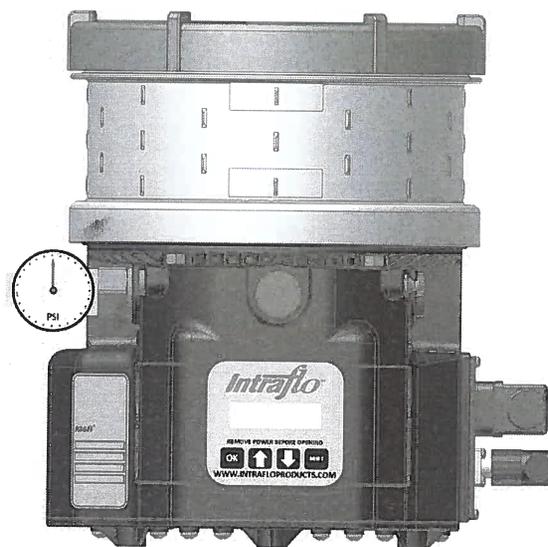


Intraflo™



400 Series Lubrication Pump

TECHNICAL CHARACTERISTICS

GENERAL TECHNICAL CHARACTERISTICS										
Operating Voltage	AC		DC		AC - 50Hz		AC - 60Hz			
	12V	24V	12V	24V	110V	230V	110V	230V		
Current (nominal)	1A	0,5A	1A	0,5A	0,2A	0,1A	0,2A	0,1A		
Current (peak)	6,5A	3A	6,5A	3A	0,3A	0,2A	0,3A	0,2A		
Net Weight	2 Liter				6,5 Kg (14.33lb)					
	5 Liter				7Kg (15.43lb)					
	8 Liter				6,5Kg (14.33lb)					
Number of outlets / pumping elements	1 (3 max.)									
Outlet thread	1/8 NPT									
Nominal output per pump element*	2,8cm ³ /min (0.17in ³ /min) @ 20 RPM									
Working pressure	280bar (4061psi)									
Integrated By-pass pressure (for pump elements with integrated PSV)	320bar ±30bar (4641psi ±435psi)									
Reservoir Capacity	2 – 5 – 8 liter (0.53 – 1.32 – 2.11 gallons)									
Max Grease capability	NLGI 2									
Min. oil viscosity	46cSt									
Operating temperature	-25°C ÷ +80°C									
Storage temperature	-30°C ÷ +90°C									
Humidity	90%									
Water Ingress/Dust	Protected against water spray in any direction. Dust tight.									
Noise	< 70 db (A)									
CONTROL PANEL CHARACTERISTICS										
Operating Voltage	12VDC ±20%									
	24VDC ±20%									
	110VAC									
	230VAC									
Maximum Output load capability	5A									
Short circuit & Overload protection.	7.5A typical 10A max.									
Operating temperature	-20°C ÷ +80°C									
Storage temperature	-30°C ÷ +90°C									
Hardware protection	<ul style="list-style-type: none"> • Overload protection on motor and lamp • Integrated Motor protection • Spike voltage protection • Inverted Polarity protection 									
Memory for parameter storage	EEPROM									
Memory Life	Unlimited (no battery requirement)									
Minimum Level										
Max load	AUTOMATIC Version				1A	@	30V			
	MANUAL Version				0,3A	@	230V			
					0,25A	@	120V			

* NOTE: Pump output has been determined at the following conditions: Grease, NLGI 2, Standard environmental conditions (Temperature 20°C / 68°F, Pressure 1 ATM), Back pressure on outlet 50bar (735 psi) 12V e 24V voltage.



WARNING: Do not operate the unit outside the specified voltage ranges.

1. Electronic Control Board.

In the automatic version, pump and cycle control is managed by the onboard controller. Three operating modes are possible:

1. **CYCLE:** Lube and pause cycles are set using the built in timer or counting external inputs; the two condition work with every combinations
2. **PULSE** Lube Cycle and Pause cycle are determined by external inputs. During of Lube Cycle, the cycle sensor can be monitored to ensure a correct system working. Pump can suspend the lube cycle if external pulses are not found.
3. **OFF:** Pump works as slave regarding the control of the machine

Pumps offer two different types of connection plates. Standard connection plates for power and low level output as well as feedback plates (standard on "F" pumps) for power, low level output, remote switch input and external sensor input. Integrated mounting provisions for the 40 and 41 Series progressive divider valves are conveniently located on the bottom of the pump.

