MLP - Mobile Lube Pump

Grease Electro-pump

User and Maintenance Manual

Warranty information

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Manufacturer	**DropsA SpA**
Product	**MLP- Mobile Lube Pump**
Year	**2003**
Certification	CE

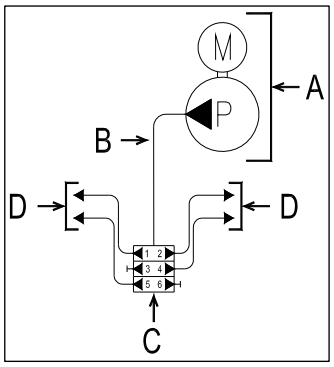
1. INTRODUCTION

This manual refers to MLP - Mobile Lube Pump.
You can find newer revisions of this document from our Sales Offices, or from our website **http://www.dropsa.com** .
This user and maintenance manual contains important information on health and safety issues for the personnel.
It is recommended to attentively read this manual and carefully keep it in good condition so that it is always available to personnel requiring to consult it.

2. GENERAL DESCRIPTION

2.1 CENTRALIZED LUBRICATION – PRINCIPLE OF OPERATION

Centralized lubrication systems significantly reduce the maintenance costs of the equipment on which they are installed, lowering downtime for maintenance operations and increasing life of lubricated components.
These systems also enable to reach all lubrication points, including those inaccessible to operators.



The aside figure represents the centralized lubrication system in its basic configuration.
The system consists of:
A – Electro-pump with reservoir
B – Main piping
C – Multiple way distributor
D – Secondary piping

Once the MLP is commissioned, it supplies a distributor through the main piping coming from the pumping element. The distributor divides and meters the amount of lubricant among the friction points.
The secondary piping distributes the lubricant to the fittings of the different friction points.

2.2 MLP ELECTRO-PUMP

MLP is a piston pump driven by an eccentric cam which has been designed to operate with a maximum of three pumping elements.
The housing is a compact monobloc plastic element shaped to offer a full resistance to mechanical stresses.
A roller-shaped system and a grease-scraper enable to eliminate air bubbles from grease, thus ensuring an easy operation, also at low temperatures.
The worm-gear ratiomotor with helical wheel and DC low voltage, is directly started by the user or through the control timer setting.

The pump is available in three versions (12-24VDC e 110-220VAC), all provided with the magnetic sensor for the minimum level:

- no TIMER
- with TIMER PAUSE-WORK
- with TIMER PAUSE-SENSOR(*)

A remote control device is available as optional for systems with Pause-Sensor(*) timer (see par. 6.5.4).

*** Note: Compatibility is guarantee only with microswitch and REED contacts. Pause-sensor timer doesn't work with proximity switch.**

3. PRODUCT – MACHINE IDENTIFICATION

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

4. TECHNICAL SPECIFICATIONS

Input voltage	12VDC - 24VDC - 110VAC - 220VAC /50Hz
Nominal Absorption:	
12 V DC	1 A
24 V DC	0.5 A
110 V AC	0.1 A
220 V AC	0.2 A
Working Temperature	– 30°C÷+ 80°C (– 22°F÷+176°F)
Number of outlets	1- 2 - 3
Pumping element	Piston-type Ø 6 mm (0.2 in.) driven by cam
Main piping inlet	Fast-lock for Ø 6 mm (0.2 in.) pipe
Reservoir	2, 4, 8 lt (0.44-0.88-1.76 gals) with MIN-MAX level indicator
Mineral Lubricant	Grease MAX **NLGI 2**
Reservoir refill system	Lubricator A/M10X1 UNI7663
Air-bubbles discharge	Rotating cylinder and grease scraper
Maximum pressure	250 ± 50 bar (3675 ± 735 psi) safety valve inside the pumping unit
Flowrate * for each outlet	~ 2.8 cm^3/min (~ 0.17 cu.in.)
Ratiomotor	Worm-gear, with helical wheel and shielded DC low voltage
Idling speed	22 rpm
Mechanical protection grade	IP65
Control	• No Timer • With Pause-Work Timer • With Pausa-Sensor Timer

NOTE: This value refers to the following test conditions: grease class NGLI 2, standard ambient conditions (Temperature +20°C/+68°F, pressure 1 atm), counterpressure 100 bar (1470 psi) and nominal voltage 12 V and24 V.

4.2 MAGNETIC SWITCH ELECTRO-MECHANICAL CHARACTERISTICS (Minimum level)

Mechanic lifetime	100 millions of operation
Working frequency	250 imp/s
Repeatability precision	0.1 mm
Working temperature	-20°C ÷ +60°C (-4°÷+140°F)
Input voltage	100VDC- 150VAC
Power absorption	0.10W
Nominal absorption	0.5A

4.3 CYCLE SENSOR TECHNICAL CHARACTERISTICS (to be mounted on the distributor)

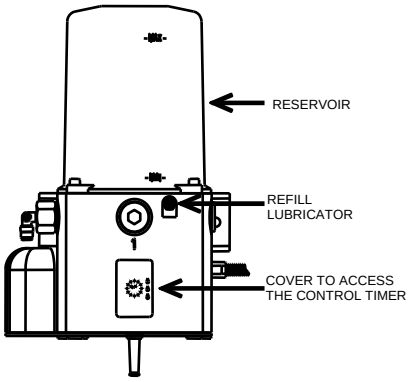
Protection grade	IP 68
Contact	ON / OFF
Working temperature	-30°C ÷ +80°C (-22°F ÷ +176°F)

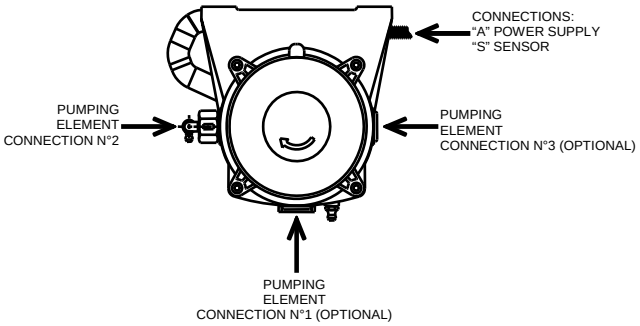
4.4 PUMPING ELEMENT TECHNICAL CHARACTERISTICS

Bore	Ø 6 mm (0.23 in.)
Stroke	5 mm (0.2 in.)
Piston displacement	0.14 cm³ (0.08 cu.in.)
Weight	0.200 Kg (0.4 lb)
Safety valve	P_{max} = 250 ± 50 bar (3675 ± 375 psi)
Inlet	Standard thread G 1/4”

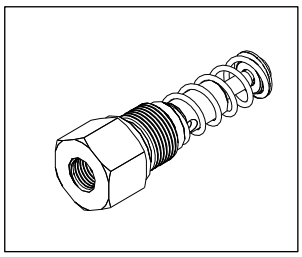
<u>WARNING</u>: Operate the pump only with the voltage indicated on the product label.

5. PUMP COMPONENTS

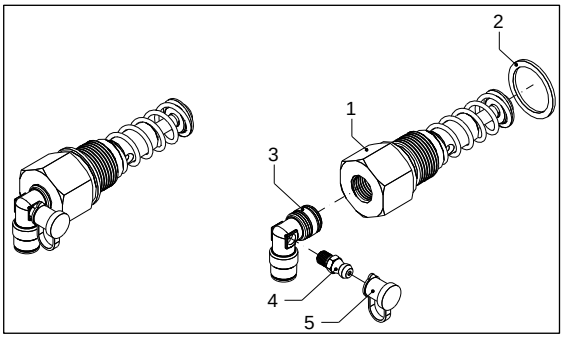




5.1 PUMPING ELEMENT



Representing the pump operating-member, it is screwed directly into pump housing and driven by means of an eccentric cam. The suction system consists of a free-dual-line, while discharge is provided with an adjustable delivery valve. The piston is provided with a safety valve which discharges directly into reservoir, to avoid excessive pressure damaging the system in the event of distributor fault.
Its components are made of high-quality alloy steel, specially treated to improve wear-resistance characteristics. Furthermore, a special external coating guarantees excellent resistance to corrosion, tested through salt fog tests.



