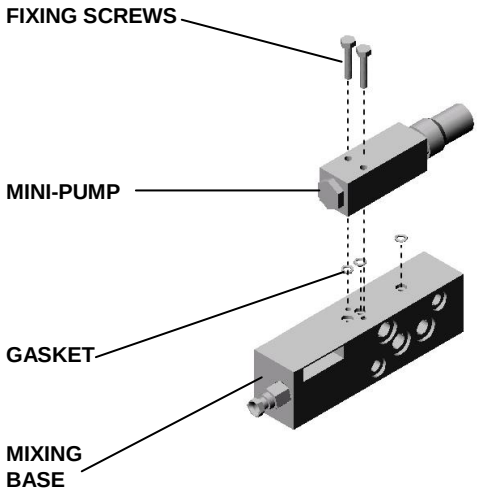
Once a suitable location has been found to install the unit, remove the panel from package. Check the unit has not been damaged during transportation or storage. No particular disposal procedures are necessary as package materials are no dangerous for health or environment. However, package should be disposed of in accordance with regulations that may be in force in your area or state.

6.2 INSTALLATION

- In order to facilitate maintenance interventions, to avoid unnatural posture for personnel during machine operation or the possibility of sustaining impacts, install the machine in a comfortable and easily reachable location.
- Allow sufficient space for the installation, leaving minimum 100 mm (3.9 in.) around the unit.
- Do not install the unit in aggressive or explosive/inflammable environments or on vibrating surfaces.
- To install the panel, use only the supplied bracket provided with two holes for screws Ø6.5 mm (Ø 0.25 in.), see *Dimensions ch.12*.

6.3 INSTALLING MINI-PUMPS ON THE MIXING BASES

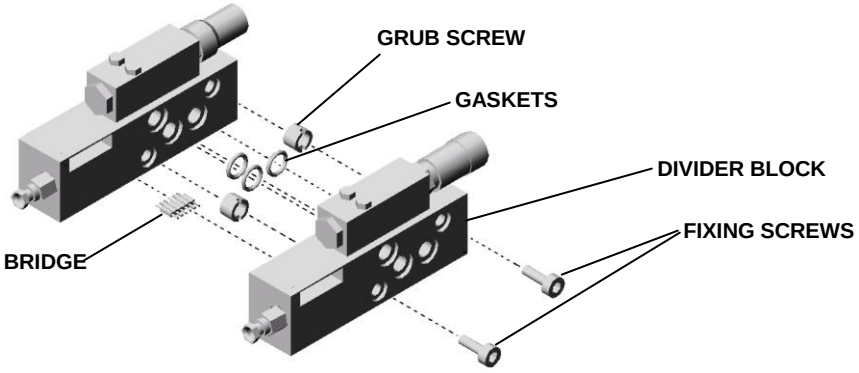
Mini-pumps are assembled to the mixing bases by means of two fixing screws. Be careful to correctly position o-rings between mini-pumps and mixing bases, as shown in the figure below:



6.4 ASSEMBLY OF THE MIXING BODY

To assembly a new mixing element, proceed as follows:

1. Disconnect the panel from power supply.
2. Empty the reservoir.
3. Disconnect the solenoid valve from the air supply system and unscrew the fitting screws from the plate.
4. Connect a new base via a bridge, paying particular attention to the alignment and then, assemble the unit using the two screws supplied for the purpose.
5. Screw the plate and put back in place the solenoid valve.



6.5 HYDRAULIC CONNECTION

Connect each pump (connection 1/8”) to the corresponding lubrication point.

6.6 PNEUMATIC CONNECTIONS (For the figure see Ch. 12)

Connect the air inlet to the solenoid valve push-in using a Ø8 mm (0.3 in.) nylon pipe. A check valve must be arranged in order to stop air supply.

6.7 ELECTRIC WIRING

WARNING!

