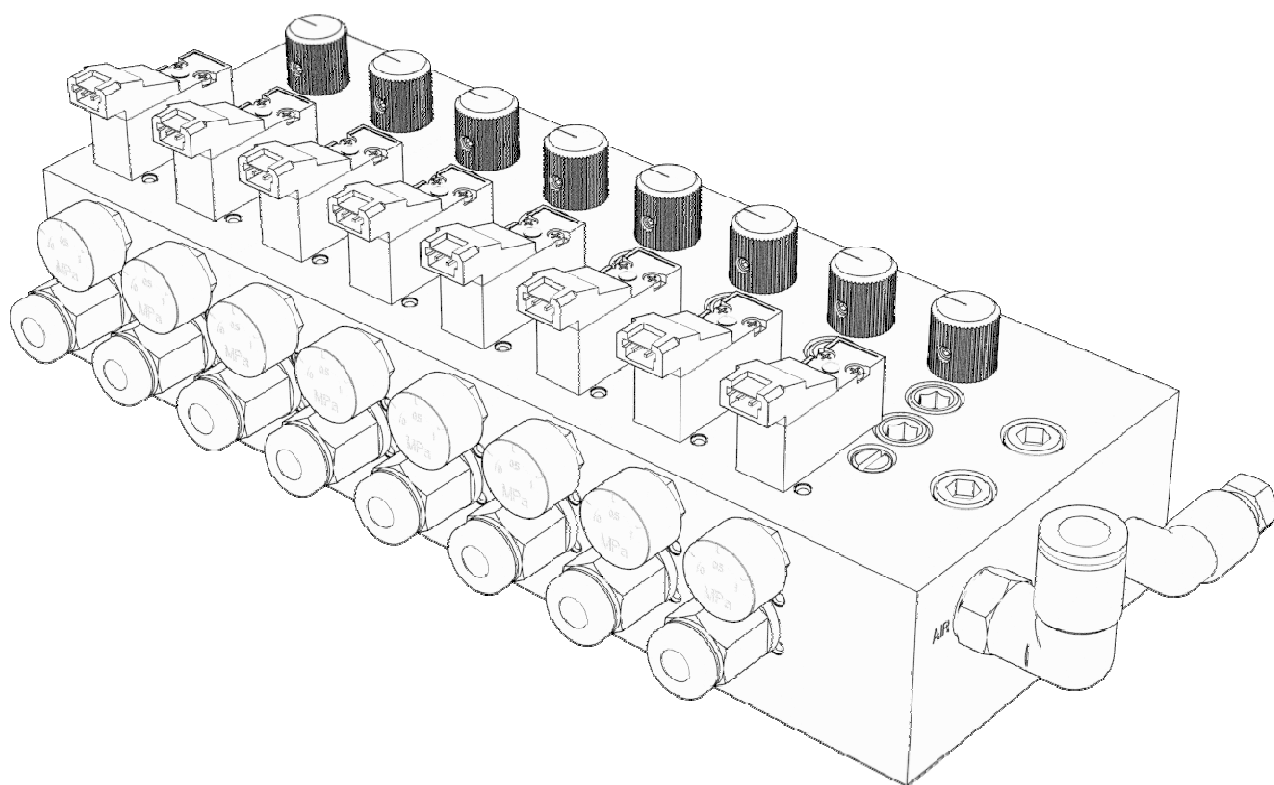


*Air/oil modular minimal system  
With external pump*

## User Operating and Maintenance Manual

Original text translation



*The manual has been prepared in compliance  
with Directive 2006/42*

C2168IE - WK 15/19

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## Summary

<b>1. INTRODUCTION .....</b>	<b>2</b>
<b>2. GENERAL DESCRIPTION .....</b>	<b>2</b>
<b>3. MACHINE IDENTIFICATION .....</b>	<b>3</b>
<b>4. TECHNICAL SPECIFICATIONS .....</b>	<b>3</b>
<b>5. MACHINE COMPONENTS .....</b>	<b>4</b>
<b>6. UNPACKING AND INSTALLATION .....</b>	<b>7</b>
6.1 UNPACKING .....	7
6.2 INSTALLATION .....	7
6.3 PNEUMATIC CONNECTIONS.....	7
6.5 AIR/OIL HYDRAULIC CONNECTIONS TO THE LUBRICATION NOZZLE.....	8
<b>7. INSTRUCTIONS FOR USE .....</b>	<b>9</b>
<b>8. PROBLEMS AND SOLUTIONS.....</b>	<b>10</b>
<b>9. MAINTENANCE PROCEDURES .....</b>	<b>10</b>
<b>10. DISPOSAL.....</b>	<b>10</b>
<b>11. INFORMAZIONI D'ORDINE .....</b>	<b>11</b>
<b>9.1 ACCESSORIES AND SPARE PARTS .....</b>	<b>12</b>
<b>12. DIMENSIONS .....</b>	<b>13</b>
<b>13. HANDLING AND TRANSPORT .....</b>	<b>14</b>
<b>14. PRECAUTIONS FOR USE .....</b>	<b>14</b>
<b>15. GUIDELINES FOR USE .....</b>	<b>15</b>

## 1. INTRODUCTION

This user and maintenance manual relates to the MiQueL EXT.

Using this pump means that oils and greases can be distributed within lubrication systems even at high pressures of up to 400 bar (5880 psi).

The latest version may be obtained from the Technical-Commercial Office, or by consulting our web site <http://www.dropsa.com>.

The pump subject of this manual must be used by qualified personnel with basic hydraulic and electrical knowledge.

This user and maintenance manual contains important information about protecting the health and safety of the personnel who intend to use this apparatus. You must read and look after it carefully, making sure that it is available at all times for the operators who intend to consult it.

