

INSTRUCTIONS FOR USE

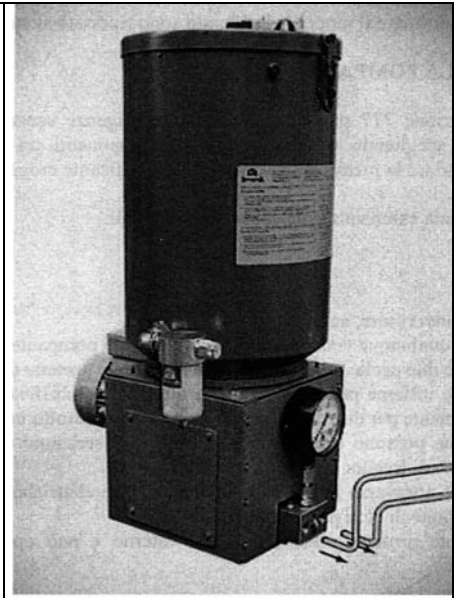
Pump 777 DROPSA SpA

In accordance with para. 1.7.4, of I, Dir CEE 89/392

Sections:

- 0.0 INTRODUCTION
- 1.0 DESCRIPTION OF THE PUMP
- 2.0 TECHNICAL SPECIFICATIONS
- 3.0 CORRECT USE
- 4.0 INSTRUCTIONS FOR ORDERING AND LIST OF DISTRIBUTORS.

DECLARATION OF CONFORMITY



Catalogue P/N C2018IE - Wk 17/99

Registered name	DROPSA SpA
Address	via Croce 1, 20090 Vimodrone (MI), Italy
Model	Pump 777
Year of manufacture	1999
Marking	CE

0.0 INTRODUCTION

This user's and maintenance manual refers to **pump 777**, for use in lubrication systems for oil and grease, including high pressure systems (up to 500 bar).

The use of this pump permits the distribution of oil and grease in lubrication systems at pressures up to 500 bar.

It is recommended that this manual is carefully kept in good condition and is always available to persons requiring to consult it.

To request further copies, updates or clarifications with respect to this manual contact the Engineering Department at Dropsa SpA.

The use of the pump referred to in this manual must be entrusted to qualified personnel with a knowledge of hydraulics and electrical systems.

The manufacturer reserves the right to update the product and/or the user's manual without the obligation to revise previous versions. It is however, possible to contact the Engineering Department for the latest revision in use.

The pump, and any accessories mounted on it, should be carefully checked immediately on receipt and in the event of any discrepancy or complaint the Dropsa SpA Sales department should be contacted without delay.

DROPSA S.p.A. declines to accept any responsibility for injuries to persons or damage to property in the event of the non-observance of the information presented in this manual.

Any modification to component parts of the system or the different destination of use of this system or its parts without prior written authorisation from DROPSA S.p.A. will absolve the latter from any responsibility for injury or damage to persons and/or property and will release them from all obligations arising from the guarantee.

Instructions for the correct ordering of the required model, and a list of importers, is shown in Section 4.

1.0 DESCRIPTION OF THE PUMP

The 777 series lubrication pumps can be adapted to meet many requirements without mechanical modifications, even where the pump is already installed. By choosing from among a range of perfectly compatible and easily assembled components, variations can be made to the pressure, the quantities of lubricant delivered, the type of lubricant or the type of distribution.

This construction technique is based essentially on the following modules:

- Motor and reduction unit
- Dual element pump
- Tank
- Valves and output assembly (reverser, etc.)

The supporting structure is common to all versions, with the dual pumping element constituting the essential module. From one pump assembly there are provided two separate outlets for the lubricant, protected by double non-return valves. The two ways can be connected together to double the quantity of lubricant on one line only or they can be employed separately on two independently controlled single line circuits.

On the same support structure it is possible to mount types of tank with different volumes suitable for oil or grease with paddle units and level indicators.

The control of the motor is obtained by use of normal electrical equipment which provides for the reversing of the direction of rotation and the execution of the programmed cycles.

The motor-driven pump 777 is totally protected from the external environment and can operate without difficulties in the severest environmental conditions.

