

Sumo Pump

Modular electric pump

User and Maintenance Manual

Original text translation

WARRANTY

CONTENTS

1. INTRODUCTION
2. GENERAL DESCRIPTION
3. IDENTIFICATION OF THE MACHINE
4. TECHNICAL CHARACTERISTICS
5. PUMP COMPONENTS
6. UNPACKING AND INSTALLATION
7. INSTRUCTIONS FOR USE
8. PROBLEMS AND SOLUTIONS
9. MAINTENANCE PROCEDURES
10. DISPOSAL
11. INFORMATION ABOUT ORDERING
12. DIMENSIONS
13. HANDLING AND TRANSPORT
14. PRECAUTIONS FOR USE
15. CONTRAINDICATIONS FOR USE
16. WARRANTY
17. DECLARATION OF CONFORMITY
18. DISTRIBUTORS



1. INTRODUCTION

This user and maintenance manual relates to the **Sumo pump**. Using this pump means that oils and greases can be distributed within lubrication systems even at high pressures of up to 400 bar (5880 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 Sumo series of lubrication pumps may be adapted to many uses without making any mechanical changes even after it has been installed. In fact, by making a selection from a set of components which are fully compatible and easy to assemble, the pressure, quantity of lubricant delivered, actual type of lubricant or type of distribution can be altered.

This construction technique is essentially based on the following modules:

- Electric motor
- Pump body with integrated reducer
- Two pumping elements
- Reservoir
- Valves and outlet unit (inverter, pressure adjustment valve, etc.).

There is only one bearing structure for all versions, with the dual pumping element constituting the essential module.

The pump unit possesses one single output, because the deliveries from the two pumping elements flow into a manifold unit.

Two types of tank for grease and two for oil with different volumes (of 30 or 100 kg) with stirring paddle and level indicators can be arranged on the pump body.

The pump is controlled by normal electrical apparatus which is able to effect inversion and perform the programmed cycles.

The Sumo electric pump is fully protected against the external environment and can operate without difficulty under the most severe environmental conditions.