1.1 Minimum Level

In manual version (no control board) the minimum level switch (Normally closed) opens when the minimum level is reached. With the automatic (controlled) version, a voltage free changeover contact NC/NA can be obtained to give a remote signal of minimum level.

1.2 Connections and Wiring

Different connectors and wiring are available as standard by fitting a selection of connector plates. It is also possible for custom settings for OEM clients.

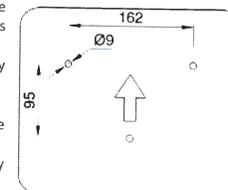
2. Unpacking

2.1 Unpacking

Once a suitable installation position has been identified, unpack the pump and prepare for installation. It is important to inspect the pump to ensure that there has been no damage during transportation. The packaging material used does not require any special disposal procedures. You should refer to you regional requirements.

2.2 Installing The Pump

- On the bottom of the box there is a mounting hole template as shown in the diagram on the right. This can be used to drill the fixing holes. The fixing holes should be $\varnothing 9\text{mm}$ ($\varnothing 0.35$ inch). Use 3 screws to fix the pump into place.
- Assembly the pump so that the filling point and the control panel are accessible by the user.
- Allow 100mm (4 inches) perimeter distance around the pump for easy access.
- Ideally, install the pump at a height that is easily and comfortably accessible by the user to facilitate maintenance and refilling.
- Do not install the pump where it may be submerged by liquids of in excessively aggressive environment.
- Do not install the pump in hazardous areas where there may be flammable or explosive materials.
- Do not install near strong heat sources or electrical areas that may cause electrical interference with the control system.
- Ensure that tubing and wiring is appropriately secured and protected.



2.3 Installing Pump Elements

The pump is supplied with a single pump element installed in port 1. The additional pump elements can be installed in any of the additional pump port (2 or 3). It is also possible to move Pump Element 1 to another port if necessary, for example to simplify piping arrangements on the lubrication system. To install a new pump element:

- Unscrew and remove the plastic plug with the O Ring that is installed on the standard product.
- Insert and screw the pump element until it is fixed in position.
- Use 20Nm torque to secure the element.



WARNING: Based on the position of the internal cam drive it may be difficult to screw in the pump element a sit compresses the return spring. In this case, use another outlet or of pay particular attention when inserting the pump element and ensure that it does not cross-thread.

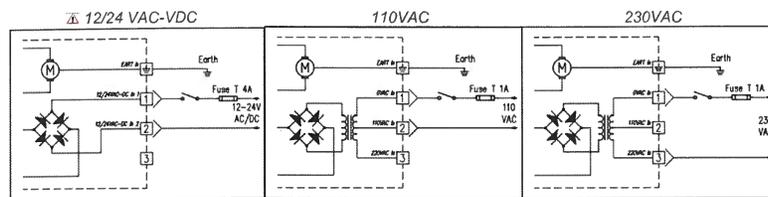
2.4 Hydraulic Connections

The hydraulic connection to the pump is via the pump outlets using adequate 1/8 NPT fitting and tubing. Additionally there is a 1/8" BSP port that can be used as a return line or a remote refilling line. Ensure that any refilling system provides clean grease to the pump.