The aside figure shows a pumping element with the fitting for the main pipe connection, which is supplied as standard. The main components are:

Pos	Part number	Description
1	888336	Pumping element with piston Ø 6 mm (0.23 in.)
2	888337	Washer Ø22.5x28x1.5 (0.88 x 1.1 x 0.05 in.)
3	888340	Fitting a 90° G1/4”
4	888341	Lubricator A M6 UNI7663
5	888342	Plug

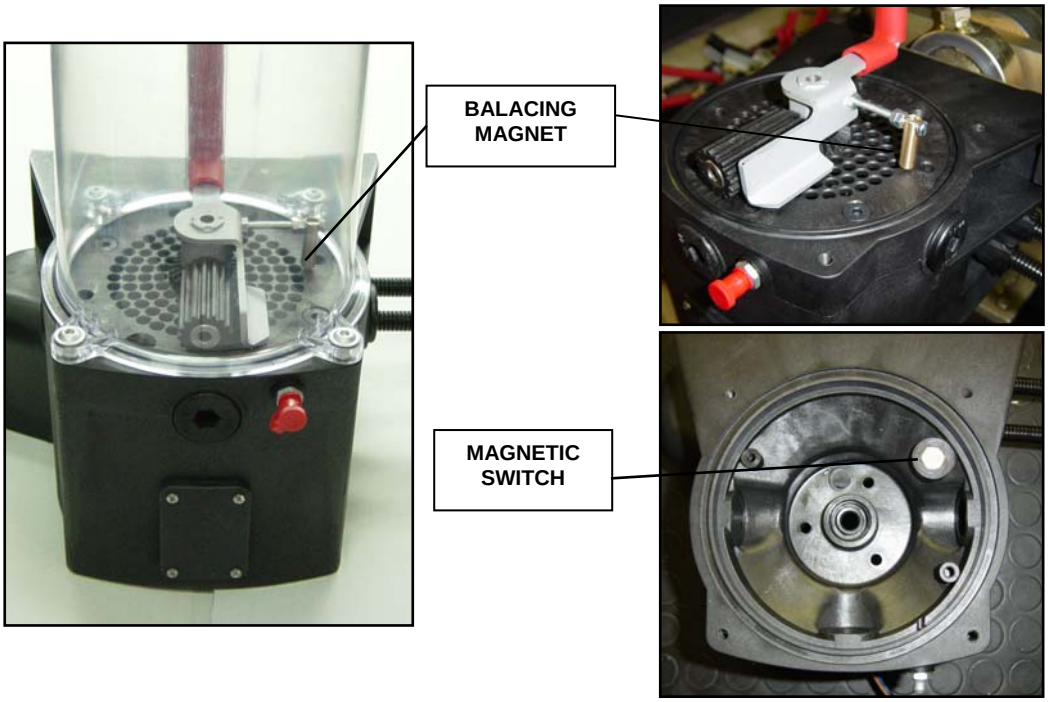
NOTE: For pumping element technical characteristics, please refer to par. 4.4.

Every pumping element is adjusted and tested by the manufacturer. It is therefore advisable:

- Not to modify safety and delivery valves regulations.
- Dropsa Spa shall not be responsible for damages originating from tampering with the safety valve.
- In the event of troubles, please contact the **Customer Service**

5.2 MINIMUM LEVEL

Lubricant minimum level is detected by a magnetic sensor through the localization of the balancing magnet during pump operation.



The **magnetic switch** operation is based on the principle of *normally open switch*. When pump is switched on, the grease scraper drags the **balancing magnet**. At this time, one of the following conditions can be generate:

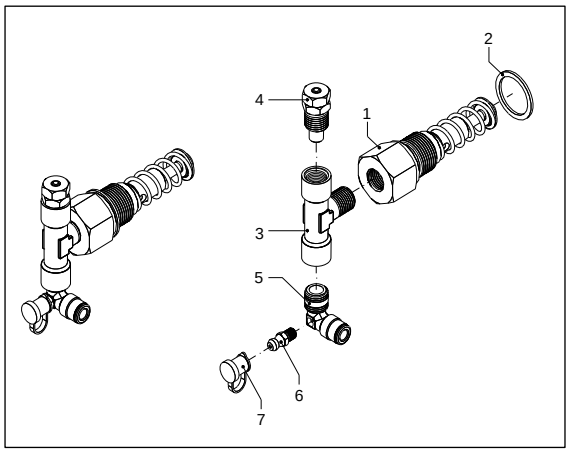
1. If the grease is above the minimum level, the balancing magnet will take an horizontal position because of the resistance opposed by the moving grease.
2. If the grease is below the minimum level, the balancing magnet will take a vertical position because of its weight.

- In the first case the *magnetic switch* will ignore the presence of the *balancing magnet*.
- In the second case, the *magnetic switch* will detect the *balancing magnet* and will signal the minimum level.

NOTE: Minimum level detection system does not require any regulation.

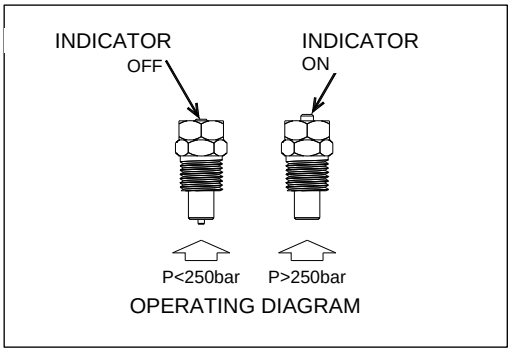
When the pump is provided with **no timer** or with a **pause-work timer**, the signal detected will be managed by the machine control system. When the pump is started-up, in order to oppose balancing magnet inertia, it is advised to retard the alarm signal of **1 second** at least.
When the pump is provided with a **pause-sensor timer**, the minimum level signal is processed by the timer which will immediately stop the centralized lubrication system.

5.3 OVER-PRESSURE INDICATOR (OPTIONAL)



The pumping element can be supplied, as optional, with an indicator which includes an external signalling device controlling safety valve operation. The following table lists the components:

Pos	Part number	Description
1	888336	Pumping element with piston Ø 6 mm (0.23 in.)
2	888337	Washer Ø22.5x28x1.5 (0.88 x 1.1x 0.05 in.)
3	888338	3-way shunt G1/4”
4	888339	Over-pressure indicator 250 bar (3675 psi)
5	888340	90° Fitting G1/4”
6	888341	Lubricator A M6 UNI7663
7	888342	Plug



OPERATING DIAGRAM

During ordinary operating conditions, the external over-pressure indicator is at rest (**OFF**). As soon as pumping element outlet pressure reaches 250 bar (3675 psi), the indicator moves to signalling position (**ON**). After the restore of ordinary operating conditions, it is necessary to verify that the over-pressure indicator is in the **OFF** position.

5.4 TIMER

Located inside the pump housing, in a water-proof compartment, it automatically controls the centralized lubrication system.

Working Input voltage*	**12VDC**	10÷15VDC
	24VDC	20 ÷ 30VDC
Maximum load current		5 A
Short circuit limit		7 A
Stand-by power absorption		30 mA
Cycle power absorption		50 mA (motor current excluded)
Working temperature		-25°C ÷ +70 °C (-13°F ÷ +158°F)
Storage temperature		-30°C ÷ +80 °C (-22 °F ÷ +176°F)
Hardware protection		• Overload limit • Polarity reversal • Overheating • Over voltage (max 45 V DC)
Memory for time recording		EEPROM
Life of the memory		unlimited
Pause time range		5 minutes ÷ 12 hours via digital programming
Cycle time range (only for Pause-work version)		20 seconds ÷ 8 minutes via digital programming

***For the 110VAC and 220VAC the built-in timer is 24V (supplied via transformer and rectifier).**

Warnings:

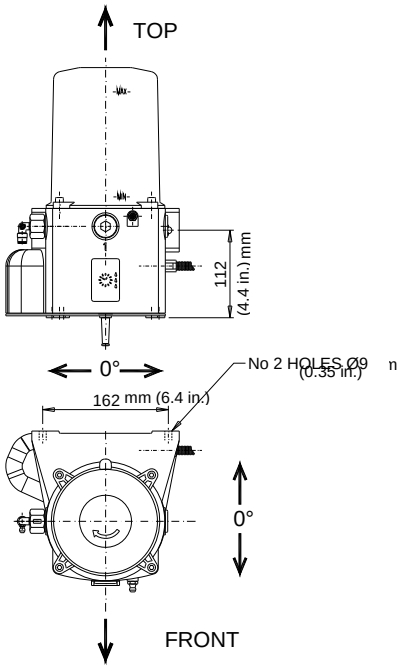
- For timer power supply, please refer to the **ELECTRICAL DIAGRAMS** of the electro-pump.
- To prevent timer fault, DO NOT supply the **12VDC version**, with voltages higher than **22VDC**.
- To prevent timer fault, DO NOT supply the **24VDC version**, with voltages higher than **35VDC**.

6. UNPACKING AND INSTALLING THE PUMP

6.1 UNPACKING

Once a suitable location has been found to install the unit remove the pump from the packaging. Check the pump has not been damaged during transportation or storage. No particular disposal procedures are necessary, however packing should be disposed of in accordance with regulations that may be in force in your area or state.

