

# Lubrication System

## VIP4Air Panel User and Maintenance Manual

Original text translation

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## 1. INTRODUCTION

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This user and maintenance manual refers to the VIP4Air air/oil lubrication system.

This manual should be conserved in such a way that it remains undamaged over time and is readily available to personnel needing to consult it.

Further copies of this manual, updates or clarifications can be obtained by directly contacting the Technical Sales Office at Dropsa.

The manufacturer reserves the right to update the product and/or the user and maintenance manual without the obligation to revise previous versions. It is however, possible to contact the Technical Sales Office for the latest revision in use, or to consult our web site at <http://www.dropsa.com>.

The use of the equipment referred to in this manual must be entrusted to qualified personnel with a basic knowledge of mechanics, hydraulics and electrical systems.

It is the responsibility of the installer to use tubing suitable for the system; the use of inadequate tubing can cause problems with the pump, injury to persons and create pollution.

Loosening of connections can cause serious safety problems; carry out a check before and after installation and, if necessary retighten them.

Never exceed the maximum working pressure values permitted for the panel and the components connected to it.

Before any maintenance or cleaning operation disconnect the power supply, close off the air supply and discharge the pressure from inside the equipment and the tubing connected to it.

Do not subject the panel, the connections, the tubing or parts under pressure to violent impacts; damaged tubing or connections are dangerous and should be immediately replaced.

After long periods of inactivity check air tightness of all parts subjected to pressure.

Personnel must use personal protection equipment, clothing and tools adequate for the location and the use of the panel both during its operation and during maintenance operations.

The panel, and any accessories mounted on it, should be carefully checked immediately on receipt and in the event of any discrepancy or complaint the Dropsa SpA Sales department should be contacted without delay.

Dropsa SpA declines to accept any responsibility for injuries to persons or damage to property in the event of the non-observance of the information presented in this manual.

Any modification to component parts of the system or the different destination of use of this system or its parts without prior written authorization from Dropsa SpA will absolve the latter from any responsibility for injury to persons and/or damage to property and will release them from all obligations arising from the guarantee.

## 2. GENERAL DESCRIPTION

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The **VIP4Air** panel is to be utilized for 'on mandrel' applications and machine tools.

Designed for high performance at a low cost, it is distinguished by its compactness.

The system is composed of a central unit which controls and manages the entire system.

The central unit regulates and controls the functioning of the modular doses and mixers, which are composed of pneumatically controlled mini-pumps and the mixer bases. The mini-pumps can be fitted with a series of spacers in order to vary the flow rate so as to cover a wide range of needs. Integrated inside the mixer base is a flow control, which is utilized by the central unit to verify the correct functioning of the equipment.

The modular design of the system makes it extremely versatile; up to a maximum of **8** mixer bases can be installed.

The high technology utilized in this system permits a total control of the lubrication combined with a simplicity of installation without resorting to superfluous connections.

## 3. IDENTIFICATION OF THE MACHINE

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A yellow plate showing the product code, the supply voltage and the basic characteristics is mounted on the front of the oil tank.

## 4. TECHNICAL SPECIFICATIONS

CHARACTERISTICS	VIP4Air lubrication panel
Power supply voltage	24 V dc 110 V ac
Absorbed power	10 W
Air supply pressure	5 - 8 bar
Output signals	Remote alarm contact: max. 250 V 1 A NO/NC
Working temperature	-5 - +55 °C
Working humidity	90% max.
Protection class	IP-44
Admissible lubricants	Oil
Oil viscosity at working temp.	32 - 220 cSt
Conservation temperature	-20 - +65 °C

**WARNING: DO NOT** supply the machine with voltages or pressures other than those indicated on the specification plate.

## 5. DESCRIPTION OF COMPONENTS

### Central VIP4Air Unit

The central unit of the lubrication system is composed of the three elements:

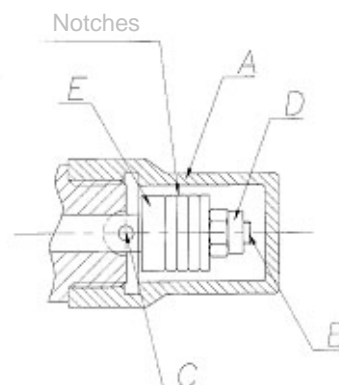
- a *Tank*, made of transparent plastic material, compatible with lubricants on the market.
- an *air control system* composed of a pressure regulator, applied laterally, and a solenoid valve, which can block the air flow.
- the *VIP4Air panel* manages and controls the entire lubrication process: the time intervals, the lubrication flow rate, the air pressure and the oil level. In addition it provides for priming cycles (air venting).

