VIP4Air : Air/Oil
Micro-lubrication System.

Instruction & Maintenance Manual.

Automatic Lubrication Systems
WK 12/01
C2033IE

This manual conforms to the EEC Directive
89/392 Enc I, paragraph 1.7.4
1. INDEX

1. Index 2
2. Introduction 2
3. Machine Identification 2
4. General Description 2
5. Component description 3
6. Operating parameters 4
7. Transportation & storage 5
8. Disposal 5
9. Installation 5
10. Operating instructions 7
11. Maintenance 9
12. Precautions 9
13. Troubleshooting 10
14. Dimensions 11
15. Component list 12
16. Technical specification 12
17. Warranty 13
18. Declaration of Conformity 14
19. Distributors 15

2. INTRODUCTION

This operating and maintenance manual refers to the VIP4Air Air-Oil Micro-Lubrication System. It should be kept in a secure place in order that it may be referred to by the user. It is possible to obtain more copies of this manual or updated versions by contacting one of Dropsa's sales offices or via web site at http://www.dropsa.com

Dropsa reserves the right to update product specification or documentation without prior notice.

The use of the VIP4Air lubrication system and this manual requires personnel with only basic understanding of hydraulic, pneumatic and electrical systems.

Dropsa declines any responsibility for damage caused to persons or equipment in the event of non observance of the procedures and instructions outlined within this manual. Any changes or modifications to components must be carried out only with prior written authorization by Dropsa.

Note : This document does not contain parameters for calculating correct lubrication parameters for individual applications which should be carried out by a qualified Engineer. Varying lubrication parameters that have been set by your machine or bearing manufacturer may cause lubrication failure and void machine warranty.

3. MACHINE IDENTIFICATION

Located on the side of the oil reservoir, a yellow identification label indicates the device model, part number, voltage requirements and other basic characteristics.

4. GENERAL DESCRIPTION

The VIP-4-Air system is used for minimal Air/Oil spindle lubrication on machine tools. It has been designed in a reduced space-envelope over previous systems and has been integrated to include all the functions required in one unit, avoiding troublesome connecting pipework and wiring common on other such systems.

The system comprises of a main unit (the VIP4Air controller body) that controls all other components. Underneath this unit, one or more micro-pump modules and air-oil mixing devices can be assembled. The pneumatically operated micro pumps are available either with a fixed discharge or with a variable discharge option. Additionally installed on the base unit is a displacement flow-sensor which allows the control unit to have positive feedback that lubricant has been injected into the air-oil mixing chamber.

The modular concept provides great flexibility in installing different number of micropumps, types of discharges and allows expandability later if necessary.

The technology employed allows a total control of the lubrication cycle in addition to an unprecedented ease of installation with system connections taking place internally.
VIP4Air, Main Unit Reservoir & Controller
The main unit comprises of 3 main elements. The steel reservoir, located on the top, is compatible with the majority of lubricants available on the market and has a sight-level gauge for visual verification. The Air Filter-Regulator is located to the right of the main unit and has a solenoid to activate the airflow as necessary. The VIP4Air controller that controls and monitors the lubrication cycle is centrally located. The controller monitors the lubrication time-interval, lubrication flow, air pressures and oil level. It additionally provides priming facilities, diagnostic information and can communicate faults over the Profi-Bus Network (optional).
Pneumatic Micro-pumps
The compact micro-pump is available either with fixed discharge or variable discharge. Both are installed on the same base unit.

**Fixed Discharge**
The discharge on the fixed discharge micro pump is set by using different spacers on the air piston. This can be accessed by removing the protective covering cap located on the right hand side of the micro pump. The marking on the spacer reflects the discharge that the micro pump will then deliver.

**Variable Discharge Micro-pump.**
The variable discharge micro-pump is suited for application where the user requires to be able to easily vary the lubrication amount or lubricant ratio between one or more points. The adjustment is carried out by winding the red adjustment dial. Rotating the dial clockwise reduces the flow; anticlockwise increases the flow.