6.2 INSTALLING THE PUMP

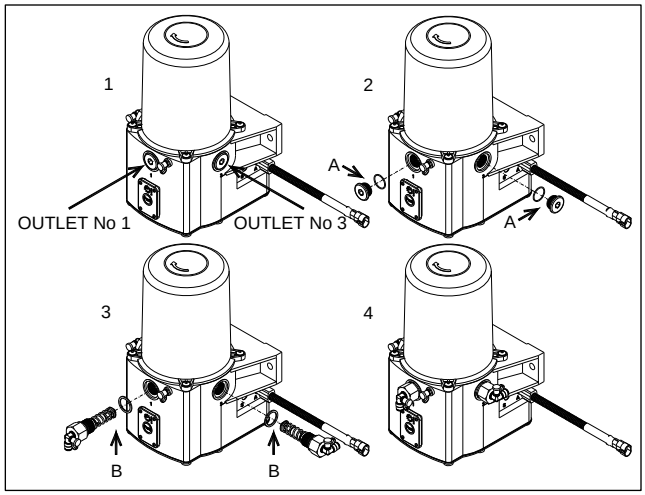


- Place the pump as shown in the aside figure and fix it to the bracket using the Ø 9 mm (Ø 0.35 in.) holes and n° 2 screws M8 UNI5931 – 8.8.
- Mount the pump in a way that the refill lubricator and timer are always easy to access.

Furthermore, we recommend:

- Allow 100 mm (3.93 in.) minimum distance from the other equipments or obstacles which might prevent access to pump.
- Place the pump in a position which prevents unnatural posture or the possibility of sustaining impacts.
- Do not install the pump immersed into liquids or on vibrating surfaces.
- Do not install the pump in locations with explosive or flammable mixtures.
- Do not install the pump near to heat sources or electric equipments which could determine Timer fault.
- When the installation has been completed, be sure cables are save from impact and carefully fixed.

6.3 PUMPING ELEMENT INSTALLATION



The system is usually supplied with a single pumping element installed on outlet 2.
The figure shows the sequence of operations to be performed to install a pumping element on outlet 1 and/or 3.

- Unscrew and remove the seal plug "**A**" from the outlet where the pumping unit has to be installed.
- Insert and tighten the pumping element in the selected configuration "**B**".
- Tighten the pumping element with 20 Nm-torque

CAUTION: Driving cam position may hinder pumping element screwing. In this case, it is necessary to install or insert the pumping element on one of the other outlets, paying attention to the correct thread screwing.

6.4 HYDRAULIC CONNECTION

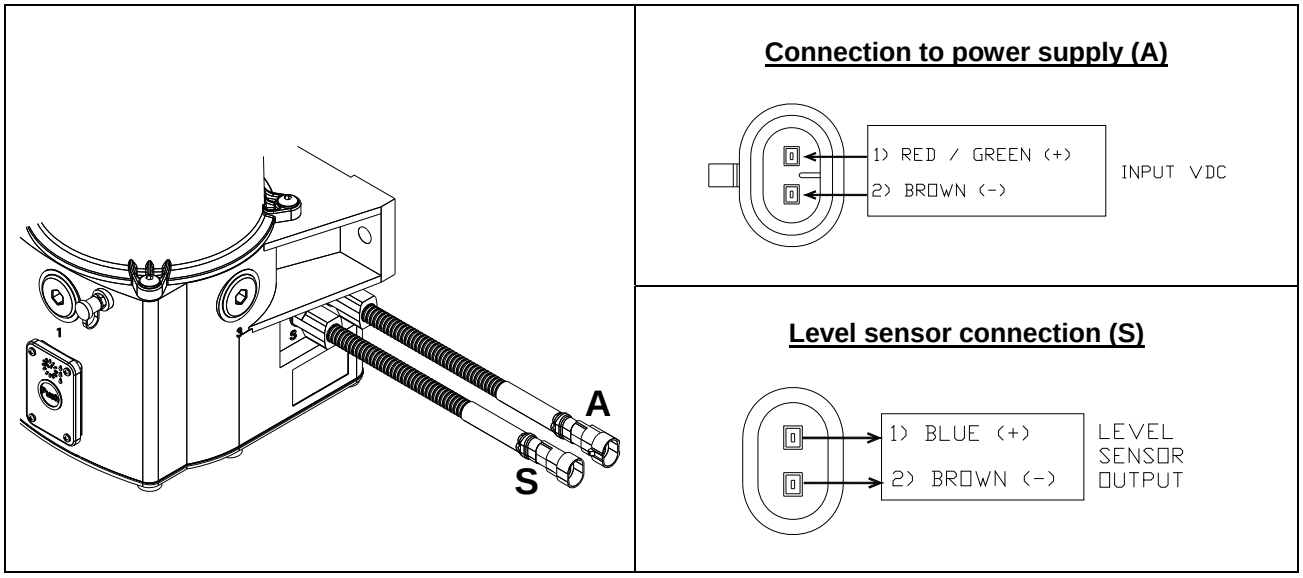
Connect the pump to the system using the hydraulic connecting point located on pump member.

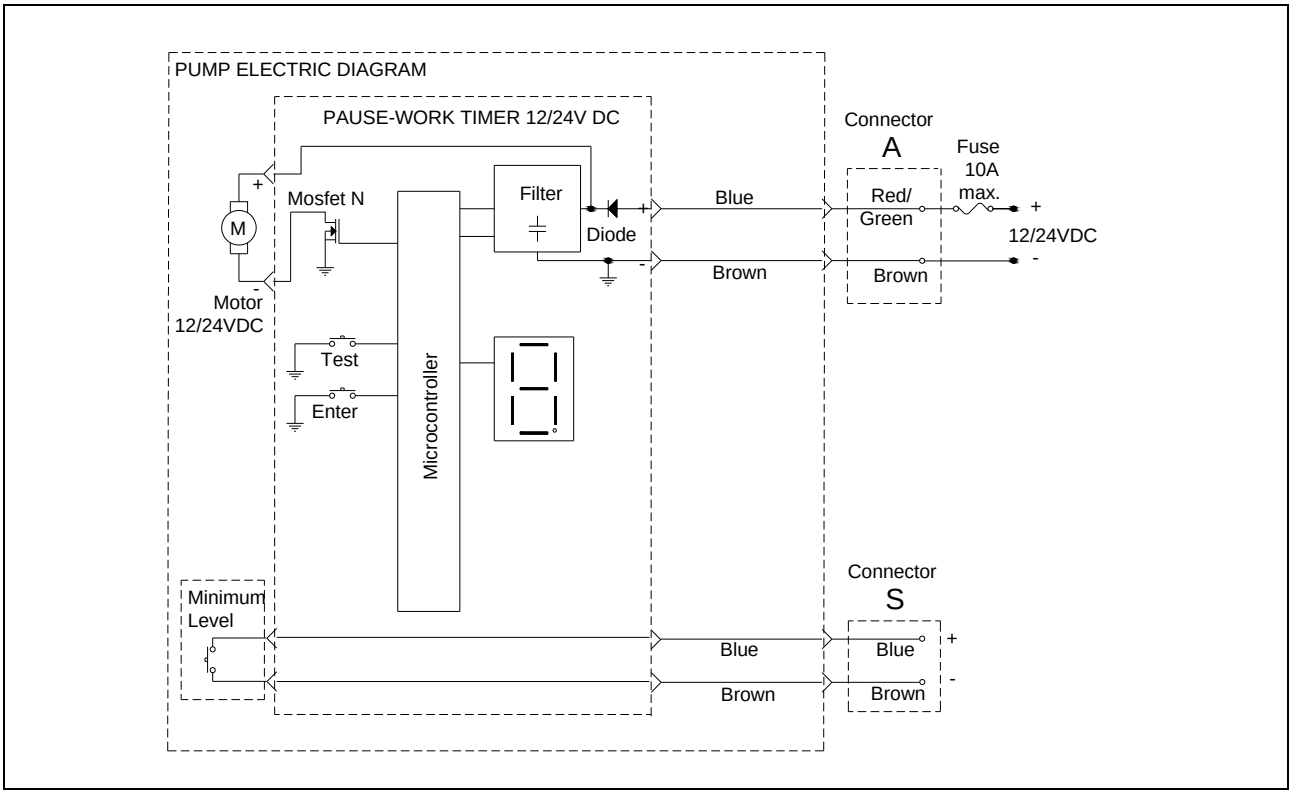
6.5 ELECTRIC CONNECTIONS AND DIAGRAMS

WARNING: Before any kind of operation, it is necessary to verify the input voltage on the product label.