Photo 1



Sumo 100 kg

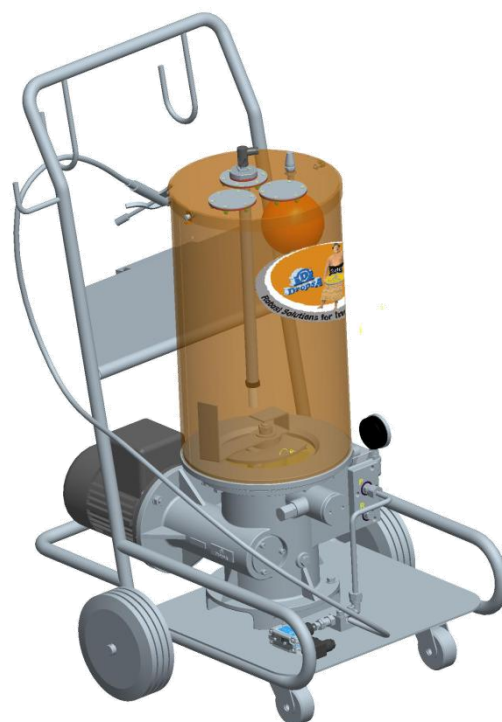
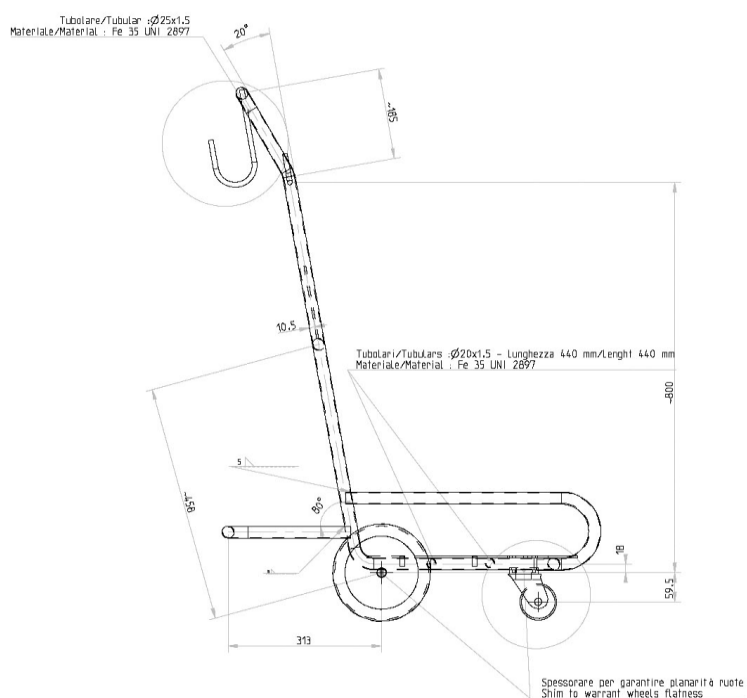
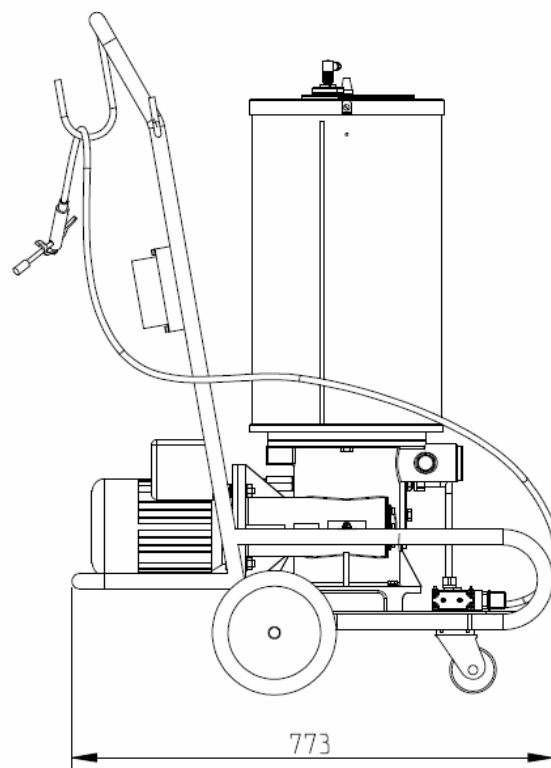
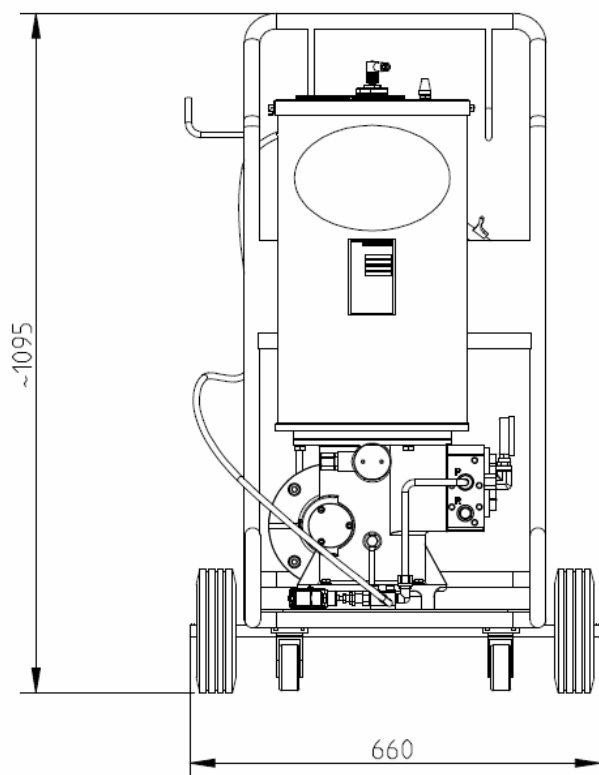
Photo 2



