

# INSTRUCTIONS FOR USE

## Pump Series 999 DROPSA SpA

In accordance with point 1.7.4, to I, Dir 98/37 CE

### 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 C20211E - Wk 23/02

<b>Registered name</b>	DROPSA SpA
<b>Address</b>	via Croce 1, 20090 Vimodrone (MI), Italy
<b>Model</b>	<b>Pump 999</b>
<b>Year of manufacture</b>	1999
<b>Marking</b>	CE

### 0.0 INTRODUCTION

This user's and maintenance manual refers to a **series 999 modular motor-driven gear pump** for oil and grease. This modular pump is particularly suitable for the distribution of oil and grease in lubrication systems. 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 features which distinguish this pump are:

high performance;  
simplicity of construction;  
modularity.

The simplicity of construction guarantees long life, reliability and simplified and reduced maintenance. The modularity of the components allows the system engineer to construct the lubrication unit to meet the specific needs of the lubrication system it is serving.

The pump is made up of a series of components:

CHARACTERISTICS	<b>PUMP 999</b> Electric piston pump
Fixed flow rate pump element Piston diam. 6 mm. Piston diam. 8 mm.	0.20 cc/stroke 0.35 cc/stroke
Variable flow rate pump element Piston diam. 6 mm: Piston diam. 8 mm.	from 0.028 to 0.20 cc/stroke from 0.05 to 0.35 cc/stroke
Maximum pressure - bar (MPa)	750 (75)
Tank capacity	3 – 5 – 10 - 30
Characteristics of the mineral lubricant	oil: min. 15 CSt grease: max. NLGI 2
Temperature of use For operations outside of this range	- 5C - + 40 °C Consult Engineering Dept Dropsa
Variable flow rate model: AC Motor (specify if single or 3 phase)	220-380 V 50/60 Hz at 1500 rpm
DC Motor	24V at 2200 rpm
Fixed flow rate model: AC Motor (specify if single or 3 phase)	220-380 V 50/60 Hz at 1500 rpm
DC Motor	24V at 2200 rpm
Insulation	Class F

### 1.1 Minimum level indicator

*Electro-mechanical type*

Normally closed at minimum level. Maximum commutable power ISA; maximum commutable voltage 220/250 VAC; a lubricant maximum level and reserve indicator is available on request: fitted with floats and two switches (minimum and zero)

### 1.2 Pressure gauge (Accessory)

Two types of pressure gauge are available:

PART N°	PRESSURE RANGE
299196	0 - 500 bar (0 - 50 MPa)
291395	0 - 1000 bar (0 -100 MPa)

### 1.3 Pressure regulator (Accessory)

Three types of regulator (valves) are available to protect the system from overpressures.

PART N°	PRESSURE RANGE
299450	0 - 250 bar (0.25 MPa)
299451	0 - 350 bar (0.35 MPa)
299452	50 - 800 bar (5.80 MPa)



#### **WARNING:**

Pay strict attention to what is indicated on the valves when assembling.

Incorrect assembly of the regulator (valve) can result in an overpressure which could prejudice the correct functioning of the pump itself and be dangerous for the user.

### 1.4 Filling filter (only for the grease version) (Accessory)

This removable cartridge filter is recommended to ensure the filling of lubricant which is free from foreign bodies and to avoid the formation of air bubbles.

### 1.5 Hydraulic inverter (Accessory)

PART N°	DESCRIPTION
86240	Complete with base mounting plate
86199	Inverter only

Pressure up to 300 bar.

Type of lubricant: oil minimum viscosity 15 cSt – grease maximum consistency NLGI2

### 1.6 Auxiliary pump element

The pumps are supplied with one pump element only, but a second one can be mounted; this would permit the feeding of two lines independently or the combining of the outlets of the two pump elements to obtain a doubling of the flow rate.

To obtain the part number of the auxiliary pump element consult the table by utilising the last number off the 999 base pump, or its flow rate specification (at 1500 rpm) and its maximum working pressure.

### 1.7 Maximum level electrical contact

The metal tanks, except those of 3 and 5 litres, can be fitted with electrical maximum level indicators for automatic replenishing of the tank.