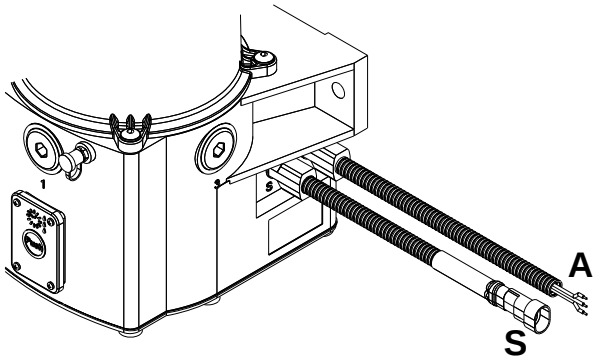
6.5.1 No Timer or with Pause–Work Timer

Versions 12VDC and 24 VDC

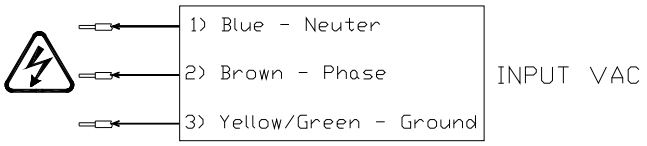




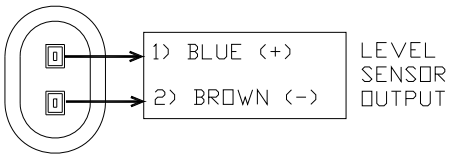
Versions 110VAC and 220VAC

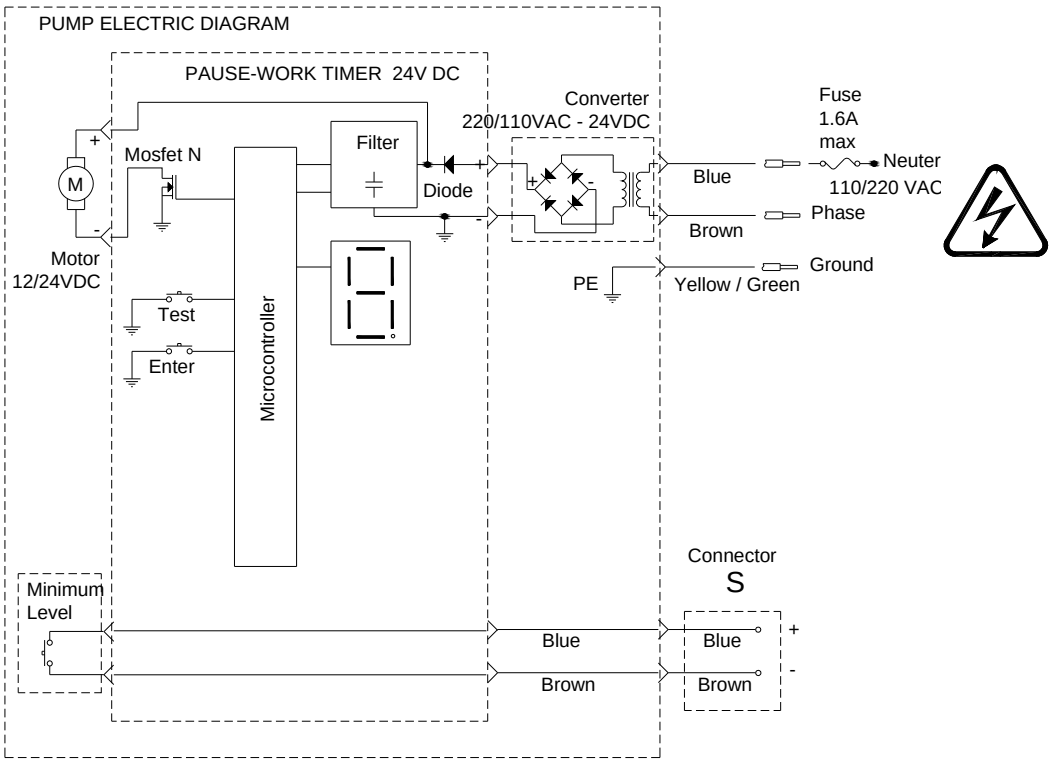


Connection to power supply (A)



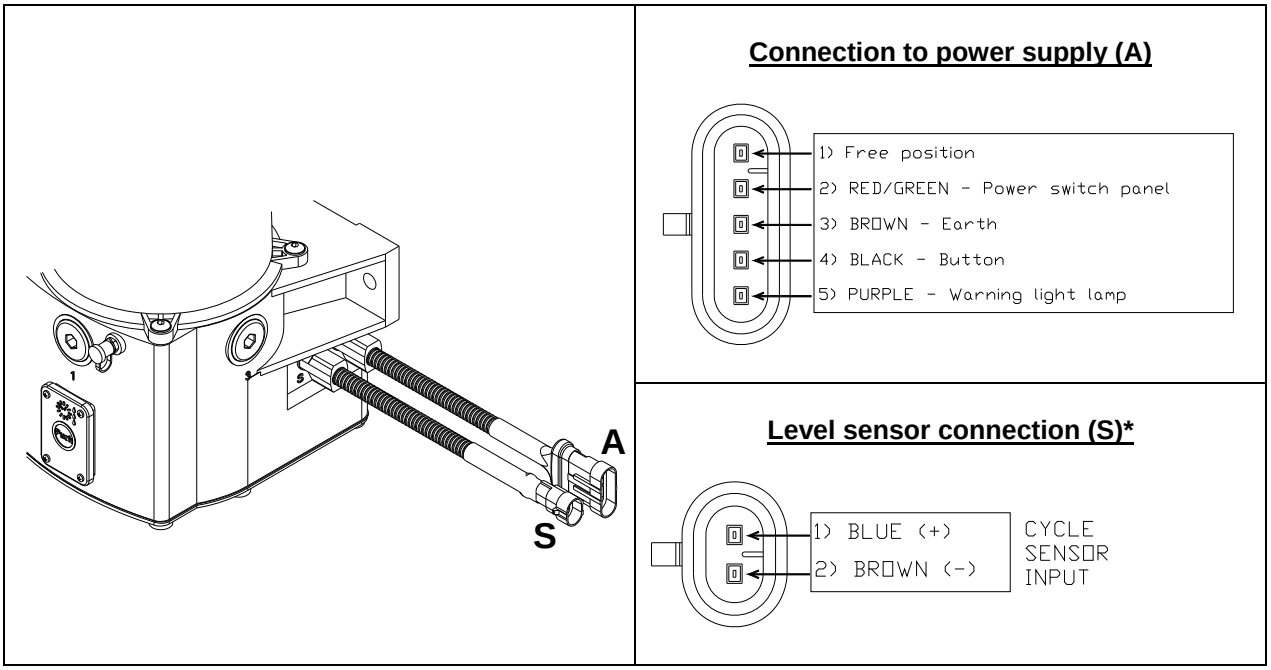
Level sensor connection (S)