Wiring

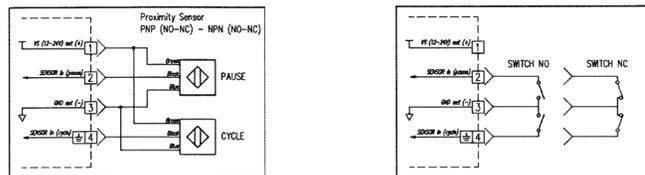


Wiring **A** Power Supply

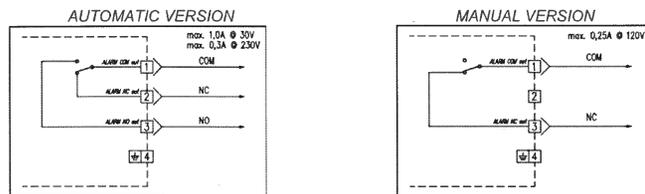


⚠ On 12/24 VAC-VDC manual version do not connect earth terminal

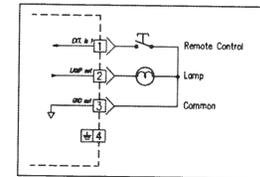
Wiring **B** Cycle Sensor



Wiring **C** Low Level

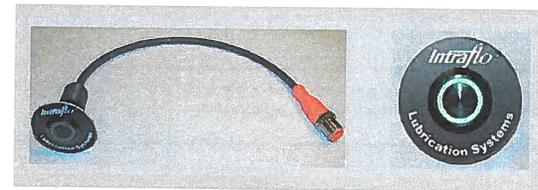


Wiring **D** Remote Control



2.5 Remote Control Switch and Lamp

After mounting the pump, it is possible to continue the installation by connecting a remote illuminated momentary switch on feedback pumps (Pumps with an "F" at the end of the part number). The connection is made by simply connecting an M12 patch cable (85071 or 85072) between the pump and the illuminated momentary switch (85073). Installation of a remote switch allows pump control and error indication inside the cab.



3. Operating Instructions

3.1 Before Putting Into Operation

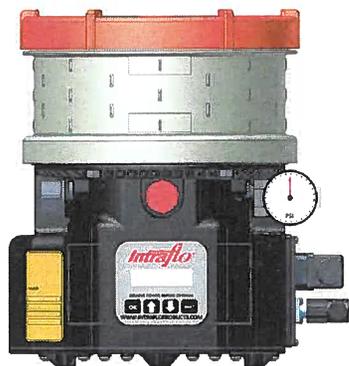
- Note that the unit should not be dismantled by the user if a fault is found.
- Use gloves when handling lubricants and ensure you have checked the lubricant safety data sheet.
- Do not use lubricants that are incompatible with NBR (Buna) seals.
- Ensure that you have complied with all health and safety requirements before putting the pump into service.
- Maintain proper hygiene standards. Never ignore any potential danger to health.
- Ensure all tubing and fittings are designed to handle the maximum system pressure.
- Check integrity in the pump. Ensure no damage;
- Check and fill the reservoir. If the reservoir is below the MIN level, follow procedure 3.3 to refill;
- Verify the pump is at the correct operating temperature and tubing is free of air bubbles;
- Check the unit is properly cabled.

3.2 Operation

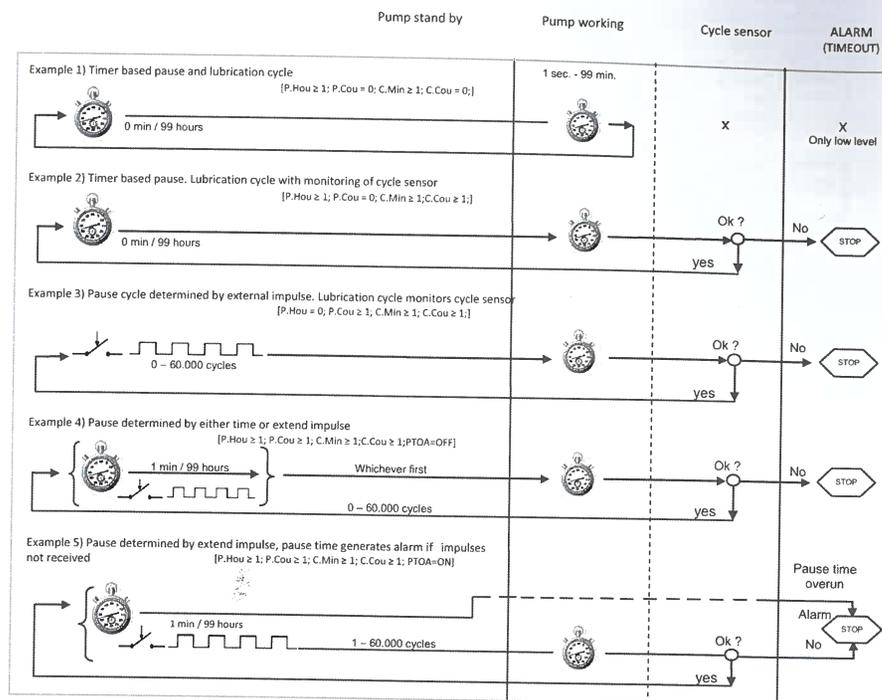
- Check and set the operating mode and parameter if using the automatic versions.
- Press the remote start button on your machine if using a manual version.
- Check that the pump is running.
- Check lubricant is being delivered to the greasing points as necessary.