The pump is composed of a series of components with the following characteristics:

CHARACTERISTICS	PUMP 777
Pump capacity cc/min	max. 130
Maximum pressure in bars	500 (7350 psi)
Tank capacity in litres	10 - 30 - 100

By-pass rating (with internal regulating screw)	300 bar (4410 psi)
Minimum operating time (sec)	24 (minimum pause time 96 sec)
Mineral lubricant characteristics at working temperature	CSt 15 - 1500 (oil) max NLGI 2 (grease)
Working temperature	- 5 °C ÷ + 40 °C (+23°F ÷ +104°F)
Motor	Three phase 220 – 380 V 50 Hz – 4 pole 1500 rpm
Absorbed Power	370 W On request 750 W
Grade of protection	IP55
Insulation	Class F

It is also possible to supply the pump with a mechanical or hydraulic reverser.

1.1 Pump assembly (Code 291415)

The assembly is made up of two identical pump units, each one having two identically sized pistons. The pistons are in ground and lapped hardened steel; one of these acts as the pump and the other as the control valve. The pump housing is in steel; the ports are bored and lapped; the drive shaft is in hardened and ground steel.

1.2 Reduction unit

The reduction unit casing is in aluminium. The drive shaft with worm screw is hardened and ground. The worm wheel is in hardened steel.

Both the drive shaft and the worm wheel shaft are fitted with ball bearings.

The free wheels used on this pump are among the best brands on the market.

Attention: lubrication of the reduction unit in dual line grease systems is ensured by the return of grease into the pump via port (F). Where the pump is utilised for grease on a single line system (where there is no return to the pump) it would be advisable to provide a point for lubrication of the reduction unit through port (F).

Obviously, in an oil system this precaution is not necessary as all parts of the reduction gears are effectively in an oil bath.

1.3 Reverser

1.3.1 Electro-mechanical reverser

When the pump is installed in a dual line system it is necessary to utilise this reverser.

The mounting is already prepared with fixing holes to accept this device, whose functioning is tied to the use of the reverser and lubrication cycle electrical control equipment.

The main parts of the device are:

- the reverser in steel with a hardened, ground and lapped piston;
- cam assembly and freewheel in hardened steel;
- two watertight micro-switches which control the reversing and the exact positioning of the piston.

The front of the reverser is prepared with a hole for connecting a manometer.

OPERATION AND ADJUSTMENT OF THE CONTACTS

One of the original features of this motor-driven pump is that of utilising the motor both for the movement of the pistons of the pump unit and for the reversing of the line.

The motor, after the required pause between one lubrication and the next, is started by turning the worm screw, the worm wheel and the pump assembly.

The worm wheel has an external appendix on which is mounted a cam for the reversing of the line.

When the motor drives the pump, the worm wheel shaft rotates anticlockwise for as long as the cam, for

the effect of the free wheel, remains stationary.

The pump feeds line 1 and, after having filled the tubing and the valves, will act on the contact of the end of line pressure switch which, through the electrical equipment, provokes the inversion of the motor direction. This reversing will result in the reversing of the rotation of the cam shaft, while the pump will stop instantaneously; also the pump drive shaft is attached with the free wheel.

The line reversing cam will rotate rapidly to the closure of the microswitch (32) contact, the motor will reverse direction returning to drive the pump to feed line 2.

The closing of the line 2 pressure switch contact will provoke a further inversion of the initial rotation by actuating the second microswitch closing contact. (32).

The closing of this contact will reverse the rotation of the motor for a period of approx. one second; this will conclude the lubrication cycle.

1.3.2 Hydraulic reverser

The lubricant which comes from the pump through the central part of piston A (Fig.1) is distributed into chamber C, entering into line 1 and tending to position piston B toward the left.

When the set pressure of spring M1 is reached, the small piston S1 of the sequence valve lifts and permits the lubricant to enter into chamber D.

Piston A is moved toward the left; lubricant is sent into chamber E, the small piston B is moved to the right (Fig.2) and the lubricant enters into line 2 while line 1 discharges (return).

When the set pressure of spring M2 is reached, lubricant is sent into chambers C and F; pistons A and B invert their positions and the delivery is again directed to line 1.

The necessary reversing pressures are attained by regulating the loading of springs M1 – M2.

1.4 Pressure Control Valve

Code	Description
291162	Pressure 50 ÷ 500 bar (735 ÷ 7350 psi)
291391	Pressure 20 ÷ 250 bar (294 ÷ 3675 psi)

Also these valves can be easily disassembled for inspections.

They are adjustable and have the function of regulating the pressure.

It is important to keep in mind that the inversion of the lines is controlled by the closing of the pressure switch contacts.

The regulation of the pressure switch must involve an operating pressure which is always less than the maximum pressure controlled by this valve.

1.5 Flow regulator (Code 3293060)

The flow regulator serves to regulate the quantity of lubricant delivered at each pump cycle.

