

## VIPAIR 4.0

### USER AND MAINTENANCE MANUAL TRANSLATION OF ORIGINAL INSTRUCTIONS



Manual drafted in compliance  
with EC Directive 2006/42 and EU Directive 2014/30

C2386IE WK 08/24

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# 1. INTRODUCTION

## 1.1. GENERAL INFORMATION

Please read this manual carefully and keep it in a safe place so that it is always available to operators who wish to consult it.

Through this manual we want to provide you with all the important information for the safety of the people involved in the installation, use, maintenance and disposal of the VIP Air 4.0 air/oil lubrication system.

If the component is sold, rented out or loaned for use, the manual must be delivered to the new user together with the EC declaration of conformity.

Please read this manual carefully and keep it in a safe place so that it is always available to operators who wish to consult it. It is forbidden to carry out any operation on the components before having carefully read and understood all the instructions contained in this manual.

The images contained in this manual are for illustrative purposes and are not binding for the Manufacturer who reserves the right to make changes to components and/or parts for improvement purposes or for other reasons without updating this manual if they do not alter operation and safety of the system.

## 1.2. MANUFACTURER'S DATA

DropsA S.p.A.  
Via Benedetto Croce, 1  
20055 – Vimodrone (MI) – ITALY  
Telephone +39 02 250 791  
Fax +39 02 250 79 767  
E-mail: sales@dropsa.it  
Website: www.dropsa.com

## 1.3. IDENTIFICATION PLATE

On the device support plate there is a label showing the product code and its basic characteristics.

	<p style="text-align: center;"><b>WARNING</b></p> <p style="text-align: center;">It is forbidden to remove the pump name plate.</p>	
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## NOTICE

The pump includes some components made from alloyed metals which have a lead content (CAS 7439-92-1) < 0.35% by weight. See disposal chapter 10.1 for details

## 1.4. HOW TO CONSULT THIS MANUAL

For a better understanding of the information provided in this manual, warnings or instructions considered critical or dangerous are highlighted with the following symbols: It is important to read this manual before performing any operation. We recommend that you comply with the safety regulations of the country in which the equipment is installed and employee specialised personnel in the various maintenance, use, installation, etc. necessary during the life of the equipment.

This manual uses safety indications and symbols in accordance with the ANSI Z535, ISO 3864 and ISO 7010 standards listed below:

WARNING TABLE			
WARNING	DAMAGE TO	DEFINITION	CONSEQUENCES
 <b>HAZARD</b>	People	Indicates a hazardous situation that, if not avoided, will certainly cause death or serious injuries.	Death or severe, paralyzing injury.
 <b>WARNING</b>		Indicates a hazardous situation that, if not avoided, could cause death or serious injuries.	Possible death or serious injuries.
 <b>CAUTION</b>		Indicates a hazardous situation that, if not avoided, could cause mild or moderate injuries.	Possible mild or moderate injuries
 <b>NOTICE</b>	Property	Indicates practices not related to personal injury. Tips or other information.	Damage to things and not to people

SYMBOL TABLE					
HAZARD		PROHIBITION		OBLIGATION	
	General hazard		General prohibition		General obligation
	Laser beam hazard		No smoking or use of open flames		It is mandatory to read the instructions
	Electricity hazard		Do not enter with watches and metal objects		It is mandatory to use hearing protection
	Hot surface hazard		Do not touch		It is mandatory to use eye protection
	Vessel under pressure hazard		Do not extinguish with water		It is mandatory to ensure earthing
	Danger of crushing hands				It is mandatory to disconnect the power
	Danger explosive area				Protective gloves must be worn

## 1.5. PERSONNEL QUALIFICATION

To ensure that all operations performed on the device take place in safe conditions, the operators in charge of operations must have the qualifications and requirements to carry out the related operations.

The operators are classified as follows:

### 1.5.1. FIRST LEVEL OPERATOR:

unqualified personnel, i.e. without specific skills, able to perform only simple tasks.

### 1.5.2. MECHANICAL MAINTENANCE OPERATOR:

qualified technician able to intervene on the mechanical parts to carry out all necessary adjustments, maintenance and repairs. This operator is not authorised to work on electrical systems in the presence of voltage.

### 1.5.3. ELECTRICAL MAINTENANCE OPERATOR:

qualified technician in charge of all electrical interventions. This operator can operate in the presence of voltage inside cabinets and junction boxes.

## 2. SAFETY

### 2.1. GENERAL WARNINGS

This manual must be read before carrying out any operation on the device. We recommend that you comply with the safety regulations of the country in which the device is installed and employee specialised personnel in the various maintenance, use, installation, etc. necessary during the life of the equipment.

The main rules of conduct to be observed to work with a good level of safety are as follows:

- The operations of installation, use, maintenance, etc. must always be carried out by qualified and trained personnel.
- Always wear the required personal protective equipment.
- Carry out all the cleaning, adjustment and maintenance operations making sure that all the energy supplies are isolated.
- Install the device away from passageways to prevent it from being hit or damaged.
- Do not install or use the device in classified area other than that indicated on the device's plate.
- Do not direct jets of water against electrical parts, even if they are protected by casings.
- Do not work while carry out work or maintenance operations.
- Check the signs and pictograms applied to the device; if they are damaged inadvertently, immediately replace them with identical ones.
- Check the chemical compatibility of the materials from which the device is made with the fluid to be pumped. In addition to damage to the devices and pipes, incorrect selection of fluid could cause serious risks for people (leakage of irritating and harmful products) and for the environment.
- Do not exceed the maximum operating pressure allowed by the device and the components connected to it. If in doubt, consult the data on the machine plate.
- Only use original spare parts.
- If it is necessary to replace components with others, make sure they are suitable for operating at the device's maximum working pressure.

DropsA S.p.A. disclaims any liability for damage to persons or property resulting from improper use of the device, from tampering with its safety equipment or from non-compliance with workplace safety regulations.

### **WARNING**



It is necessary to read the equipment's User and Maintenance Manual to know the risks of use.



## 2.2. RESIDUAL RISKS

Hazards which have not been completely eliminated but are deemed acceptable are indicated below, together with their respective countermeasures:

<b>⚠ CAUTION</b>		
		
When filling the lubricant, use protective goggles and gloves to avoid direct contact. Before any operation, check the absence of residual pressures in each branch of the lubricant circuit.		
<b>⚠ WARNING</b>		
	Use only suitable lubricant. The characteristics are shown both on the device and in this User and Maintenance Manual (if in doubt, contact the DropsA S.p.A. Technical Department):	
<b>⚠ DANGER</b>		
	Disconnect the power supply before any intervention, making sure that no one can reconnect it. All installed equipment (electrical and electronic), tanks and basic structures, must be connected to the earth line.	 
<b>⚠ DANGER</b>		
	The lubricant used in lubrication circuits is flammable at temperatures >250°C. Avoid contact with hot parts or naked flames.	

## 2.3. PICTOGRAMS

Pictograms with warning and safety symbols for operators are applied on the lubrication system. Read carefully and familiarise yourself with the symbols and their messages before using the system.

DropsA s.p.a. declines all liability for damage to persons or property due to failure to comply with the rules indicated by the pictograms or their imperfect conservation.

## 3. MACHINE DESCRIPTION

The device consists of a main module that manages the cycles of each output completely independently and communicates the status of the entire system via IO-Link. Furthermore, with the IoT connectivity via the DropsA.app platform The main module can manage up to 4 mixing bases (8 outlet mini-pumps) and has an on-board lubricant level sensor with which it is possible to detect the percentage of liquid in the tank.

The system can operate in 2 modes:

- One fully autonomous, allowing stand-alone installation with remote diagnostics via IO-Link and IoT
- One in IO-Link mode, for remote management of the entire product via PLC

You can use the parameters to select when the system should lubricate; this can occur when the external input pulses are reached or when the set time expires or in both modes.

When one of the two counts is reached, the oil dispensing of the mini-pumps is activated and then the lubrication counts are reset.

The output on the device is also configurable via the parameters and can be set as "System Status", "Refilling" or independent management via IO-Link command.

### 3.1. INTENDED USE AND PROHIBITED USE

#### 3.1.1. INTENDED USE

The VIPAIR 4.0 has been developed for mandrel and machine tool applications.

#### WARNING



The device has been designed to operate with oils with a maximum grade of 220cSt.  
Use lubricants compatible with NBR seals.  
Any residual lubricant used for assembly and testing is 32 cSt.