## 2. GENERAL DESCRIPTION

Il MiQueL EXT è un sistema modulare aria/olio disponibile in 3 versioni:

- **PRO**: modulo compreso di valvola di compensazione
- **BASE**: modulo senza valvola di compensazione
- **CART**: modulo senza valvola di compensazione, senza regolazione olio e a portata fissa.

Tutte le versioni possono essere munite di elettrovalvola per il controllo indipendente del singolo modulo, VERSIONI “i”.

### Operation

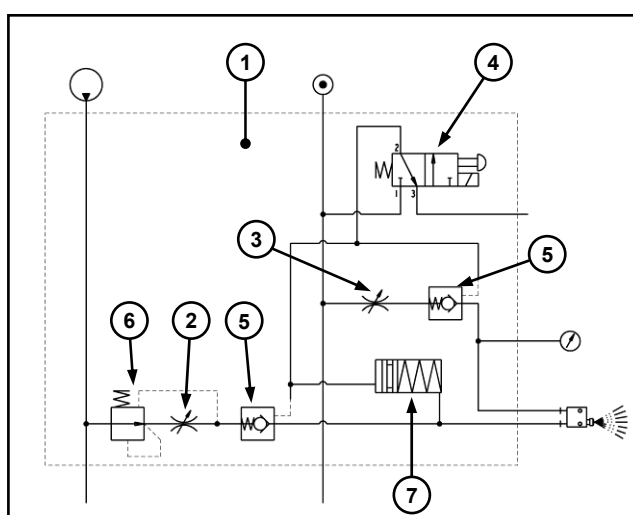
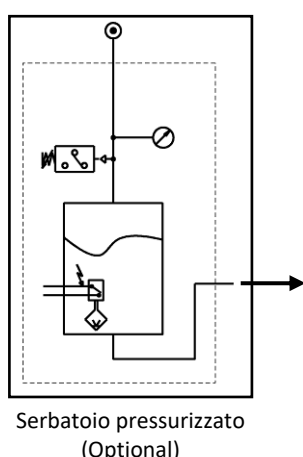
The system consists of a pressurised lubricant tank, one or more mixture regulation modules, pipes and spray nozzles (see hydraulic diagram below).

The lubricant is sent to mixing valve ① through an external pump or a pressurised reservoir.

Each module has oil ② and air ③ (NO CART version) check valves that are controlled manually by the operator. The outward oil and air flow can be managed independently between the different modules using a mini solenoid valve ④ (“i” version only) that activates the control valves ⑤ on the module. The module has a compensation valve ⑥ (“PRO” version only) is able to keep the flow rate constant as the inlet tank pressure and outlet counter-pressure varies.

The lubrication pipes can be traditional or coaxial. In the latter case, the lubricant and nebulisation air are transported separately to the nozzle. The piston ⑦ keeps the oil from dripping from the nozzle when the lubrication operation is complete.

### Hydraulic diagram



### Spray nozzles

When traditional pipes are used, the air and oil are already mixed when they arrive at the nozzle.

If coaxial pipes are used, the nozzle mixes the air and oil at the point to be lubricated. The lubricant is atomised in minuscule particles by the air flow that passes in front of the oil outlet hole.

The geometry of the nozzle is designed based on the type of spray to be obtained (conic, blade-shaped, etc.).

### Advantages

- Easy to install on the machine
- Reduction in tool wear
- Improved surface finish on the part
- No lubricant residuals left on the part when the work is complete
- The nozzles do not drip after being turned off
- Large spray range (up to 300 mm)
- Greater safety and environmental hygiene at the workplace

### Application

- Machine tools
- Machines for cutting and bending plate
- Steelworks

## 3. MACHINE IDENTIFICATION

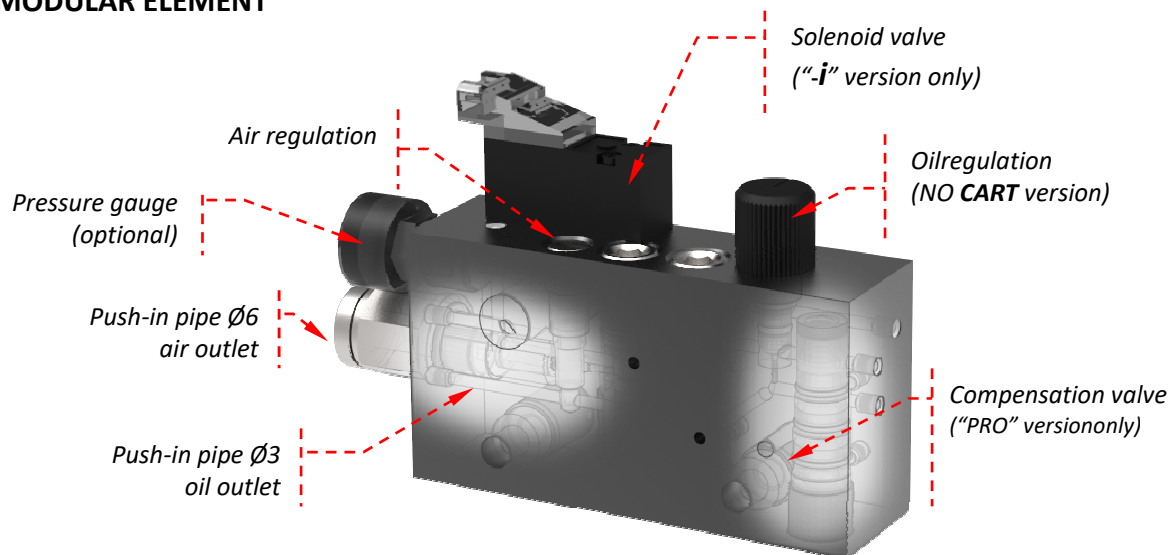
There is a plate on the side of the unit that displays the product code, the power supply voltages and the basic characteristics.