It can easily be set between * 14.5 - 65 cc./1 by turning the rear nuts code 3235097 clockwise or anticlockwise.

It is also applicable to a single pump element.

1.6 Minimum and maximum level indicators

1.6.1 Indicator for grease

Minimum level

Code	Description
291244	For 10 kg tank. (22 lb)
291220	For 30 kg tank. (66.1 lb)
291210	For 100 kg tank. (220.4 lb)

This device is used when it is wished to control the minimum level of the tank where the use of a paddle unit is provided for grease.

The operation of the minimum level contact occurs through the reaction of the blade with the shaft (7) opposing the grease moved by the arm of the moving paddle.

The minimum level contact serves to illuminate the warning lamp on the electrical panel and additionally for any command signal to an automatic tank refilling pump.

Maximum level

This indicator must always be provided when it is wished to incorporate automatic tank refilling.

The refilling pump is automatically set in operation when the grease in the tank falls below the minimum level actuating the respective electrical contact.

To avoid the refilling pump continuing to deliver lubricant beyond the capacity limit of the tank it is essential to incorporate a maximum level microswitch with which to stop the pump.

1.6.2 Minimum and maximum level indicators for oil

Code	Description
291155	Maximum level indicator
291275	Minimum level indicator for 30 l tanks.
291276	Minimum level indicator for 10 l tanks.
291291	Minimum level indicator for 100 l tanks.

Two magnetic contact indicators are incorporated for the control of the minimum and maximum oil levels. The cover is suitably prepared for receiving these devices; the output cables can be run through a single sheathing for connecting to the electrical control equipment.

1.7 Paddle unit for grease

Tanks are provided in three different capacities: 10, 30 and 100 kg. (22, 66.1 , 220.4 lb).

There is a "paddle unit for grease" assembly for each capacity.

The pump mounting, which also supports the tank, is prepared for receiving this assembly.

To install the paddle unit when the pump is already mounted, it is sufficient to remove the tank.

In addition to the perforated disk, which supports the paddle unit assembly, there is also provided, on the upper part, a steel mesh filter disk with 0.5 mm holes. In this way the pump is protected from any foreign bodies that could be encountered even in grease from sealed drums or which may inadvertently fall into the tank during refilling from above.

Where the blade is not able to push very thick (above grade 3) grease through the holes in the filter mesh, or when working at very low temperatures, the filter disk can be removed. However, care must then be taken to ensure that refilling is carried out using a suitable manual or pneumatic pump and a filter, code 3130009.

Refilling of the tank by hand is not recommended.

1.8 Manometer

Code	Description
20550 1000 bar (14700 psi)	<i>Only one version is provided</i>

1.9 Operating control

The pump 777 can be supplied with an electrical control panel with indicators for on/off, minimum and maximum lubricant levels, pressurisation of the two lines, alarms, lubrication cycle not respected and power on.

In addition there is a selector for continuous operation or timed by the system, and two timers for regulating the pause and lubrication times.

1.10 Electrical equipment

“DROPSA” electrical equipment has been designed with the aim of supplying a system complete with all the controls necessary for automatic operation and controlled by centralised lubrication system safety signalling.

1.10.1 Equipment for dual line systems

This equipment is enclosed in a robust metal cabinet with IP 55 grade protection, and is available in different versions for the command and control of the 777 Series pumps with electromechanical or hydraulic reversers.

It is equipped with two yellow warning lamps (B and G) for signalling minimum and maximum lubricant levels, two white lamps (C and D) which signal the pressurisation of respectively lines 1 and 2 and a red alarm warning lamp (F) which illuminates when the lubrication cycle is not effected in the time set on the cycle control timer.

A green lamp (A) indicates power on, while a blue lamp (E) indicates the functioning of the pump.

A reset button (H) resets the system after an alarm and a selector (I) permits the selecting of either continuous operation or timed by the system.

Two multi-scale electromechanical timers facilitate the simple and rapid setting of the pause and lubrication times (working time of the pump).

The minimum and maximum work and pause times and the variations depend on the type of scale set.

The pause timer is equipped with a mechanical lock device which, in the event of a power off during the pause, locks the timer in the position reached.

Code	Description
1641295	For 777 pumps with electromechanical reverser
1638489	For 777 pumps with hydraulic reverser
1638488	As the 1638489 but c/w acoustic alarm signal
1638540	As the 1638489 but in a flameproof version

1.10.2 Equipment for progressive systems

This equipment is enclosed in a robust metal cabinet with IP 55 grade protection, and is equipped with an electronic timer for the setting of the pause time and an electromechanical timer for setting the lubrication time (working time).