Sumo 30 kg

2.1 TROLLEY MOUNTED VERSION

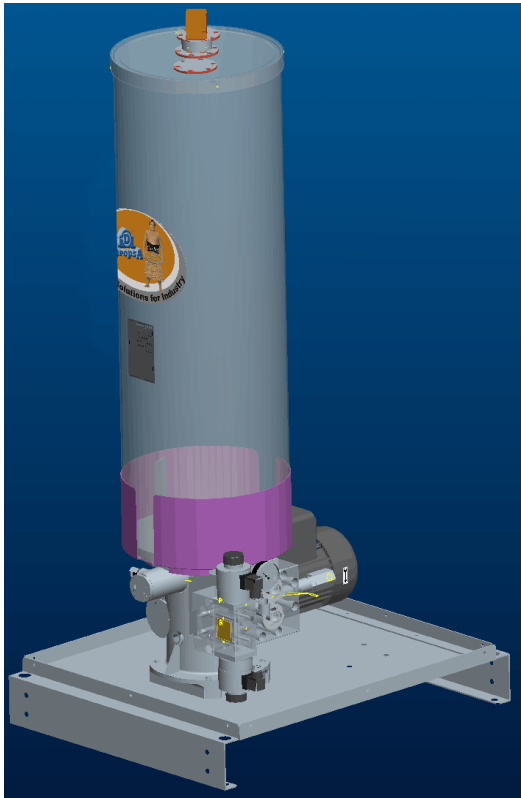
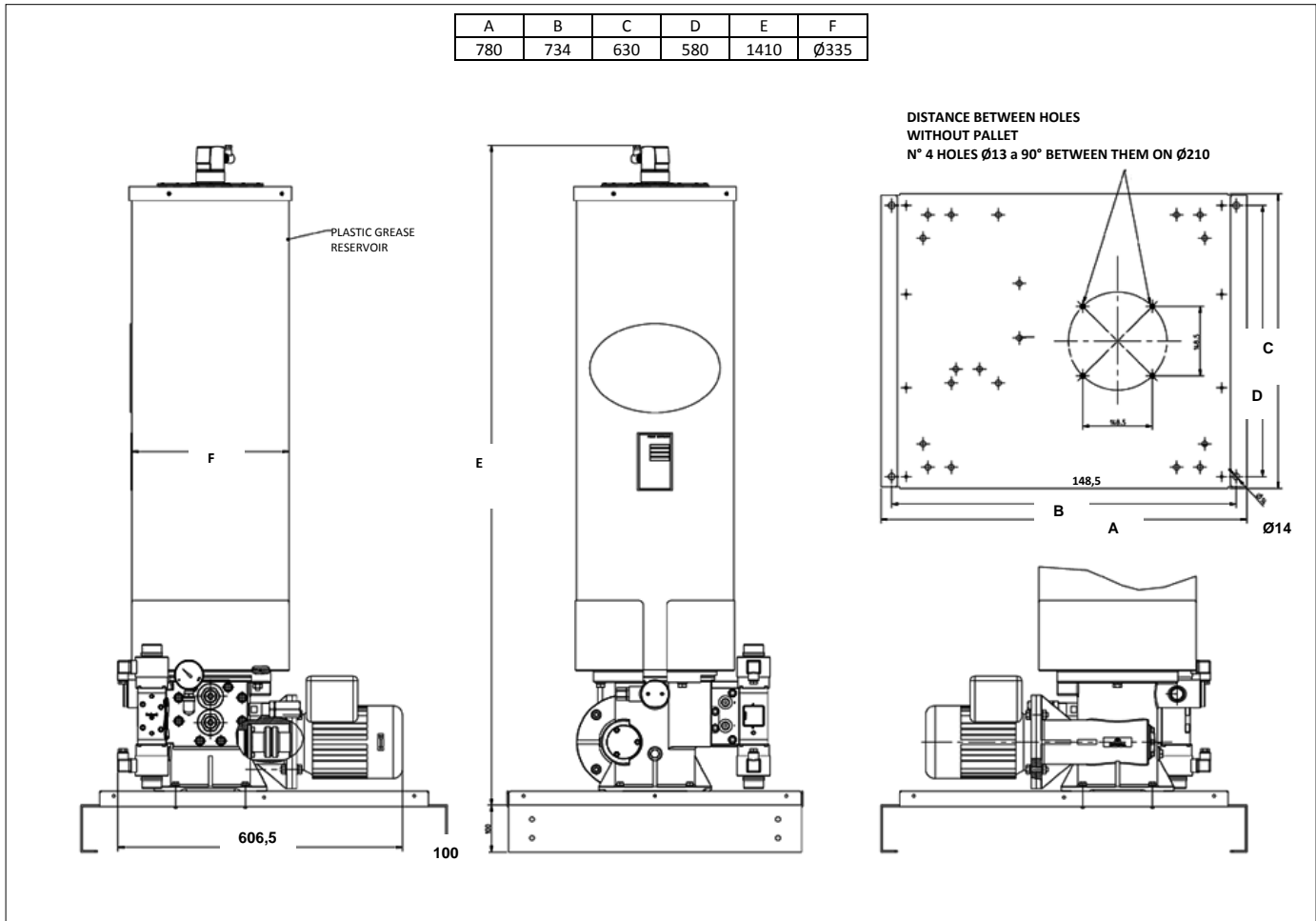
Sumo Pump trolley mounted 30 Kg metal reservoir; the system is complete with electrical control equipment that allows the pump motor control when the pressure exceed provided or in case of malfunction of the lubricant system distribution.