## 4. TECHNICAL SPECIFICATIONS

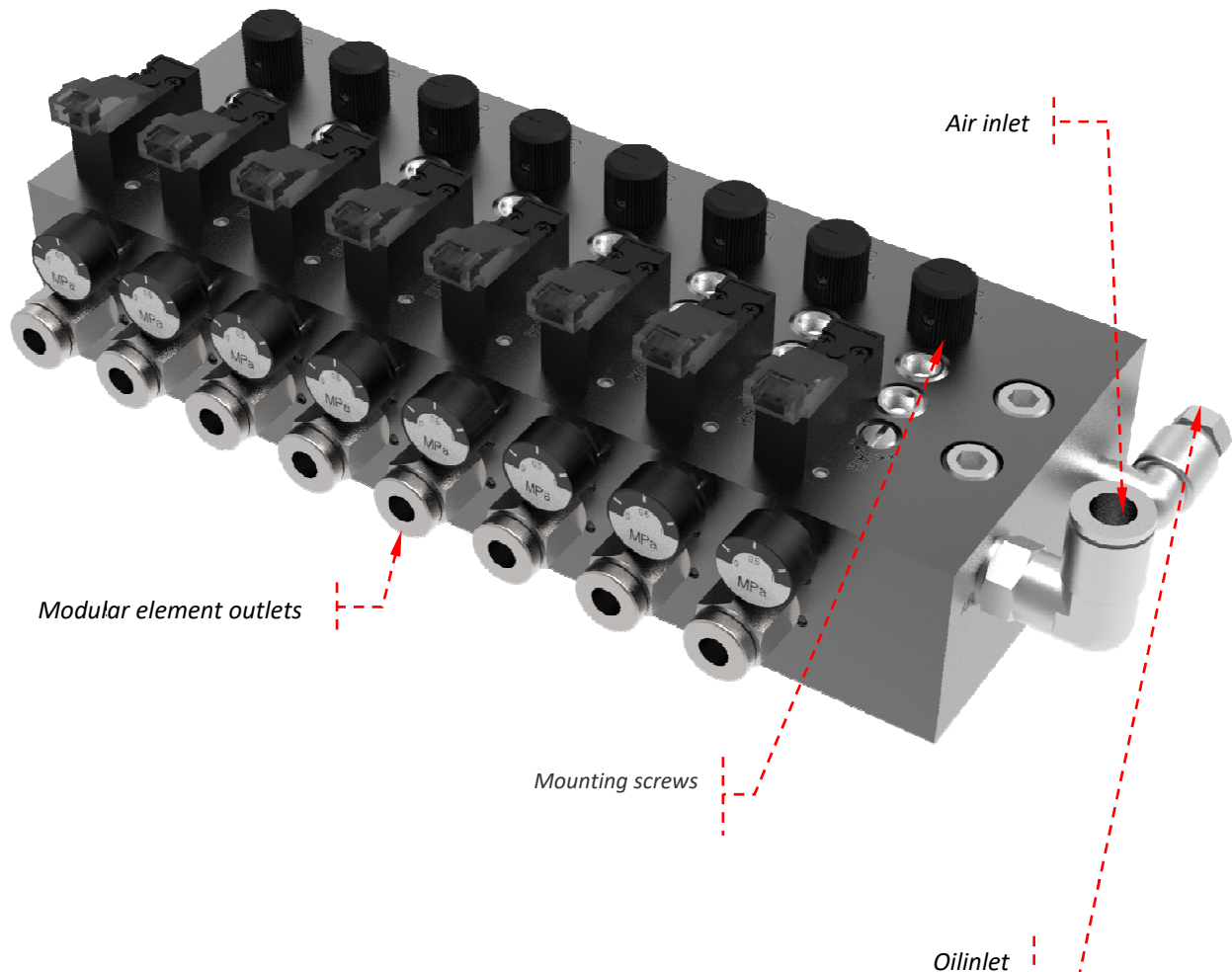
<b>TECHNICAL SPECIFICATIONS</b>		
Pumping system	External pump	
Maximum number of modules	8	
Maximum Oil inlet pressure	2,5:1 in relation with air inlet pressure	
Air inlet pressure	4bar ÷ 7bar [87psi ÷ 101,5psi]	
Maximum air consumption at the outlet	~50NI/min (per module)	
Air inlet pipe	Ø8mm	
Oil inlet pipe	Ø6mm	
Air outlet pipe	Ø6mm	
Oil outlet pipe	Ø3mm	
Oil flow rate per element	PRO	0,1 ÷ 2,7 cc/min (Oil 10cSt)
		0 ÷ 1 cc/min (Oil 32cSt)
		0 ÷ 0,2 cc/min (Oil 100cSt)
	BASE	0,3 ÷ 8 cc/min (Oil 10cSt)
		0,1 ÷ 3 cc/min (Oil 32cSt)
		0 ÷ 0,6 cc/min (Oil 100cSt)
CART	cc/min = (P x 8,16)/V P = Operating pressure in [bar] V = viscosity [Engler] at operating temperature	
Lubricant	10cSt ÷ 100cSt	
Protection grade of module “-L”	Standard	IP 00
	On request (special)	IP 65
Element solenoid valve power supply	24Vdc	
Operating temperature	+5°C ÷ +50°C	
Storage temperature	-10°C ÷ +80°C	
Max relative humidity without operating condensate	90%	
Sound level pressure	< 70 db (A)	