For further information on the technical characteristics and safety measures to be adopted, consult the Product Safety Data Sheet (EEC Directive 93/112) relating to the type of lubricant chosen and supplied by the manufacturer.

#### 3.1.2. PROHIBITED USE

#### WARNING



Any use other than that for which the device was built represents an abnormal condition and, therefore, can cause damage to the pump and be a serious danger to the operator.



Below are a series of operations, relating to the improper use of the device, which are not permitted under any circumstances.

- Do not operate the device empty, in the absence of oil.
- Do not modify the product or replace its parts without the manufacturer's written authorisation.
- Use the pump only in industrial installations, any other use of the machine is prohibited.
- Do not use the pump in conditions other than those indicated in this user and maintenance manual.
- Do not use the pump in an explosive or aggressive atmosphere or with a high concentration of dust or oily substances suspended in the air.
- Do not carry out modifications, repairs or maintenance work on the pump on your own initiative. Maintenance work may only be carried out in accordance with the provisions of this manual.
- Do not use non-original spare parts or parts that are not provided by the Manufacturer.
- Do not use the device to pump substances other than those indicated. The use of unauthorized materials can damage the pump, degrade its performance or reduce its useful life.
- Do not expose the pump to rain, steam, excessive humidity or direct sunlight.
- Do not install the pump in rooms subject to possible flooding.
- Do not place or store the pump near flammable or combustible materials or substances.

#### FLUIDS THAT ARE NOT PERMITTED

FLUIDS	HAZARDS
Lubricants with abrasive additives	Wear of the components inside the pump
Lubricants with silicone additives	Seizing of the pump
Petrol – solvents – inflammable liquids	Fire – explosion – damage to the gaskets
Corrosive products	Pump corrosion - damage to people
Water	Pump oxidation
Food substances	Contamination of the same

For more detailed information regarding product compatibility with particular fluids, contact the DropsA S.p.A. Technical Office.

### 3.2. SOUND EMISSIONS

In normal working conditions, the emission of sound does not exceed 70 dB "A" at a distance of 1 meter (39.3 inches) from the module.

### 3.3. TECHNICAL CHARACTERISTICS

TECHNICAL FEATURES		
Operating voltages	VDC	24 ±10%
Maximum current	A	2
Supply air pressure	bar	5 - 8
Minipump flow rate(2)	mm <sup>3</sup> /cycle	7 - 15 - 30
Operating temperature	°C [°F]	-5 - +50 [23 - +122]
Operating humidity	%	90 max
Degree of protection	IP	65
Lubricants (1)		Oil
Oil viscosity at working temperature	cSt	32 - 220
Storage temperature	°C [°F]	-20 - 65 [-4 - +149]
Air supply		Ø8 hose
Air/oil outlets		Ø4 hose
Digital inputs	No.	1
Digital outputs	No.	1
Power supply/IO-Link connector		M12x1 – 4 Male Pin
Signal connector		M12X1 – 4 Female Pin
Digital output		24V DC – 0.5A
Digital input		24 V DC
Hardware features		Protection from polarity inversion on the power supply

#### TECHNICAL SPECIFICATIONS IO-LINK SIGNALS

INPUT - Signals		Independent command for each air outlet Independent oil supply command Clear alarms (Reset) Output signal command
OUTPUT – Tank level	%	0 - 100
OUTPUT - Air outlet pressure	Bar	0 - 10 (±1% FS)
OUTPUT - Signals		System status Solenoid valve status Signal of oil supply completed Status/refilling signal

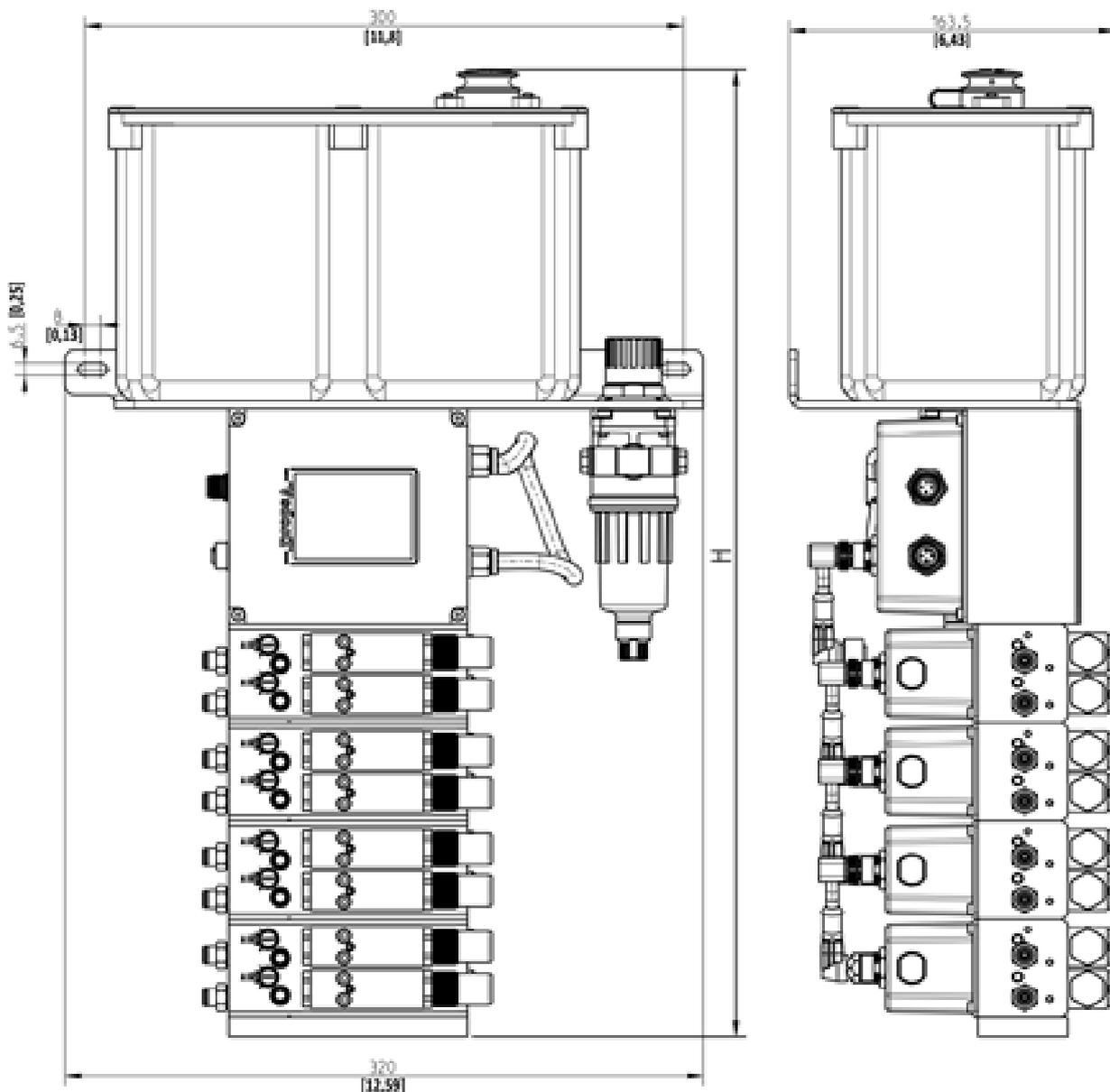
Note: Specifications refer to an operating temperature of +20°C (+68°F)

(1) If a different product is to be used, the suitability for use must be requested from DropsA S.p.A.