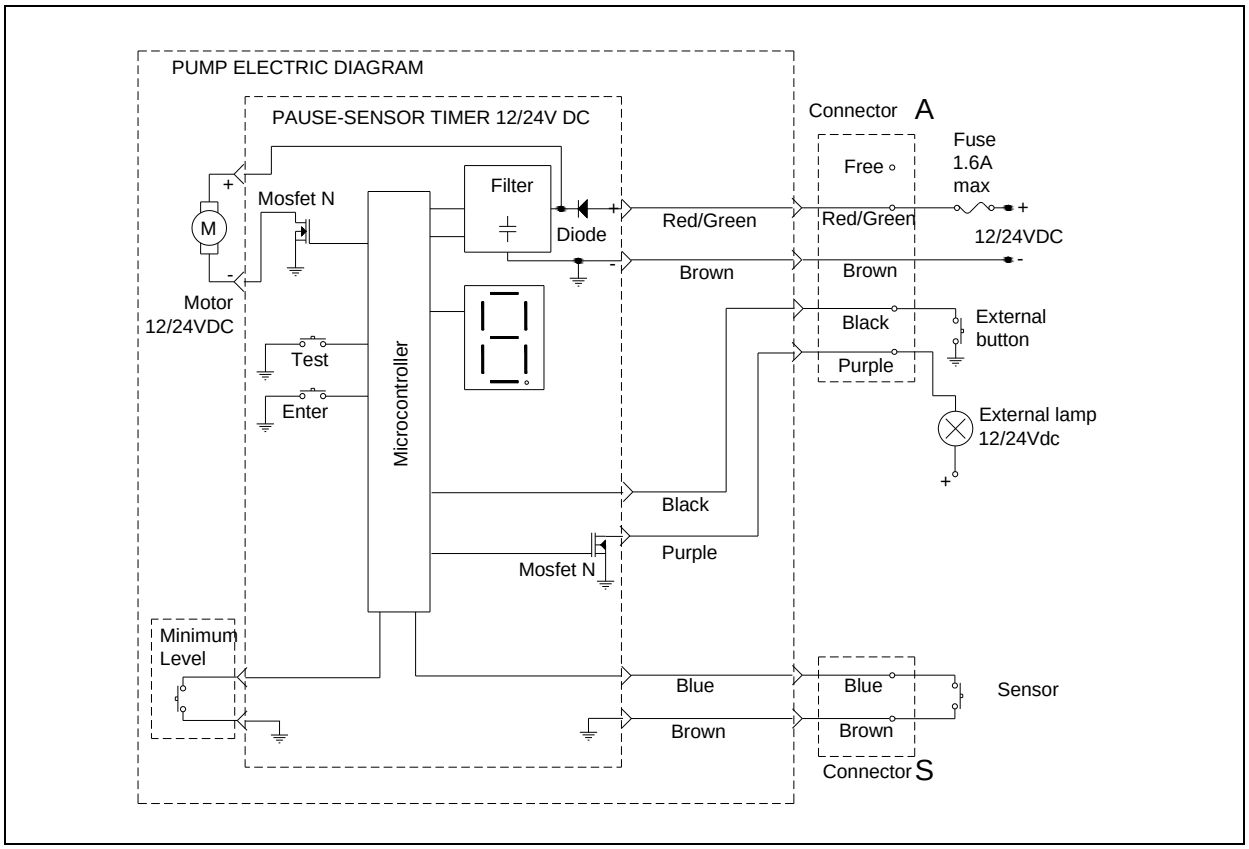


6.5.2 With Pause–Sensor Timer

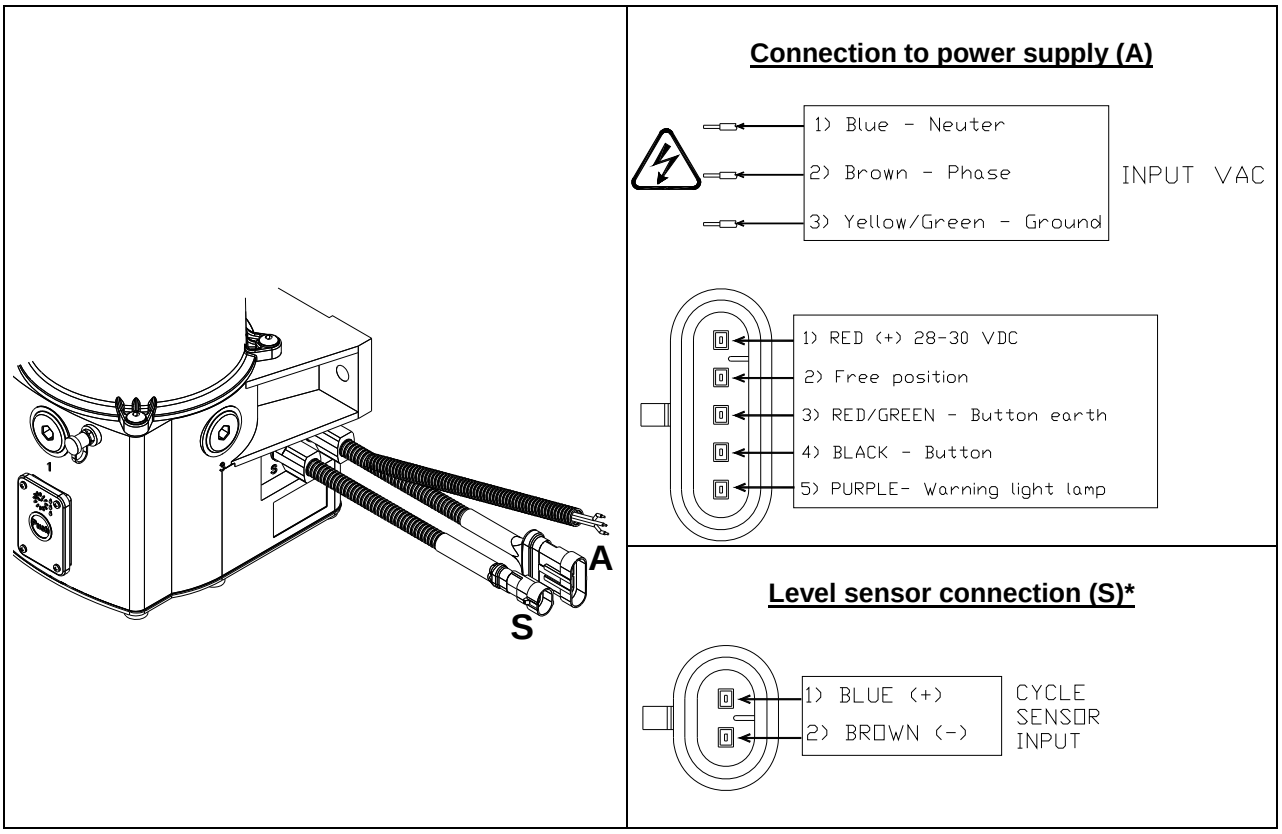
VERSIONS 12VDC and 24 VDC



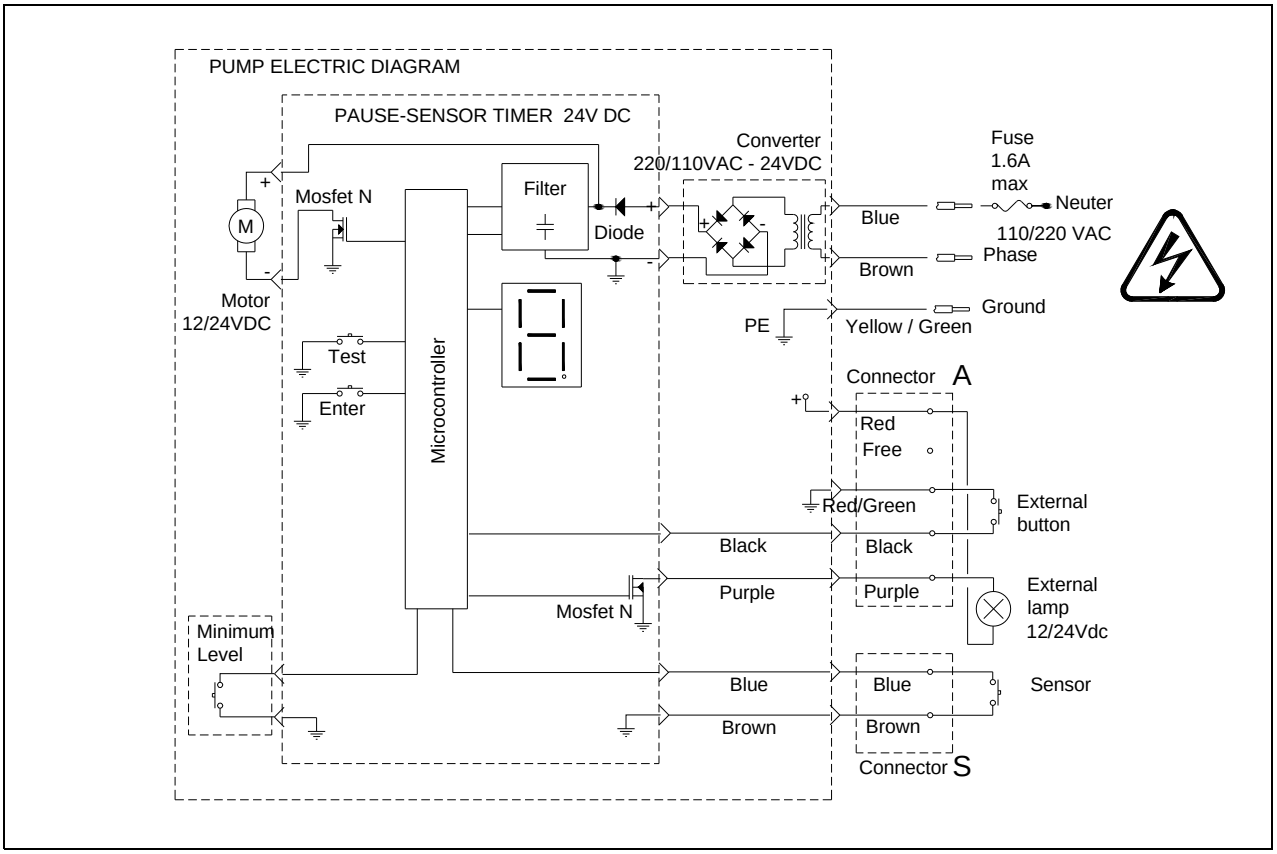
*** Note: Compatibility is guarantee only with microswitch and REED contacts. Pause-sensor timer doesn't work with proximity switch.**



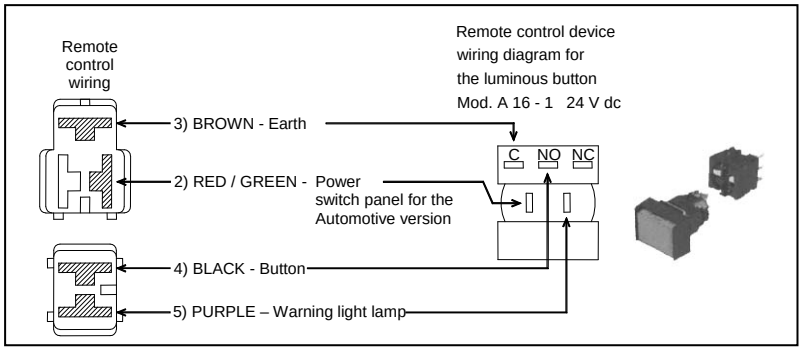
VERSIONS 110VAC and 220 VAC



*** Note: Compatibility is guarantee only with microswitch and REED contacts. Pause-sensor timer doesn't work with proximity switch.**



6.5.4 Remote Control Device (Pause-seansor Timer only)
When all pump electric connections have been carefully completed, connect the electro-pump to the electric control panel of the vehicle or machine on which the lubrication system is installed.
Install the **Remote Control Device** on the machine control panel on which the lubrication system is installed.
For electro-pumps with pause-sensor control Timer, install the **Remote Control device** LED button on the control board of the machine or vehicle. It is possible to use both the 12/24 VDC and 110/220 VAC remote control devices.