*Tanks for grease:*

Electrical contact Part N° 299197

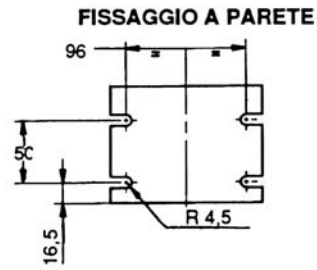
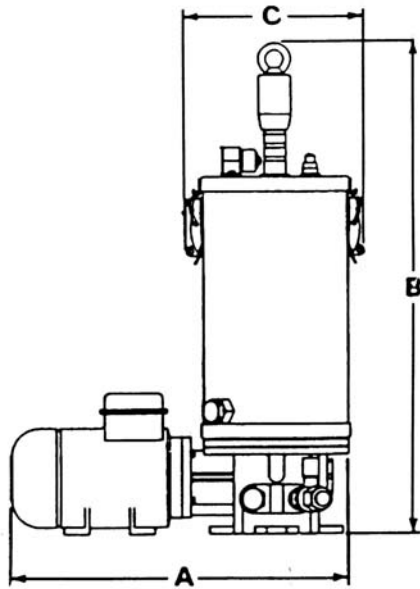
*Tanks for oil*

Electrical contact Part N° 291155

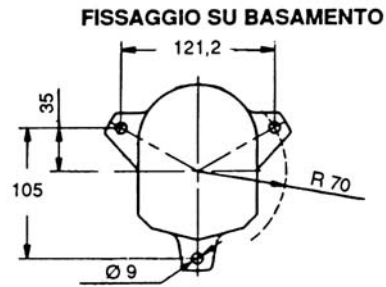
## 2.0 TECHNICAL SPECIFICATIONS

## 2.1 Fixing and overall dimensions

DIMENSIONI IN mm DIMENSIONS IN mm



WALL FITTING



BASE FITTING

Dimensioni mm	SERBATOI PER GRASSO						SERBATOI PER OLIO (Lamiera)			
	3 kg		5 kg		10 kg	30 kg	3 litri	5 litri	10 litri	30 litri
	Trasparente	Lamiera	Trasparente	Lamiera	Lamiera	Lamiera				
<b>A</b>	300	300	300	300	423	453	300	300	423	453
<b>B</b>	354	490	414	550	645,5	825,5	392,5	452,5	557	714,5
<b>C Ø</b>	197	197	197	197	299	358	197	197	299	358

Dimensions in mm	TANKS FOR GREASE						TANKS FOR OIL (METAL)			
	Transparent	Metal	Transparent	Metal	Metal	Metal	3 litres	5 litres	10 litres	30 litres

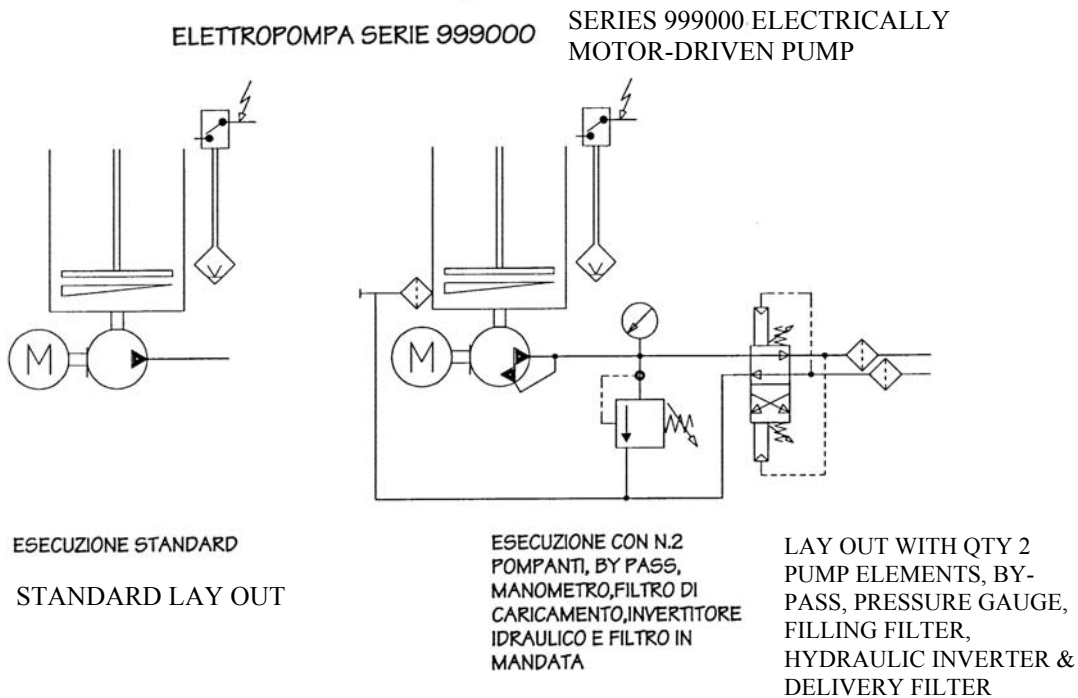
## 2.2 Electrical system – Technical Data