(2) To change the flow rate of the mini-pump, see par. 5.1.2

# 4. DIMENSIONS

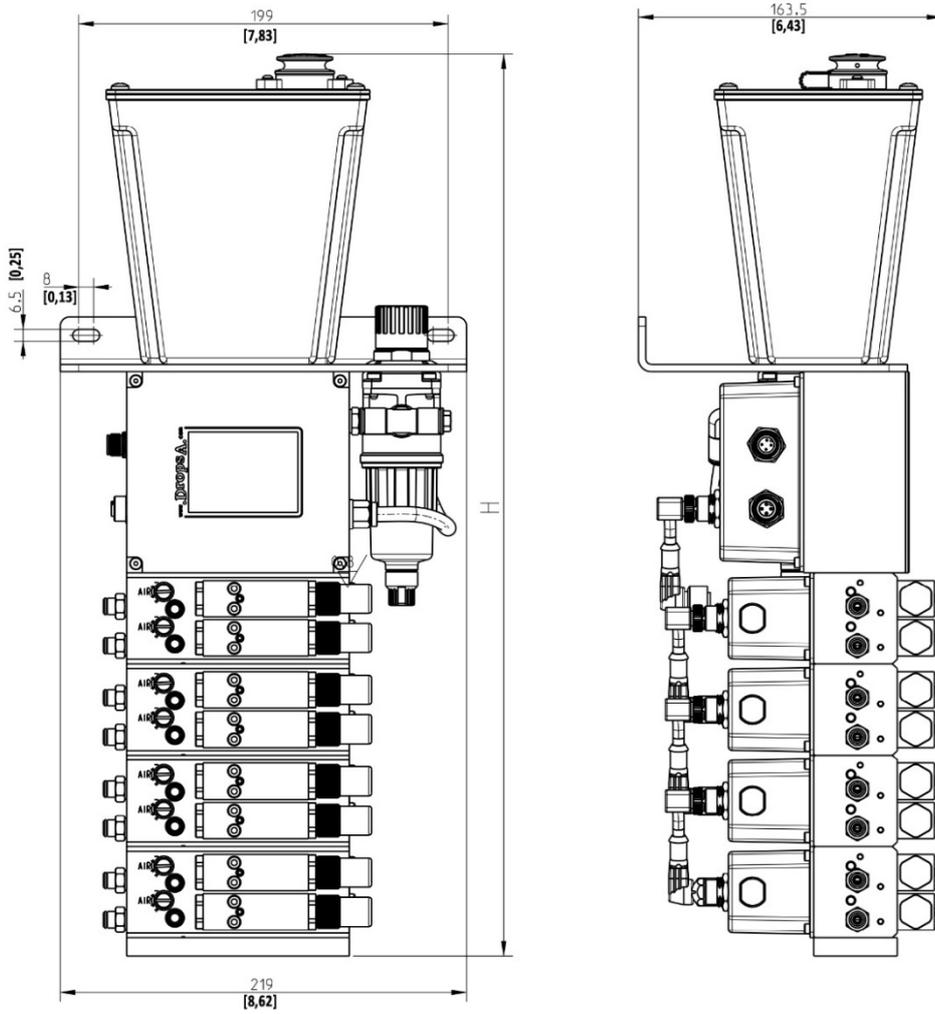
## 4.1. MODEL SA 3L



"H" HEIGHT
344 [13.5]
394 [15.5]
444 [17.5]
494 [19.4]

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## 4.2. MODEL SA 2L

**"H" HEIGHT**

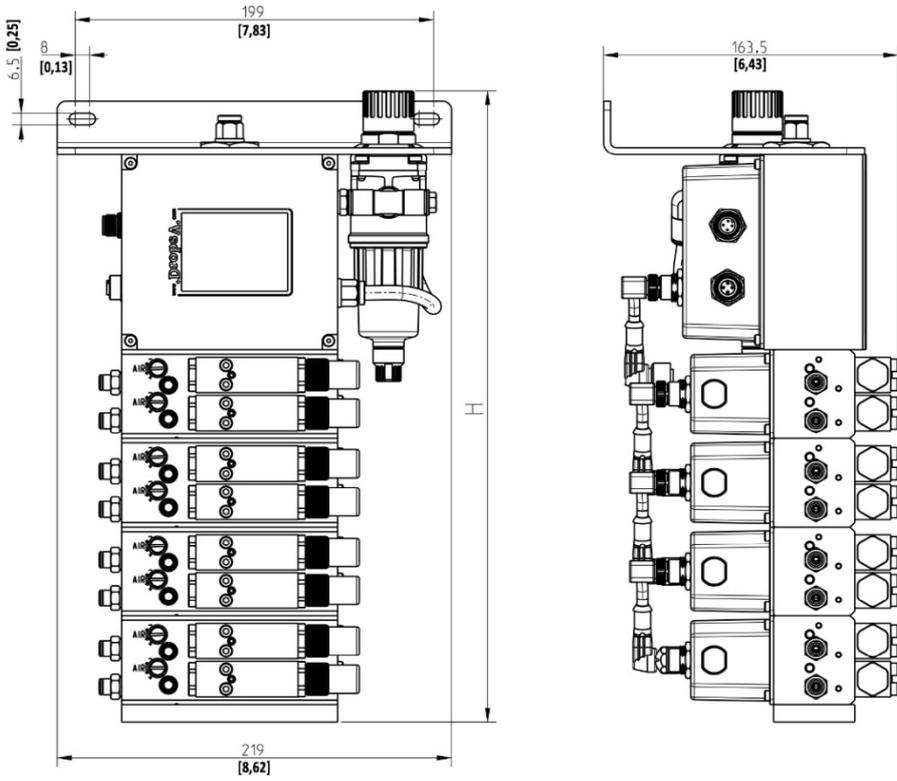
343 [13.5]

393 [15.5]

443 [17.4]

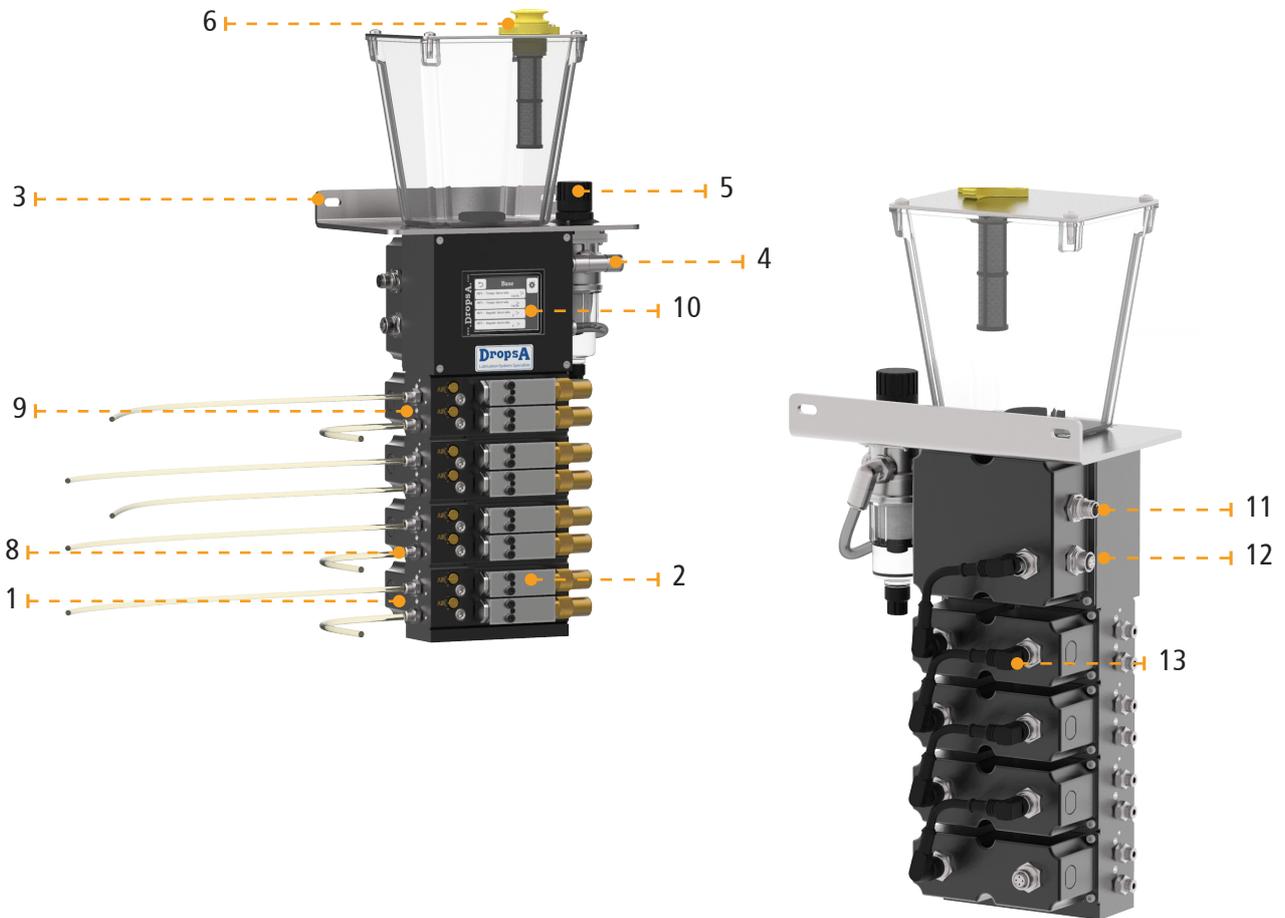
493 [19.4]

### 4.3. MODEL RM-SA



"H" HEIGHT	
206	[8.1]
256	[10]
306	[12]
356	[14]

## STANDARD SYSTEM PARTS



## STANDARD PARTS

1	Sub-base	8	Air/oil OUTLET - Ø4 hose
2	Minipump	9	Oil level sensor purge screw
3	Support bracket	10	Display
4	Air inlet - Ø8 hose	11	Power supply connector (PWR Conn.)
5	Inlet pressure adjustment	12	Inlet and outlet connector (I/O Conn.)
6	Oil filler with filter	13	Power cable and communication with sub-bases (MP Conn.)
7	Additional air adjustment at outlet		

## 5. INSTALLATION

### 5.1. RECEIPT AND CHECKING OF THE CONTENTS

On receipt of the VIPAIR 4.0 system, check that the packaging is intact or for obvious signs of damage due to transport or storage conditions. If everything is intact, unpack and check the pump.

