

DRAGON X PUMP

User Operating and Maintenance Manual

Original instructions

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The manual has been prepared in compliance with Directive
CE 06/42

C2150IE WK 05/16

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www.dropsa.com/contact or contact us sales@dropsa.com

1. INTRODUCTION

This user and maintenance manual relates to the **Dragon X**. Using this pump means that oils and greases can be distributed within lubrication systems even at high pressures of up to 70 bar (1015 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

The **DRAGON X** pump is particularly suggested due to its compact form and versatility when used with press lubrication systems, machine tools, reducers, guides, chains, etc.

The **DRAGON X** pump has a built-in release valve* and can be used in the following types of systems:

- Lubrication systems with injectors and circulation systems with operating pressures <20 bar (290 psi) – system 01
- Lubrication systems that have "direct response" measuring devices with operating pressures < 50 bar (735 psi) - system 33V.
- Progressive lubrication systems and circulation systems controlled by progressive measuring devices with operating pressures < 70 bar (1015 psi) – system 26. A non-return valve is available for this version.

* The release valve aims to discharge the line pressure when the pump is not in activity. This valve ensures 0.5÷1 bar (7.2÷14.5 PSI) seal on the supply line, in order to avoid the emptying pipes during the pause time of the pump, that is between a lubrication and the next one.

3. PRODUCT IDENTIFICATION

There is a yellow label on the front of the pump tank that displays the product code and its basic characteristics.

PRODUCT IDENTIFICATION TEST CERTIFICATE	
PART NUMBER	3905000
VAR	
PACK QUANTITY	
39050.. (Elec'ric Gear Pump)	
FLOW	350 cc/min
VOLT	230-400V 50Hz
PRESSURE	70 bar Max
TANK	3 lt Max
OIL	MIN 32 cSt
GREASE	MAX NLGI 000
WO: IT	0001
  Dropsa SpA Milan Italy	
Year: 2016 MADE IN ITALY	
Scan for Info Scannen für Info Telechargez-info Info Prodotto 扫描产品信息 Сканер штрих-кода	
	
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4. TECHNICAL CHARACTERISTICS

GENERAL CHARACTERISTICS	
Empty weight	6.2 Kg
ELECTRICAL CHARACTERISTICS	
Motor power supply	230-400 V - 50 Hz } three-phase 265-460 V - 60 Hz } 110 V 50 Hz single phase 4p 230 V 50 Hz single phase 4p 24 V CC 2800 rpm ⁽¹⁾
Rated motor power	0.09 Kw – 0.11 Kw
Degree of motor protection	IP 55
Minimum level	Optical (oil and fluid grease versions) / With floating switch (only oil version)
Optical power supply level	8÷28 V DC inversion protected
Optical level output signal	Type NPN/PNP short-circuit protected, off in the case of minimum level. Max 1.7A
Optical LED signal	Active when tank is not empty
Level connector (optical- floating switch)	DIN 43650
Float Level output signal	Clean contact 50V max voltage, 40 W max power. SPDT Contact.
Pressure switch	Contact closed in the case of max calibration pressure alarm (3-18-30 bar)
Pressure switch output signal	Voltage free contact max voltage 42V, max. power 100 W
HYDRAULIC CHARACTERISTICS	
Pumping system	Gear pump
Flow rates (1500 rpm)	350 cc/min - 500 cc/min (three-phase/single-phase versions) 600 cc/min - 850 cc/min (24V DC version)
Maximum operating pressures	- 70 bar -three-phase motor (with intermittent service max 5 min with pause ratio 1:1) - 40 bar (single-phase motor) - max 30 bar with continuous service
Outlet connection	G1/8" BSP
Tank capacity	3L/6L
Filter	Degree of filtering 1000 µ
By-pass	Adjustable 0 ÷70 bar – precalibrated 40bar (35bar for single-phase motors)
Temperature of use	+ 5 ÷ + 70 °C
Operating humidity	90 % rel. humidity
Permitted lubricants *	Mineral lubricating oil 32 cSt; grease max NLGI000
Storage temperature	-20 ÷ +65 °C
Continuous sound pressure level	< 70 dB(A)

N.b. The specifications refer to the temperature of use of +20°C (+68°F)

⁽¹⁾ revolutions with load less motor

* If a different product is used, please contact Dropsa S.p.A. to ensure it is suitable for use (see page 12)