### piston pump

AC ELECTRIC MOTOR	
Electrical power supply:	Single phase 220 VAC 50 HZ 0.12 KW 3-Phase 220/380 VAC 50 HZ 0.18 KW 4 pole
DC ELECTRIC MOTOR	
Electrical power supply:	Single phase 24 VDC – 120 W 12 VDC – 100 W

## 2.3 Hydraulic system – Technical Data

Connection between the pump and the valve block by steel tubing with connectors. (Only for requested versions)



## 2.4 Other data

Class of protection	F
Grade of mechanical protection	IP 55
Operating temperature	- 5 - + 40 °C
Operating humidity	90 % relative humidity
Preservation temperature	- 20 - + 50 °C
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 (220/380 VAC) 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 magneto-thermal 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  $\leq 10$  kA and the nominal current  $I_n = 6$  A.***

- ◆ The connection of the pressure switch mounted directly on the tank must be 24 VAC/DC.
- ◆ The pump **MUST NOT** be submersed in fluids or utilised in 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 (min/max indication on the tank);
- ◆ 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 minimum level indicator is supplied, unless otherwise specified by the customer, with the contact closed for minimum level. Should the user require to use a normally open contact it will be necessary to invert the operating direction of the microswitch.

#### 3.2 Use

1. Verify the settings made;
2. Press the start button of the machine to which the 999 series pump is connected;
3. Verify the starting 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 cardboard package.

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

Handling must be effected by at least two persons.

**!** *Lift the unit with taking account of the right way up indicated on the cardboard carton*

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

### 3.4 Assembly/Disassembly

No pump assembly operations are envisaged.

For wall mounting ensure adequate space is available (as shown in the installation diagram) to avoid abnormal postures and possible impacts; four fixing holes are provided for wall mounting and three for base fitting. Subsequently it will be necessary, as previously described, to connect the pump to the machine hydraulically and then to connect the control panel.

During the disassembly phase ensure the tank is empty.

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

*Flow rate (for versions with adjustable flow rates)*

It is possible to regulate the flow rate by rotating the regulating screw (8 mm hexagonal key) clockwise to decrease and anticlockwise to increase.

### 3.6 Maintenance

- ! *Locate the machine in conditions which facilitate easy access.*
- Utilise individual protection to avoid contact with mineral oil*

*Periodic inspections*

Periodically it is necessary to check:

<b>VERIFICATION</b>	<b>WORK CYCLE/RUNNING TIME</b>
The state of lubrication	1000/every 6 months
The oil/grease level	2000/once a year
Cleanliness of the filling and intake filter (where fitted)	500/every 6 months

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.

### 3.7 Repairs

The following diagnostic table indicates the main anomalies which may be encountered, the probable causes and possible solutions.

The anomalies shown are:

- the pump fails to deliver lubricant
- irregular pressure
- irregular flow rate

In case of doubts and/or problems which cannot be resolved do not attempt to disassemble parts of the machine but contact the Engineering Department of DROPSA S.p.A.