Otherwise, in the case of damage to the packaging, immediately inform the transport agent and manufacturer.

Always check that the material received corresponds to that indicated on the consignment note.

The packaging must be opened using all precautions to avoid damage to people or the contents of the same.

### 5.2. PACKAGING

Before shipping, the VIPAIR 4.0 system is carefully packed in a cardboard box.

When transporting and storing the equipment, pay attention to the orientation indicated on the box itself.

Do not burn or disperse the packaging components into the environment.

### 5.3. TRANSPORT AND HANDLING

Upon receipt, check the packaging for damage and store the equipment in a dry place.



#### CAUTION

Lift the equipment taking into consideration the direction shown on the cardboard package. During storage, ensure that the ambient temperature is between -40 and + 65 °C (-40-149F). Before starting, wait until the pump has reached a temperature of -5°C (+ 23F).

Given the light weight of the equipment, its handling does not require the use of lifting equipment. The box is equipped with special gripping devices.

### 5.4. STORAGE

Empty the oil from the VIPAir 4.0 system and close the inlet and outlet with the appropriate protections. The VIPAir 4.0 system must be stored in its packaging and stored in covered, dry, protected places not exposed to direct sunlight and at temperatures within the range indicated in the technical features table.

### 5.5. ENVIRONMENTAL CONDITIONS

The VIPAir 4.0 system must be installed and used in a covered and sufficiently lit room.

The installation area must meet all the requirements regarding heights, air changes and comply with the requirements imposed by current legislation.

#### 5.5.1. TEMPERATURE

The required ambient working temperature values are shown in the technical features table.

#### 5.5.2. LIGHTING

All areas must be lit with uniform lighting and sufficiently to ensure all the operations provided for in the manual, avoiding shadow areas, glares and eye strain.

## 5.6. INSTALLATION

There are no foreseen module assembly operations. The modules are equipped with a wall mounting plate. Provide adequate spaces (as per installation diagram) to avoid abnormal postures or the possibility of collisions. Install the modules away from passageways to prevent them from being hit or damaged. Subsequently it is necessary, as previously described, to make the hydraulic and pneumatic connection of the modules and then to carry out the connection to the control panel. Once all connections have been made, turn on the air solenoid valves and adjust the air flow rate using the screw provided.

## 5.7. HYDRAULIC CONNECTIONS

Connect the oil supply line to the push-in fitting at the top of the bracket using a Ø8 hose (RM-SA version only). Connect the air/oil outlets of the individual modules, located on the side, using a Ø4 hose to the point to be lubricated.

## 5.8. PNEUMATIC CONNECTIONS

Connect the air supply piping to the push-in fitting at the top of using a Ø8 hose.

## 5.9. OIL LEVEL PURGE

When filling the oil tank for the first time, open the purge screw and allow the air in the line to escape.

### 5.10. ELECTRICAL CONNECTIONS



#### PWR CONN. (POWER SUPPLY CONNECTOR)

Pin	Wire colour with standard cable	Description	Connection
1	Brown	24V+ (Power Supply Input)	
2	White	Status/refilling signal output (+24V)	
3	Blue	24V- (Power Supply Input)	
4	Black	IO-Link	

#### I/O CONN. (INPUT AND OUTPUT SIGNAL CONNECTOR)

Pin	Wire colour with standard cable	Description	Connection
1	Brown	24V+ (Voltage output)	
2	White	Status/refilling signal output (+24V)	
3	Blue	24V- (Voltage output)	
4	Black	Pulse signal input (NPN/PNP)	

### ! NOTICE

The status/refilling signal output on both connectors are internally connected to the same control and split for easy wiring.

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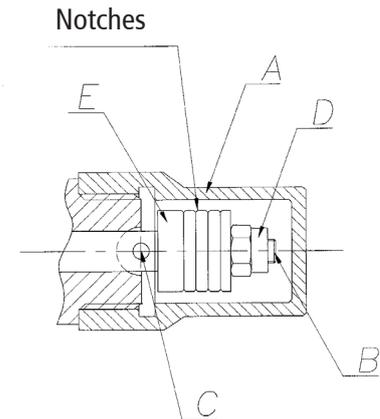
## 6. OPERATING INSTRUCTIONS

### 6.1. PRELIMINARY OPERATIONS

#### 6.1.1. CHANGING MINI-PUMP FLOW RATE

The mini-pumps used are extremely small and are installed on the mixing bases. They are equipped with spacers that allow the flow rate to be changed; a table for identification and the relevant codes is shown below. Proceed as follows to change the spacers:

1. Unscrew the brass cap (A).
2. Rotate the shaft (B) until the hole (C) coincides with the slot.
3. Insert a  $\varnothing 2$  mm pin punch into hole (C).
4. Unscrew the nut (D) with a 5.5 mm hex spanner.
5. Remove the spacer (E) and replace it with the one of your choice.
6. Screw the nut (D) back on completely and replace the cap (A).



# NOTCHES	FLOW RATE (MM <sup>3</sup> /CYCLE)	CODE SPACER
1	30	3233188
3	15	3233191
4	7	3233193

### 6.2. OPERATING CYCLE

This device's operating cycle is managed by the "Lubrication" parameter, with which it is possible to choose whether the lubrication cycle takes place via the parameters or is fully remotely managed via a PLC and IO-Link.

### 6.3. REMOTE OPERATING CYCLE (IO-LINK)

In this mode, the system executes commands from the PLC which can reset the alarms on the pump, activate the output on the main unit and activate the solenoid valves in the system.

In this case, the PLC will have to manage all the cycles of the mini-pumps which will have to follow the following steps:

- Activate the air and oil solenoid valves.
- Check the air pressure.
- Check that the cycle sensor has set within 2 seconds. If it has not changed status, see paragraph 8.1.
- Disable the oil solenoid valve.
- If the system does not require continuous air activation, wait a few seconds for the oil to drain and then switch off the air solenoid valve.
- Wait X seconds (calculated according to the type of use/system) and then resume the cycle from the beginning.

### 6.3.1. LOCAL OPERATING CYCLE

Immediately after being switched on, the device enters pre-lubrication mode (if parameter "Pre-lubrication Cycles" is greater than 0), which performs N oil dispensings (set by the parameter) and switches to lubrication mode at the end of them.

In pre-lubrication mode, the system performs N oil dispensings (set with the "Pre-lubrication Cycles" parameter) interspersed with pump refilling time.

In lubrication mode, the system only activates oil dispensing after the predefined time has elapsed ("Time between cycles" param.) or when the set pulses are reached ("Pulses between cycles" param.). Once oil dispensing is activated, both counts are reset and the lubrication cycle is repeated.

Each oil dispensing is divided into the following phases:

- Activation of the oil solenoid valve
- Waiting for oil dispensing (cycle sensor signal) or end of cycle sensor control time countdown
- Deactivation of the oil solenoid valve

During the oil dispensing phase, the system checks the actual oil dispensing via the cycle sensor and if the number of consecutive dispensings without lubrication reaches the value preset by the "Maximum cycles in error" param., the oil dispensing failure alarm of the relevant mini-pump will be triggered and the lubrication cycle will be interrupted. If you still wish to continue the lubrication cycle, even in the presence of a mini-pump alarm, you can do so by activating the "Enable lubrication in alarm" param.