## 5. MACHINE COMPONENTS

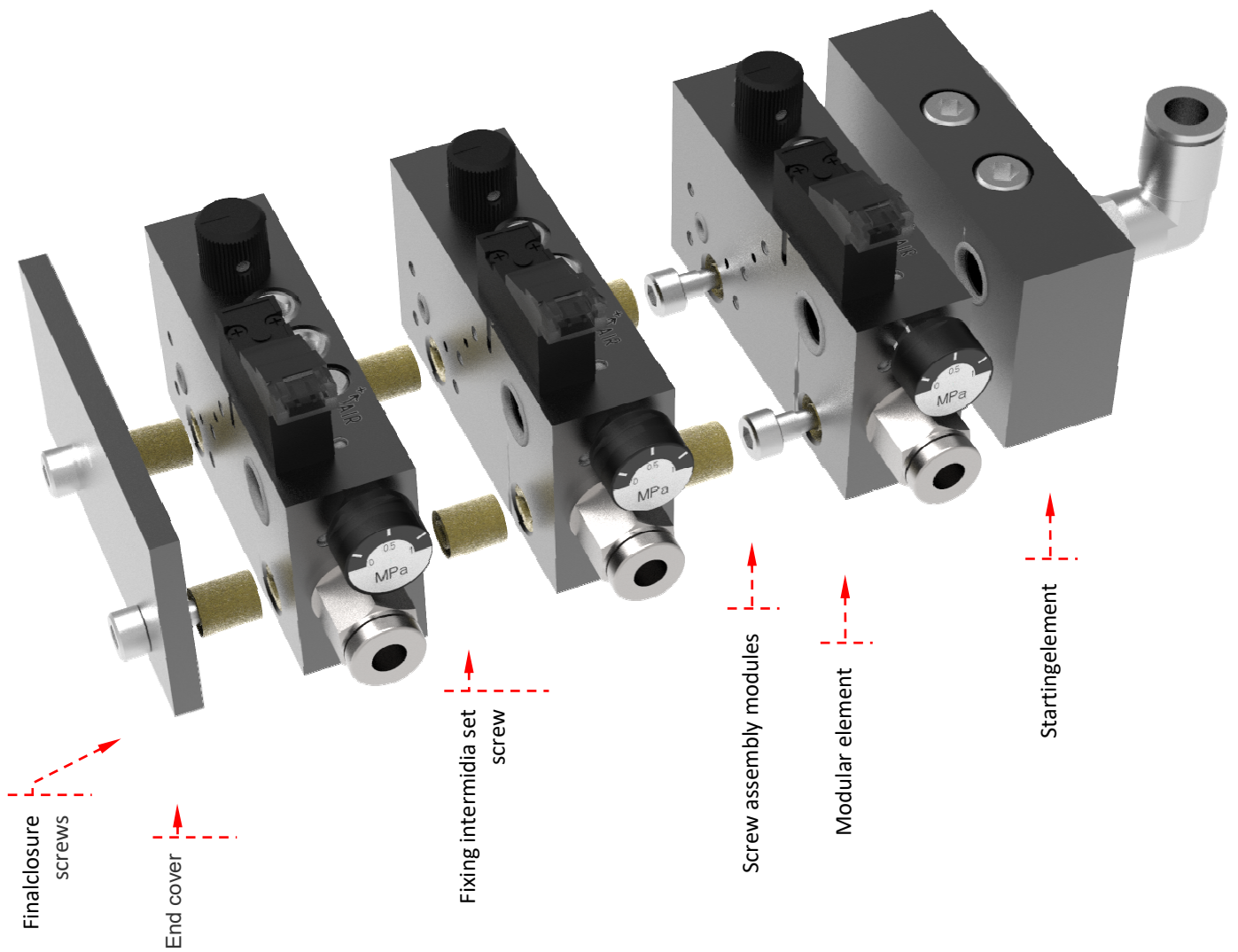
### MODULAR ELEMENT



### MiQueL PRO-i EXT Module



Assembly system / increasing modular elements



### Pressurized reservoir for MiQuel EXT (optional)



TECHNICAL SPECIFICATIONS	
Reservoir capacity	1lt – 3lt
Air inlet pressure	4bar ÷ 7bar [87psi ÷ 101,5psi]
Air inlet pipe	Ø6mm
Oil outlet thread	G1/8" – UNI ISO 228/1
Air outlet thread (plugged)	G1/8" – UNI ISO 228/1
Protection grade	IP 65
Pressure switch calibration (optional)	6bar [87psi]
Maximum pressure switch load (optional)	Voltage free contact maximum voltage 250V Maximum power 100W
Maximum electric level load	0,2A @ 30V



## 6. UNPACKING AND INSTALLATION

### 6.1 UNPACKING

Once the suitable location for installation has been identified, open the package and remove the unit.

Check that it was not damaged during transport or storage.

The packaging material does not require special disposal precautions as it is not in any way dangerous or polluting.

### 6.2 INSTALLATION

Allow a sufficient amount of space for installation, leaving a minimum perimeter space of 100 mm (3,93 in.).

Install the unit at “shoulder height” to prevent abnormal positions or the possibility of impacts.

Use the brackets with the holes (see chap. 12) to fix the unit properly. It is also possible to disassemble the brackets from their current position and reassemble them in the prepared threaded holes for side or corner installation.

It is prohibited to use the unit if submersed in fluids or in a particularly aggressive or explosive/inflammable environment if not previously prepared for that purpose by the supplier.

Use safety gloves or glasses as specified in the safety sheet for the lubricant.

Do not use aggressive lubricants with NBR gaskets. In the case of doubt, contact the DropsaSpA technical office to receive a detailed card about the recommended oils.

Do not ignore the hazards to health and comply with the health regulations  $\varnothing$ 8mm.

### 6.3 PNEUMATIC CONNECTIONS

Before making the connection, check that the valve for the main air, the manual sliding valve and the check valves (air and oil) are closed. Make sure that the inlet pressure does not exceed 7bar.

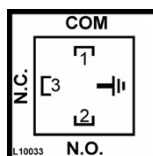
Use fittings and pipes that are suitable for the operating pressures, push-in connection for  $\varnothing$ 10mm pipe.