**DIAGNOSTIC TABLE**

ANOMALY	CAUSE	REMEDY											
The pump does not deliver lubricant	The tank is empty	Refill the tank with clean lubricant, in accordance with the procedure shown in the Maintenance section. Warning: if the tank has emptied without the minimum level electrical contact having signalled the minimum level, check the contact.											
	The tank has been filled from above and not through the side connection fitted with a filter.	Remove the air vent plug B (see fig. on page 6) and run the pump allowing the grease to exit until free from air bubbles. Replace and partly screw in plug B and continue running the pump until grease exits between the threads and the plug and then fully tighten the vent plug.											
	The piston of the pump element assembly is seized or the piston return spring is broken	Replace the pump element.											
	The pump does not function because the grease being used is of a consistency greater than NLGI 3 (max. recommended consistency).	Remove the tank from the pump, remove the unsuitable grease and wash out the tank and filter with petrol. Disassemble the pump element and wash out with petrol. Reassemble completely, refill the tank (utilising the side connection fitted with a filter) with suitable grease and run the pump, ensuring that grease free from air bubbles exits. If necessary, remove the air vent plug B (see fig. on page 6) and proceed as in the previous point.											
	The pump fails to function because it has been run with the tank empty creating an air lock inside the pump itself.	Remove the plug which closes the auxiliary pump element outlet or, where the pump has two elements fitted, remove one of the two pump elements and run the pump until homogeneous grease exits. Replace the plug (or the pump element) and continue running the pump until grease exits free from air bubbles. If necessary, remove the air vent plug B (see fig. on page 6) and proceed as indicated above.											
Irregular pressure	Pump element return valve and seating dirty.	Disassemble the parts shown in diagram A (see fig. on page 6) and wash them in petrol. Also clean the valve seating. Check the condition of the components and replace if necessary.											
	Pressure regulating valve (by-pass) dirty.	Disassemble the parts of the valve shown in the diagram and wash them in petrol. Also clean the valve seating. Check the condition of the components and replace if necessary. <table border="0"> <tr> <td>Valve Part N°</td> <td>Spring part N°</td> <td>Pressure reg.</td> </tr> <tr> <td>299450</td> <td>299456</td> <td>0 - 250 Bar</td> </tr> <tr> <td>299451</td> <td>299457</td> <td>0 - 350 Bar</td> </tr> <tr> <td>299452</td> <td>299458</td> <td>0 - 800 Bar</td> </tr> </table> Before reassembling the valve, check that the ring seal 18818 has not been damaged.	Valve Part N°	Spring part N°	Pressure reg.	299450	299456	0 - 250 Bar	299451	299457	0 - 350 Bar	299452	299458
Valve Part N°	Spring part N°	Pressure reg.											
299450	299456	0 - 250 Bar											
299451	299457	0 - 350 Bar											
299452	299458	0 - 800 Bar											
Irregular flow rate	Screw C, which secures the pump element D and return spring E, is loose.	Remove the pump element assembly from the pump body and completely disassemble it. To reassemble the pump element assembly see the sequence in the diagram. Check all the parts and reassemble after having washed them all in petrol. Warning: put some Loctite type sealant on screw C, which is inserted into pump element D. Hold the pump element between wooden vice clamps to prevent damage to the lapped surface.											



### 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:

- ◆ in the version of the pump without a release it is possible to encounter squirts of oil (for this reason appropriate protective clothing must be worn)
- ◆ contact with oil -> see the requirements for the use of suitable personal protective clothing
- ◆ 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
- ◆ given the purpose of the pump it 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.
- ◆ incorrect assembly of the regulator (valve) can result in an over pressure which can prejudice the functioning of the pump itself and create danger for the user. This is avoided by stamping the mounting instructions on the table.