### Pneumatic Mini-pump

The mini-pumps employed are particularly small and are installed on the mixer bases. They can be fitted with a range of spacers which serve to vary the flow rate. The following table details how to recognize these and indicates the relative part numbers. To change the spacers proceed as follows:

1. Unscrew and remove the brass cap (A).
2. Rotate shaft (B) until the hole (C) aligns with the relative slot.
3. Insert a  $\varnothing 2$  mm tommy bar in hole (C).
4. Unscrew hex. nut (D) using a 5,5 mm spanner.
5. Slide off the spacer (E) and replace it with the required one.
6. Replace and fully tighten nut (D), remove the tommy bar and replace cap (A).

N° OF NOTCHES	FLOW RATE (mm <sup>3</sup> /cycle)	SPACER PART NUMBER
1	30	3233188
3	15	3233191
4	7	3233193



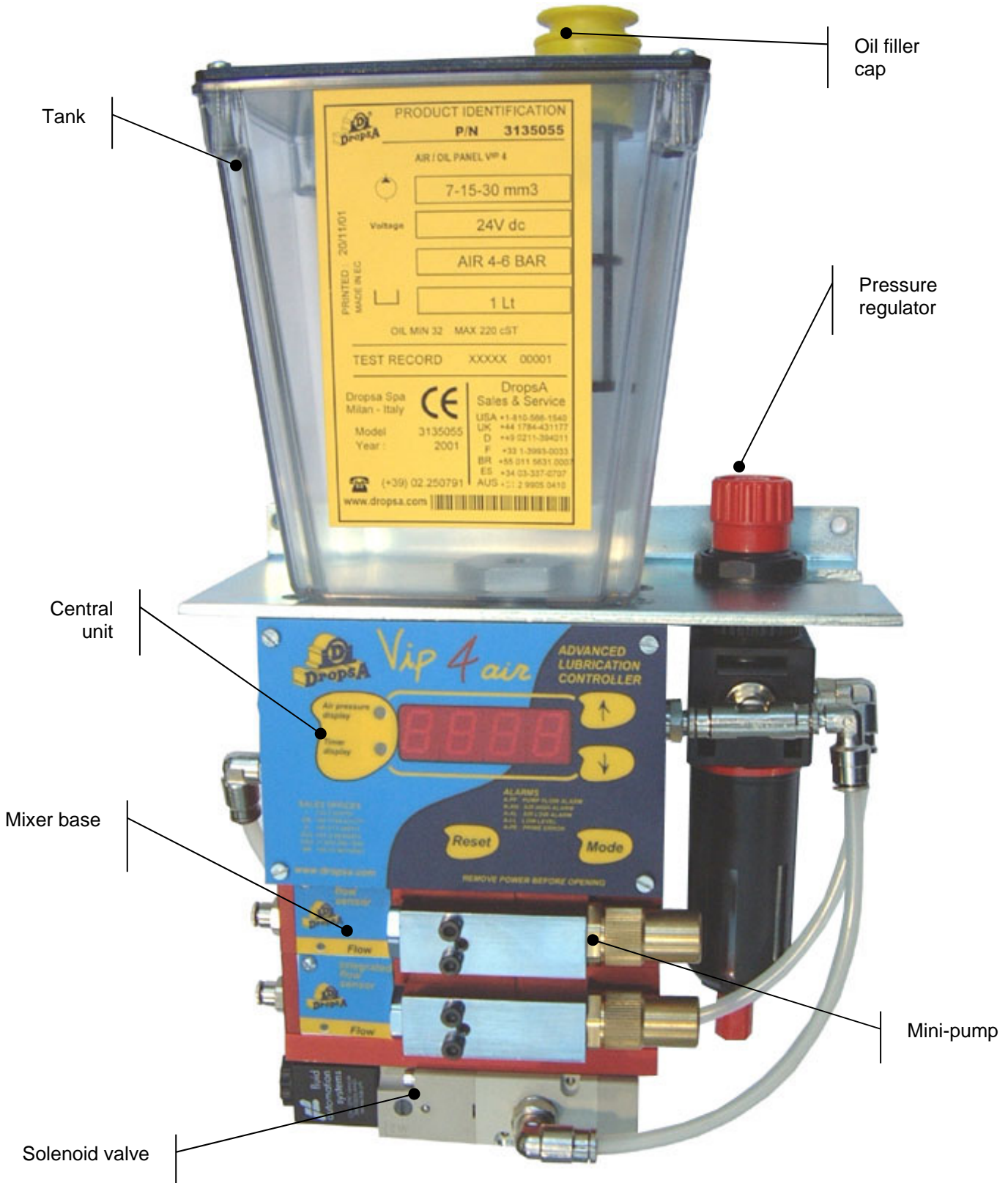
### Mixer base with flow rate sensor

In the mixer base there is an integrated lubrication detector system with a self-setting sensor. This sensor does not require to be regulated or calibrated as it automatically adapts to the functioning conditions and the type of lubricant.

The detection system is interfaced, by means of an electrical connection completely integrated into the mixer base, with the VIP4Air panel mounted on the central unit. Where an anomaly occurs this is detected by the central unit, which signals the error.