3.3 Refilling The Reservoir

The refilling of the tank is carried out through the dedicated filling ports with adequate filtration to ensure clean lubricant. Continue to fill unit until the max level is reached/ this level should not be exceeded. In the event the user overfills the tank, the excess lubricant will be expelled through vent holes located under the lid.



3.4.2 Operation Mode : Automatic Version Mode - Cycle



WARNING: to avoid introducing contamination into the pump and voiding the warranty ensure that refilling is always carried out through the designated ports using clean grease.

3.4 Configuration

Automatic version Control panel layout

DISPLAY
Indicates the parameter being programmed and the set value

OK
Confirms the value shown on the display

UP ARROW
Allows the user to increment the setting value shown on the display



RESET
Resets the current lube cycle, cancels any alarms and restarts the program.

DOWN ARROW
Allows the user to decrease the value shown on the display

Optional Remote Light Button

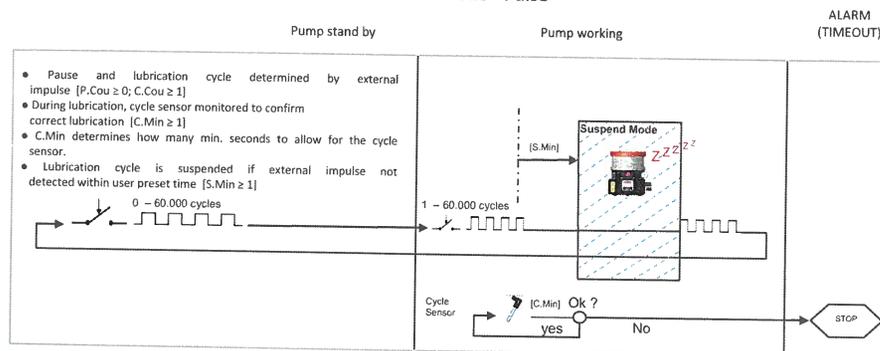


The light is constantly lit when the pump is running. Flashes when a minimum level or other alarm is detected by the control system in the pump. The number of flashes defines the anomaly code. When pressed during the pause (standby) cycle, it will make the pump starts a lubrication cycle and then return to normal automatic operation. The RESET of the pump is allowed when the button is pressed for 6 seconds.

3.4.1 Operation Mode : Manual Version

The manual version of the pump does not have any settable features as there is no local controller. You should arrange to control the pump ON/OFF with a host system that activates the pump as required and monitors the lubrication system, including checking level switch and cycle switch when installed.

3.4.3 Operation Mode : Automatic Version Mode - Pulse



3.4.4 Operation Mode : Automatic Version Mode - Off

Pump operates when external signal is given. No monitoring



NOTE:
When power is removed from the pump, the electronic control will save the cycle condition in memory. When power is reapplied the controller will resume the logic from exactly the same point (unless the PRELUBE option is set).
When powering on the system or when pressing the RESET button the display will the firmware version of the unit for 2 seconds.
For all modes the Prelube parameter determines if the pump starts in a lubrication cycle when it is set to ON. Cycle and Pause inputs consider one complete cycle when the input returns to its original state at the time of cycle. For example, if the switch is in the ON state at the start of the lubrication cycle then it must change state to OFF, and then back to ON to count as one cycle.

3.5 Programming The Electrical Controller

PROGRAMMING SEQUENCE		
STEP	BUTTONS	OPERATION
1	OK hold for 5 seconds.	Enter programming mode
2	↑ or ↓	Select PARAMETER to change
3	OK	Confirm the selection and view the current value
4	↑ or ↓	Increment/Decrement VALUE/SETTING of PARAMETER
5	OK	Confirm value/setting and return to menu
6	OK hold for 2.5 seconds.	Save settings and exit programming mode



NOTE: To modify the operating parameters repeats steps 2 to 5 for all necessary values and then follow step 6 to save and exit.
During programming mode, if no button is pressed for 20 seconds, or alternatively UP or DOWN arrows are held for 2.5 seconds, this will exit Programming mode without saving the values.