**Air/Oil Base-Mixing unit with flow sensor.**
The base unit can accommodate both the Fixed and the Variable Micro pumps. Integrated within the Air/Oil mixing base is an flow sensor that detects flow given by the micro-pumps. Each sensor has its own microprocessor that differentially calculates the conditions before and after the micro-pumps are activated. By using this technique, the unit does not require calibration of the sensor during commissioning, but adjusts itself automatically to conditions required transparently. The Sensors are interfaced with the main unit completely internally and do not require external wiring. In the event of a failure, the main Controller is notified of a sensor fault and the user can monitor the status of the sensor by the onboard LED

When the VIP4 controller initiates a lubrication cycle, the LED on the Air/Oil Mixing-Base will light until the completion of the lubrication cycle. Between lubrication cycles the **LED is not lit**

### 6. OPERATING PARAMETERS

#### 6.1 ENVIRONMENTAL CONDITIONS

- Operating Temperature range: -5°C +55°C
- Storage Temperature range: -20°C +65°C
- Relative Humidity: 90%

#### 6.2 POWER REQUIREMENTS

- 24 Vac. Part No.: 3135064, 3135055, 3135067, 3135070, 3135066, 3135057, 3135069, 3135072.
- 110 Vac. Part. No.: 3135065, 3135056, 3135068, 3135071
- Flow sensor: Positive feedback on discharge > 7 mm³
- Warning: Always check the model power requirements before wiring.

### 7. TRANSPORTATION & STORAGE

VIP4Air is packaged in a cardboard container. Ensure that there is no damage before proceeding with the installation. Avoid stacking boxes more than 1.5 meters high and follow any storage and transportation instruction indicated on the packaging. Store the product in a dry environment. No special handling equipment is necessary for this product.
8. DISPOSAL

During Maintenance or disposal of the unit, do not dispose of substances as normal waste. This applies particularly to lubricants which need to be removed from unit. It is important to refer to your local regulations or legislative requirements when disposing of such substances. When the unit is destroyed or taken out of service, the identification label must be destroyed or voided also.

9. INSTALLATION

9.1 UNPACKING

The unit should be removed from its packaging and inspected for damage in transit. **Do not attempt to operate the unit if you are in any doubt that it has been damage.**

The unit is designed to be applied to industrial machine tools in an indoor production environment. Packaging material does not require special disposal. Check your local regulation or legal requirements.

9.2 FIXING THE UNIT TO THE MACHINE.

Identify a suitable space for installing the unit on the machine which is easily accessible. Do not install the unit in particularly harsh or explosive/inflammable environments.

Always use the mounting bracket supplier by Dropsa.

9.3 INSTALLING THE MICRO-PUMPS ON THE MIXING BASE.

Two Fixing screws (included) are used to fix the pump to the mixing base as shown on the diagram below. Care must be taken to ensure that the O-rings are installed between the base and the micro-pumps during installation (also shown on the diagram).

9.4 ASSEMBLING THE MIXING BASES TOGETHER.

Insert the threaded insert into the first Mixing base and carefully place the O-Ring seals as shown in the diagram below. Place the next second mixing base along-side the first one making sure to fit the 4-pin male bridging connector. Ensure that the connectors are aligned and slot into each other. Use the fixing screws to fix the bases together.
The first base is assembled onto the VIP4Air controller in the same fashion with the omission of the Threaded inserts. Use the connector supplied.

After the last base is installed be sure to screw on the Blanking plate.

9.5 HYDRAULIC CONNECTIONS.

All Hydraulic connections are internal to the unit. No external connections are required.

9.6 PNEUMATIC CONNECTIONS.

Connect the air inlet using a 6mm nylon tube and each air/oil output using 4mm nylon tube to the lubrication points.