The functioning is also indicated by an LED mounted on the base itself.

When the VIP4Air starts a lubrication cycle, the LED located on the mixer base illuminates (ON) until the end of the lubrication cycle. During the pause the LED is not illuminated (OFF).



## 6. UNPACKING AND INSTALLING THE PUMP

### 6.1 UNPACKING

Once a suitable location has been identified for the installation, open the package and remove the equipment. Check that the VIP4Air has not sustained damage during transport and storage.

The packaging material does not require any special disposal precautions, not being in any way dangerous or.

### 6.2 MOUNTING THE VIP4Air PANEL

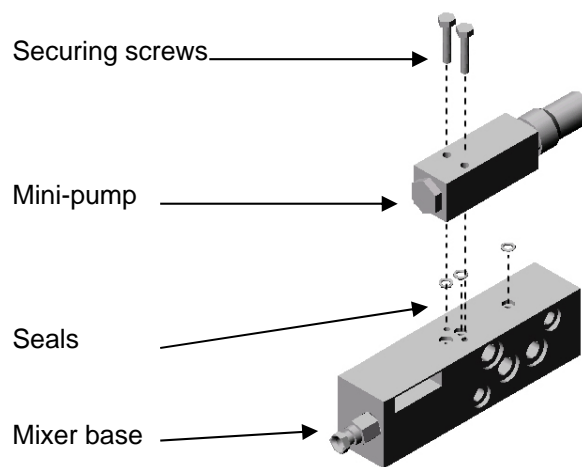
Provide adequate space for the installation, leaving a minimum room of 100 mm around the panel. Mount the VIP4Air panel at shoulder height to avoid unnatural posture or the possibility of obscuring the control panel or of sustaining impacts. Do not install the VIP4Air in particularly aggressive or explosive/flammable environments or on components subject to vibration.

Only use the supplied mounting bracket with N° 2 holes for  $\varnothing 6$  mm bolts.

### 6.3 MOUNTING THE MINI-PUMPS ON THE MIXER BASES (for replacement or augmenting)

The mini-pumps are mounted on the mixer bases utilizing two securing screws.