SPECIAL FUNCTIONS AND PARAMETERS		
BUTTONS	DISPLAY	DESCRIPTION
OK + ↑	LOC	Reset of key board. Reset is operating
OK + ↓	FREE	Unlock keyboard
↑ + ↓ + Reset Release	DEFA	Reset the default values in the active operating mode
↓ + Reset Release	CDAY	Display total days in working state
	CMIN	Display total minutes in working state
	PDAY	Display total days in pause state
	PMIN	Display total minutes in pause state
	EDAY	Display total days in alarm state
	EMIN	Display total minutes in alarm state

Operating Parameters

DISPLAY	DESCRIPTION	MODE	DEFAULT	RANGE	NOTES
MODE	CYCLE PULSE OFF	CYCLE PULSE OFF			Cycle 100%
PHOW	PAUSE TIMER: SET Hours and Minutes	CYCLE	10 min	0 min / 99 ore	Both
SINH	TIMER to suspend the cycle	PULSE	0 sec	0 sec / 99 min	
PCOW	PAUSE COUNTER: number of divider switch cycles to wait in pause	CYCLE PULSE	1 cycle	0 / 60000	Complete Cycle
CTOW	CYCLE TIMER: if timed cycle it indicates the duration; if cycle with control impulses, indicates the waited maximum time of the single impulse before alarm	CYCLE PULSE	1 min	99 min / 1 sec	
CCOW	CYCLE COUNTER: number of divider switch cycles per lubrication cycle. input used: • Sensor Cycle if Cycle Mode • Sensor Pause if Pulse Mode	CYCLE PULSE	1 cycle	0 / 60000	Complete Cycle
PREL	PRELUBE: Start –controller in Lubrication mode when powered on.	CYCLE PULSE	OFF	ON-OFF	
DUTY	Motor DUTY: allows reduction in pump output by adjusting motor speed	CYCLE PULSE OFF	100	100 / 50	
MCYC	Number of cycles given from the manual input (it allows eventual filling system)	CYCLE PULSE	1	0 / 9999	
PEOA	If OFF, to expiring of the pause time, stars the lubrication cycle If ON, to-expiring of the pause time, gives Pause Time Overrun alarm.	CYCLE	OFF	ON-OFF	
LEVEL	If OFF, the minimum level is excluded.	CYCLE PULSE OFF	ON	ON-OFF	



NOTE:
Continuous Cycle: Continuous cycle can be achieved by setting the pause timer to zero.
Complete cycle: Valid on input full cycle ON>OFF>ON or OFF>ON>OFF.
Both: When the pause timer is set to non zero, the system operates in a combined mode. The cycle will start EITHER on impulse Count OR Pause Time being reached.

4. Troubleshooting

Below is a trouble shooting table to show possible problems and solutions. If you are in any doubt about the correct solution to fixing a problem, do not dismantle parts of the pump but contact an authorized sales and service point for technical assistance.

TROUBLESHOOTING TABLE		
PROBLEM	POSSIBLE CAUSE	REMEDIAL ACTION
Pump Motor does not operate	Power missing.	Check the power lines, ensure that any fuse installed is still intact.
	Electronic Controller does not function.	Replace electronics board. ⚠
	Gear motor no longer works.	Replace gear motor assembly. ⚠
Pump is operating but no lubricant reaches points	Tubing is disconnected.	Check the condition of tubing in the system and ensure that it is correctly secured and not blocked for example, by hardened grease.
	Distributor valves are blocked.	Clean or replace.
Lubricant does not reach lubrication points on each pump cycle or irregularly	Distributor valves are incorrectly connected or sized.	Check valves and system schematic.
	Incorrect Pause/Cycle Settings.	Ensure that the system designs and settings allow for at least a full cycle for all distributor valves in the system.
PROBLEM	POSSIBLE CAUSE	REMEDIAL ACTION
No lubricant from pump	Reservoir is empty.	Refill, and verify any low level alarms.
	Air bubble in grease	Disconnect the primary tubing from the pump and operate a lubrication cycle. Check that clean, air free grease is coming from the pump and then reconnect the tubing.
	Incompatible lubricant.	Some lubricants are not suitable for automatic pumping systems. Replace the grease.
	Blocked pumping element.	Dismantle the pumping element and check for contamination. Clean and reinstall or replace.
	Worn pump element.	Replace pump element.
	Pump element Check worn.	Replace pump element.
The display is not lit	Incorrect power/voltage.	Check power and voltage. Ensure proper power supply to pump.
The pump starts the lubrication cycle but then immediately stops	Defective or blocked Pump motor.	Allow the pump to cool. Retry the lubrication cycle. If the problem persists it will be necessary to replace the pump motor assembly. ⚠

⚠ : Allowed only by trained technician.