The maximum standard pause time is 1 hour with variations of 2.5 min. By specifying when placing the order or by acting on the electrical jumper situated in the timer it is possible to obtain a maximum pause time of 8 hours (20 min. variations) or 24 hours (1 hour variations).

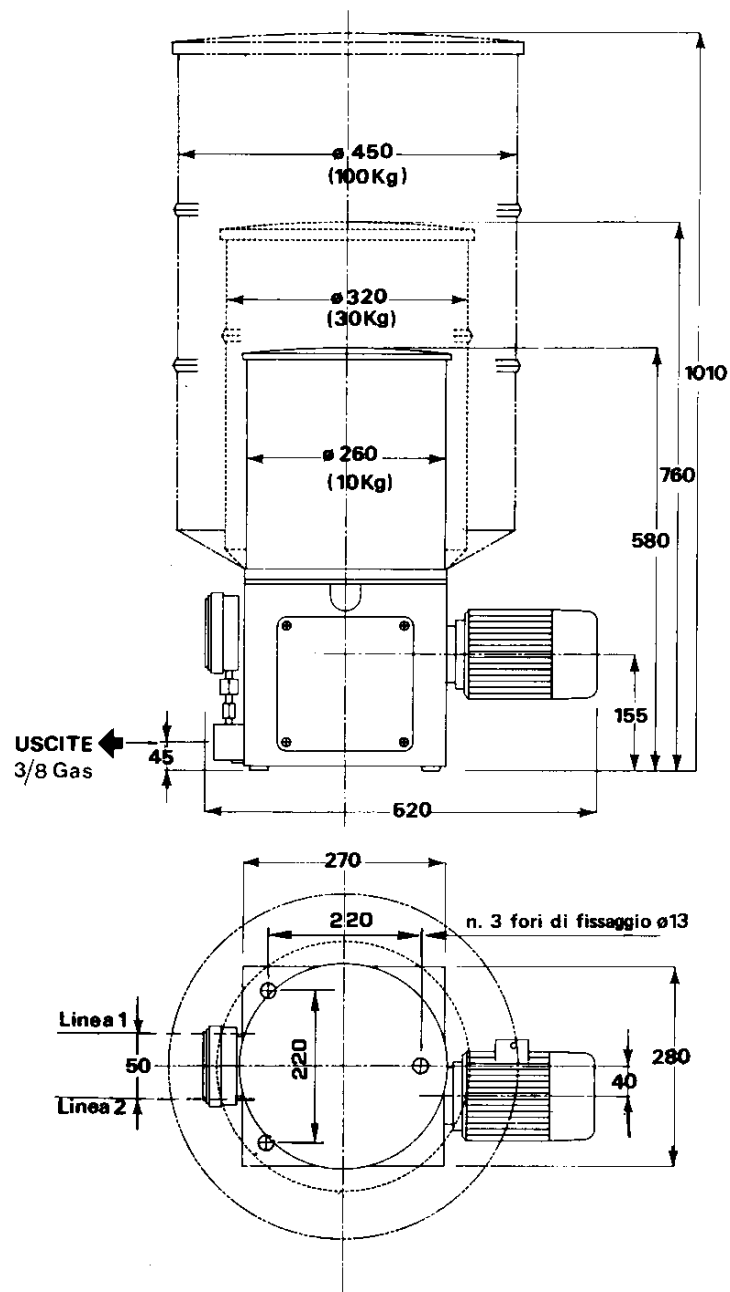
The working time can be regulated from 0 to 12 minutes with variations of 12 seconds.

It is equipped with alarm warning lights for lack of lubricant and minimum level in the tank.

A reset button resets the system after an alarm and a further button is used as a lubrication cycle manual control.