To connect the Remote Control device to the electro-pump, please refer to the electric diagram of the pump you bought.

NOTE: For *110VAC and 220VAC versions*, it is recommended the use of a lamp with a voltage over 24 V.

7. INSTRUCTIONS FOR USE

- Users are not allowed to make unauthorized changes to the existing system. Modifications must be carried out or authorized by the manufacturer only or in compliance with him.
- The system should always be used within the operating parameters specified in paragraph **4.TECHNICAL SPECIFICATIONS**.
- The system must be used only with compatible fluids, (see paragraph **15.PRECAUTIONS**).
- For further information, contact Technical Department of **Dropsa Spa**.
- The manufacturer shall not be responsible for damages from an improper use or the unauthorized modification of the system or its components.
- The manufacturer shall not be responsible for damages originating from the use of non-original spare parts or parts not certified by the manufacturer, or for damages originating from the use of incompatible lubricants.

7.1 NO TIMER
In the *NO TIMER* version of the pump, no regulations (time–pressure–flowrate) are required. Pump is electrically supplied by the control system. In this case, for the instructions on pump start-up and operation, see the control and management instructions of the machine on which the lubrication system is installed.

7.2 WITH TIMER
In the *TIMER* version of the pump, you can regulate ***pause time*** and ***cycle time***.

7.2.1 *PAUSE-WORK* CYCLE
The cycle is entirely controlled through the digital timer setting. The system runs a lubrication cycle for the preset cycle-time soon after the pause-time interval.
Cycle time must be set in a way so that the lubrication duration allows to lubricate all the connected bearing points.
To determine the time required to complete a lubrication cycle, disconnect the secondary pipe from any of the distributor outlets and measure the time interval between two subsequent lubricant deliveries.
For assistance in determining working time, contact the **Customer Service**.

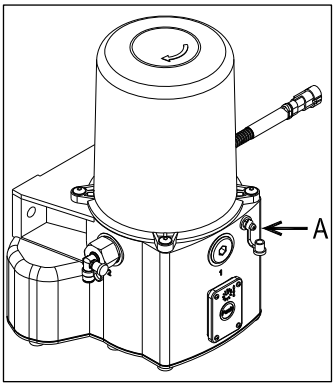
7.2.2 *PAUSE-SENSOR* CYCLE

The timer only controls pause-time programming: after the pre-set time interval, the system starts lubrication. A proximity sensor, switch or inductor, installed on the progressive distributor, reads the start and the end cycle positions and stops the pump automatically.

7.2.2.1 SENSOR

The sensor generally used on the system has the same functions of an ordinary switch with an outlet acting as internal contact. This sensor is used with the Pause-Work Timer. The lubrication cycle starts with the sensor contact closed: pump starts lubricating after the pre-set pause interval. When the distributor starts operating, the sensor contact detects lubrication cycle starting. At the subsequent distribution actuation, the contact is activated, detects the end of cycle and stops the pump.

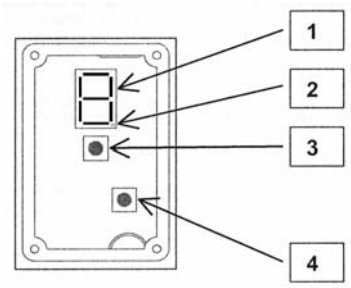
7.3 RESERVOIR REFILL



Reservoir is refilled through lubricator "**A**". Remove the lubricator plug and refill the reservoir up to maximum level (**MAX**), by means of a special equipment for lubrication in pressure. During refill, verify that air is discharged through the air-hole. Ensure that the air-hole, placed on the reservoir rear side, is not obstructed.

For information on lubricant characteristics, please refer to par. 14.2 (LUBRICANTS).

7.4 CENTRALIZED LUBRICATION SYSTEM CONTROL AND MANAGEMENT WITH PAUSE-WORK AND PAUSE-SENSOR TIMERS

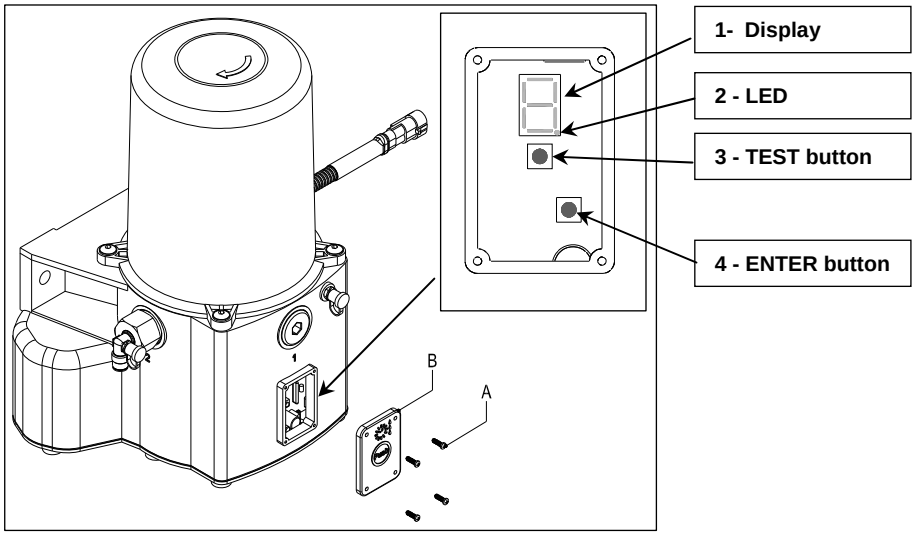


Pos.	Type	Description
1	**Display**	• During time setup It displays the parameters set. • LEDs flashes during normal operation.
2	**Led**	This LED is ON when lubrication system is powered.
3	**TEST button**	It can be actuated by slightly pressing PUSH on the timer access cover. By pushing this button during normal operation, pump starts the lubrication cycle set, and after the timer returns to the automatic mode. By pushing the button during timer setup, it enables options browsing.
4	**ENTER button**	• By pushing for 3 seconds, digital setup is started. • During setup, by shortly pushing, it enables P (pause) and L (working) parameters setup.
-----	**LED**	• It is ON when centralized lubrication system is powered. It remains on for a few seconds until timer has completed the initial check and then turns off. • It flashes when pump is started up. • It turns on when lubricant is below the minimum level or the system is faulty. • Pushed during normal operation, a work cycle is started. Then, timer returns to the Automatic mode.

7.5 TIMER DIGITAL PROGRAMMING

It is useful to remember that in case of power cut, timer saves the internal data in a long lasting digital memory. As soon as power is restored, timer reloads the saved data and starts counting time from the point and the status its operation had been interrupted.

7.5.1 Programming procedure



N°	Operation	Effect
01	Unscrew fixing screws "**A**" and remove cover "**B**" to access the timer	This operation gives access to control timer digital setup.
02	Press **ENTER** for 3 seconds	The display is ON and **P** (Pause) is shown.
03	Press **ENTER** shortly	The display shows the value set for parameter **P**.
04	Press **TEST** to change value **P**	Every time the button is pushed, the display sequentially shows the digits and the letters indicated in the pause time setting table.
05	Press **ENTER** shortly to confirm the setup	The value is stored as current value for **P** and the display shows letter **P** again.
• **NB.** For versions with Pause-Sensor control timer, skip directly to operation 10, because the only parameter that can be set is the P (pause time).		
06	Press **TEST** to alternate **P** and **L** displays	The display shows letter **L** (working time). • **NB**: Remember that **TEST** enables to alternate **P** or **L** displays.
07	Press **ENTER** shortly	The display shows the value set for L.
08	Press **TEST** to change **L** value	Any time the button is pressed, the displays sequentially shows the digits and the letters indicated on the work time settings table.
09	Press **ENTER** shortly to confirm setup	The value is stored as current value for **L** and the display shows letter **L** again.
10	Press **ENTER** for 3 seconds	The display turns OFF and is ready to run with the new parameters set.
11	Remount timer access cover "**B**" and retighten screws "**A**"	Pump is ready to operate.

7.5.2 Pause/Cycle time tables

• **PAUSE: P** Pause time setup	
Display	**Time**
0	**5 min**
1	**10 min**
2	**15 min**
3	**30 min**
4	**1 h**
5	**2 h**
6	**3 h**
7	**4 h**
8	**5 h**
9	**6 h**
A	**7 h**
B	**8 h**
C	**9 h**
D	**10 h**
E	**11 h**
F	**12 h**

• **OPERATION: L** Cycle time setup	
Display	**Time**
0	**20 sec**
1	**40 sec**
2	**1 min**
3	**1.5 min**
4	**2 min**
5	**2.5 min**
6	**3 min**
7	**3.5 min**
8	**4 min**
9	**4.5 min**
A	**5 min**
B	**5.5 min**
C	**6 min**
D	**6.5 min**
E	**7 min**
F	**8 min**

WARNING!