**ATTENTION: Always install a regulator filter with condensate recovery on the air inlet. Any unfiltered deposits or sediments could irreparably damage the product.**

### 6.4 ELECTRIC CONNECTIONS

Connect the unit to the pump or to the pressurized reservoir using suitable piping for the working pressure that must not be greater than 2.5 times the air pressure (es.: air 6bar [87psi] – oil 15bar [217,5psi] max.).

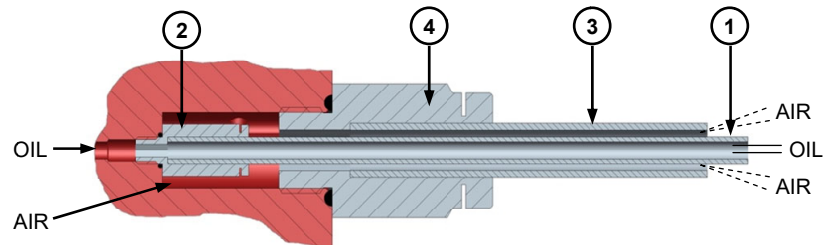


Connect the (optional) “NO” pressure switch, precalibrated to 6 bar, by passing the cables from the protective cover using a 6.3 mm faston.



## 6.5 AIR/OIL HYDRAULIC CONNECTIONS TO THE LUBRICATION NOZZLE

Using coaxial pipes, connect the  $\varnothing 3\text{mm}$  pipe ① to the oil outlet push-in ② on the module, slide the  $\varnothing 6\text{mm}$  tube ③ outside the  $\varnothing 3\text{mm}$  tube until connect it to the air outlet push-in ④.



Then connect the same coaxial pipes to the lubrication nozzle push-in as shown below:

1. Insert the  $\varnothing 6$  air pipe in the push-in on the nozzle connection.



2. Remove the nozzle head from the articulated pipe, through which the  $\varnothing 3$  oil tube should pass, making it protrude approx. 20/25mm.



3. Insert the  $\varnothing 3$  oil pipe in the push-in on the nozzle head.



4. Replace the nozzle head on the articulated pipe.



To make it easier to remove the pipes exiting the module, use the device to remove  $\varnothing 3$  tube (code 1525475) not supplied: unscrew the  $\varnothing 6$  push-in, insert the device in the  $\varnothing 3$  pipe, push the device on the collar of the  $\varnothing 3$  push-in, push and pull the  $\varnothing 3$  pipe.

## 7. INSTRUCTIONS FOR USE

### Operations to perform before start-up.

- Check the integrity of the unit.
- Check the power supply pressure.
- Check that the electric connection was carried out correctly.
- Check that the unit is at the operating temperature.

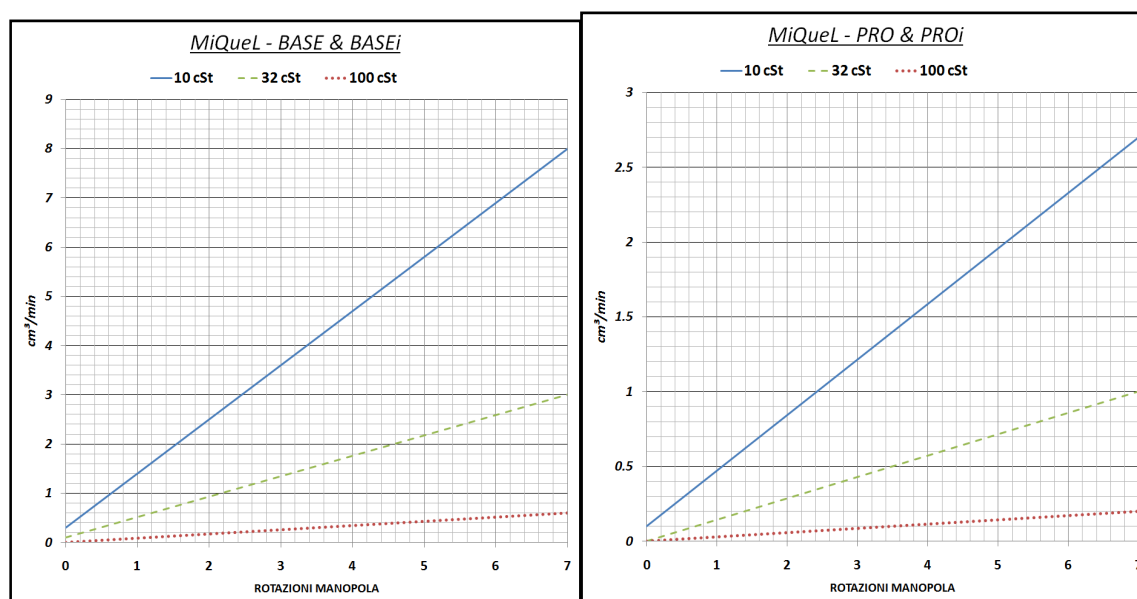
#### 7.1 USE

- Open the manual cursor valve;
- Press the start button on the machine to which the unit is connected or start it;
- Check that the solenoid valves on the elements are correctly activated;
- At the first start-up, it may be necessary to fill the oil pipes, wait until the lubricant exits;
- Check that the lubrication is suitable (if there are doubts about correct operation, the DropsaSpA technical office can be contacted to request the inspection procedure).

#### 7.2 REGULATION

The modular elements are normally supplied with the oil (NO CART version) regulation and the air regulation completely closed. To regulate the air/oil mixture for the individual elements, proceed as follows:

- Turn the oil regulation knob (NO CART version) clockwise to increase the flow rate or anticlockwise to decrease the flow rate. Following an orientation reference diagram for flow adjustment.



- Use a screwdriver to turn the air regulation pin clockwise to increase the flow rate or anticlockwise to decrease the flow rate, until the desired spray is obtained, normally the adjustment is made by max 3 revs.