In both modes (pre-lubrication and lubrication), four different air solenoid valve operating modes can be selected.

1. Off – The air solenoid valve will always stay off
2. Continuous – The air solenoid valve is always active even in the event of a mini-pump alarm
3. Normal – The air solenoid valve is always active but in the event of an alarm the solenoid valve is deactivated
4. Spray – The air solenoid valve is activated at the same time as the oil solenoid valve and its deactivation will be delayed with respect to the oil solenoid valve by the time set via the "Air SV Deact. Delay" param.

5 seconds after activation of the air solenoid valve and until its deactivation, the system constantly monitors the pressure and an alarm is given if the value is outside the range set with the "Minimum Pressure" and "Maximum Pressure" parameters. This type of control can also be activated when the solenoid valve is switched off ("Residual Pressure Alarm" param.). In this case, the control is activated 5 seconds after the solenoid valve is deactivated and stays active until the solenoid valve is reactivated. This control consists of checking that the pressure value stays outside the range seen previously. The oil level is analogue on this device, which lets you adjust the various intervention thresholds by modifying only the pump parameters and have automatic tank filling.

### 6.4. IO-LINK COMMUNICATION

It is always possible via IO-Link communication to know the current system status, control the output on the main unit and reset alarms.

### 6.5. PROCESS DATA

Using process data it is possible to know the status of the entire system and to control the solenoid valves in the system, if enabled via parameters.

There are two types of process data, one concerning the current status of the system and the mini-pumps (Input) and the other concerning the commands of the solenoid valves and the system (Output).

An IODD file can be downloaded from our website for quick and easy configuration of the variables.

### 6.5.1. INPUT

The input bytes contain system status, oil level, pressure sensor states and the status of the mini-pump solenoid valves.

Number of input Bytes: 22

BYTE 0								BYTE 1							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
System status								Level							
-	-	-	Warning	Alarm	Refilling	Keep Alive	Comandip disab.	From 0 to 100%							

BYTE 2								BYTE 3							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Mini-pump Presence								Mini-pump cycle sensor status							
M.P. 8	M.P. 7	M.P. 6	M.P. 5	M.P. 4	M.P. 3	M.P. 2	M.P. 1	M.P. 8	M.P. 7	M.P. 6	M.P. 5	M.P. 4	M.P. 3	M.P. 2	M.P. 1

BYTE 4								BYTE 5							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Mini-pump air pressure 1 (bar)															
Whole Part								Decimal Part							

BYTE 18								BYTE 19							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Mini-pump air pressure 8 (bar)															
Whole Part								Decimal Part							

BYTE 20								BYTE 21							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Mini-pump air solenoid valve status								Mini-pump oil solenoid valve status							
M.P. 8	M.P. 7	M.P. 6	M.P. 5	M.P. 4	M.P. 3	M.P. 2	M.P. 1	M.P. 8	M.P. 7	M.P. 6	M.P. 5	M.P. 4	M.P. 3	M.P. 2	M.P. 1

Via Bytes 0 and 1, you can know the status of the device, whether it can be controlled remotely (IO-Link) and the percentage of the oil level.

In Bytes 2 and 3, you can know whether there is a mini-pump and the status of the cycle sensor.

Bytes 4 to 19 concern the output air pressure of each mini-pump.

Bytes 20 and 21 show the status of all solenoid valves in the system.

#### NOTICE

Perform this calculation to find out the air pressure: Air Pressure = Whole Part + (Decimal Part / 100)

### 6.5.2. OUTPUT

The output bytes contain the commands for the solenoid valves for air, oil, alarm reset and the output on the main unit.

Number of output Bytes: 4

BYTE 0								BYTE 1							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Commands								Not used							
-	-	-	-	-	-	External output command	Alarm Reset	-	-	-	-	-	-	-	-

BYTE 2								BYTE 3							
Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Mini-pump air solenoid valve								Mini-pump oil solenoid valve							
M.P. 8	M.P. 7	M.P. 6	M.P. 5	M.P. 4	M.P. 3	M.P. 2	M.P. 1	M.P. 8	M.P. 7	M.P. 6	M.P. 5	M.P. 4	M.P. 3	M.P. 2	M.P. 1

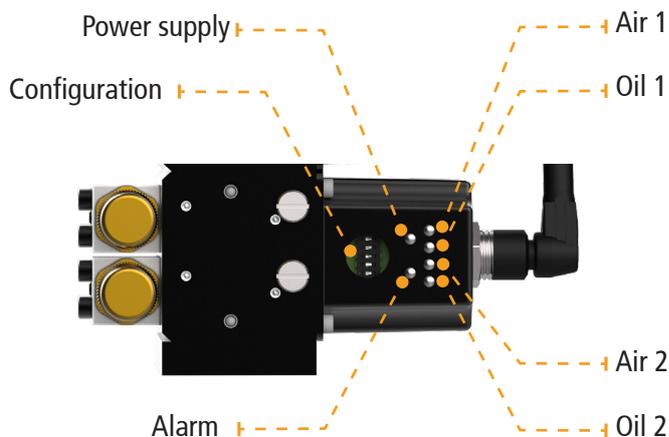
Byte 0 holds the command to reset the alarms and the command to activate the output on the main unit.

Byte 2 holds the commands for the air solenoid valves of the individual mini-pumps.

Byte 3 holds the commands for the oil solenoid valves of the individual mini-pumps.

### 6.6. SUB-BASES

#### 6.6.1. PARTS



NAME	DESCRIPTION
Power supply	Always on in the presence of voltage and without alarms
Alarm	On in the presence of an alarm
Air 1	On when the air solenoid valve of outlet 1 is active
Oil 1	On when the oil solenoid valve of outlet 1 is active
Air 2	On when the air solenoid valve of outlet 2 is active
Oil 2	On when the oil solenoid valve of outlet 2 is active
Configuration	Microswitches for sub-base identification

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## 6.7. ID CONFIGURATION

The main unit communicates with the sub-bases via a proprietary protocol and, therefore, if the system is expanded or reduced, the sub-base addresses must be reconfigured by giving them a unique address.

The address configuration is done via the first 4 microswitches (1 to 4) on the front of the sub-base.

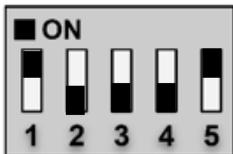
The fifth microswitch is used to enable the terminal resistor and must only be set to "ON" on the last (lower) sub-base.

To speed up addressing, simply activate the microswitch according to the current position of the sub-base.

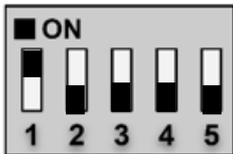
For example, the first sub-base connected directly to the main unit will only have the first microswitch set to "ON", the next sub-base will only have the second microswitch set to "ON", and so on.

Once all addresses have been set, the fifth microswitch of the sub-base furthest from the main unit must be set to "On"; the device must be switched on and the sub-bases read out by entering "Advanced Menus" and pressing the "Read ID" parameter.

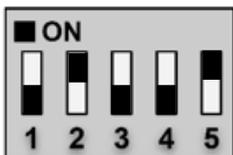
Example of configuration with one sub-base



Example of configuration with two sub-bases



First sub-base configuration



Second sub-base configuration

# 7. LUBRICATION CONTROL SETTINGS

## 7.1. CONTROL PANEL DESCRIPTION

### 7.1.1. PROGRAMMING PANEL

This device is equipped with a 320x240 pixel TFT LCD display for user interaction.

Upon start-up, the following screen appears on the device. The main parts of the panel are described in the figure below.



Press the middle of the screen (Widget Area) to view other system statuses; instead, press the top part of the screen (Status Bar) to display additional information regarding the status of the alarm/warning present.

### 7.1.2. I/O STATUS

The main page shows the current status of the inputs, outputs and the status of the system (see table below).

The current status of the entire system can be understood based on this information.