4.1 HYDRAULIC SYSTEM

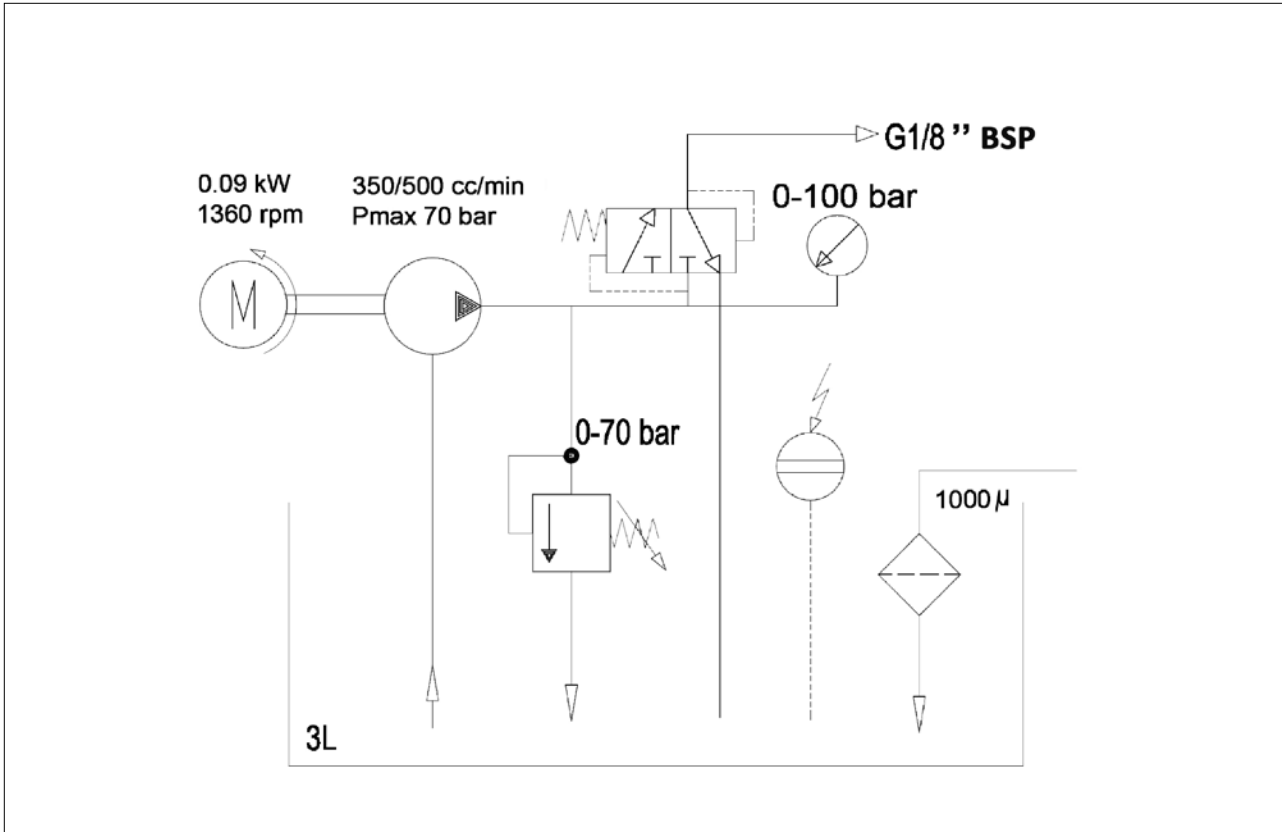


Fig. 1 Hydraulic diagram