- ***The electro-pump with timer is shipped with the following default setting: PAUSE-TIME = 5h (Display 8) – PAUSE-WORK = 1 min (Display 2).***
- ***Cycle time L can be set only through the "Pause –Work" electronic board.***
- ***Cycle time is set to 10 minutes in the "Pause-Sensor" electronic board.***

7.6 PRECAUTIONS TO BE TAKEN DURING CONNECTING PROCEDURE

⇒ Prior to any operation, verify the voltage of the machine on the product label.

⇒ In order to prevent dangers of electric shocks due to direct or indirect contact with the energized parts, electrical power supply line must be protected by a suitable magneto-thermal circuit breaker with an intervention threshold of 0.03 Ampere and 1 second minimum operating time. Circuit breaker power must be $\leq$ 10 kA and nominal power In P4 A.

8. TROUBLESHOOTING

The following diagnostic table highlights the main anomalies which may be encountered, the probable causes and possible solutions.
If doubt exists or you cannot solve the problem, do not attempt to search for the trouble by disassembling machine parts, but contact the **Engineering Department of DROPSA S.p.A.**

N	Problem	Code	Possible cause	Solution
01	Motor does not operate	01.01	Power supply failure	Verify power supply system, and check the fuse
		01.02	The electronic board does not operate	Replace the electronic board
		01.03	Ratiomotor does not operate	Replace the ratiomotor
02	Pump does not deliver lubricant	02.01	Empty reservoir	Refill the reservoir with impurity-free lubricant
		02.02	Air-bubbles in lubricant	Disconnect main piping from pumping element fitting. Operate the pump in the manual mode until lubricant free of air-bubbles comes out of the fittings
		02.03	Use of incompatible lubricant	Refill the reservoir with compatible lubricant
		02.04	Obstructed suction pipe-line	Disassemble the pumping unit and clear the suction pipe-line
		02.05	Piston wear	Replace the pumping element
		02.06	Blocked delivery valve	Replace the pumping element
03	Pump operates but does not deliver lubricant to the bearing- points	03.01	Disconnected piping	Inspect piping and replace the wear pipes
		03.02	Blocked progressive distributor	Clear the distributor. Replace it, if necessary
04	Lubricant reaches the bearing-points in incorrect quantities	04.01	The distributor is not correctly connected to the bearing-points	Verify that the dosages are those indicated in the system diagram
		04.02	Incorrect pause time setup	Re-set pause time
05	The LED is off	05.01	Incorrect supply voltage	Verify that supply voltage range is between 20V DC and 30V DC. Then act on the supply circuit
06	By pushing TEST button, motor does not operate	06.01	Motor is not correctly connected to timer	Verify motor connections to timer and restore correct connections
		06.02	Motor does not correctly operate	Verify the motor neither is short-circuited nor it absorbs a current over 7A. If you cannot solve the problem replace the ratiomotor
07	LEDs flashes but the motor does not operate	07.01	Faulty motor	Contact the Customer Service
08	Pump starts lubricating but stops immediately	08.01	Faulty motor or high output consumption	Allow the pump being cooled for a few minutes and try again. If the problem still continues, contact the Customer Service
09	LED flashes for 2 secs.; is off for 0.5 sec but you cannot enter pump programming	09.01	Short circuit at the motor control output	Verify motor electric connections to the timer and restore the correct connection, if necessary. If you cannot solve the problem, replace the electronic board

9. MAINTENANCE PROCEDURE

9.1 MAINTENANCE

This paragraph provides essential information to allow maintenance staff to perform ordinary maintenance in safety.

Before performing any maintenance procedure, operators should:

- Verify the system is off
- Disconnect the electro-pump from power supply
- Open the selector contact switch placed on the upper side of the electric cabinet
- Adopt all the protective measures in accordance with the accident prevention, especially those necessary to warn that system is in maintenance.

WARNING! DO NOT clean the electro-pump using alcohol

9.2 SCHEDULED MAINTENANCE

Due to components simplicity of design, sturdy construction and reliability, **Dropsa SpA** expects a limited number of inspections and scheduled maintenance interventions.

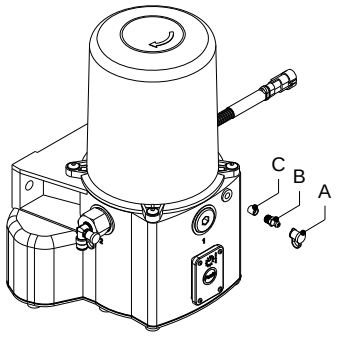
The following table lists the checks that have to be performed periodically, along with the frequency and type of interventions that serviceman must perform to guarantee the efficiency of system for a long time.

CHECK	RECURRENCE	INTERVENTION
Tightening of components	After the first 500 hours	Check that all components are properly tightened
Fixing of piping	After the first 500 hours Every 1500 hours	Check snap-on connections. Check pump fixing to the machine/vehicle
Electro-pump operation	Every 6 months	Verify electro-pump operation by pushing the TEST button
Lubricant level	As required	Refill the reservoir when lubricant is below the minimum level
Refill filter	Every 2 refills	Check and replace the filter, if necessary (see the following paragraph)

9.3 FILTER REPLACEMENT

For the maintenance of the refill filter, proceeds as follows:

- Remove plug“ **A**”, lubricator“ **B**” and filter “**C**”.
- Inspect and clean the filter with compressed air, when required.
- If the filter is still dirty after being cleaned, replace it.
- Remount filter “**C**”, lubricator “**B**” and plug “**A**”. Tighten lubricator “**B**” with torque 6Nm maximum.



10. DISPOSAL

During maintenance or disposal of the machine care should be taken to properly dispose of environmentally sensitive items such as oils or other lubricants. Refer to local regulations in force in your area.

When disposing of this unit, it is important to ensure that the identification label and all the other relative documents are also destroyed.

11. ORDERING INFORMATION

NOTE: When you ask for technical information or spare parts, it is advised to always indicate pump part number.

11.1 ELECTRO-PUMP WITH NO TIMER

Reservoir / Voltage	2 lt 0.44 gals	4 lt 0.88 gals	8 lt 1.76 gals
12 V	888300	888301	888302
24 V	888303	888304	888305
110 V	888306	888307	888308
220 V	888309	888310	888311

11.2 ELECTRO-PUMP WITH PAUSE-WORK TIMER

Reservoir / Voltage	2 lt 0.44 gals	4 lt 0.88 gals	8 lt 1.76 gals
12 V	888312	888313	888314
24 V	888315	888316	888317
110 V	888318	888319	888320
220 V	888321	888322	888323

11.3 ELECTRO-PUMP WITH PAUSE-SENSOR TIMER

Reservoir / Voltage	2 lt 0.44 gals	4 lt 0.88 gals	8 lt 1.76 gals
12 V	888324	888325	888326
24 V	888327	888328	888329
110 V	888330	888331	888332
220 V	888333	888334	888335

11.4 SPARE PARTS FOR ELECTRO-PUMP WITH PAUSE-WORK TIMER

Part Number	Description	E-pump Reser. 2 lt 0.44 gals	E-pump Reser. 4 lt 0.88 gals	E-pump Reser. 8 lt 1.76 gals
888345	Pause-Work Timer 12VDC. For electro-pump version 12VDC	888312	888313	888314
888346	Pause-Work Timer 24VDC. For electro-pump versions 24VDC, 110VAC and 220VAC	888315	888316	888317
		888318	888319	888320
		888321	888322	888323

11.5 SPARE PARTS FOR ELECTRO-PUMP WITH PAUSE-SENSOR TIMER

Part Number	Description	E-pump Reser. 2 lt 0.44 gals	E-pump Reser. 4 lt 0.88 gals	E-pump Reser. 8 lt 1.76 gals
888349	Pause-Sensor Timer 12VDC. For electro-pump version 12VDC	888324	888325	888326
888350	Pause-Sensor Timer 24VDC. For electro-pump versions 24VDC, 110VAC and 220VAC	888327	888328	888329
		888330	888331	888332
		888333	888334	888335