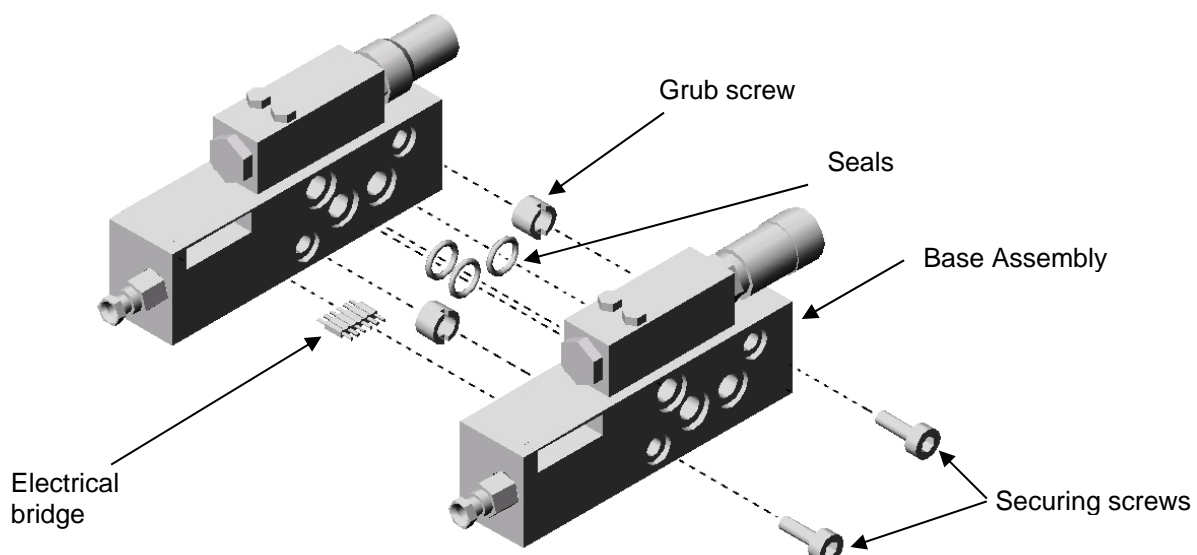
Particular attention should be paid to the correct positioning of the o-rings between the mini-pump and the mixer base (see diagram below).



### 6.4 MOUNTING THE DOSER ASSEMBLY ON THE PUMP (for replacement or augmenting)

To install a new mixer unit proceed as follows:

1. Disconnect the electrical power supply from the VIP4Air panel and empty the tank of oil.
2. Disconnect the air supply from the solenoid valve and remove the three securing screws.
3. Unscrew the screws which secure the blanking plate.
4. Connect the new base, inserting the electrical bridge, paying particular attention to the alignment. Secure the unit using the two screws supplied for the purpose.
5. Reposition the blanking plate and the relative solenoid valve.



## 6.5 HYDRAULIC CONNECTIONS

The only connection to be undertaken is that of the individual pumps, provided with push-in connections, to the lubrication point. The tubing must be in  $\varnothing 4$  mm nylon (obtainable from Dropsa).

## 6.6 PNEUMATIC CONNECTIONS

Connect the air input to the push-in connector of the solenoid valve utilizing  $\varnothing 6$  mm nylon tubing, and provide a stop valve to permit shutting off the supply.

## 6.7 ELECTRICAL CONNECTIONS

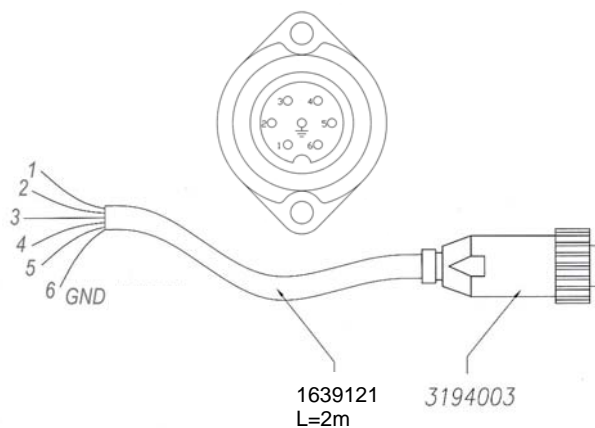
Before carrying out any operation check the type of supply necessary for the machine as shown on the label located near the connector.

The panel is to be interconnected with the emergency stop switch of the machine it is serving.

For 110 V supply the user must protect the installation with a magneto-thermic differential IN switch max. 2 Amp, I<sub>dn</sub> 0.03 Amp. For safety purposes the Alarm contact (NO/NC) must be connected.

For the electrical connections refer to the following diagram representing the lubrication panel connections.

**Note:** The female connector is purchased separately (see "Accessories")



**1639115** - Connect and Cable assembly 2 mt

Pin/Wire	24V Vers.	110V Vers.
1	0 V	
2	24 Vdc	/
3	/	110 Vac
4	NC Alarm	
5	Com. Alarm	
6	NO Alarm	
⊕	Ground	

**N.B.:** After all connections have been completed ensure the tubing and cables are protected from impacts and are suitably secured.