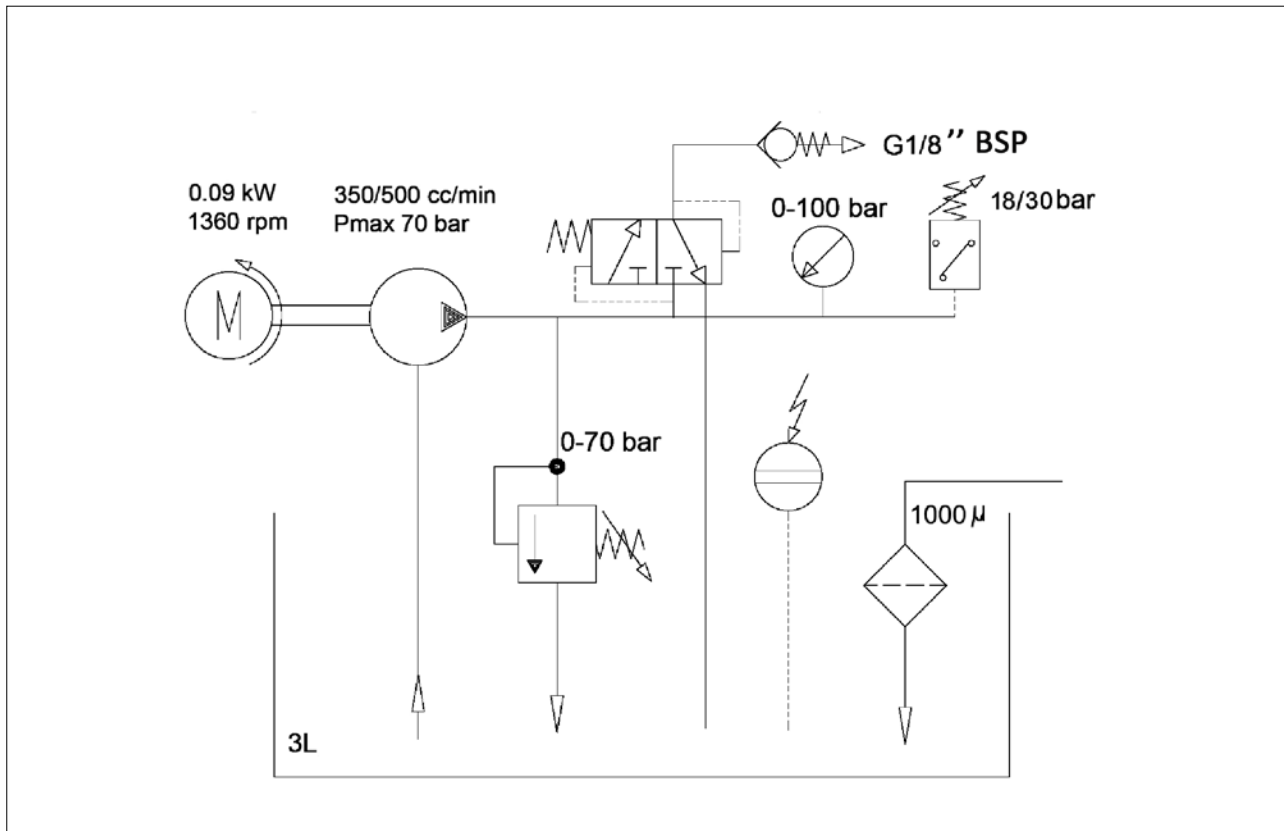
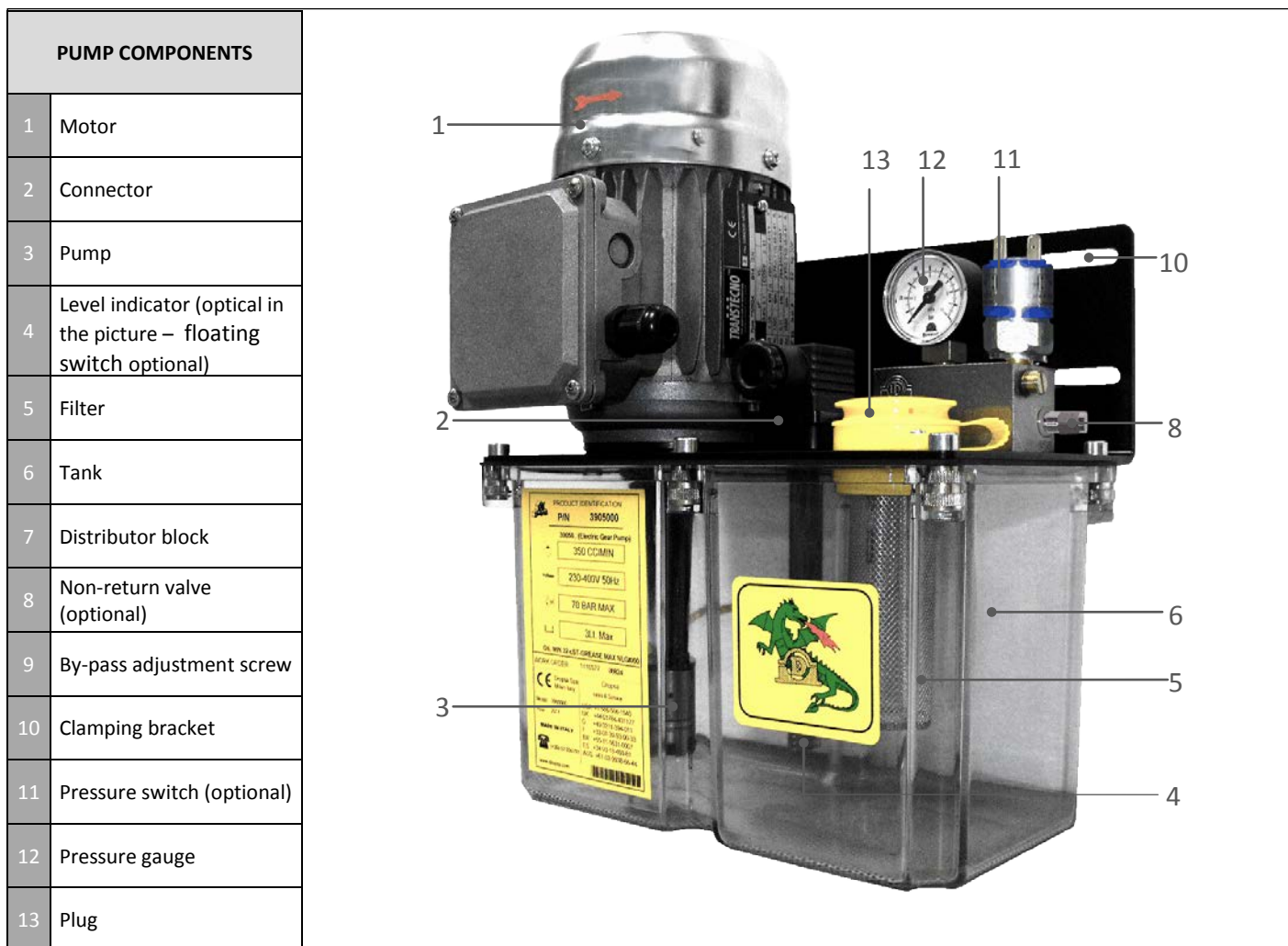