**ATTENTION: Do not over unscrew the air regulation pin as it could get out its place.**

## 8. PROBLEMS AND SOLUTIONS



**ATTENTION: The unit may only be opened and repaired by authorised Dropsa personnel.**

A diagnostics table is provided below that indicates the main anomalies, the probable causes and the possible solutions. If you were not able to solve the problem after consulting the diagnostics table, do not try to find the fault by disassembling machine parts but contact the Dropsa technical office and report the discovered anomalies, with a detailed description.

DIAGNOSTICS TABLE		
ANOMALY	CAUSE	SOLUTION
<b>Lubrication does not take place activating the solenoid valve.</b>	Solenoid valve broken.	<i>Replace the solenoid valve.</i>
	The air supply pressure is below 4 bar [58psi].	<i>Increase the supply pressure up to a minimum of 4 bar in case of maximum air consumption</i>
<b>The lubricant exits irregularly and with large air bubbles visible in the Ø3 oil pipe.</b>	The Ø3 oil pipe is not perfectly engaged into push-in of module.	<i>Top up the tank with new lubricant.</i>
		<i>Insert the pipe, making sure to insert it to the end.</i>



**ATTENTION: Make sure that the pneumatic power supply is disconnected before carrying out any maintenance work.**

## 9. MAINTENANCE PROCEDURES

Le unità sono state progettate e costruite in modo da richiedere la minima manutenzione. Per semplificare la manutenzione, si consiglia il montaggio delle stesse in una posizione facilmente raggiungibile (vedi paragrafo 6.2).

- Controllare periodicamente i giunti delle tubazioni per rilevare eventuali perdite.
- Controllare periodicamente il livello dell'olio ed eventualmente procedere al riempimento tramite il tappo di carico.
- Mantenere sempre puliti i moduli per poter rilevare prontamente eventuali perdite.

La macchina non richiede attrezzature speciali per nessuna attività di controllo e/o manutenzione. Si raccomanda di utilizzare attrezzi e protezioni personali idonei all'uso in rif. al D. Lgs. 81/2008, ed in buone condizioni (secondo la normativa vigente) onde evitare danni a persone o parti della macchine.

## 10. DISPOSAL

During machine maintenance, or if it is demolished, do not dispose of the polluting parts in an improper manner. Refer to the local regulations for their correct disposal. When demolishing the machine, the identification plate and all other documents must be destroyed.

## 11. INFORMAZIONI D'ORDINE

VERSION	DESCRIPTION	MODULES	CODE
<b>MiQueL PRO</b>	Air/Oil modular minimal system <b>with</b> compensation valve <b>without</b> a solenoid valve for independent control N(1-8) modules	1	3135581
		2	3135582
		3	3135583
		4	3135584
		5	3135585
		6	3135586
		7	3135587
		8	3135588
<b>MiQueL PRO - <i>è</i></b>	Air/Oil modular minimal system <b>with</b> compensation valve <b>with</b> a solenoid valve for independent control N(1-8) modules	1	3135591
		2	3135592
		3	3135593
		4	3135594
		5	3135595
		6	3135596
		7	3135597
		8	3135598
<b>MiQueL BASE</b>	Air/Oil modular minimal system <b>without</b> compensation valve <b>without</b> a solenoid valve for independent control N(1-8) modules	1	3135601
		2	3135602
		3	3135603
		4	3135604
		5	3135605
		6	3135606
		7	3135607
		8	3135608
<b>MiQueL BASE - <i>è</i></b>	Air/Oil modular minimal system <b>without</b> compensation valve <b>with</b> a solenoid valve for independent control N(1-8) modules	1	3135611
		2	3135612
		3	3135613
		4	3135614
		5	3135615
		6	3135616
		7	3135617
		8	3135618
<b>MiQueL EXT - BASE - <i>è</i></b> <b>- IP65</b>	Air/Oil modular minimal system <b>without</b> compensation valve <b>with</b> solenoid valve for independent control	1	3135391
		2	3135392
		3	3135393
		4	3135394
		5	3135395
		6	3135396
		7	3135397
		8	3135398
<b>MiQueL EXT - CART - <i>è</i></b>	Air/Oil modular minimal system <b>without</b> compensation valve and oil adjustment <b>with</b> solenoid valve for independent control	1	3135631
		2	3135632
		3	3135633
		4	3135634
		5	3135635
		6	3135636
		7	3135637
		8	3135638

<b>MiQueL EXT - CART - <i>ē</i></b> <b>- no EV</b>	Air/Oil modular minimal system <b>without</b> compensation valve and oil adjustment <b>without</b> solenoid valve for independent control with valves	1	3135651
		2	3135652
		3	3135653
		4	3135654
		5	3135655
		6	3135656
		7	3135657
		8	3135658