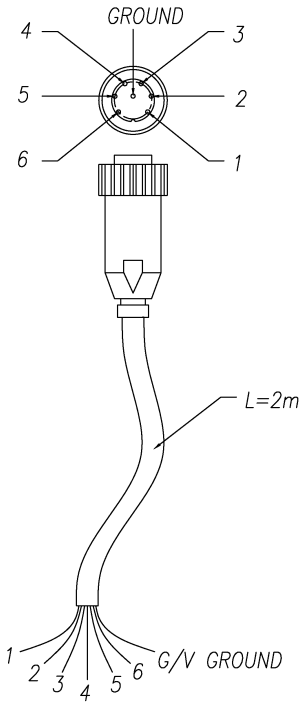
⇒ **Prior to any operation, verify the voltage on the label placed near the connector.**

⇒ **In order to prevent dangers of electric shocks due to direct or in direct contact with the excited parts, the electrical power supply line must be protected by a suitable magneto-thermal circuit breaker with an intervention threshold of 0.03 Ampere and 1 second minimum operating time. Circuit breaker power must be ≤ 10 kV nominal power In = 6 A**

⇒ **For safety reasons, connect the switch contact (N.O./N.C.)**

Interconnect the panel to the emergency switch of the slave machine.

LUBRICATION PANEL CONNECTOR



Pin/Wire	24V	110V
1	0 V	
2	24 VDC	/
3	/	110 VAC
4	Alarm NC	
5	Alarm Common	
6	Alarm NO	
⏚	Ground	

***NOTE:** The female connector must be purchased separately (see par. 11.2 SPARE PARTS AND ACCESSORIES)*

At the end of all connecting operations, make sure that pipes and wires are safe from impacts and carefully fixed.

7. INSTRUCTIONS FOR USE

7.1 PRIOR TO MACHINE START-UP

- ❑ Verify the unit is undamaged.
- ❑ Check that pneumatic, hydraulic and electric connections have been carefully carried out.
- ❑ Refill the reservoir with compatible lubricant.
- ❑ Verify power supply: MAX 220VAC.

RESERVOIR REFILL

Use ONLY compatible lubricant and refill the reservoir by means of the oil refill plug provided with a filter. Do not pour lubricant directly into the reservoir without using this oil refilling plug.

7.2 MACHINE START-UP

In order to avoid damage to the machine, the unit must be working when a minimum working temperature of +5°C (+41°F) is reached.

- ❑ Supply the machine with a proper pneumatic source.
- ❑ Start a lubrication cycle.
- ❑ Verify machine start-up.
- ❑ Setup machine parameters.
- ❑ Regulate the pressure.
- ❑ Verify machine correct operation: lubrication must be correctly carried out and according to parameters setup.

7.3 MACHINE OPERATION

Stage 1 – Initial Operation – Prime Mode

Press simultaneously **MODE and ↓ for at least 10 seconds**. The pump goes into the Prime mode, carries out a series of lubrication cycles (1 second of lubrication and 1 second of pause) for a duration of 10 minutes, necessary to vent air from the system.

When priming is completed, the panel carries out a further lubrication cycle to check lubrication functioning. If there are no alarms, it proceeds to Stage 3.

Stage 2 – Initial Operation - Set-up

Press the **MODE for 10 seconds** to enter the configuration menu to setup machine parameters for machine correct operation.

Stage 3 – Normal Operation

When the machine is switched ON a cycle is automatically activated. During the pause time the display shows alternately the time remaining of the cycle and the mixing air pressure. At the same time the LEDs at the side of the display are illuminated alternately.

By pressing the ↑ it is possible to freeze the **display** on the **mixing air pressure** reading until the button is released.

By pressing the ↓ it is possible to freeze the **display** on the **timer** reading until the button is released.

Stage 4 – Alarm Function

In the alarm mode the display starts blinking and displaying the error code (see **8.TROUBLESHOOTING**). When the conditions have been restored, to return to normal operation, press the **RESET** button.