Fig.2 Hydraulic diagram with check valve

The only connection to make is to connect the pump to the point to lubricate or to the metering valves.

5. COMPONENTS



6. UNPACKING AND INSTALLATION

6.1 UNPACKING

Once the suitable location for installation has been identified, open the package and remove the pump. 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. Refer to the local regulations for disposal.

6.2 INSTALLATION

Pump assembly operations are not required.

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

For wall-mounting, suitable space must be provided (see the installation diagram) to prevent abnormal positions or the possibility of impacts; fixing holes are provided on the plate (see Para. 12).

Then, the pump must be connected hydraulically to the machine. Make the connection to the control panel and fill the tank (making sure not to exceed the maximum visual level).

Empty the tank during the disassembly phase.

Disconnect the electric part from the hydraulic part.

6.3 MINIMUM LEVEL CONNECTION

The connection at the minimum level is done using connector 2 based on the following table:

VIP5 Dropsa (Optional)	Connection pin when it is used Dropsa VIP5 Control Device
Terminal streap M2	
n° PIN	Note: Set PIN 4 – M2 connection exclusively on Out N or on Out P.
10	
5	
4 / NC	Note: Set the NC level in VIP5 parameters
4 / NC	

1	V+ (8÷28 Vdc)
2	V- (GND)
3	Out N
⏏ 4	Out P

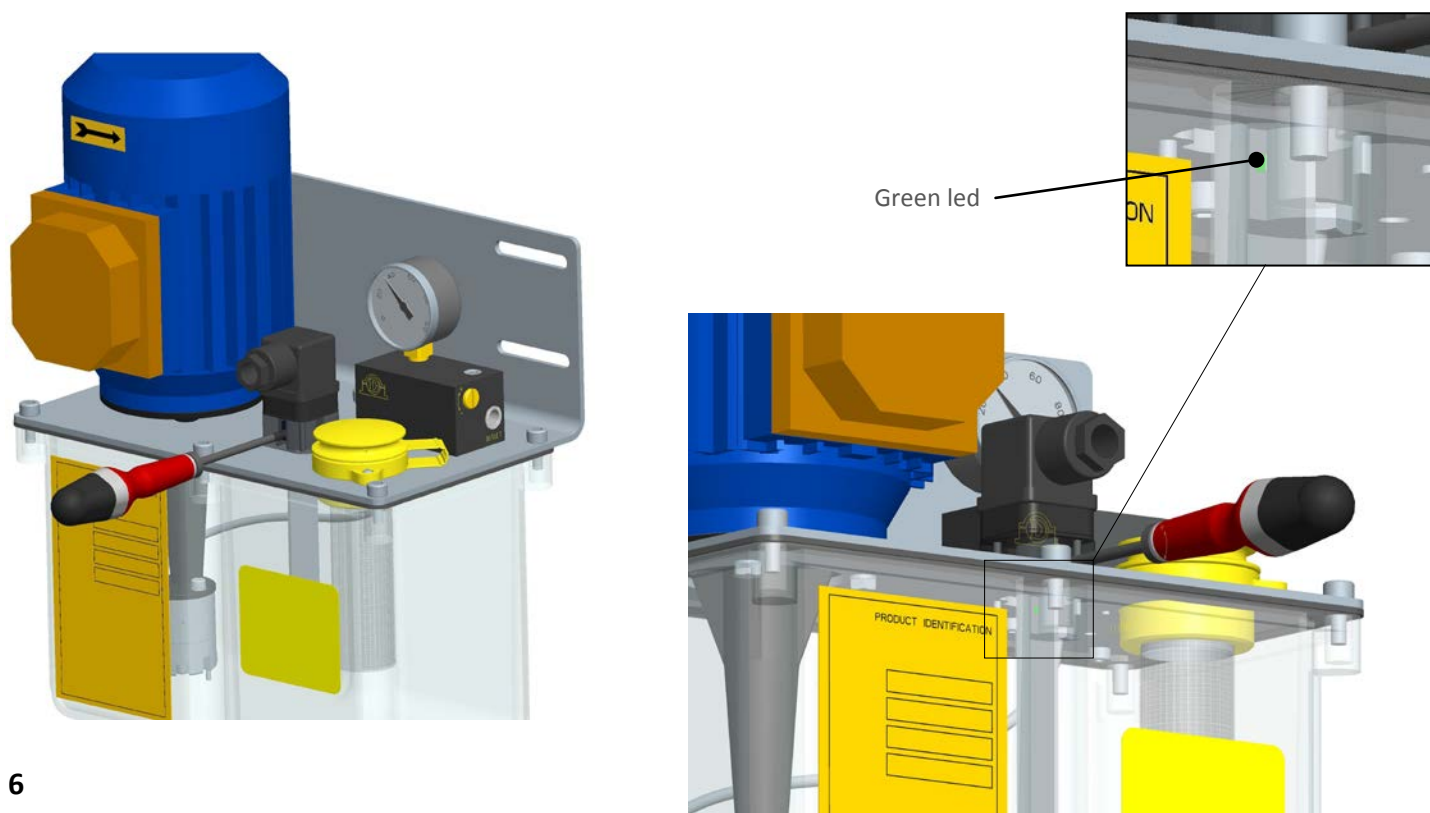
1	COM
2	NC
3	NO
⏏ 4	-

6.4 OPTICAL LEVEL CALIBRATION

The level is tested and calibrated with oil by Dropsa, however is recommended before starting the pump to following the procedure below:

- 1) Fill the reservoir;
- 2) Open the front regulating hole;
- 3) Turn the level adjustment screw using a screwdriver, until the green led on the level is off (see the image below);