2.0 TECHNICAL CHARACTERISTICS

2.1 Fixing and overall dimensions DIMENSIONI

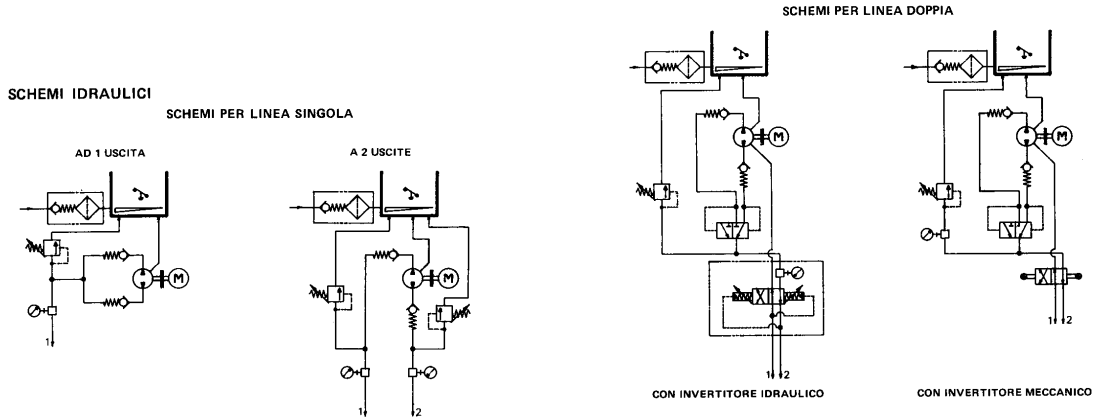


2.2 Electrical system – Technical Data

Electrical power supply:	380 - 220 V 50/60 Hz
Absorbed power:	Approx. 370 W

2.3 Hydraulic system – Technical Data

Connections from the gear pump to the valve body by means of nylon tubing with external \varnothing 4 mm (see attachment 7);



2.4 Other data

Class of protection	F
Grade of mechanical protection	IP55
Operating temperature	-5 ÷ +40°C (+23°F ÷ +104°F)
Operating humidity	90% relative humidity
Conservation temperature	-20 ÷ +50°C (-4°F ÷ +122°F)
Level of continuous sound pressure	< 70 dB(A)

3.0 CORRECT USE

3.1 Putting into service

Damage to the power supply cable and housing could result in contact with high voltage live parts and hence be a danger to life:

- ◆ carefully check the integrity of the power supply cable and the unit before use;
- ◆ In the event of there being damage to the power supply cable or the unit, **DO NOT** put the system into service!;
- ◆ Replace the damaged power supply cable with a new one;
- ◆ The unit can be opened and repaired **ONLY** by qualified personnel;
- ◆ In order to prevent dangers of electric shock due to direct or indirect contact with live parts it is necessary that the electrical power supply line is adequately protected by a suitable differential magnetothermal circuit breaker with an intervention threshold of 0.03 Ampere and a max. operating time of 1 second.

The breaking capacity of the circuit breaker must be ≤ 10 kA and the nominal current $I_n = 6$ A.

- ◆ The submersed pump **MUST NOT** be utilised in fluids or environments which are particularly aggressive or explosive/inflammable if not prepared for this purpose beforehand by the supplier.
- ◆ For correct fixing verify the distance between centres shown in the diagram in Section 2.
- ◆ Use gloves and safety glasses as required in the lubrication oil safety chart;
- ◆ **DO NOT** use aggressive lubricants with **NBR** gaskets and seals; if in doubt consult the Engineering Department of Dropsa SpA, who will provide a chart with the details of recommended oils;
- ◆ **DO NOT** ignore dangers to health and observe all hygiene standards;
- ◆ **WARNING!** All electrical components must be grounded. This refers to both electrical components and control devices. In this regard ensure that the ground cable is correctly connected. For reasons of safety the ground cable must be approx. 100 mm longer than the phase cables. In the event of accidental detachment of the cable, the ground terminal must be the last to be removed.

action to be taken prior to start up

- ◆ Verify the integrity of the pump;
- ◆ Fill the tank with suitable lubricant;
- ◆ Verify that the pump is at operating temperature and the tubing free from air bubbles;
- ◆ Check that the electrical connections have been effected correctly (UNI 64/8, IEC ...);

The pump is supplied with a maximum and minimum level switch

3.2 Use

1. verify the settings made;
2. press the start button of the machine to which the 777 pump is connected;
3. verify the starting up of the pump;
4. verify the adequate lubrication of the machine (if doubt exists as to the correct functioning consult the Engineering Department of Dropsa SpA to request test procedures).

3.3 Transport and storage

Transport and storage is effected in a wooden package.

No particular precautions are required except as noted on the package itself.

Handling must be effected utilising suitable lifting devices.

! After having removed the packaging, lift the pump utilising the appropriate brackets provided on the sides of the base.

! The machine components can withstand temperatures, during storage, from -20 to +50°C (-4°F ÷ +122°F); however, in order to avoid damage, starting of the machine should occur at a minimum temperature of -5°C (23°F).