ALARM CODES			
MESSAGE	LIGHT BUTTON	ALARM	REMEDY
A L L L	1 Flash	Low lubricant level in reservoir	Refill with clean lubricant.
A C C S	2 Flashes	Cycle Sensor overrun	The cycle sensor was not received within the specified time. Ensure Timer overlong is set to appropriate value and that there is no problem on the lubrication circuit.
A L E D	3 Flashes	Pause timer overrun	Verify input pause sensor
A L L P	4 Flashes	Pump Motor Blocked	Replace the motor unit
A O O L	5 Flashes	Pump Motor Over-load	Allow system to cool, if the problem still goes on go on, replace the motor unit.
A C O Q	6 Flashes	C.COU pulses counter in Pulse Mode	Modify C.COU parameter
A E E E	7 Flashes	Eprom Error	Electronic Board memory error. Board requires replacement.



NOTE: To cancel alarm message push buttons and together

5. Maintenance Procedure



WARNING: Before carrying out any maintenance operation, ensure that power and hydraulic system are disconnected.

The pump does not necessitate any special tool for operation and maintenance. When working with the pump it is nonetheless recommended that personal health and safety equipment is used as is normal for any operation in an industrial or similar workplace to best safeguard the user from harm.

The pump has been designed and built as to require minimal maintenance and operate in diverse and challenging operating environment. It is recommend that the unit is inspected and kept clean to ensure long life and trouble free operation. It is important to check all tubing on the system to ensure that it is always tight and leak free.

5.1 Programmed and Operational Maintenance

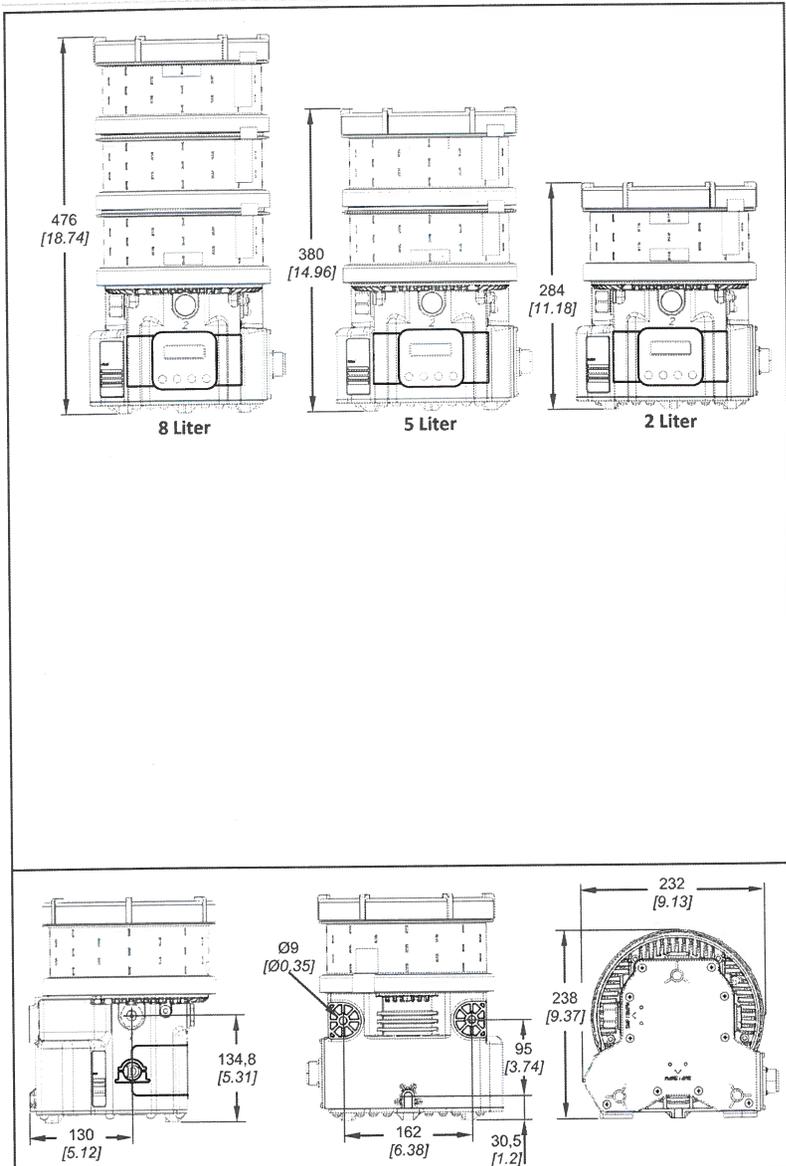
The following operations should be performed on the pump.