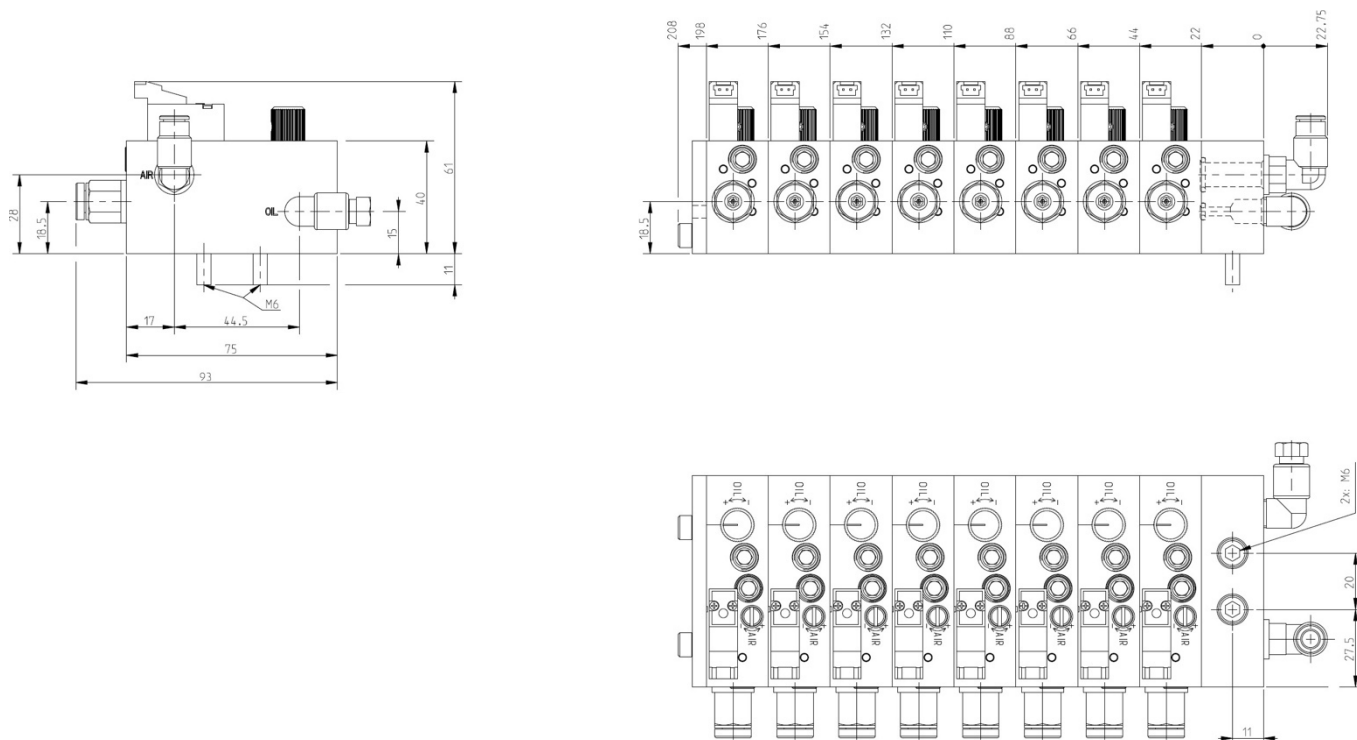
## 9.1 ACCESSORIES AND SPARE PARTS

CODE	DESCRIPTION	CODE	DESCRIPTION
1525430	MiQueL PRO- <i>i</i> - Modular element	3084672	Swivel push-in 90° Ø8 pipe
1525440	MiQueL PRO - Modular element	3084566	Swivel push-in 90° Ø6 pipe
1525450	MiQueL BASE- <i>i</i> - Modular element	3190432	OR gasket oil output
1525460	MiQueL BASE - Modular element	0018808	OR gasket air output
1525456	MiQueL BASE- <i>ē</i> IP65 - Modular element	0014072	Screws end closing
1525688	MiQueL CART- <i>ē</i> Modular element	0031021	Silencer filter
1525871	MiQueL CART- <i>ē</i> Without SV - Modular element	0014094	Inlet element assembly screws
1525427	Inlet element block	5717232	Outlet oil Ø3 tube
1525420	End cover	5717301	Ø6 AIR outlet pipe
0093070	Double cone straight connector with Ø6 pipe	3226664	Oil MK 150 20 lt.
0020694	Pressure gauge for module AIR outlet ( <i>-i</i> )	3226665	Oil MK 100 25 lt.
1525446	Module solenoid valve connector ( <i>-i</i> )with 600mm cable	3226666	Oil MK High Performance 29 lt.
1525476	Module solenoid valve connector ( <i>-i</i> )with M8 connector	3225465	Oil MK Stainless 20 lt
1525442	Module solenoid valve ( <i>-i</i> )	3133455	Coaxial nozzle - Narrow Cone Pattern
3133561	Pressurized Reservoir for MiQueL EXT – 1lt	3133558	65° Coaxial nozzle – flat cone
3133560	Pressurized Reservoir for MiQueL EXT – 3lt	3133564	FULL cone monotube nozzle
1525431	Electric minimum level sensor (reservoir)	3133565	65° monotube nozzle flat cone
0039841	Electric minimum level connector (reservoir)	1525050	Monotube nozzle for 50mm BLADE
3291028	Pressure gauge calibrated at 6 bar (reservoir)	1525051	Monotube nozzle for 70mm BLADE
0020557	Pressure gauge (reservoir)	1525475	Device to remove Ø3 tube