7.4 PARAMETERS SETUP

To regulate all the parameters, start the panel, press **MODE for 10 seconds** to enter **SET-UP**. Press ↑ and ↓to setup the value (follow the instructions given in the table below) and **MODE** to save and go to the next option.

Parameter	Display	Description		Operative Range	Default
Cycle control time		Max time allowed to confirm oil delivery		**00-60 seconds**	5 s
Pump recharge time		Pause time for recharging the pump		**0.0-9.9 seconds**	1.5 s
Pause cycle		Interval of time between one lubrication cycle and another. Counter starts when lubrication delivery is confirmed		**00.00-99.59 minutes**	Care of customer
Inversion of solenoid control		Relay function: **1** for **NC**, **0** per **NO**		***WARNING*:** **DO NOT CHANGE**	1
N° of control elements		Number of elements with flow control installed. If the **0** is set, timeout must pass before pause		**0-99 elements**	MIN 1 MAX 8
Air pressure		**MAX**	Mixing air pressure MAX limit. **Alarm disabled** when entering a **null value**	**0÷7 bar** **(0÷103 psi)**	Care of customer
		**MIN**	Air pressure MIN limit.		Care of customer
System pre-cycle start-up		Number of cycles for system pre-lubrication start		**00-60** *NOTE: cycle setup number must be twice the required value.*	6
Fault cycles		Number of consecutive fault cycles needed to generate an alarm		**2-**	2
Minimum oil level		Alarm function for minimum oil level		Entering **0** an error is displayed but VIP*4*Air continues to operate. Entering **1** an error is signaled but equipment stops operating.	1
Alarm Status		Set the action to take after an alarm: 1 = stop the lubrication cycles 0 =Do not stop the lubrication cycles		Enter the desired values using the ↑ and ↓ keys.	1

8. TROUBLESHOOTING

WARNING: The machine can be opened and repaired by Dropsa personnel only.

The following diagnostic table indicates the main anomalies which may be encountered, the probable causes and possible solutions. **If you cannot solve the problem, do not attempt to disassemble parts of the machine but contact the Engineering Department of DROPSA S.p.A.**

ALARM	DESCRIPTION	CAUSE E INTERVENTO
A-PF **PUMP CYCLE** 	○ The flow sensor has not detected the correct dose	○ Air in the circuit causes an incorrect delivery. Carry out a Priming cycle. ○ Pump failure. Carry out Priming verifying the delivery of lubricant at the outlet. ○ Flow sensor faulty. Check the sensor electrical connections. Replace the sensor, if necessary. ○ Check the oil level.
A-AH **AIR HIGH** 	○ Air pressure too high	○ Check the pressure on the display and regulate it on the external reducer. To facilitate the operation press the ↓ key to freeze the display of air pressure. *Warning: the alarm depends on the value entered during set-up.*
A-AL **AIR LOW** 	○ Air pressure too low	
A-LL **OIL LEVEL** 	○ Oil level low	○ Refill the reservoir. *Warning: if the low oil level alarm function is not enabled, there will be an alarm signal but the equipment will not be stopped.*
A-PE **PRECYCLE** 	○ No pre-cycle reading	○ Air in the circuit causes an incorrect delivery. Carry out a Priming cycle. ○ Pump failure. Carry out Priming verifying the delivery of lubricant at the outlet. ○ Flow sensor faulty. Check the sensor electrical connections. Replace the sensor, if necessary. ○ Check the oil level.

9. MAINTENANCE PROCEDURE

The machine does not require any special tool for check or maintenance tasks. However, it is recommended the use only of appropriate and in good conditions tooling, protective devices (gloves) and clothing (626/94 and DPR 547/55) to avoid injury to persons or damage to machine parts.

WARNING:

- **Prior to any maintenance, be sure that power, hydraulic and pneumatic supplies are off.**
- **Before replacing mini-pumps, be sure the reservoir is empty.**

This unit has been designed and manufactured to require the minimum maintenance. Anyway, it is recommended:

- To keep the unit clean and periodically to check pipe joints to readily detect possible leaks.
- To replace refill filter when necessary.
- Periodically empty pressure regulator water trap by opening the red valve located in its base.