3.4 Assembly/Disassembly

No pump assembly operations are envisaged.

For the fixing of the unit the holes provided in the inside of the base must be used. Adequate space is provided (as shown in the installation diagram) to avoid abnormal postures and the possibility of impacts (see Section 2)

Subsequently it will be necessary, as previously described, to connect the pump to the machine hydraulically and then to connect the control panel.

Remove the countersunk screws (9) and the locating pins (17) from both plates.

Remove the retaining rings (6 and 7) and the key (2).

Using screws in the M8 threaded holes, withdraw the plate (15) with the ball bearing (4) from the central shaft (11).

Remove the shim (12) and remove the lateral blocks (19) with the pistons (21).

Remove the springs and the cams withdrawing them from the shaft (11). Unhook the springs (18).

! before withdrawing the pistons from the blocks (19) mark them (they must be reassembled in the same seating).

Remove the washer (12) and the shaft (11), utilising a press or an extractor.

The bearings (4 and 5) must be removed with care from their seatings.

It is now possible to proceed with disassembling the parts of the pumping element blocks (22) after having withdrawn the pistons, removing the dowel (1), the ball (8), the plug (10) and the taper plug (20).

! the plugs (20) are slightly tapered; therefore it is advisable to replace them on reassembly.

During the disassembly the tank emptied.

Disconnect the electrical and hydraulic parts.

Where the machine is to be scrapped, do not dispose of potentially polluting parts in the environment, following local regulations for their correct disposal.

At the time of the machine being scrapped it is necessary to remove and destroy the identification plate and all other relative documents.

3.5 Regulation

pressure

The working pressure can be regulated by rotating the by-pass screw clockwise to increase the pressure and anticlockwise to decrease it. During this operation pay attention to the rotary joint.

Flow rate regulation

Serves to regulate the quantity of lubricant delivered during each cycle of the pump.

This accessory is installed on one or both pump elements.

3.6 Maintenance

! *Locate the machine in conditions which facilitate easy access.*

Utilise individual protection to avoid contact with mineral oil or grease.

Periodic inspection

Periodically it is necessary to check:

VERIFICATION	WORK CYCLE
The state of lubrication	1000
Cleanliness of the filling filter and the suction filter	4000

The machine does not require any special tools to carry out checks or maintenance tasks, However, it is recommended that only tools suitable for the tasks and in good condition should be utilised (DPR 547/55) to avoid injury to persons or damage to machine parts.

Take due care when effecting cleaning of the tank (machine stopped and unable to be accidentally restarted).

Remember to reseal the tank at the end of the operation.

3.7 Repairs

Trouble shooting guide

INDICATION	CAUSE	REMEDY
<p>The motor driven pump does not deliver lubricant</p>	<p>The electric motor does not function</p> <p>The tank is empty</p> <p>The motor is rotating in the reverse direction</p> <p>The pump is not actioned due to:</p> <ul style="list-style-type: none"> - the motor rotating in the reverse direction - the motor rotating in the correct direction but the paddle unit is not turning - presence of air bubbles in the lubricant <p>The pressure regulating valve (bypass) has been set at a very low value</p> <p>Presence of foreign bodies in the non-return valve</p> <p>Mechanical defect in the pump</p>	<p>Check the electrical connections between the motor and the power supply line.</p> <p>Check the motor windings.</p> <p>Check that the connection links of the motor terminal block are positioned in accordance with the supply current</p> <p>Refill the tank. Attention: If the tank were to empty without a minimum level warning signal being given, the minimum level contact must be checked</p> <p>Take off the tank cover and check that the paddle unit rotates and is moving the lubricant; if this is not the case invert two of the three motor phases</p> <p>See above</p> <p>Check the paddle unit control cams</p> <p>Detach the pump delivery tube to bleed the lubricant until free of air bubbles.</p> <p>Adjust the valve (see Technical Manual 777000)</p> <p>Clean or replace the valve (see Technical Manual 777000)</p> <p>Disassemble the pump and carry out the checks described in Technical Manual 777000</p>