## 7. INSTRUCTIONS FOR USE

### 7.1 STARTING THE VIP4Air PANEL

Before using the VIP4Air panel, it is necessary to carry out some preliminary checks:

- check the integrity of the equipment
- check that the electrical and pneumatic connections have been effected correctly
- enter the data inside the VIP4Air Panel

### 7.2 METHOD OF FUNCTIONING

#### **Stage 1 – Initial function – Prime mode**

Simultaneously press the MODE and ↓ keys for at least 10 seconds. The pump goes into the Prime mode, executing a series of lubrication cycles, with 1 second of lubrication and 1 second of pause, necessary to eliminate all traces of air from the system, for an overall duration of 10 minutes.

At the end of this cycle, the Panel effects one lubrication cycle and carries out a verification of the lubrication. If there are no alarms it proceeds to Stage 3.

#### **Stage 2 – Initial function - Set-up**

Press the MODE key for 10 seconds to enter the configuration menu. All the basic functions necessary for the correct functioning of the equipment are entered during this Set-up function. To regulate see the paragraph on regulation.

### Stage 3 – Normal function

On switching on the cycle is automatically activated. During the pause time the display shows alternately the time remaining of the cycle and the mixer air pressure. At the same time the LEDs at the side of the display are illuminated alternately.

By pressing the ↑ key it is possible to freeze the display of the mixer air pressure reading until the key is released.

By pressing the ↓ key it is possible to freeze the display of the timer reading until the key is released.

### Stage 4 – Alarm function

In the alarm mode the display starts blinking displaying the error code (see the “troubleshooting” paragraph).

When the conditions have been restored, the RESET button must be pressed to return to normal functioning.

## 7.3 REGULATION

To regulate all the parameters, start the pump and press the MODE key for 5 seconds. Subsequently follow the instructions given in the table below.

Pressing the MODE key passes from one option to the next.

PARAMETERS	DISPLAY	DESCRIPTION	OPERATION	DEFAULT
Cycle control time	P-88	The max. time is set within which the delivery of lubricant must be confirmed. The range of regulation is 00-60 seconds	Enter the desired values using the ↑ and ↓ keys	5 s
Pump recharge time	C-88	Pause time for recharging the pump. The range of regulation is 0.0-9.9 seconds.	Enter the desired values using the ↑ and ↓ keys	1.5 s
Pause cycle	0000	Interval of time between one lubrication cycle and the next. The count commences when the delivery of lubricant is confirmed. Range of regulation is 00.00-99.59 minutes.	Enter the desired values using the ↑ and ↓ keys	User discretion
Inversion of solenoid command	P001	Relay function; 1 for NC, 0 for NO.	<b>Do not alter</b>	1
N° of control elements	Pn88	Number of elements installed with flow control. If the value 0 is set, before entering in pause (pause time), all the timeout time must pass. Range of regulation 0-99 elements.	Enter the desired values using the ↑ and ↓ keys	Min. 1 Max. 8
Max. air	P888	Max. limit of mixer air pressure. Entering the value 0 the alarm is disabled. Range of regulation 0.0-7.0 bar	Enter the desired values using the ↑ and ↓ keys	User discretion
Min. air	P188	Min. limit of air pressure. Range of regulation 0.0-7.0 bar.	Enter the desired values using the ↑ and ↓ keys	User discretion
Minimum oil level	EL-8	Alarm function for minimum oil level.	Entering the value 0 an error is displayed but the VIP4Air continues to operate. Entering the value 1 an error is signaled and the equipment stops.	1
System start pre-cycle	0005	Number of start cycles for system pre-lubrication. Range of regulation 00-60.	Enter the desired values using the ↑ and ↓ keys bearing in mind that the value of cycles entered must be double that of the desired value.	6
Cycles of fault	C800	Number of consecutive fault cycles needed for an alarm.	Enter the desired values using the ↑ and ↓ keys.	2
Alarm Status	AS01	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
Alarm coded	AC00	Set the option for alarm output: 1 = Coded alarm (see Phar. 8.1) 0 = Standard alarm	Set the value by ↑ and ↓ button	0