Sumo Pump 30 kg trolley mounted

2.2 TRANSPARENT RESERVOIR VERSION

Sumo Pump 80 Kg with transparent reservoir made of polyethylene for special applications.



3. IDENTIFICATION OF THE MACHINE

On the front part of the pump tank there is a plate which indicates the product code, the supply voltage and the basic characteristics.

4. TECHNICAL CHARACTERISTICS

The pump consists of a series of components with the following characteristics:

Technical characteristics	
Max. pressure	400 bar
Outlet delivery	400 cm ³ / min (24 cu. in/min) (2 x 200 cm ³ (12 cu. in) pump modules)
Working temperature	da - 5° C a + 50° C (da 23° F a +122° F)
Working humidity	90% max
Mineral oil lubricants	
Viscosity at working temperature	Min. 32 cSt
Grease lubricants	
Viscosity at working temperature	NGLI 2 Max.
Degree of protection	IP 55
Electric motor	Three phase Power 0.75kW Protection IP55 class B Voltage: 230-400 Volt ± 5% 50 Hz 240-440Volt ± 5% 60 Hz S1 continuous service.

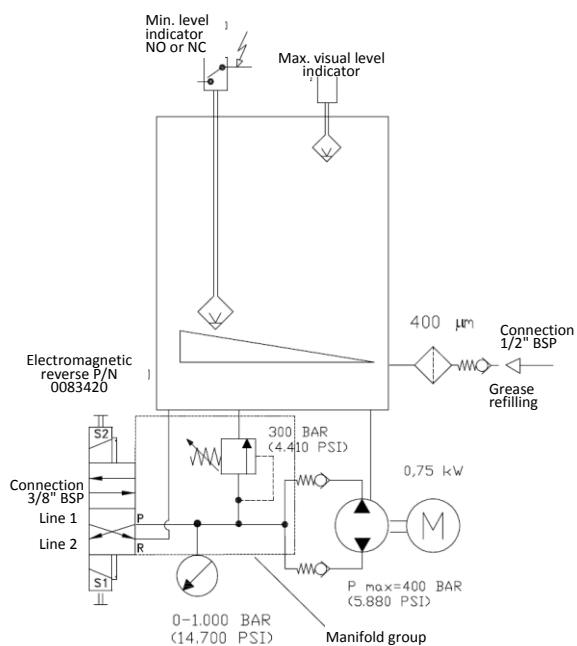


N.B.: do not supply the machine with voltages and pressures different from those indicated on the plate.

4.1 HYDRAULIC FUNCTION DIAGRAM

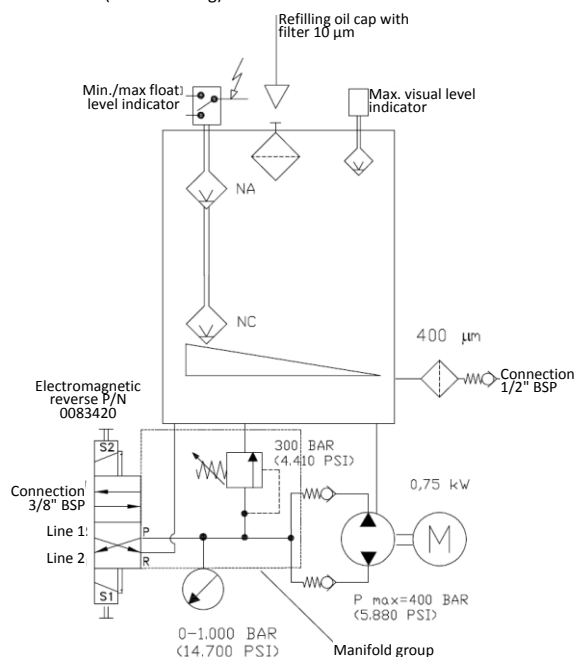
Standard grease pump (dual line)