Description of the possible states of each signal status

NAME	POSSIBLE STATES	
Minimum Level	<span style="color: red;">●</span>	Level alarm
	<span style="color: yellow;">●</span>	Minimum level warning
	<span style="color: green;">●</span>	Level OK
Input	<span style="color: green;">●</span>	Input ON
	<span style="color: white;">●</span>	Input OFF
Refilling	<span style="color: green;">●</span>	Refilling ON
	<span style="color: white;">●</span>	Refilling OFF
	<span style="color: red;">●</span>	Refilling in alarm
Output	<span style="color: green;">●</span>	Output ON
	<span style="color: white;">●</span>	Output OFF
Alarm	<span style="color: red;">●</span>	System in Alarm conditions
	<span style="color: white;">●</span>	System Ok

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## 7.2. DEVICE PROGRAMMING

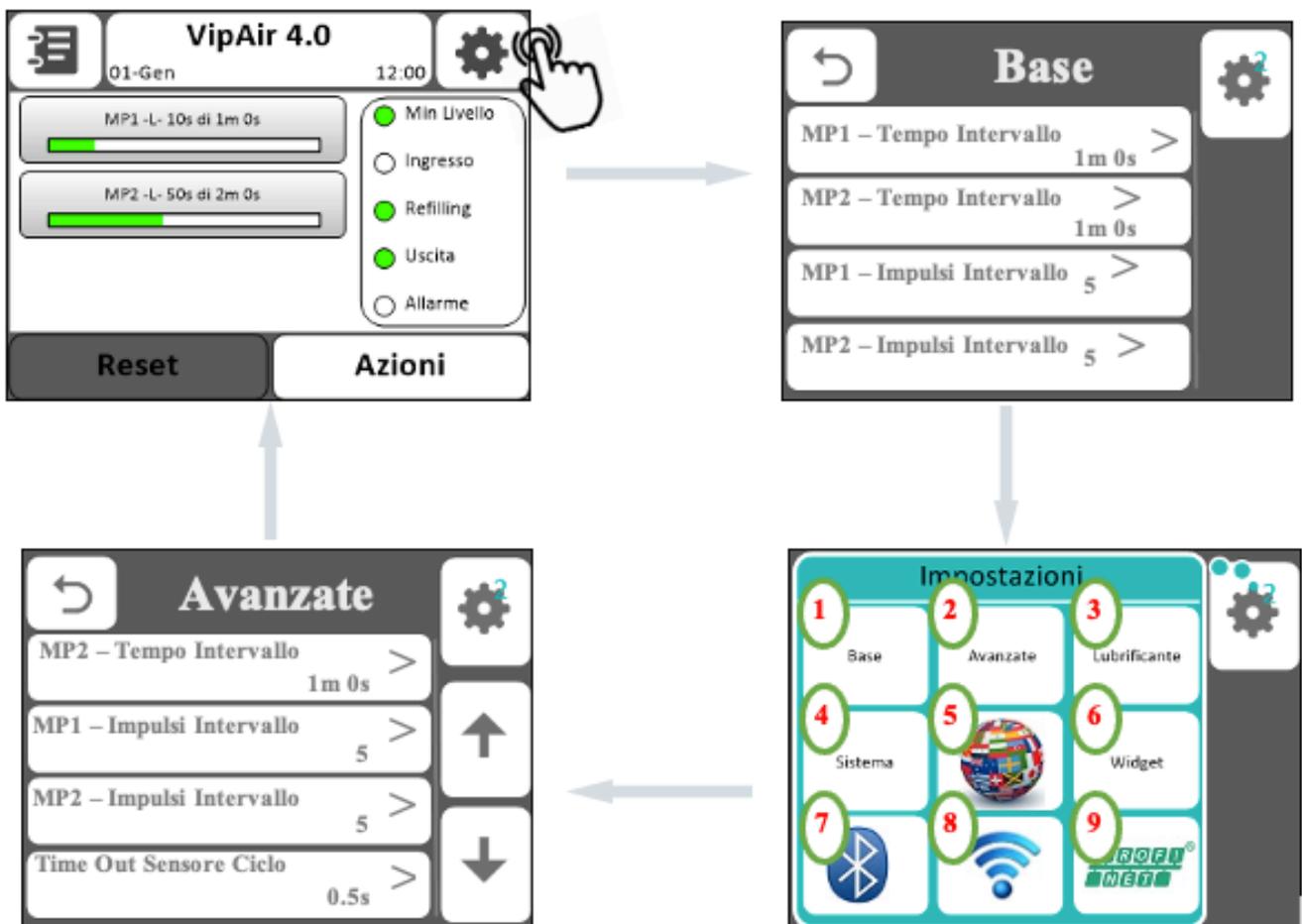
The following section describes: the main graphical components of the interface, navigation through the setting menus and contains a detailed explanation of each parameter and the possible values it can take.

### 7.2.1. NAVIGATING THROUGH THE MENUS

To access the menus click on the gear in the upper right corner, from the initial screen, in this way you enter directly into the basic menu Press on the gear in the upper right corner to display the menu selection pop-up. Press on one of the nine buttons to enter the desired menu.

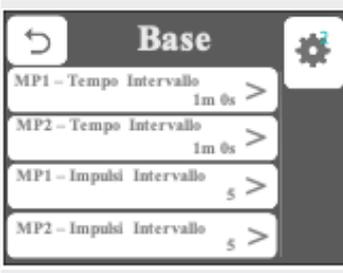
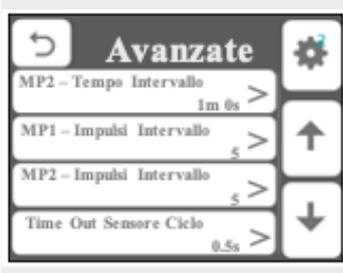
To return to the home screen and exit the menu, click on the arrow at the top left.

Below is shown the common navigation modes in the Basic and Advanced setting menus.



### 7.2.2. DESCRIPTION OF MENUS

Below are the screens of the various menus that can be selected

<p><b>1 - BASIC MENU</b> In this section it is possible to set only the most frequently used parameters for the selected system type.</p>		<p><b>2 - ADVANCED MENU</b> In this section, you can set all the parameters related to the entire system.</p>	
<p><b>3 - LUBRICANT</b> In this section you can set the lubricant parameters. You can also activate an automatic reorder request for lubricant when it is about to run out.</p>		<p><b>4 - SYSTEM MENU</b> Allows all general system data (e.g. date, time, etc.) to be set.</p>	
<p><b>5 - LANGUAGE SETTINGS</b> The language can be set by simply clicking on the country flag.</p>		<p><b>6 - WIDGET</b> Through this menu it is possible to change the widget screens on the main screen (See paragraph 9.1.).</p>	
<p><b>7 - BLUETOOTH</b> To start or cut the connection between the pump and a mobile</p>		<p><b>8 - WI-FI</b> This menu enables changes to the Wi-Fi connection settings. By connecting you can access the DropsA cloud that allows you to check the pump status, view errors and request assistance directly from DropsA.</p>	

## 8. PROGRAMMING THE LUBRICATION CYCLE

“LAN/PROFINET” is not available for this product.

### 8.1. PROGRAMMING THE LUBRICATION CYCLE

The pump can be managed through 2 main menus, the BASIC MENU and the ADVANCED MENU.

The BASIC MENU allows the operator to quickly adjust the system.

This menu only shows the parameters for the time/pulses between dispensings.

The ADVANCED MENU allows the installer to quickly configure the system.

The parameters in the basic menu are also displayed in this menu.

## 8.2. BASIC AND ADVANCED MENU PARAMETERS

The following table shows the operating parameters and the possible values that can be set.