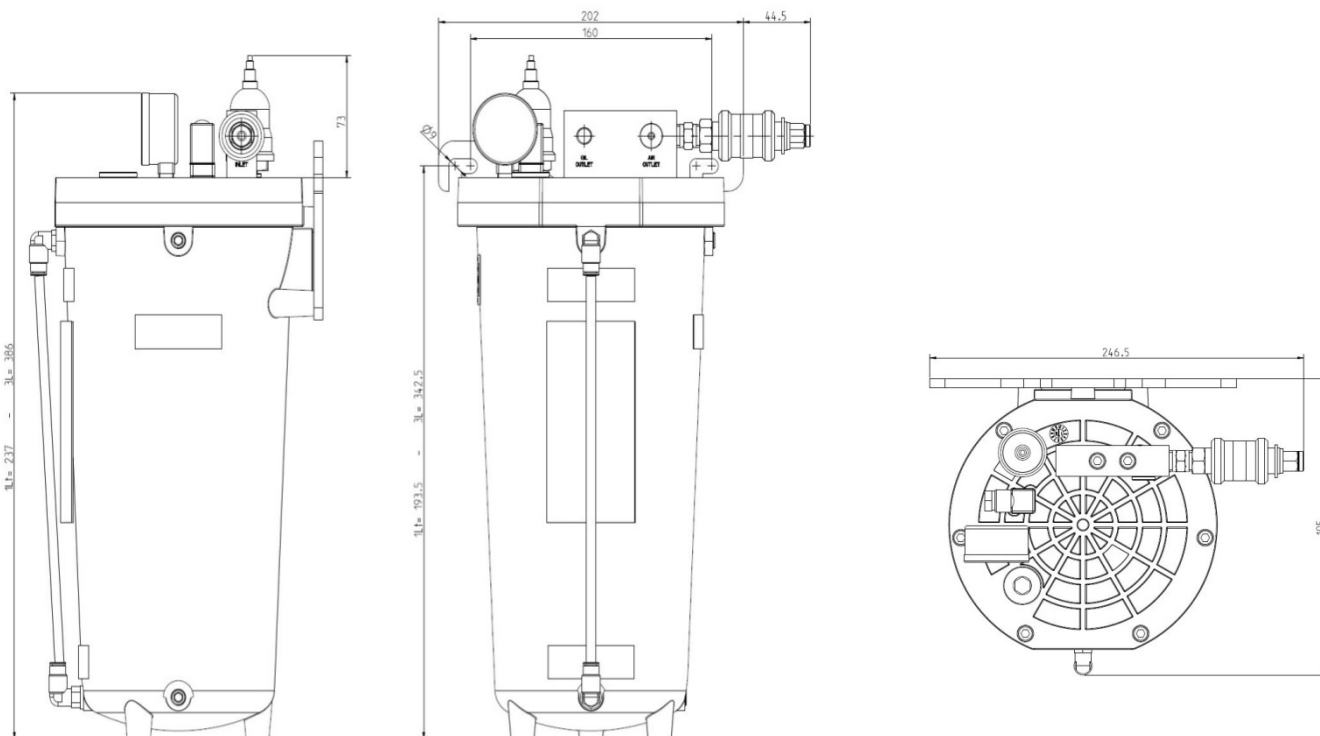
\* For more information about accessories and spare parts, contact our technical sales office.

## 12. DIMENSIONS

### MiQueL- EXT



### Reservoir for MiQueL EXT (optional)



Dimensions in mm [inch].

## 13. HANDLING AND TRANSPORT

Before shipping, the units are carefully packed inside cardboard boxes. When transporting and storing the equipment, pay attention to the direction indicated on the boxes themselves.

Upon receipt, check that the package has not been damaged and store the equipment in a dry location.



**Lift the equipment according to the direction shown on the cardboard package.**

**The machine components can be stored at temperatures between -30 and + 80 °C; however, to prevent damage, it must only be started up after the machine has reached a temperature of +5 °C.**

## 14. PRECAUTIONS FOR USE

The warnings about the risks involved in using a unit for lubricants must be read.

The operator must understand its operation and clearly understand the hazards connected to pumping pressurised oils.

Therefore we recommend the following:

- Check the chemical compatibility of the material with which the unit is built with the fluid to be pumped (see chap. 4). An incorrect selection could cause, in addition to damaging the units and pipes, serious risks for people (spillage of irritating products that are harmful to health) and for the environment.
- Never exceed the maximum operating pressure permitted for the unit and the components connected to it. In the case of doubt, refer to the data specified on the machine plate.
- Only use original spare parts.
- If components must be replaced with others, make sure they are suitable for operating at the unit's maximum operating pressure.



**ATTENTION!** *Never try to stop or deviate any leaks with your hands or other body parts.*



**Note:** **Personnel must use protective devices, garments and tools in compliance with current standards with regard to the location and the use of the unit both during work as well as during maintenance operations.**

### Electric current

Do not carry out any work on the machine before disconnecting it from the electrical power supply and making sure that no one can reconnect it during the operation. All the installed equipment (electric and electronic), tanks and basic structures must be connected to the ground line.

### Inflammability

The lubricant used in the lubrication circuits is normally not an inflammable liquid. It is however necessary to adopt all the possible measures to prevent that it comes into contact with very hot parts or open flames.

### Pressure

Before each operation, make sure there is no residual pressure in every branch of the lubrication circuit that there is no residual pressure that could cause oil to spray when disassembling fittings or components.

After long periods of inactivity, check the seal of all the parts subject to pressure.

Do not subject the fittings, pipes and pressurised parts to violent impacts.

Damaged flexible pipes or fittings are DANGEROUS and must be replaced.

Only original spare parts should be used.

### Noise

Under normal operating conditions, noise emission **does not exceed 70 dB“A”** at a distance of 1 metre (39.3 inches) from the unit.

For further information about the technical specifications and the safety measures to adopt, refer to the product safety sheet (Directive 93/112/EEC) relative to the type of lubricant selected and supplied by the manufacturer.



## 15. GUIDELINES FOR USE

Compliance with the essential safety requirements and the provisions specified in the machine directive was checked by filling out prepared check lists that are contained in the *technical file*.

Two types of lists were used:

- Risk assessment (UNI EN ISO 14121-1).
- Compliance with the essential safety requirements Machine Directive –EC 06/42).

**The risks that were not completely eliminated, but considered acceptable, are specified below:**

- During maintenance, sprays of oil at low pressure are possible (for this purpose, suitable PPE must be worn during maintenance activities).
- Unsuitable postures: The correct dimensions and installation methods are described in this manual.
- Use of unsuitable lubricant: The specifications of the lubricant are indicated both on the unit as well as in this *User and maintenance manual* (in the case of doubt, contact the Dropsa S.p.A technical office).

FLUIDS THAT ARE NOT PERMITTED	
FLUIDS	RISKS
Lubricants with abrasive additives.	Wear of internal components.
Lubricants with silicone additives.	Seizure.
Petrol – solvents – inflammable liquids.	Fire – explosion – damage to the gaskets.
Corrosive products.	Corrosion - damage to people.
Water.	Unit oxidation.
Food substances.	They would be contaminated.