ITEM	FREQUENCY	OPERATION
Integrity of tubing and system	After initial 500 hours. Every 1500 hours.	Check fittings and tubing secured. Verify components are correctly fixed to machine.
Reservoir level	As needed.	Top up level with clean lubricant.
Filling Filter	As needed, or once per year.	Check and replace as necessary.

6. 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.

7. Dimensions



Dimensions in mm [in].

8. 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.

9. Operating Hazards

 **WARNING:** It is necessary to carefully read about the instructions and the risks involved in the use of lubrication machines. The operator must know the machine functioning through the User and Maintenance Manual.

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 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 produces noise, not more than 70 dB(A).

9.1 Lubricants

 **NOTE:**
 The pump has been designed to operate with grease max NLGI 2.
 Always use lubricants compatible with NBR (Buna) Rubber seals.
 Any residual lubricant found on new units is residual NLGI 2 test grease used during the assembly of the pump.

The following table shows the comparison between NLGI (National Lubricating Grease Institute) classification and ASTM (American Society for Testing and Materials) for greases and cSt (Centi stokes) e SUS (Saybolt Universale) for Oil

GREASE		OIL	
NLGI	ASTM	cSt	SUS
000	445 – 475	46	213.3
00	400 – 430	70	323
0	355 – 385	100	462.6
1	310 – 340	150	694.2
2	265 – 295	220	1018
		320	1480
		450	2082
		700	3239
		1000	4628

For further technical information and on safety information consult the lubricant MSDS Safety data sheet or equivalent document supplied by the lubricant manufacturer.

10. Precautions

The verification of conformity with the essential safety requirements and regulations of the Machine Directive is effected by means of the compilation of a check list which has been pre-prepared and is contained in the *technical file*.

The lists which are utilised are of three types:

- list of dangers (appendix A, EN 1050).
- application of essential safety requirements.
- electrical safety requirements (EN 60204).

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

- ◆ During installation there may be small low pressure oil seepage from the pump. Always use appropriate protective clothing, gloves and take all necessary safety precautions.
- ◆ Contact with lubricant during maintenance or filling of the reservoir. → As per previous point, correct precautions must be taken to protect from contact with lubricant.
- ◆ Moving Parts and crush danger. → All moving parts are enclosed within the pump unit. Do not open the pump unit. Appropriate danger labels are located on the pump.
- ◆ Electric shock. → All electrical connections must be carried out by a qualified electrician who has studied the connection to ensure no electrical danger.
- ◆ Abnormal operation posture. → The pump should be installed in a suitable position with ample clearance as indicated in this manual to avoid abnormal posture for the operator.
- ◆ Unsuitable Lubricant. → Lubricant characteristics are indicated on the pump and in this user manual. In any case contact a Dropsa Sales and Support engineer (if in any doubts, contact the Technical Department Dropsa SpA).

FLUIDS EXPLICITLY NOT ALLOWED	
Fluid	Danger
Lubricants with abrasive additives	High wear rate of contacted parts
Lubricants with silicone based additives	Seizure of the pump
Petrol – solvents – inflammable liquids	Fire – explosion – damage to seals
Corrosive products	Corrosion of the pump– injury to persons
Water	Oxidation of the pump
Food substances	Contamination of the substances themselves