Hidraulic diagram SUMO grease pump
(30 and 100 Kg) – dual line



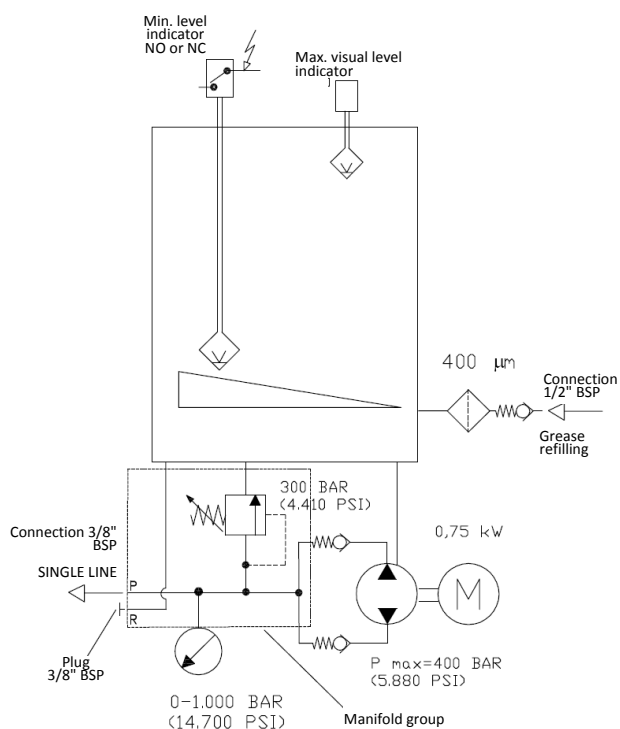
Standard oil pump (dual line)

Hidraulic diagram SUMO oil pump
(30 and 100 Kg) – dual line



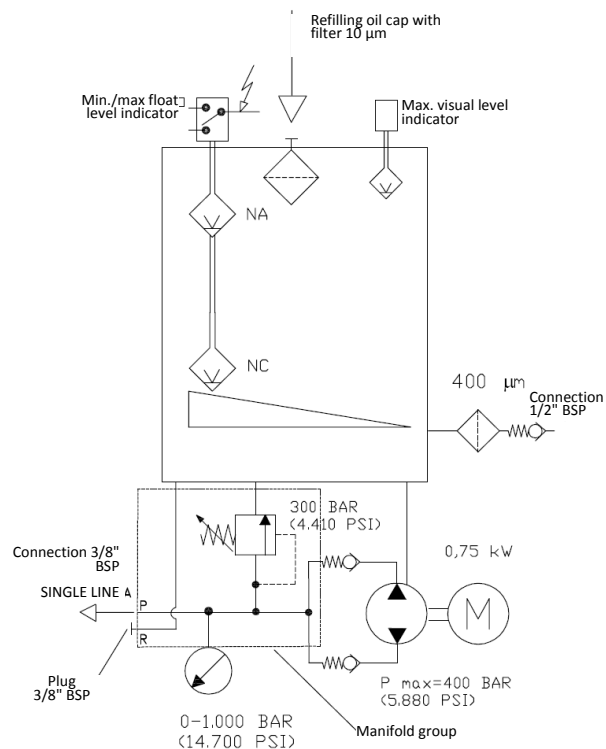
Single outlet grease pump (option)

Hidraulic diagram SUMO grease pump
(30 and 100 Kg) – single line



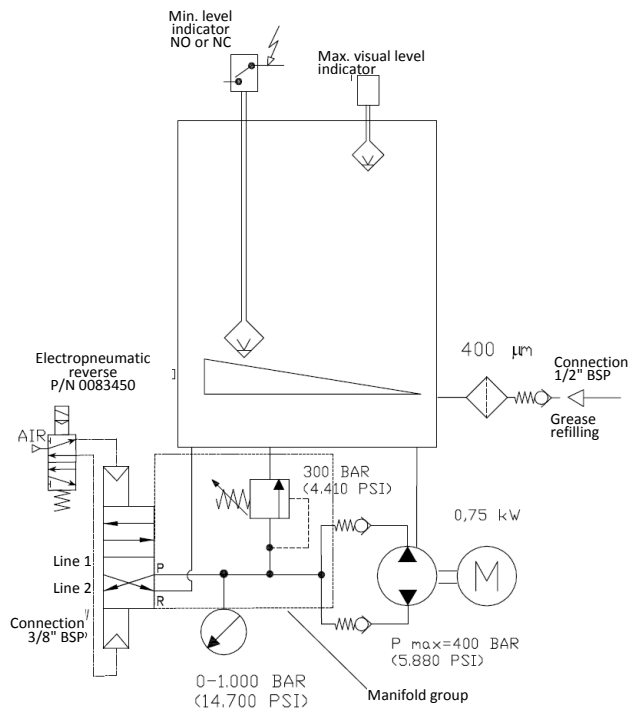
Single outlet oil pump (option)