## 7.4 OUTLETS COMBINED FLOW DATA






8 outlets combined flow		Nylon Tube Ø 4x2,5	8 outlets combined flow		Nylon Tubo Ø 6x4	8 outlets combined flow		Nylon Tubo Ø 6x4
Air inlet (bar)	Air flow Nm3/h		Air inlet (bar)	Air flow Nm3/h		Air inlet (bar)	Air flow Nm3/h	
1	3,0		1	3,9		1	4,0	
2	5,5		2	8,2		2	8,4	
3	8,1		3	12,0		3	12,2	
4	11,3		4	16,3		4	16,7	
5	15,0		5	20,3		5	20,6	
6	18,3		6	22,2		6	22,6	
7	19,2		7	22,9		7	22,9	
8	20,5	8	23,4	8	23,4			



## 8. TROUBLESHOOTING

The following is a diagnostic table giving the main anomalies, the probable causes and possible solutions.

If, after consulting this diagnostic table, the problem remains unresolved, do not attempt to disassemble the machine looking for faults, but contact the Engineering Department at Dropsa with an as fully detailed description as possible of the anomaly.

DIAGNOSTIC TABLE FOR THE VIP4AIR PANEL		
ALARM SIGNAL	DESCRIPTION OF DEFECT	CAUSE/INTERVENTION
<b>A-PF</b> <b>Pump cycle</b> 	<ul style="list-style-type: none"> <li>The flow sensor has not detected the correct dose.</li> </ul>	<ul style="list-style-type: none"> <li>Presence of air in the circuit causing incorrect delivery. Carry out Priming cycle.</li> <li>Pump defective. Carry out Priming verifying the delivery of lubricant at the outlet.</li> <li>Flow sensor defective. Check the sensor electrical connections or replace it.</li> <li>Check the oil level in the tank.</li> </ul>
<b>A-AH</b> <b>Air high</b> 	<ul style="list-style-type: none"> <li>Air pressure too high (could be plugged air/oil line)</li> </ul>	<ul style="list-style-type: none"> <li>Check the pressure on the display and regulate it on the external reducer. To facilitate the operation press and hold down the ↑ key to freeze the air pressure display. The alarm depends on the value entered during set-up.</li> </ul>
<b>A-AL</b> <b>Air low</b> 	<ul style="list-style-type: none"> <li>Air pressure too low (could be broken air/oil line)</li> </ul>	<ul style="list-style-type: none"> <li>Check the pressure on the display and regulate it on the external reducer. To facilitate the operation press and hold down the ↑ key to freeze the air pressure display. The alarm depends on the value entered during set-up.</li> </ul>
<b>A-LL</b> <b>Oil level</b> 	<ul style="list-style-type: none"> <li>Low oil level</li> </ul>	<ul style="list-style-type: none"> <li>Add oil to the tank. Warning: if the low oil level alarm function is not enabled, there will be an alarm signal but the equipment will not be stopped.</li> </ul>
<b>A-PE</b> <b>Pre-cycle</b> 	<ul style="list-style-type: none"> <li>No pre-cycle reading</li> </ul>	<ul style="list-style-type: none"> <li>Presence of air in the circuit causing incorrect delivery. Carry out Priming cycle.</li> <li>Pump defective. Carry out Priming verifying the delivery of lubricant at the outlet.</li> <li>Flow sensor defective. Check the sensor electrical connections or replace it.</li> <li>Check the oil level in the tank.</li> </ul>

### 8.1 CODED ALARM

The VIP 4 air is able to send a warning coded to highlight the type generated alarm. You do it switching the alarm relay with 1s pulses and 5s pause parameters. Following table show the code alarm list of coded alarm (AC=1).

CODE	TYPE	ALARM SIGNAL
ALARM 01	LOW LEVEL	A-LL
ALARM 02	CYCLE TIMEOUT	A-AH
ALARM 03	BOOST WARNING	A-AL
ALARM 04	THERMAL PROT.	A-PE
ALARM 05	PS ALREDY ON	A-PF

## 9. MAINTENANCE PROCEDURE

The pump has been designed and constructed so as to reduce maintenance to a minimum.

To simplify maintenance it is recommended that the equipment be mounted in an easily reached location (**see paragraph 7.2**).