NAME	FULL NAME	DEFAULT VALUE	DESCRIPTION	RANGE
Lubrication	Lubrication Mode	Internal	Internal: The cycles are determined by the on-board controller. IO-Link: The cycles are entirely managed by the PLC	Internal IO-Link
MP1-Interval Time*	Mini-pump1- Interval Time	60s	Time between mini-pup oil dispensing cycles. The time interval is disabled if set to 0	0 - 36000s
MP1-Interval Pulses*	Mini-pump1- Interval Pulses	0	Number of pulses between mini-pup oil dispensing cycles. The pulse interval is disabled if set to 0	0 - 999999
Cycle Sensor Time Out	Cycle Sensor Time Out	0.5s	Maximum waiting time of the cycle sensor	0.1 - 10s
Pump refilling time	Pump refilling time	0.5s	Waiting time between dispensing with the oil solenoid valve switched off (Parameter only used in pre-lubrication and filling mode)	0.1 - 10s
Pre-lubrication Cycles	Pre-lubrication Cycles	0	Number of cycles during the pre-lubrication phase	0 - 100
Maximum cycles in error	Maximum cycles in error	2	Number of consecutive oil dispensings ended with an error after which to generate the alarm	1 - 100
Air SV	Air Solenoid Valve	Normal	Continuous: The air outlet will always be active even with a mini-pump alarm Normal: The air outlet will be active when the mini-pump is not in alarm Spray: The air outlet will be activated at the same time as the oil sol. and delayed shut-down with the "Air SV Delay" param. Off: The air outlet will always stay off	Continuous Normal Spray Off
Air SV Delay	Air Solenoid Valve Delay	5s	Waiting time between the end of oil dispensing and the switching off of the air solenoid valve. This parameter is only visible if the "Air SV" param. is set to "Spray".	0 - 120s
Enable lubr. in alarm	Enable lubrication in alarm		If checked, lubrication is not stopped if there is an alarm on the mini-pump	Checked Not checked
Min. level warning	Minimum level warning	10%	Percentage of the level below or equal to which the minimum level warning is triggered and refilling starts. If the value set is the same as the parameter "Minimum level alarm", no signal is generated	0 - 100%
Min. level alarm	Minimum level alarm	1%	Percentage of the level below or equal to which the minimum level alarm is triggered. If the value exceeds the parameter "Minimum level warning", the alarm will not be generated	0 - 100%
Maximum level	Maximum level	90%	Percentage of the level to be reached with automatic filling	0 - 100%
MP1-Minimum press.	MP1-Minimum pressure	0.0	Pressure below which the minimum pressure alarm will be generated	0 - 12, 0bar
MP1-Maximum press.	MP1-Maximum pressure	10.0	Pressure over which the maximum pressure alarm will be generated	0 - 12, 0bar
Residual Pressure Alarm	Residual Pressure Alarm		If checked, the pressure control will be active even when the air solenoid valve is switched off. In this case, the pressure must be outside the range set with the previous parameters	Checked Not checked
Mini-pump ID reading2	Mini-pump ID reading	-	If pressed, a reading of all mini-pumps connected to the system will be taken.	-
Output	Output	System OK	System OK: activates output when no alarm is present in the system Refilling: Activates the output when the tank level is in warning and then switches off at maximum level System OK(Steady)/Warn.(Flash.): This has the same function as "System OK" mode, but if a warning is present it works intermittently From IO-Link: Takes command directly from IO-Link communication	System OK Refilling System OK(Steady)/Warn.(Flash.) From IO-Link
Maximum Refilling time	Maximum Refilling time	60s	Maximum filling pump activation time	1 - 3600s
Set Default Val.	Set Default Values	-	Restores all values in the Advanced menu to default settings	-

\* = also present in the Basic menu    1 = Number of the outlet (from 1 to 8)

2 = Only to be used when replacing or modifying sub-bases

### 8.3. SYSTEM MENU

Allows all general device data to be set (e.g. date, time, FW update, etc.).

This menu allows 3 types of passwords to be set:

Basic menu password -> access ONLY to basic menu programming

Advanced menu password -> access to both basic and advanced menu programming

System menu password -> access to all programming levels



The following table shows all the values that can be set from this menu.

NAME	DEFAULT VALUE	DESCRIPTION	VALUES/RANGE
Mem. All Logs		Enabling of logging of all events (logs) related to pump status	Checked Not checked
Synchronise Date		Enables date/time synchronisation from the Internet	Checked Not checked
Save Screen	0s	Screen backlight off time	0s - 1800s
Basic Password	0000	Password for basic settings access	0000 - 9999
Advanced Password	0000	Password for Advanced settings access	0000 - 9999
System Password	0000	Password for System settings access	0000 - 9999
Screen Lock	1m	Period of time after which the password protection of a menu is activated	30s 1m 10m 30m 60m
FW update	-	Button for requesting firmware update (Internet connection required)	-
Reboot Device	-	Button used to reboot the device	-
Time Zone	+2H 00M	Used to set the time zone	-12H 00M +12H 00M
Device Info	-	Button for displaying general pump information	-
Current Date	-	Sets the current date	-
Current Time	-	Sets the current time	00:00 - 23:59
Change Page	No Display	Sets a page change following an alarm and/or warning	No Display Alarms Only Alarms and Warnings
Page Change Duration	10s	Duration of a page change following an alarm and/or warning	0s - 10m

### 8.4. REMOTE ASSISTANCE

To use remote assistance, you must have a Wi-Fi connection.

To configure the Wi-Fi connection, enter the "WiFi" menu and enter the correct data for the Wi-Fi network you wish to use.

To manage and control the pump remotely, you must have the ID and PIN of the device which are displayed by holding down the gear in the top right-hand corner of the main screen for more than 5 seconds.

Please refer to the DropsA.app manual for information regarding remote registration and remote control.



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## 9. MAINTENANCE

### 9.1. GENERAL WARNINGS

#### **DANGER**



Make sure that the electrical, hydraulic and pneumatic power supply of the system in which the pump is installed is disconnected before carrying out any maintenance operations.

Do not carry out operations, modification and/or repair of any kind, other than those indicated in this manual.

Only trained or authorised technical personnel have the necessary experience to perform any operation with the appropriate technique.

If pump maintenance is performed in a manner inconsistent with the instructions, using non-original spare parts or without the manufacturer's written permission, or otherwise in a manner that undermines the integrity or modify its features, DropsA S.p.A. cannot be held liable for the safety of persons and the faulty operation of the pump.

Do not remove or tamper with the warranty seal for any reason.

The pump has been designed and constructed to require minimal maintenance. To simplify maintenance, we recommend mounting it in an easily accessible position. The machine does not require special equipment for any inspection and/or maintenance operations.

#### **CAUTION**



Use tools and personal protections suitable for use (gloves and glasses) and in good condition according to current legislation to avoid damage to people or parts of the machine.

For proper maintenance it is essential to:

- immediately check the causes of any anomalies (excessive noise, overheating, etc.),
- pay particular attention to safety devices,
- use all the documentation provided by the manufacturer (user manuals, wiring diagrams, etc.),
- use only tools suitable for the job and original spare parts.



#### **CAUTION**

Lift the equipment taking into consideration the direction shown on the cardboard package.  
During storage, ensure that the ambient temperature is between -40 and + 65 °C (-40-149F).  
Before starting, wait until the pump has reached a temperature of -10°C (+ 14F).

In case of doubts and/or problems that cannot be solved, do not try to disassemble parts of the machine; contact the DropsA S.p.A. Technical Office.

## 9.2. TABLE OF OPERATIONS

The following table shows all periodic operations needed to keep the pump in perfect working conditions.

TYPE OF OPERATION	FREQUENCY	OPERATOR QUALIFICATION
Check piping joints	Periodically	
General cleaning of the pump	Periodically	
Cleaning of the loading filter	At 2000 hours	
Replacement of pumping elements	As needed	
Periodically check that the parts do not make abnormal noise	Every three months	
Periodically check that the parts move freely without abnormal friction	Every three months	
Periodically check the absence of oxidation / encrustation / deformation	Every three months	
Remove any accumulation of dust on all parts of the equipment	Every three months increase according to the environmental conditions of the place of installation	
Check the earthing of all parts	Every three months	

### 9.3. CHECK PIPING JOINTS

Periodically check the piping joints to detect any leaks.

### 9.4. GENERAL CLEANING OF THE PUMP

Always keep the pump clean to promptly detect any leaks or defects.

Cleaning the pump is necessary to remove dirt deposits.

Use a dry cloth.

# 10. TROUBLESHOOTING

## 10.1. FAULTS, CAUSES AND REMEDIES

### **WARNING**



The machine can be opened and repaired only by authorised DropsA personnel.  
Wear adequate personal protection equipment to carry out all operations indicated.

Below is a diagnostic table highlighting the main faults, probable causes and possible solutions. If, even after consulting the diagnostic table, you have not been able to solve the problem, do not proceed to search for the fault by disassembling parts of the machine, but contact the DropsA Technical Office and report the anomalies that have been found, with a detailed description.