INDICATION	CAUSE	REMEDY
On start up (first lubrication cycle) of the system the pump delivers lubricant, but on reaching pressure in line 1 the reversing does not occur and the line remains with pressure	<p>Incorrect connection of the motor phases: the motor rotates in the correct direction for pumping but in the control panel the remote control switch T1 (Reversing command) is excited instead of switch TL (Delivery command)</p> <p>Incorrect electrical connections between the electromechanical reverser microswitches and the control and command panel</p> <p>Incorrect connections of the control pressure switch</p>	<p>Invert the connections of two of the three motor phases</p> <p>Invert the connections of the microswitches and check that the pump delivers lubricant. Where it does not, invert two of the three motor phases</p> <p>Invert the electrical connections to the control and command panel</p>
No minimum level warning signal when there is no lubricant in the tank	Incorrect minimum level adjustment	<p>Remove the tank cover, move horizontally, in both directions, shaft 8, which actuates the microswitch. This can present the following 2 cases:</p> <ul style="list-style-type: none"> - the command panel warning light illuminates: adjust the contact by turning screw 9 clockwise - the command panel warning light does not illuminate: check the electrical connections and, if necessary, replace the microswitch
Minimum level warning signal given with lubricant above the minimum and the pump functioning	Incorrect adjustment of the minimum level	<p>Remove the tank cover, move horizontally, in both directions, shaft 8, which actuates the microswitch (see Technical Manual 777000). This can present the following 2 cases:</p> <ul style="list-style-type: none"> - the command panel warning light goes out: adjust the contact by turning screw 9 anticlockwise (see Technical Manual 777000) - the command panel warning light remains on: check the electrical connections and, if necessary, replace the microswitch

INDICATION	CAUSE	REMEDY
No maximum level warning signal when tank is full	Incorrect connection of the float with the microswitch	<p>Remove the tank cover and lift the float up until the microswitch is actuated (see Technical manual 777000). This can present the following 2 cases:</p> <ul style="list-style-type: none"> - the command panel warning light illuminates: check that the float rod is able to move freely. If not, eliminate the cause to permit the free movement of the float - the command panel warning light does not illuminate: check that, when the float is lifted up the microswitch is actuated. If it is not, move the microswitch using the securing screws. Check the electrical connections and, if necessary, replace the microswitch.
The maximum level warning light illuminates when the tank is not full	Incorrect connection of the float with the microswitch	<p>Remove the tank cover and push the float down (see Technical manual 777000). This can present the following 2 cases:</p> <ul style="list-style-type: none"> - the command panel warning lights goes out: check that the float rod is able to move freely. If not, eliminate the cause to permit the free movement of the float. - the command panel warning light does not go out: check that when moving the float downwards the microswitch is actuated.. If it is not, move the microswitch using the securing screws. Check the electrical connections and, if necessary, replace the microswitch..

INDICATION	CAUSE	REMEDY
<p>AG6 DOSING UNITS</p> <p>Alarm signalled for lack of lubricant delivery. The rods visible inside the dosing unit turret must move sequentially up and down and actuate the control microswitches when the pump is operating. Where this is not the case the two outlets or the single outlet of that dosing unit will not deliver lubricant.</p>	<p>The dosing unit piston is seized.</p> <p>Tubing between the dosing unit outlet and the lubrication point is obstructed.</p> <p>Pressure in the line is too low (lubricant is not delivered to some points)</p> <p>Dosing unit is prepared for two outlets but only one is utilised.</p>	<p>Replace the dosing unit with another having the same characteristics. Anyway ensure that the unit is correctly assembled, particularly as regards the fixing. Overtightening of the securing screws could damage the dosing unit and cause a seizing of the piston.</p> <p>Detach the tubing and ensure free passage for the lubricant.</p> <p>Adjust the pressure regulating valve (by-pass) or the control pressure switch (end of line).</p> <p>Check that, when only one outlet is used, the correct pad is assembled and that the other outlet is plugged. See the AG6 Dosing Unit Instruction Leaflet.</p>

INDICATION	CAUSE	REMEDY
<p>END OF LINE PRESSURE SWITCH</p> <p>The pressure switch does not send a signal to the electrical command and control panel</p> <p>The pressure switch sends a signal before the end of the lubrication cycle</p>	<p>Incorrect electrical connections</p> <p>Incorrect adjustment of the control pressure switch. The pressure value set is too high and the pressure regulating valve (by-pass) intervenes before the pressure switch can be actuated</p> <p>Incorrect setting of the control pressure switch. The pressure value set is too low</p>	<p>Check the electrical connections</p> <p>Reduce the pressure set on the pressure switch until an electrical contact is obtained</p> <p>Increase the set value of the pressure switch. The optimum set value is that which permits a pressure of 50-70 bar at the end of the lubrication line.</p>

INDICATION	CAUSE	REMEDY
RIGID AND FLEXIBLE TUBING		
Loss of lubricant	Fracture of the tubing due to excessive pressure or material wear.	Replace the damaged section and ensure correct assembly.
Insufficient lubricant delivery.	Loosening of connections due to incorrect assembly or vibration.	Reassemble, using Teflon tape on the threads if necessary, and adequately tighten the connections.
	Tubing flattened.	Replace the damaged section, correctly reassemble and install external protection if necessary.
	Dimensions of the tubing reduced by excessive bending.	Replace the damaged section and correctly reassemble.