Periodically check the tubing connections for leaks. Always maintain the equipment in a clean condition in order that any leaks will be immediately evident.

When necessary replace the oil filling filter P/N 3130139.

Periodically empty the pressure regulator condensate trap by rotating the small red valve located at its base.

The machine does not require any special tools for carrying out checks and/or maintenance tasks. It is recommended that suitable tools and personal protection clothing (gloves) are used in accordance with Legislative Decree 81/2008 (Safety at Work legislation), and that they are in good condition in order to avoid injury to persons and damage to the machine.

**Ensure that electrical, pneumatic and hydraulic supplies are disconnected before undertaking any maintenance tasks.**

## 10. DISPOSAL

During the maintenance of the machine, or in the event of its being scrapped, do not discard polluting components in the environment. Refer to local regulations for their correct disposal. At the time of final disposal of the machine it is necessary to destroy the identification plate and all other documentation.

## 11. ORDERING INFORMATION

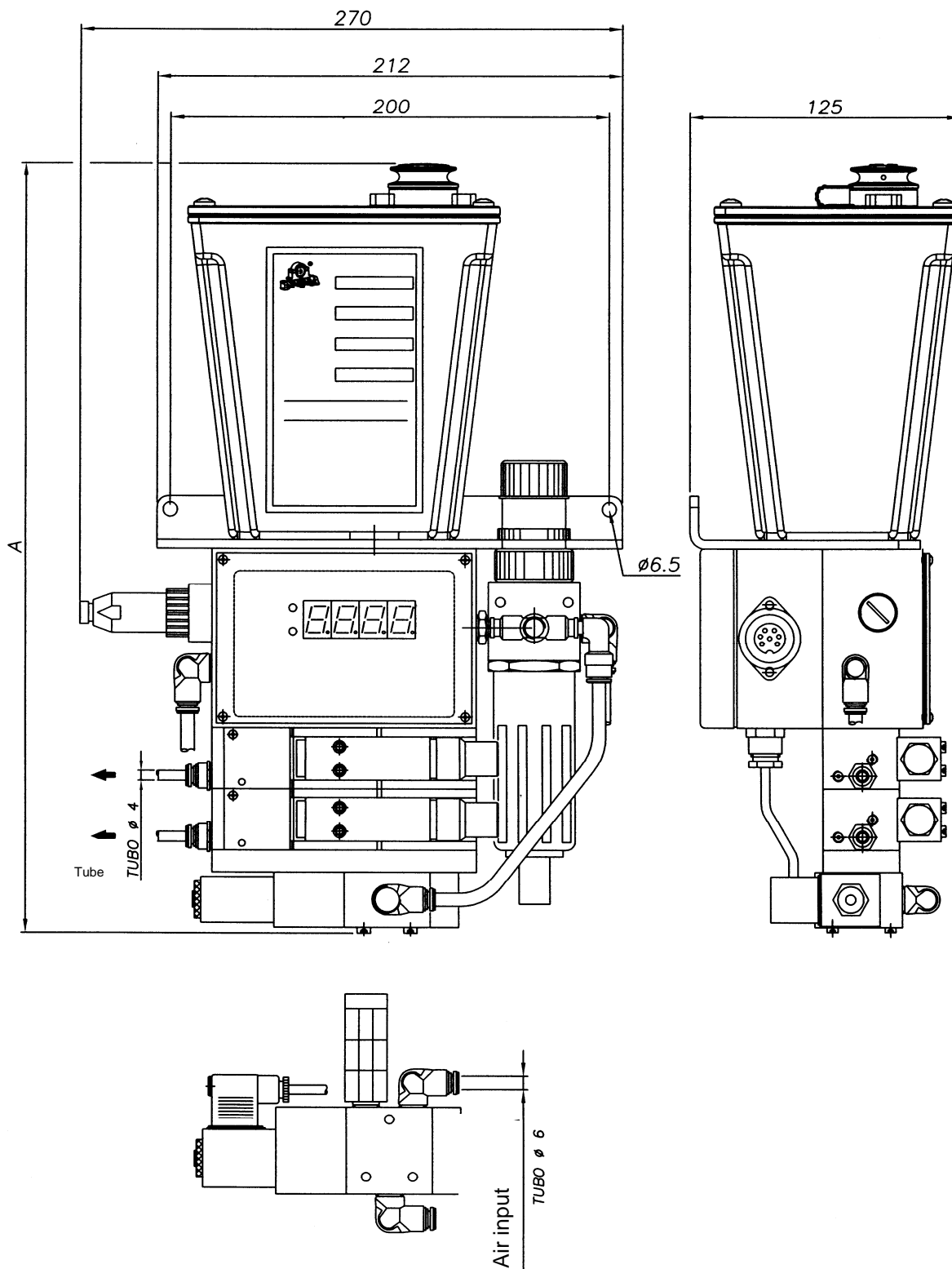
### VERSIONS

N° of Dosers	VIP4Air - 24 V dc	VIP4Air - 110 V ac
1	3135064	3135065
2	3135055	3135056
3	3135067	3135068
4	3135070	3135071
5	3135073	3135074
6	3135076	3135077
7	3135079	3135080
8	3135082	3135083

### ACCESSORIES

PART NUMBER	DESCRIPTION
3044335	Tank complete
3130139	Filter, filling, oil
3155148	Solenoid valve 24 V dc
3155149	Solenoid valve 110 V ac
1524408	Mixer base with flow control
3103115C	Mini-pump, pneumatic, complete with set of washers + 2 screws 14067
3233193	Washer for 7 mm <sup>3</sup>
3233191	Washer for 15 mm <sup>3</sup>
3233188	Washer for 30 mm <sup>3</sup>
5717300	Tube, flexible Ø4
5717301	Tube, flexible Ø6
1639111	Box, connection, power supply 24 V dc
1639112	Box, connection, power supply 110 V ac
1639115	Connector + connection cable (2 m)
3194003	Connector
3133283	Kit for 3103115 – 3103116 mini-pumps

## 15. DIMENSIONS



Number of elements	Height A (mm)	Weight (Kg.)
1	331	3.8
2	359	4.3
3	387	4.8
4	415	5.3
5	448	5.8
6	471	6.3
7	499	6.8
8	527	7.3

## 13. HANDLING AND TRANSPORT

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Prior to dispatch VIP4Air lubrication panels are carefully packed in a cardboard carton. During transportation and storage maintain the equipment the right way up as indicated on the carton.