ANOMALY	CAUSE	REMEDY
Alarm' and 'Power supply' LEDs flashing	Communication with the main unit has been lost	Check the connection between the sub-bases and the main unit
"Alarm" LED flashing (0.1S On - 1S Off)	Pressure sensor faulty	Replace the module
No lubricant is dispensed / Absence of cycle signal	The tank is empty. The mini-pump does not start (possible presence of air bubbles in the circuit).	Fill the tank. Purge the air from the mini-pump using the appropriate purge screws

# 11. ORDER INFORMATION

## 11.1. STANDARD VERSION

DESCRIPTION	CODE
Vip Air 4.0 – 2 Points-1L-SA	3135921
Vip Air 4.0 – 4 Points-1L-SA	3135922
Vip Air 4.0 – 6 Points-1L-SA	3135923
Vip Air 4.0 – 8 Points-1L-SA	3135924
Vip Air 4.0 – 2 Points-3L-SA	3135926
Vip Air 4.0 – 4 Points-3L-SA	3135927
Vip Air 4.0 – 6 Points-3L-SA	3135928
Vip Air 4.0 – 8 Points-3L-SA	3135929
Vip Air 4.0 – 2 Points-RM-SA	3135931
Vip Air 4.0 – 4 Points-RM-SA	3135932
Vip Air 4.0 – 6 Points-RM-SA	3135933
Vip Air 4.0 – 8 Points-RM-SA	3135934

DESCRIPTION	CODE
MODULE Vip4 Air4.0 - MODBUS	3135905
1 metre IO-Link PUR cable	UE-CVPR054
2 metre IO-Link PUR cable	UE-CVPR055
M12 Connector 4pin Male Straight	0039171
M12 Connector 4pin Female Straight	0039169
*Fastening screw - 1 module	0014198
*Fastening screw - 2 modules	0014191
*Fastening screw - 3 modules	0014793
*Fastening screw - 4 modules	0014795
Sub-base	3071490
Complete module (sub-base + mini-pumps)	3135905
Cable	1639336

## 11.2. SPARE PARTS

Use Original Spare parts when replacing the pump parts.

When purchasing spare parts always mentioned the pump model and serial number (this information is found on the identification plate) as well as the spare part code.

SPARE PART DESCRIPTION	CODE
Minipump	3103015
Cover	6770209

DropsA S.p.A. cannot be held liable for any deterioration in pump performance or damage caused to it due to the use of non-original spare parts.

## 12. ADDITIONAL INFORMATION

During the maintenance of the machine, or in case of its demolition, do not dispose of polluting parts in the environment. Refer to local regulations for proper disposal. Upon termination of a demolition machine it is necessary to destroy the identification tag and any other document.

### 10.1 Waste disposal

It should be remembered that residues deriving from industrial processes which, in terms of quality or quantity, are not declared to be similar to urban waste are considered special waste.

Deteriorated or obsolete machines are also considered special waste.

According to local legal regulations, the user must take particular precautions regarding the disposal of materials, such as:

- Protection device material (PVC and methacrylate)
- Pneumatic piping plastic
- Coated electrical cables
- Rubber belts
- Used oils



**CAUTION**

Comply with the environmental protection laws implemented in the user's country.

### 12.1. TOXIC-HARMFUL WASTE

Toxic-harmful waste is all waste that contains or are contaminated by the substances indicated in Presidential Decree 915/52, which implements EC directives 75/442 and 76/403 and Law no. 319 of 10 May 1976.

Below are the main pictograms affixed to containers of hazardous or harmful material:



#### 12.1.1. TEMPORARY STORAGE

The temporary storage of toxic-harmful waste is allowed according to the planned disposal of the same through final storage and/or treatment.

#### 12.1.2. CHARACTERISTICS OF THE CONTAINERS

Fixed and mobile containers, intended to contain toxic-noxious waste, must have adequate resistance requirements in relation to the chemical-physical properties and the hazardous characteristics of the waste contained.

To make the nature of their contents known, the containers in which dangerous or noxious products or materials are stored must bear indications and markings.

### 12.1.3. 10.2.3 REGISTRATION OBLIGATIONS

According to the provisions of Presidential Decree 23 August 1982 regarding the implementation of EC Directive 75/439 concerning the disposal of waste oils, the loading/unloading records must be kept by all companies that produce special or toxic-noxious waste deriving from industrial and artisanal processes.



## ! WARNING

This regulation is valid in Italy; for other CEE countries, please refer to the national legislation. During disposal operations there are risks of cuts, projection of splinters, entanglement, contact with moving parts, contact with chemical products. Operators must use the appropriate personal protective equipment.

### 12.2. DISMANTLING OF THE MACHINE

Dispose of the machine after disassembling its various parts.

For disassembly operations, in addition to wearing the Personal Protective Equipment mentioned in the MANUAL, refer to the instructions and diagrams in this manual, or if necessary as the Manufacturer for specific information.

Once the various parts have been disassembled, divide the various parts and separate the metal, plastic, copper, etc. according to the type of differentiated disposal in force in the country where the machine is dismantled.

Waste resulting from demolition of the machine must be classified as special waste.

If the various parts have to be stored pending their admission to the landfill, keep them in a safe place protected from atmospheric agents, to avoid contamination of the ground and groundwater.



## ! CAUTION

Dismantling and demolition operations must be carried out by qualified personnel.

### 12.3. DISPOSAL OF ELECTRONIC PARTS (WEEE DIRECTIVE)



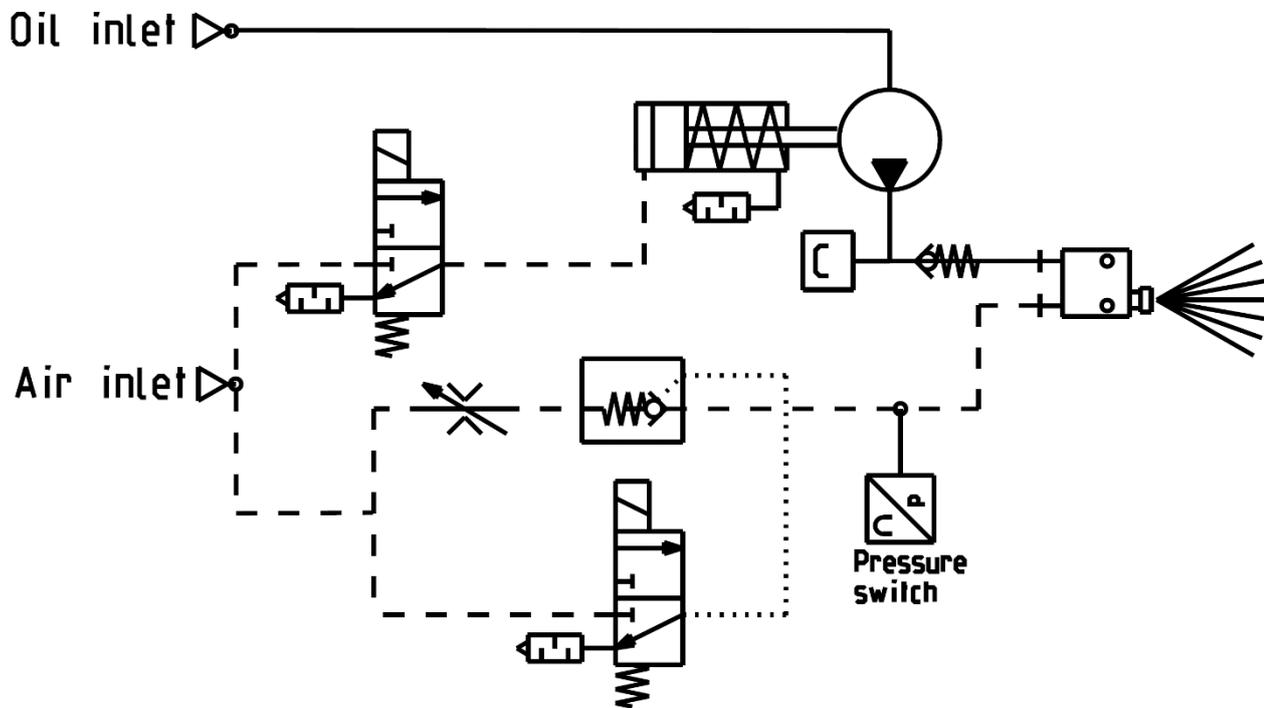
EC directive 2012/19 (WEEE) requires manufacturers and users of electric and electronic equipment to comply with a series of obligations regarding the collection, treatment, recycling and dispose of this type of waste. We recommend that you strictly follow these rules for the disposal of such waste. Remember that the illegal disposal of such waste implies the application of administrative penalties provided for by current legislation.



## 13. ANNEXES

### 13.1. HYDRAULIC DIAGRAM

Below is the hydraulic diagram for the individual module.



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All descriptions and information contained in this product catalogue apply to the state at the time of creation.

We reserve the right to change the contents of this document without notice.

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The text and drawings contained in this manual may not necessarily conform to the supply.

Technical drawings may not necessarily be drawn to scale.