10. DISPOSAL

During maintenance or disposal of the machine care should be taken to properly dispose of environmentally sensitive items. Refer to local regulations in force in your area.
When disposing of this unit, it is important to ensure that the identification label and all the other relative documents are also destroyed.

11. ORDERING INFORMATION

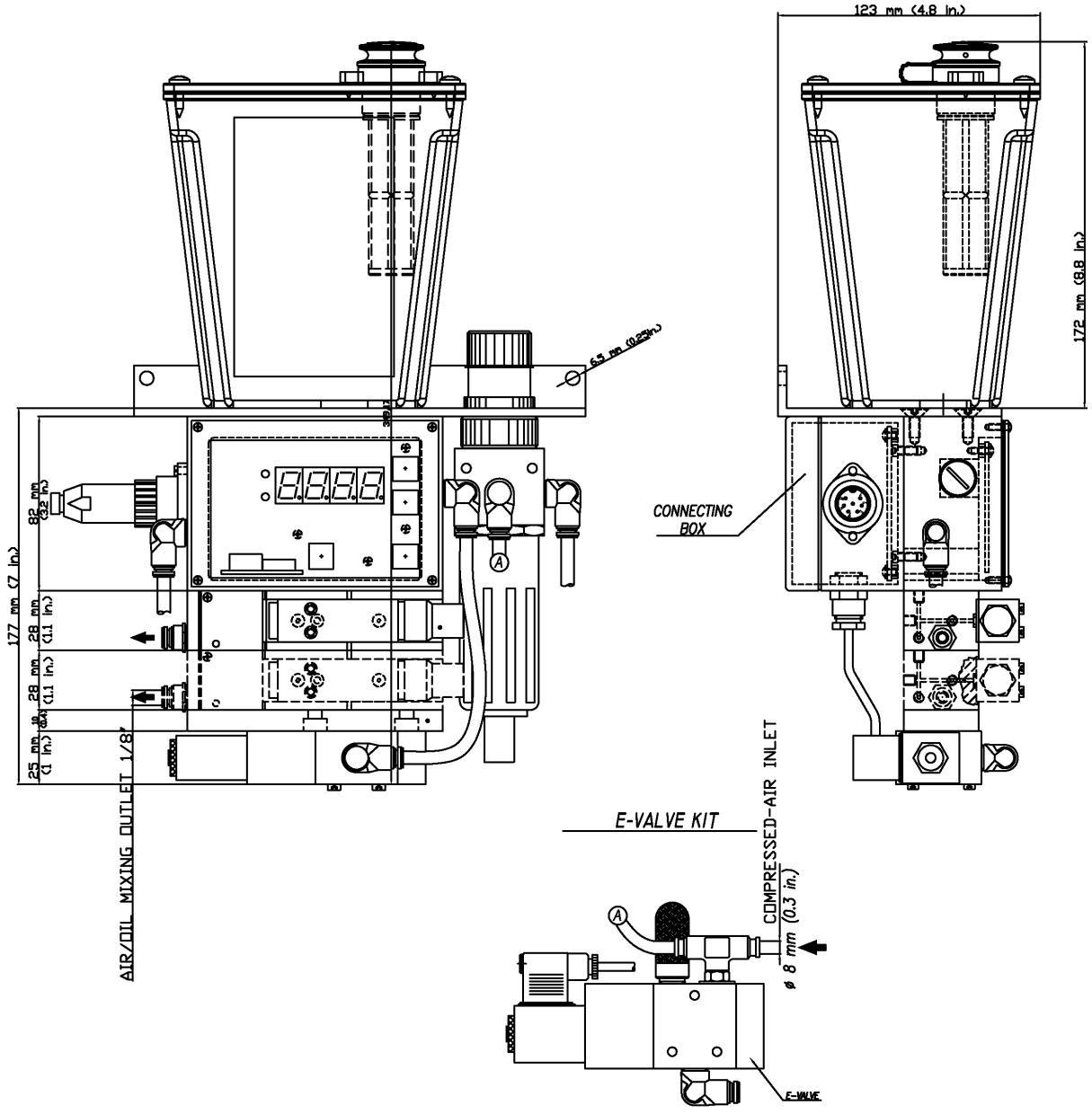
11.1 VIP4*Air*/continuous air

Number of mini-pumps	24V	110V
1	**3135171**	**3135201**
2	**3135172**	**3135202**
3	**3135173**	**3135203**
4	**3135174**	**3135204**
5	**3135175**	**3135205**
6	**3135176**	**3135206**
7	**3135177**	**3135207**
8	**3135178**	**3135208**

11.2 SPARE PARTS AND ACCESSORIES

PART NUMBER	DESCRIPTION
3044335	Reservoir
3130139	Oil refill filter
3155148	EV - 24VDC
3155149	EV - 110V/50 Hz AC
1524408	Mixing base with flow control
3103115C	Pneumatic mini-pump arranged with a set of washers + 2 screws 14067
5717300	Flex pipe Ø4 mm (0.15 in.)
5717301	Flex pipe Ø6 mm (0.23 in.)
5717302	Flex pipe Ø8 mm (0.3 in.)
1639111	Power supply connection box 24VDC
1639112	Power supply connection box 110VAC
1639115	Connector + cable (2 mt.)(6.5 ft) (optional)
3233188	Spacer 30 mm^3/cycle
3233191	Spacer 15mm^3/ cycle
3233193	Spacer 7 mm^3/ cycle

12. DIMENSIONS



Number of mini-pumps	A		Weight	
	(mm)	(in.)	(Kg)	(lb)
1	353	13	3.8	8.4
2	381	14.1	4.3	9.5
3	409	15.2	4.8	10.6
4	437	16.3	5.3	11.7
5	465	17.6	5.8	11.7
6	493	18.5	6.3	13.9
7	521	19.6	6.8	15
8	549	20.7	7.3	16

13. HANDLING AND TRANSPORTATION

Prior to shipping, the equipment is carefully packed in cardboard package. During transportation and storage, always maintain the pump the right way up as indicated on the box. On receipt check that package has not been damaged. Then, storage the machine in a dry location.

⇒ *Due to machine contained weight and size, it is not necessary the use of material handling equipment. The box is provided with handles.*