- 4) Turn the screw in opposite way until the green led is on.

At the end of this procedure the level is correctly set. It is possible to re-do the calibration following the same procedure above.



7. OPERATING INSTRUCTIONS

7.1 STARTING THE PUMP

Before using the pump, a few preliminary checks must be performed:

- Check the integrity of the power supply cable and the unit prior to use.
- If there is damage to the power supply cable or the unit, do not start operations!
- Replace the damaged power supply cable with a new one.
- The unit may only be opened and repaired by specialized personnel.
- In order to prevent the danger of electrocution due to direct or indirect contact with live parts, the electric power supply line must be suitably protected by a specific differential magnetothermic switch with a triggering threshold of 0.03 Ampere and max triggering time of 1 second.



The cut-off power of the switch must be = 10 kV and the rated current= 4 A

- It is prohibited to use the pump 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 lubricating oil
- DO NOT use aggressive lubricants with NBR gaskets. In the case of doubt, contact the Dropsa SpA technical office to receive a detailed card about the recommended oils.
- Do not ignore the hazards to health and comply with the health regulations.



ATTENTION: All components must be ground connected. This applies both to electric components as well as to control devices. For this purpose, make sure that the ground wire is directly connected. For safety reasons, the ground conductor must be approx. 100 mm longer than the phase conductors. If the cable is accidentally disconnected, the ground terminal must be the last to be disconnected.