9.7 ELECTRICAL CONNECTIONS.

Ensure all signal and wiring is carried out according to the following diagram.
10. OPERATING INSTRUCTIONS

10.1 BEFORE USING THE VIP4 CONTROLLER

Before using the VIP4 Controller it is necessary to carry out the following:
- Verify the integrity of the unit.
- Check that the electrical wiring has been correctly completed.
- Check that the pneumatic connections have been completed.
- Set-up the operating parameters on the VIP4.

10.2 OPERATING MODES

**Mode 1A – Priming Function (Normal)**

Holding the MODE + DOWN key for 10 seconds sets the VIP4 Controller in Prime mode. During this mode the Controller will cycle the pumps at 1 second on and 1 second off intervals to purge air from the hydraulic circuit for 10 minutes. At the end of this priming mode the controller carries out a pump cycle and registers a priming fault if the flow sensors do not indicate that oil is being discharged from the Micro-Pumps (when connected). If no alarm exists then the VIP4 proceeds to Normal Operating Mode (Mode 3).

**Mode 1B – Priming Function (Fast Prime)**

Holding the MODE + UP key for 10 seconds sets the VIP4 controller in Fast Prime Mode. This mode is identical to Mode 1A apart from the ON/OFF intervals are reduced to 0.5 Seconds. Note: It is only possible to use this function if the air-solenoid is sufficiently dimensioned to allow the discharge of air from the micro-pumps.

**Mode 2 – SETUP / Programming Mode**

Holding the MODE key for 10 seconds sets the VIP4 Controller in SETUP Mode. In this the operator can set the desired operating parameters for the controller. The parameters are described in detail in the setup portion of this manual.

**Mode 3 – Normal Operating Mode**

The controller on power on enters normal Operating Mode. During this mode the 4 digit display will alternate between Timer and Air Pressure display. The LED’s next to the display indicates the parameter.

By pressing the UP key, the display will immediately show the Timer status until the key is released.

By pressing the DOWN key, the display will immediately show the Air Pressure until the key is released.

**Mode 4 – Alarm Mode.**

Following an operating or priming fault, the VIP4 enters Alarm Mode. In this mode, the 4 Display will flash and indicate a two-digit Alarm code. For more details see the “Troubleshooting” section of this manual. Once the condition has been cleared, press RESET to clear the alarm state and return to Normal Operating Mode.