Hidraulic diagram SUMO oil pump
(30 and 100 Kg) – single line



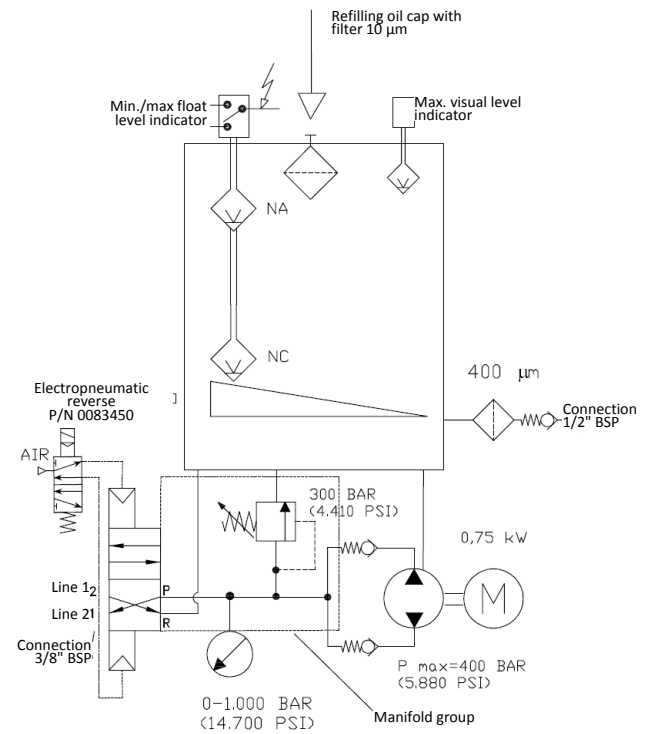
Grease pump (options: dual line, electropneumatic inverter)

Hidraulic diagram SUMO grease pump
(30 and 100 Kg) – double line



Oil pump (options: dual line, electropneumatic inverter)

Hidraulic diagram SUMO oil pump
(30 and 100 Kg) – double line



5. PUMP COMPONENTS

5.1 FIXED DELIVERY PUMPING ELEMENTS

The pump has two fixed delivery standard pumping elements (200 cm³/ min for each pumping element). A piston slides inside the body of the pumping element coupled to the latter by a lapping process. The seal between the piston and the pumping body is of a dry type, with no gasket provided between the two. The pumping element retention valve is of the tapered seal type. This solution is able to guarantee an optimum seal for the system at high operating pressures (max. pressure of 400 bar). The pumping elements are assembled on the manifold unit with a threaded attachment, which facilitates its assembly/ dismantling.

5.2 ENDLESS SCREW / WORM WHEEL UNIT

The pump has endless screw-worm wheel working kinematics with a transmission ratio of 1/40. The screw is made from special steel with high mechanical resistance, which gives it optimum flexible rigidity. To guarantee high resistance to wear, the screw has been subjected to Tenifer wear-resistant treatment. The screw is supported by oblique contact ball bearings, duly preloaded, to reduce working clearance. The worm wheel is made of bronze alloy for gear systems, particularly suitable for making the pump run quietly. The worm wheel shaft is made of special high resistance steel which gives the pump better reliability and durability.

5.3 INVERTORS

Code	Description
Series 0083420	Interchangeable electromagnetic inverter (mounted as standard on SUMO pump)
Series 0083400	Electromagnetic inverter
Series 0083450	Electropneumatic inverter

Spare parts			
Code	Description	Current (A)	Power (W)
3150011	Electromagnet 24V DC	7	170
3150012	Electromagnet 110V AC 50/60 Hz	2	206
3150013	Electromagnet 230V AC 50/60 Hz	1	176
3133262	Seal kit		



GENERAL NOTE FOR ALL INVERTERS: It is advisable to plan a delay in the de-energizing of the electromagnets from 2 ÷ 5 sec. to allow complete inversion in relation to the closing time of the pressure gauge at the end of the line.