- Check the integrity of the pump
- Check that the pump is at the operating temperature and that there are no air bubbles in the pipes.
- Check that the electric connection was carried out correctly.
- Check the connection of the level and the pressure switch, if necessary, to the control panel.
- Once the pump has started, check the direction of rotation of the electric motor: if it rotates backward, reconnect it as shown in the wiring diagram provided with the motor.

7.2 INSTRUCTIONS FOR USE

- 1) Press the start button on the machine to which the pump is connected or start it;
- 2) Check that the pump starts;
- 3) To change the pressure value, turn the adjustment screw (see Chap. 5). Turn it clockwise to increase the pressure or counterclockwise to decrease it;
- 4) Check that the machine lubrication is suitable (if there are doubts about correct operation, the Dropsa SpA technical office can be contacted to request the inspection procedure).

8. TROUBLESHOOTING



ATTENTION: The machine 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 anomalies that have been discovered, with a detailed description.

DIAGNOSTICS TABLE		
PROBLEMS	PROBABLE CAUSES	ACTIONS
The pump does not deliver oil	<ul style="list-style-type: none"> It intakes air because the tank is empty The intake filter is dirty or clogged The internal fittings are loose or broken The motor rotates backward 	<ul style="list-style-type: none"> Restore the level in the tank and bleed the air from the system Wash the filter with petroleum and blow with compressed air Carefully close all the fittings, making sure there are no leaks and replace the broken pipes. Correctly connect the motor, inverting the direction of rotation
The pump does not deliver oil at the required pressure	<ul style="list-style-type: none"> Pump deteriorated Pressure control valve decalibrated (therefore the oil returns immediately to the tank). Release valve damaged Adjustment valve incorrectly calibrated Presence of dirt in the by-pass valve 	<ul style="list-style-type: none"> Replace the pump Tighten the adjustment screw until oil comes out of the delivery pipe Replace the by-pass valve Connect a pipe that is approx. 30 cm long to the pump outlet with a pressure gauge applied to the free end. Adjust the valve by turning the screw and reading the corresponding pressure value on the pressure gauge Remove the components and wash them with petroleum. Before reassembling the components, check the wear status of the O-ring. Replace the entire assembly if necessary
Line pressure not released	<ul style="list-style-type: none"> Control valve with irregular operation 	<ul style="list-style-type: none"> Disassemble and clean the by-pass valve, replace the valve if necessary
Emptying of the main system line during the pause time	<ul style="list-style-type: none"> Pump or system outlet fittings loosened Non-return or release valve dirty 	<ul style="list-style-type: none"> Tighten the fittings Disassemble and clean the by-pass valve, replace the valve if necessary
Lubrication cycle not performed	Cycle control pressure switch calibration pressure not reached due to: <ul style="list-style-type: none"> Line pipe broken or loose fittings Pressure switch calibrated higher than the pump The pump does not deliver oil at the required pressure The pump does not deliver oil 	<ul style="list-style-type: none"> Replace the pipe - fully tighten the fittings Correctly calibrate the pressure switch See the diagnostics table See the diagnostics table

9. MAINTENANCE PROCEDURE

The pump was designed and built in order to minimize maintenance requirements. To simplify maintenance, it is recommended to install it in an easy to reach position.

- Periodically check the pipe joints to detect any leaks. Furthermore, always keep the pump clean to be able to quickly detect any leaks or defects.
- Check if the filter is clean after every 2000 hours of operation.

The machine does not require any special equipment for any control and/or maintenance activity. It is recommended to use tools and personal protective devices suitable for use (gloves) and that are in good condition according to current regulations to prevent damage to people or machine parts.



ATTENTION: Make sure that the electric and hydraulic power supplies are disconnected before carrying out any maintenance work.

In the case of doubts and/or problems that cannot be solved, do not try to discover the reason by disassembling machine parts, but contact the DROPSA S.p.A technical office.