INADMISSIBLE FLUIDS	
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

### 4.0 INSTRUCTIONS FOR ORDERING AND LIST OF DISTRIBUTORS

#### VERSIONS

Type of motor and rpm	Adjustable flow rate cm <sup>3</sup> /min		Pressure max.		SERIES 999 ELECTRIC MOTOR DRIVEN PUMP PART NUMBERS									
					TANK IN METAL								TRANSPARENT TANKS	
					GREASE MAX NLGI 3				OIL VISCOSITY MIN 15 cSt				GREASE NLGI 0	
					3 Kg	5 Kg	10 Kg	30 Kg	3 litres	5 litres	10 litres	30 litres	3 Kg	5 Kg
AC 1500 rpm	1.4	9.5	750	75	999234	999214	999224	999204	999244	999264	999274	999254	999414	999424
	2.5	17	400	40	999236	999216	999226	999206	999246	999266	999276	999256	999416	999426
	5	33	200	20	999232	999212	999222	999202	999242	999262	999272	999252	999412	999428
DC 24 V 2200 rpm	2	14.5	750	75	999634	999614	999624	999604	999644	999664	999674	999654	999684	999694
	3.6	25.5	400	40	999636	999616	999626	999604	999646	999666	999676	999656	999686	999696
	7.2	51	200	20	999632	999612	999622	999602	999642	999662	999672	999652	999682	999698
	Fixed flow rate													
AC 1500 rpm	9.5		750	75	999334	999314	999324	999304	999344	999364	999374	999354	999514	999524
	17		400	40	999336	999316	999326	999306	999346	999366	999376	999356	999516	999526
	33		200	20	999332	999312	999322	999302	999342	999362	999372	999352	999512	999522
DC 24 V 2200 rpm	14.5		750	75	999734	999714	999724	999704	999744	999764	999774	999754	999784	999794
	25.5		400	40	999736	999716	999726	999706	999746	999766	999776	999756	999786	999796
	51		200	20	999732	999712	999722	999702	999742	999762	999772	999752	999782	999792
				GREASE MAX NLGI 0				OIL VISCOSITY MIN 15 cSt				GREASE MAX NLGI 0		
DC 12 V 2200 rpm	14.5		350	30	999380				999390				999385	

Rpm and flow rates shown in the table refer to AC motors with 50 Hz frequency. With 60 Hz, the speed of the motor and the flow rate will increase by 20%. Always specify at time of ordering: voltage – current (3-Phase or Single

phase) – Frequency.

#### 4.1 Mounting Kit

999 series pumps can be supplied complete with a kit comprising of:

Filling filter– Pressure gauge – Pressure regulating valve and mounting Base.

To order the Kit it is necessary to indicate the pressure of the pump, the number of pump elements and the number of outlets.

<b>Kit Part N°</b>	<b>N° Pump elements</b>	<b>N° outlets</b>	<b>Pressure</b>
299482	1	1	0 -20 MPa 0 - 200 bar
299484	2	1	
299486	2	2	
299443	1	1	5 - 35 MPa 50 - 350 bar
299444	2	1	
299445	2	2	
299481	1	1	5 - 70 MPa 50 - 700 bar
299483	2	1	
299485	2	2	

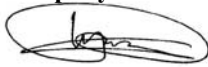
## CE Declaration Of Conformity

<b>Manufacturer:</b> DROPSA SpA Company Via Croce, 1 - 20090 Vimodrone (MI), Italy Address +39 02 250791 Telephone
--

### It is certified that:

<b>The machine:</b> Pump 999
------------------------------

- \* is manufactured in conformity with the DIRECTIVE OF THE COUNCIL OF THE EUROPEAN COMMUNITY concerning the harmonisation of member states legislation relative to machines (98/37 CE + 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
<b>Product Manager</b>	<b>Name</b>
DROPSA SpA - Vimodrone (MI) - Italy	
<b>Company</b>	
	January 1999
<b>Signature</b>	<b>Date</b>

## DROPSA SPA DISTRIBUTORS

**ITALY**  
Dropsa SpA  
t.(+39) 02-250791  
f.(+39) 02-25079767

**SPAIN**  
Polydrop, S.A.  
t.(+34) 93-260-22-50  
f.(+34) 93-260-22-51

**U.S.A.**  
Dropsa Corporation  
t.(+1) 586-566-1540  
f.(+1) 586-566-1541

**U.K.**  
Dropsa (UK) Ltd  
t.(+44) 01784-431177  
f.(+44) 01784-438598

**BRAZIL**  
Dropsa  
t.(+55) 011-563-10007  
f.(+55) 011-563-19408

**GERMANY**  
Dropsa GmbH  
t.(+49) 0211-394-011  
f.(+49) 0211-394-013

**AUSTRALIA**  
Dropsa Australia Ltd.  
t.(+61) 02-9938-6644  
f.(+61) 02-9938-6611

**FRANCE**  
Dropsa Ame  
t.(+33) 01-3993-0033  
f.(+33) 01-3986-2636