10.3 PARAMETER SETUP

All the parameters are set in the Setup/Programming Mode. Hold the MODE key for 10 seconds to enter setup mode and use the following table to set the parameters.
<table>
<thead>
<tr>
<th>Parameter</th>
<th>Display</th>
<th>Description</th>
<th>Adjustment</th>
<th>Default</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pump cycle timeout</td>
<td><img src="image" alt="P-8-B" /></td>
<td>Number of seconds before the pump cycle completes and the flow sensors (if installed) must provide confirmation of lubricant discharge.</td>
<td>Set the desired time by using the UP and DOWN keys.</td>
<td>5 s</td>
</tr>
<tr>
<td>Pump reset time</td>
<td><img src="image" alt="C-8-B" /></td>
<td>The Number of seconds at the start of the pump cycles in which the solenoid is de-energized in order to allow the micro-pumps to reset. (increments of 0.0 – 9.9 seconds)</td>
<td>Set the desired time by using the UP and DOWN keys.</td>
<td>1 s</td>
</tr>
<tr>
<td>Pause time (*)</td>
<td><img src="image" alt="BBB" /></td>
<td>The time interval between lubrication cycles. The timer commences after the completion of the Pump cycle. Range 1 sec - 99 minutes.</td>
<td>Set the desired time by using the UP and DOWN keys.</td>
<td>20 min</td>
</tr>
<tr>
<td>Alarm Relay inversion parameter</td>
<td><img src="image" alt="PU-1" /></td>
<td>Set the operating condition of the output relay, 1 for NC, 0 for NO output.</td>
<td>Set the desired value by using the UP and DOWN keys.</td>
<td>1</td>
</tr>
<tr>
<td>Pump elements with flow control</td>
<td><img src="image" alt="Pn-B" /></td>
<td>Total Number of Pump elements installed with Flow Indication sensors. Range 0-99 Elements.</td>
<td>Set the desired time by using the UP and DOWN keys.</td>
<td>2</td>
</tr>
<tr>
<td>Air High</td>
<td><img src="image" alt="AH-B" /></td>
<td>The Maximum Air pressure allowed in the mixing elements before a Air-High Alarm is triggered. Range 0.0 – 7.0 Bar.</td>
<td>Set the desired pressure by using the UP and DOWN keys. Setting 0 Bar causes the Air High Alarm to be disabled.</td>
<td>2.5</td>
</tr>
<tr>
<td>Air Low</td>
<td><img src="image" alt="AL-B" /></td>
<td>The Minimum Air pressure allowed in the mixing elements before an Air-Low Alarm is triggered. Range 0.0 – 7.0 Bar.</td>
<td>Set the desired pressure by using the UP and DOWN keys. Setting 0 Bar causes the Air Low Alarm to be disabled.</td>
<td>1.5</td>
</tr>
<tr>
<td>Oil level</td>
<td><img src="image" alt="EL-B" /></td>
<td>Determines the VIP4’s behavior with respect to a Low Oil Level in tank condition</td>
<td>Setting 0 causes the VIP4 to indicate a Low Level Alarm but continue operation. Setting 1 Causes the VIP4 to indicate a low level Alarm and enter Alarm Mode</td>
<td>1</td>
</tr>
<tr>
<td>Power On Cycles</td>
<td><img src="image" alt="COS5" /></td>
<td>Number of 1 second priming cycles performed on power on of reset.</td>
<td>Set the desired value by using the Up and DOWN keys.</td>
<td>5</td>
</tr>
</tbody>
</table>
11. MAINTENANCE

The Micro-pumps and VIP-4Air have been designed to have only minimum maintenance. To facilitate maintenance it is recommended that the user installs the device in an easily accessible place. Periodically check that there are no air or oil leaks from the device and keep the device clean by wiping with a dry cloth. On a yearly basis, replace the suction filter P/n : 3130062. The VIP4 Control does not contain user replaceable parts and should not be opened by the user. No special instrumentation or tooling is required for the above maintenance. **Ensure that all power, hydraulic and pneumatic connection are removed before carrying out any maintenance.**

12. PRECAUTIONS

Ensure that all power, hydraulic and pneumatic connection are removed before carrying out any maintenance, installation or removal of the unit from the machine.

Varying lubrication parameters that have been set by your machine or bearing manufacturer may cause lubrication failure and void machine warranty.

Micropump replacement: the micropumps are gravity fall, it is therefore important that the unit has oil removed before replacing a micropump otherwise oil will drain out of the base unit until a new micropump is installed.
## 13. TROUBLESHOOTING

The following diagnostic tables shows the most probably faults, causes and possible solutions to problems.

In case of other problems or incorrect behavior of the controller please contact one of Dropsa’s Technical offices. Always have the part identification (on the yellow label), the machine the unit is connected to and any other information you may feel relevant when contacting our support staff.