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. ORDER INFORMATION

11.1 STANDARD VERSIONS

ELECTRIC MOTOR	FLOW RATE	TANK CAPACITY	PART NUMBER (with optical level to use oil and fluid grease)	PART NUMBER (with float level to use only oil)
230-400 V 50 Hz three-phase- 0.09 KW 4P 265-460 V 60 Hz three-phase- 0.11 KW 4P	350 CC	3 L	3905000	3905040
		6 L	3905001	3905041
	500 CC	3 L	3905004	3905044
		6 L	3905009	3905049
110 V 50 Hz single phase – 0,9 KW 4P	350 CC	3 L	3905007	3905047
		6 L	3905012	3905052
	500 CC	3 L	3905008	3905048
		6 L	3905013	3905053
230 V 50 Hz single phase – 0.09 KW 4P	350 CC	3 L	3905005	3905045
		6 L	3905010	3905050
	500 CC	3 L	3905006	3905046
		6 L	3905011	3905051
24V CC	600 CC	3 L	3905002	3905042
		6 L	3905003	3905043
	850 CC	3 L	3905014	3905054
		6 L	3905015	3905055

N.B. The following specifications apply for all models:

Bypass calibration pressure 40 bar (35bar for single-phase motors); Pressure switch 18 bar; Pressure gauge 0 – 100 bar.

11.2 SPARE PARTS

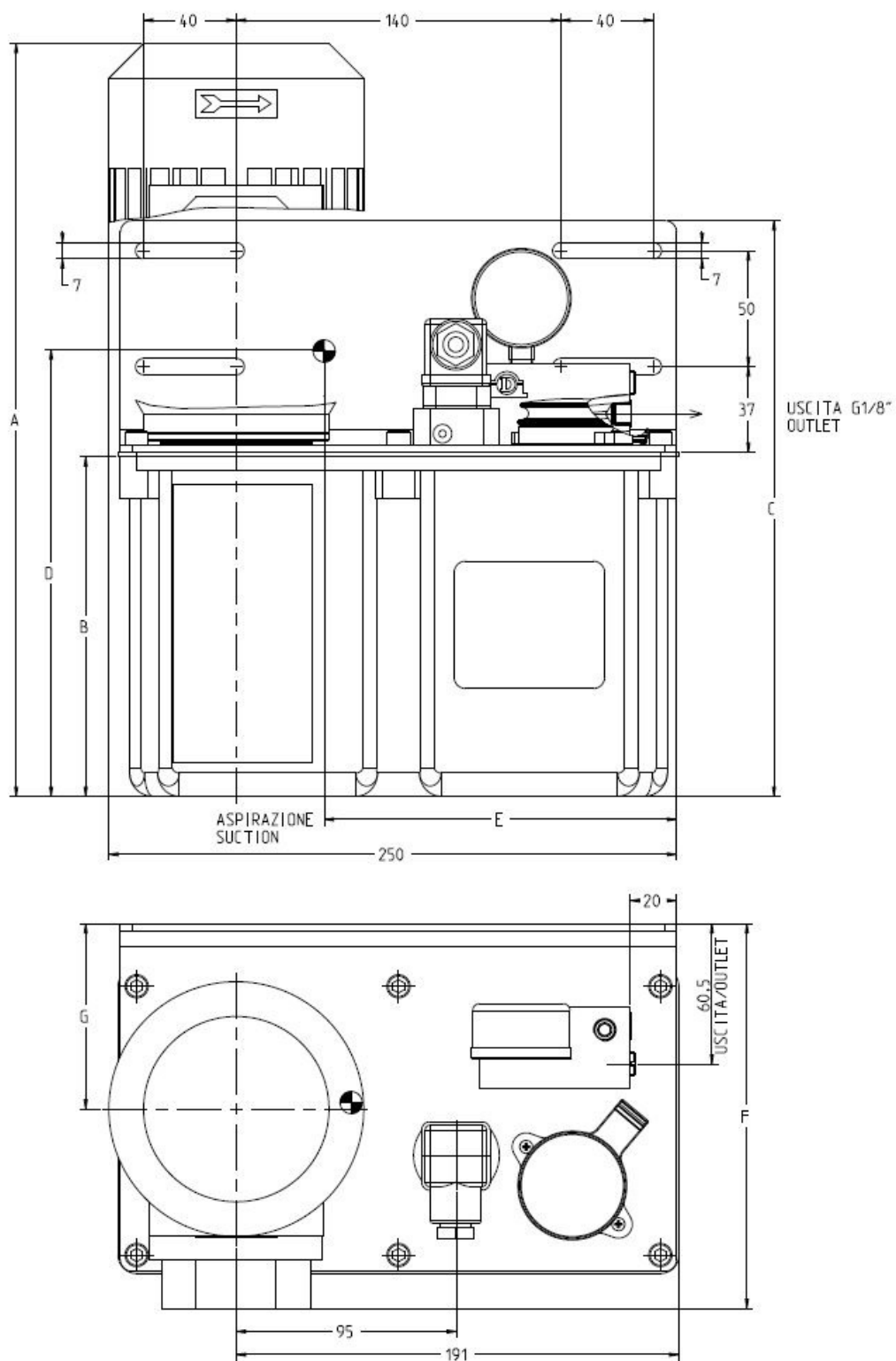
ITEM	DESCRIPTION	PART NUMBER
PUMP	Flow rate *350 CC	3099186
	Flow rate *500 CC	3099187
MOTOR	230-400 V 50 Hz three-phase- 0.09 KW 4P 265-460 V 60 Hz three-phase- 0.11 KW 4P	3301544
	230 V 50 Hz single phase – 0.09 KW 4P	3301545
	110 V 50 Hz single phase – 0.09 KW 4P	3301546
	24V CC rpm	3301283
OPTICAL SENSOR LEVEL	For the 3L tank	1639201
	For the 6L tank	1639202
FLOATING LEVEL INDICATOR	For the 3L tank	3133627
	For the 6L tank	3133628
DISTRIBUTOR BLOCK		1525370
TANK	3 L	6770033
	6 L	6770006
PRESSURE GAUGE	0 -100 bar	0020564