14. OPERATING HAZARDS

WARNING: ***It is necessary to carefully read about the instructions and the risks involved in the use of lubrication machines. The operator must know the machine functioning through the User and Maintenance Manual.***

Power supply

Any type of intervention must not be carried out before unplugging the machine from power supply. Make sure that no one can start it up again during the intervention. All the installed electric and electronic equipment, reservoirs and basic components must be grounded.

Flammability

The lubricant generally used in lubrication systems is not normally flammable. However, it is advised to avoid contact with extremely hot substances or naked flames.

Pressure

Prior to any intervention, check the absence of residual pressure in any branch of the lubricant circuit as it may cause oil sprays when disassembling components or fittings.

Noise

Pump does not produce excessive noise, less than 70 dB(A).

15. PRECAUTIONS

No particular operating hazards characterize the unit, except for the following precautions:

- Operator's **contact with lubricant** in case of piping breaking/opening or contact with the fluid during refill/maintenance. -> Protection against direct and indirect contact must be provided by the user: *the operator must be provided with suitable individual protective clothing and devices (tit VIII – 626).*
- **Unnatural posture.** See requirements in par. 6.2
- **Use of incompatible lubricant**. Main unauthorized fluids:

⇓

Fluids	Dangers
Lubricants containing abrasive components	Premature wear of pump
Lubricants containing silicon	Pump failure
Petrol – solvents – inflammable liquids	Fire – explosion –seal damage
Corrosive products	Pump damage - danger to persons
Water	Pump oxidization
Food Products	Contamination of the product