3.8 Dangers present in use

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 (as in EN 414 referring to EN 292)
- application of essential safety requirements (Machine Dir. - att. 1, part 1)
- electrical 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/maintenance phases it is possible that there could be oil squirts or splashes (for this reason appropriate protective clothing must be worn and appropriate protective measures must be taken during these operations)
- ◆ difficulty in handling: installation of suitable side brackets
- ◆ exceptionally contact with split rings in rotation
- ◆ contact with oil -> see the requirements for the use of suitable individual protective measures
- ◆ use of unsuitable lubricant -> the characteristics of the fluid are shown on the pump and in the manual (in case of doubt contact the Eng. Dept of Dropsa Spa)
- ◆ protection against direct and indirect contact must be provided by the user
- ◆ every time the tank cover is opened the catch must be correctly resealed immediately afterwards
- ◆ given the purpose of the lubrication system, the pump must always be functioning; for this reason it is necessary to pay attention to the electrical connections which, in the case of a power failure, the customer's machine is restarted only by means of a reset, while the lubrication pump is able to restart automatically

INADMISSIBLE FLUIDS	
Fluid	Danger
Lubricants with abrasive additives	High wear rate of contacted parts
Lubricants with silicon 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

4.0 INSTRUCTIONS FOR ORDERING

VERSIONS

Motor driven pump complete with mechanical line reverser with 0.37 kW – 4 pole electric motor

Tank			Description
10	30	100	
777005	777010	777020	With paddle unit for grease – min. and max. levels
777393	-	-	With follower plate for soft grease
777510	777521	777535	For oil with min. and max. levels

Motor driven pump complete with hydraulic line reverser with 0.37 kW – 4 pole electric motor

Tank			Description
10	30	100	
777060	777040	777083	With paddle unit for grease – min. level
777311	-	-	With follower plate for soft grease
777560	777572	777584	For oil with min. and max. levels

Motor driven pump for single line progressive system with 0.37 kW – 4 pole electric motor

Tank			Description
10	30	100	
777110	777030	777131	With paddle unit for grease
777312	-	-	With follower plate for soft grease
777613	777624	777635	For oil with min. and max. levels

REPLACEMENT PARTS

Pump assembly		291415
Reduction unit		291410
Electric Motor 0.37 kW gr71		3301110
Electric Motor 0.75 kW gr8		3301053
Electromechanical reverser		291380
Unidirectional valve		291355
Non-return valve		291413
By-pass valve 50 - 500 bar (735 ÷ 7350 psi)		291162
By-pass valve 20 - 250 bar (294 ÷ 3675 psi)		291391
Flow regulator		3293060
Minimum level indicator	Tank 10 kg (22 lb)	291244
	Tank 30 kg (66.1 lb)	291220
	Tank 100 kg (220.4 lb)	291210
Maximum level indicator		291145
Paddle unit for grease	Tank 10 kg (22 lb)	291245
	Tank 30 kg (66.1 lb)	291247
	Tank 100 kg (220.4 lb)	291246
Filling filter		3130009

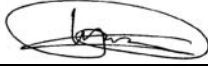
CE Declaration Of Conformity

Manufacturer : DROPSA SpA Company Via Croce 1, - 20090 Vimodrone (MI), Italy Address +39 02 250 791 Telephone
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It is certified that:

the machine: Pump 777 Ver. 01-06

- * is manufactured in conformity with the DIRECTIVE OF THE COUNCIL OF THE EUROPEAN COMMUNITY concerning the harmonisation of member states legislation relative to machines (89/392/CEE + 91/368/CEE), EMC (89/336/CEE) and BT (73/23/CEE) and relative amendments.
- * is manufactured in accordance with the following standards and harmonised technical specifications:
EN 292/1, EN 292/2, EN 50081-2, EN 50082-2, CEI EN 60204-1, EN 1050.

Technical Manager	Ing. Walter Divisi
Product Manager	Name
DROPSA SpA - Vimodrone (MI) - Italy	
Company	
	January 1999
Signature	Date

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