<table>
<thead>
<tr>
<th>ALARM</th>
<th>DESCRIPTION</th>
<th>CAUSE/SOLUTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>A-PF</td>
<td>A Flow sensor has not triggered (Green Led)</td>
<td>Presence of Air in the hydraulic circuit causing a micro-pump to operate incorrectly. Try running one or more Priming Cycles.</td>
</tr>
<tr>
<td>Pump Fault</td>
<td>indicating a pump fault</td>
<td>A Pump unit has failed. Try running a priming cycle and check if oil is being discharged from the outlets.</td>
</tr>
<tr>
<td>A-AH</td>
<td>Air Pressure is too high</td>
<td>The Air Pressure is set too high or too low. Reduce the air pressure using the regulator or change the Air High / Low Parameter depending on your machine setup.</td>
</tr>
<tr>
<td>Air High</td>
<td></td>
<td>If the Air High or Low condition occurs during normal operation, it is likely that a blockage or leak has occurred on the tubing between the output and the lubrication points. Verify and repair as necessary.</td>
</tr>
<tr>
<td>A-AL</td>
<td>Air Pressure is too low</td>
<td>Check the oil level in the reservoir and top-up if necessary.</td>
</tr>
<tr>
<td>Air Low</td>
<td></td>
<td>Air could still be present in the hydraulic circuit. Try running another priming cycle. Use Normal priming Mode.</td>
</tr>
<tr>
<td>A-LL</td>
<td>Oil Low Level</td>
<td>Ensure there are oil or air leaks.</td>
</tr>
<tr>
<td>Low Level</td>
<td></td>
<td></td>
</tr>
<tr>
<td>A-PE</td>
<td>Priming Error</td>
<td></td>
</tr>
<tr>
<td>Prime Error</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Notes:**

Software Version 01 has the Minutes and Seconds as two separate menu options.
14. DIMENSIONS
15. COMPONENT LIST

PRE-ASSEMBLED UNITS:

<table>
<thead>
<tr>
<th>Component</th>
<th>Vip 4 air 24 Vca</th>
<th>Vip 4 air 24 Vca ProfiBus</th>
<th>Vip 4 air 110 Vca</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 point</td>
<td>3135064</td>
<td>3135066</td>
<td>3135065</td>
</tr>
<tr>
<td>2 points</td>
<td>3135055</td>
<td>3135057</td>
<td>3135056</td>
</tr>
<tr>
<td>3 points</td>
<td>3135067</td>
<td>3135069</td>
<td>3135068</td>
</tr>
<tr>
<td>4 points</td>
<td>3135070</td>
<td>3135072</td>
<td>3135071</td>
</tr>
<tr>
<td>5 points</td>
<td>3135073</td>
<td>3135075</td>
<td>3135074</td>
</tr>
<tr>
<td>6 points</td>
<td>3135076</td>
<td>3135078</td>
<td>3135077</td>
</tr>
</tbody>
</table>

COMPONENTS:

<table>
<thead>
<tr>
<th>PART NUMBER</th>
<th>DESCRIPTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>3044312</td>
<td>Reservoir</td>
</tr>
<tr>
<td>3244000</td>
<td>Air filter</td>
</tr>
<tr>
<td>3155148</td>
<td>Solenoid 24 V</td>
</tr>
<tr>
<td>3155149</td>
<td>Solenoid 110 V</td>
</tr>
<tr>
<td>1524409</td>
<td>Closing plate</td>
</tr>
<tr>
<td>3130062</td>
<td>Suction filter</td>
</tr>
<tr>
<td>3050254</td>
<td>Fixing plate</td>
</tr>
<tr>
<td>1524408</td>
<td>Mixing Base with Flow Sensor</td>
</tr>
<tr>
<td>3103115</td>
<td>Micro-pump Fixed Discharge with the complete set of ring</td>
</tr>
<tr>
<td>3103116</td>
<td>Micro-pump Variable discharge.</td>
</tr>
<tr>
<td>3233193</td>
<td>Ring for 8 mm³</td>
</tr>
<tr>
<td>3233191</td>
<td>Ring for 15 mm³</td>
</tr>
<tr>
<td>3233188</td>
<td>Ring for 30 mm³</td>
</tr>
</tbody>
</table>