11.6 TRANSFORMER WITH RECTIFIER

Part Number	Voltage
888361	110 Vca
888362	230Vca

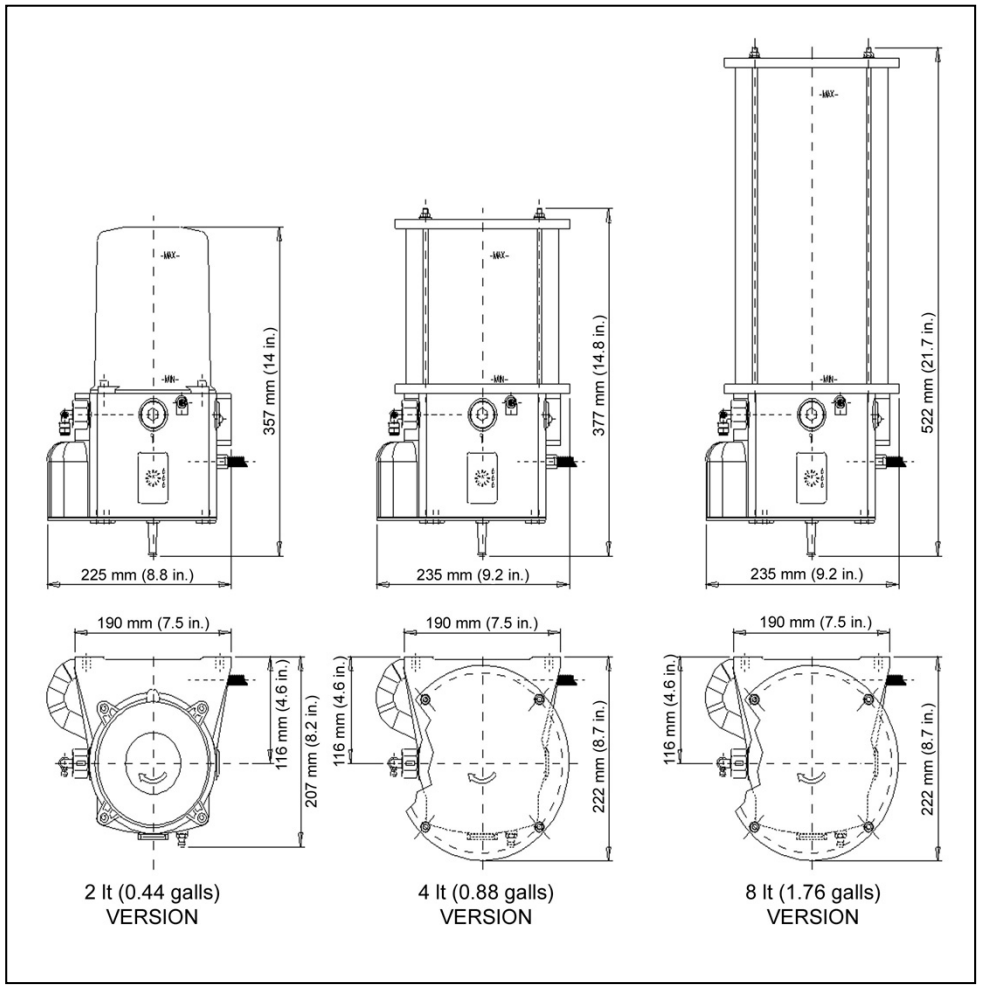
11.7 SPARE PARTS KITS FOR RESERVOIR

Part Number	Kit Composition
888356	1 reservoir 2 lt (0.44 gals), 1 seal, 4 screws
888357	1 reservoir 4 lt (0.88 gals.), 2 seals, 4 tie rods, 4 nuts
888358	1 reservoir 8 lt (1.76 gals.), 2 seals, 4 tie rods, 4 nuts

11.8 SPARE PARTS FOR CONNETCTORS

Part. Number	Connector Type
39808	Female Connector 2 poles
39809	Male Connector 2 poles
39810	Female Connector 5 poles
39811	Male Connector 5 poles

12. DIMENSIONS



Versions	Vacuum weight 1 pumping element installed	
Reservoir capacity 2 lt (0.44 gals)	3,3 kg	(7,3 lb)
Reservoir capacity 4 lt (0.88 gals)	4,8 kg	(10,6 lb)
Reservoir capacity 8 lt (1.76 gals)	5,5 kg	(12,1 lb)

13. HANDLING AND TRANSPORTATION

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

14. OPERATING HAZARDS

14.1 SAFETY WARNINGS

- It is necessary to read and understand the possible hazards and risks involved when using centralized lubrication systems. The operator must fully understand the hazards explained in this manual.
- An improper use of centralized lubrication systems may cause damages due to an excessive or inadequate lubrication of the points to which it is connected.
- It is always necessary to comply with the accident prevention laws and the environmental regulations in force in the area where the centralized lubrication system is used.

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

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

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

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

14.2 LUBRICANTS

- It is useful to remember that systems manufactured by **Dropsa SpA** are designed to be used with lubricants with a maximum grade of **NLGI 2**
- Use only compatible lubricants with **NBR** seals
- **Dropsa SpA** supplies system lubricated components with **NLGI 2** lubricant.

This table provides comparative data between NLGI (National Lubricating Grease Institute) and ASTM (American Society for Testing and Materials) data only for the values concerning systems manufactured by **Dropsa SpA.**
For further information on technical data and safety measures, see **Product Safety Sheet** (Directive **93/112/EEC**) related to the type of lubricant selected or supplied by the manufacturer.

15. PRECAUTIONS

Verification of compliance with essential safety requirements and machine Directive dispositions has been carried out filling in checking lists provided and contained in the *technical file*.
Dropsa used three kinds of checking list:

- List of hazards (according to the EN 1050 as it refers to EN 292);
- Enforcement of the essential safety requests (machine Directive – annex 1, part 1);
- Electric safety requirements (EN 60204-1)

The following is a list of dangers which have not been fully eliminated but which are considered acceptable:

- During assembly or maintenance oil squirts at low pressure are possible. (For this reason suitable personal protective clothing must be worn and appropriate protective measures must be taken during these operations).
- Contact with oil -> Protection against direct and indirect contact must be provided by the user see the requirements for the use of suitable individual protective measures.
- Use of incompatible lubricant -> fluid characteristics are shown on the pump and in the manual **(in case of doubt contact Dropsa S.p.A. Eng. Dept.)**.

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

16. WARRANTY INFORMATION

All products manufactured and marketed by Dropsa are warranted to be free of defects in material or workmanship for a period of at least 12 months from date of delivery. Extended warranty coverage applies as follows:

Complete system installation by Dropsa: 24 Months

All other components: 12 months from date of installation; if installed 6 months or more after ship date, warranty shall be maximum of 18 months from ship date.

If a fault develops, notify us giving a complete description of the alleged malfunction. Include the part number(s), test record number where available (format xxxxxx-xxxxxx), date of delivery and installation and operating conditions of subject product(s). We will subsequently review this information and, at our option, supply you with either servicing data or shipping instruction and returned materials authorization (RMA) which will have instructions on how to prepare the product for return. Upon prepaid receipt of subject product to an authorized Dropsa Sales & Service location, we will then either repair or replace such product(s), at out option, and if determined to be a warranted defect, we will perform such necessary product repairs or replace such product(s) at our expense.
Dropsa reserves to right to charge an administration fee if the product(s) returned are found to be not defective.

This limited warranty does not cover any products, damages or injuries resulting from misuse, neglect, normal expected wear, chemically caused corrosion, improper installation or operation contrary to factory recommendation. Nor does it cover equipment that has been modified, tampered with or altered without authorization.

Consumables and perishable products are excluded from this or any other warranty.

No other extended liabilities are states or implied and this warranty in no event covers incidental or consequential damages, injuries or costs resulting from any such defective product(s).

The use of Dropsa product(s) implies the acceptance of our warranty conditions. Modifications to our standard warranty must be in made in writing and approved by Dropsa.

17. DECLARATION OF COMPLIANCE WITH CE STANDARDS

Manufacturer:

DROPSA SpA

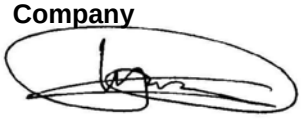
Via B. Croce, 1 - 20090 Vimodrone (MI)
Indirizzo
02 – 250.791
Telefono

states, by the terms of Directive **98/37/CE** Allegato **I**, paragrafo **1.7.4**, that:

Machine: **MLP- Mobile Lube Pump**

- Has been designed to be integrated in a machine that complies with the requirements of Directive **98/37/CE.**
- Is compliant with the requirements of Directive **98/37/CE**;
- Is compliant with the requirements of the EMC Directive **89/336/EEC** and with Directive **92/31/EEC** "Electromagnetic compatibility", as indicated in Directive **95/54/EEC** "Measurement of irradiated electromagnetic emissions".

Furthermore, the manufacturer states that the unit can be operated only if the machine on which it is installed has been identified and found compliant with the requirements of Directive **98/37/CE.**

TECHNICAL DIRECTOR	W. Divisi
	Name
DROPSA SpA	
Company	
	January 2003
Signature	**Date**

It is useful to remember that the Declaration of Conformity is valid only if:

- The indications, safety warnings and instructions given in the operation and maintenance manual are observed.
- The system is used in accordance with the instructions provided by the manufacturer.
- Adjustment operations are carried out by authorized, trained and qualified personnel.
- Maintenance operations are carried out by qualified and authorized technicians.

Failure to comply with the requirements listed in the Certificate of Conformity shall automatically invalidate the warranty.

18. DISTRIBUTORS

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