* Flowrate is referred to 1500 rpm

11.3 ACCESSORIES

ITEM	DESCRIPTION	PART NUMBER
PRESSURE SWITCH	Calibration pressure 3 Bar	3291028
	Calibration pressure 18 Bar	3291048
	Calibration pressure 30 Bar	3291022
PRESSURE SWITCH CAP		3042098
PRESSURE GAUGE	0 -16 bar	0020566
NON-RETURN VALVE		0092335

12. DIMENSIONS



CONTROL UNITS	A	B	C	D	E	F	G
3L pump	330	146	246	195	152	172	80
6L pump	431	250	347	259	148	172	80
3L 24V pump	312	146	246	173	150	151	75
6L 24V pump	413	250	347	253	150	151	75

13. HANDLING AND TRANSPORTATION

Before shipping, the 39050.. pumps 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.

Manual handling must be done by at least two people.



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

The machine components can support storage temperatures between

-20 to + 65 °C; however, to prevent damage, the machine must only be started up after the machine has reached a temperature of +5 °C.

14. PRECAUTIONS

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

The operator must understand its operation and clearly understand the hazards connected to pumping pressurized grease.

Therefore we recommend the following:

- Check the chemical compatibility of the material with which the pump is built with the fluid to be pumped (see chap. 4). An incorrect selection could cause, in addition to damaging the pumps 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 pump 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 pump'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 pump both during work as well as during maintenance operations.



***ATTENTION:* The warnings about the risks involved in using a pump for lubricants must be read. The user must understand its operation using the user and maintenance manual.**

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 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 pressurized 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 pump.



NOTE: The pump was designed to operate with lubricants with a maximum rating NLGI 000.⁽¹⁾
 Use lubricants that are compatible with NBR gaskets.
 Any internal residual lubricant used for assembly and testing purposes is 32 cSt oil

⁽¹⁾ The use of the pump with grease with a consistency NLGI000 must be assessed on a case by case basis given the extreme difference in the sliding properties of the compound, which depends both on the viscosity of the base oil as well as the soaps and additives that are used.

The use of the pump with grease with a consistency NLGI000 must be assessed on a case by case basis given the extreme difference in the sliding properties of the compound, which depends both on the viscosity of the base oil as well as the soaps and additives that are used. *

A comparison table is provided between the classification of NLGI lubricants (National Lubricating Grease Institute) and the ASTM classification (American Society for Testing and Materials) for greases for the values that concern the pump.

GREASES	
NLGI	ASTM
000	445 – 475

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. OPERATING HAZARDS

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:

- Electrocution: this can only occur in the case of serious user incompetence.
- Use of unsuitable lubricant: the types of fluids that are not compatible with correct pump operation are listed below. *
- Contact with harmful fluids.

FLUIDS THAT ARE NOT PERMITTED	
FLUIDS	RISKS
Lubricants with abrasive additives	wear of the components inside the pump
Lubricants with silicone additives	Pump seizure
Petrol – solvents – inflammable liquids	Fire – explosion – damage to the gaskets
Corrosive products	Pump corrosion - damage to people
Water	Pump oxidation
Food substances	They would be contaminated

* For more detailed information regarding product compatibility with particular fluids, contact the Dropsa S.p.A. technical office