On receipt, check that the packaging is not damaged and store the equipment in a dry place.

Given the lightness of the unit, lifting devices are not required for its handling. The box is fitted with suitable handling devices.

## 14. PRECAUTIONS IN USE

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It is necessary to carefully read the warnings and the risks involved in using the lubrication panel. The operator must understand the functioning of the unit by studying the user's manual.

### **Electric currents**

No intervention must be attempted on the equipment without first having disconnected the electrical power supply and ensuring that it cannot be reconnected during the intervention.

All installed equipment, electrical, electronic, tank and base structure, must be connected to the ground line utilizing the terminals fitted to each component.

### **Flammability**

The oil employed in the lubrication circuit is not normally flammable. It is nonetheless indispensable to take every precaution against the oil coming into contact with very hot parts or open flames.

### **Pressure**

Prior to any intervention on the equipment ensure that pressure is released from all branches of the lubrication circuit. Failure to do this could result in oil being discharged under pressure where connections or components are disassembled .

### **Noise**

The VIP4Air lubrication panel does not emit excessive noise, remaining below 70dB(A).

**WARNING: before carrying out the replacement of the mini-pumps, empty the tank of lubricant.**

## 15. CONTRAINDICATIONS

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The VIP4Air panel does not have any particular contraindications except for the following points:

- The operator coming into contact with fluid due to breakage/opening of supply tubing.

The operator must be furnished with suitable personal protection clothing/equipment.

- Abnormal posture.

Take note of the indications shown in **paragraph 10.2.**

- Contact with oil during filling/maintenance.
- Use of unsuitable lubricants.

Main inadmissible fluids.

Fluid	Danger
Lubricants with abrasive additives	High wear rate of contacted parts
Lubricants with silicon based additives	Seizure of the pump
Petrol – solvents – flammable liquids	Fire – explosion – damage to seals
Corrosive products	Corrosion of the pump– injury to persons
Water	Oxidation of the pump
Food substances	Contamination of the substances themselves