16. TECHNICAL SPECIFICATION

<table>
<thead>
<tr>
<th>CHARACTERISTIC</th>
<th>VIP4 Controller</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage</td>
<td>24 Vac</td>
</tr>
<tr>
<td></td>
<td>110 Vac</td>
</tr>
<tr>
<td>Power Consumption</td>
<td>10 W</td>
</tr>
<tr>
<td>Air Pressure requirements:</td>
<td>5 – 7 bar</td>
</tr>
<tr>
<td>Output Signals:</td>
<td>Alarm Relay Contact 250V max 1 A (NC / NA)</td>
</tr>
<tr>
<td>Working Temperature</td>
<td>-5 °C + 55 °C</td>
</tr>
<tr>
<td>Humidity</td>
<td>90% max</td>
</tr>
<tr>
<td>Isolation Class</td>
<td>IP-54</td>
</tr>
</tbody>
</table>

17. WARRANTY

We guarantee for a period of 12 months from the date of the original purchase, that this equipment is free of defects in material and work man ship.

We agree to repair or replace, at our opinion, any part or parts, found to be defective, at no change, provided said part or parts are returned, transportation prepaid, within guarantee period.

This agreement excludes evidence of defects caused by abnormal use.
18. DECLARATION OF CONFORMITY

Manufacturer:

DROPSA SpA

Company name
Via Croce, 1 - 20090 Vimodrone (MI)
Address
02 – 250791
Phone number

It's certified that

The machine: VIP 4 Air Air – Oil Lubrication Panel

- Is built in compliance with the INSTRUCTIONS OF THE EUROPEAN COMMUNITY COUNCIL regarding the drawing of the legislation of the member states in relation to machinery EMC (89/336/CEE) and BT (73/23/CEE) and related updates.
- Is built in compliance with the following rules and harmonized technical specifications EN 292/1, EN 292/2, EN 50081-2, EN 50082-2, CEI EN 60204-1.

Technical Director
Ing. Walter Divisi

Responsible for product

DROPSA SpA - Vimodrone (Mi) - Italy

Company name

Signature
February 2001

Date
19. DISTRIBUTOR

Dropsa Corporation
50679 Wing Drive
Utica, Michigan 48315, USA
Tel: (+1) 810-566-1540
Fax: (+1) 810-566-1541
E-mail: salesusa@dropsa.com

Dropsa (UK) Ltd
Unit 6, Egham Business Village,
Egham, Surrey, TW20 8RB
Tel: (+44) 01784 - 431177
Fax: (+44) 01784 - 438598
E-mail: salesuk@dropsa.com

Dropsa S.p.A.
Via B. Croce,1
20090 Vimodrone (MI) Italy.
Tel: (+39) 02 - 250.79.1
Fax: (+39) 02 - 250.79.767
E-mail: sales@dropsa.it (Export)
E-mail: vendite@dropsa.it (National)

Dropsa GmbH
Volmerswerther Strasse 80
40221 Dusseldorf 1, Deutschland
Tel: (+49) 0211-394-011
Fax:(+49) 0211-394-013
E-mail: sales@dropsa.de

Dropsa Ame (Industrie)
23, Av.des.Morillons
Z.IND. des Doucettes
95140 - Garges Les Gonesse
Tel: (+33) 1-3993-003
Fax: (+33) 1-3986-2636
E-mail: sales@dropsa.com

Dropsa do Brazil
Rua Sobralia 175  Santo Amaro,
Sao Paulo, Brazil
Tel: (+55) 11 56310007
Fax: (+55) 11 56319408
E-mail: salesbr@dropsa.com

Poly Dropsa S.A.
Av. Fabregada 26 - Pje Est.2
08907 L'Hospitalet de Llobregat
Barcelona
Tel: (+34) 03-337-0707
Fax: (+34) 03-338-7198
E-mail: sales@dropsa.it

Dropsa Australia Pty.
No. 7 Warringah Road
Dee Why
NSW 2099
Tel: (+61) 2 9905 0410
Fax: (+61) 2 99394142
E-mail: sales@dropsa.com

Web site: http://www.dropsa.com - email: sales@dropsa.com