5.3.1 Interchangeable electromagnetic inverter (code 0083420 mounted on standard pump)

The standard pump is prepared for dual line function, with an electromagnetically controlled inverter being assembled as standard. The inverter can be replaced if it is not working efficiently, without disconnecting the two line pipes (of an interchangeable type). This is able to reduce maintenance times and the relating installation shutdown.

This version means that the inverter can be replaced without disconnecting the line pipes. A solution of this type offers the following advantages:

- Ease of assembly and dismantling (only the 4 front Allen screws need to be loosened and tightened);
- Short replacement time;
- Minimum installation shutdown time.

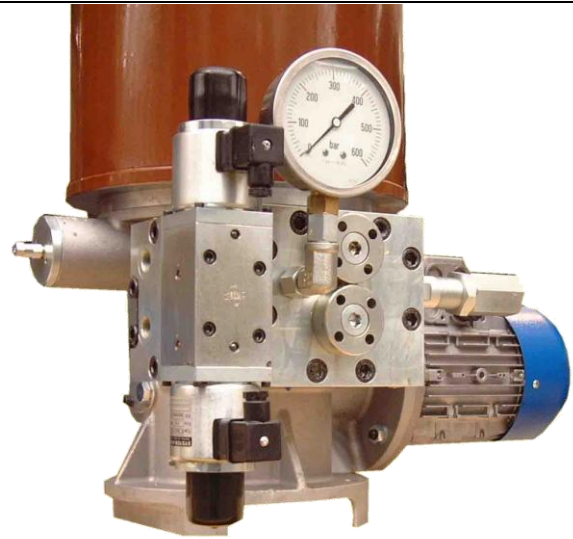


Photo 3

5.3.2 Electromagnetic inverter (code 0083400 option)



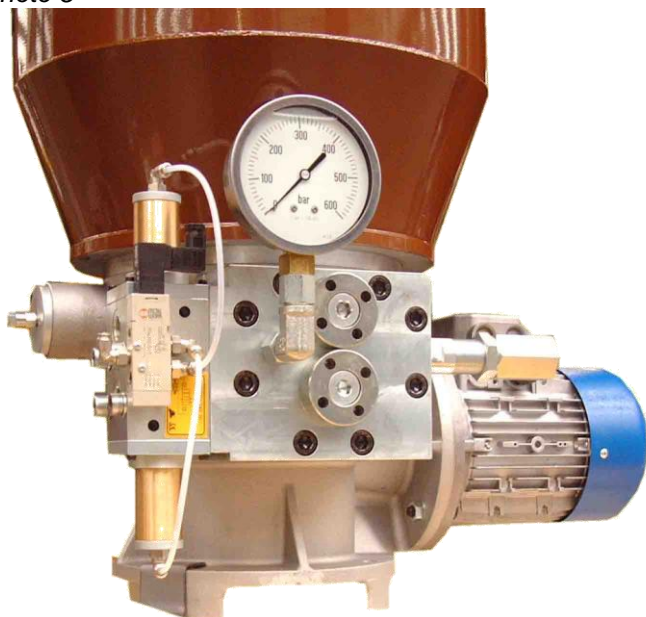
Photo 4

The main parts of the inverter are:

- A body with a central lapping hole which allows the dry seal to be coupled to the inversion piston;
- a ground piston with a dual coupling surface, with openings which are able to improve lubrication and seal at high pressures;
- the inversion phase is facilitated by the presence of a balancing system;
- by seal gaskets manufactured to sustain high pressures, via a pressure chamber, optimising the inverter operations;
- two control electromagnets equipped with a thermal probe with an intervention temperature of 100°C (protecting the coils from overheating).

5.3.3 Electropneumatic inverter (code 0083450 option)

Photo 5



The main parts of the device are:

- See point 5.3.2;
- two simple effect pneumatic actuation cylinders, controlled by a 5/ 2 type electrovalve.

Spare electrovalves	
Code	Description
3155154	Solenoid 24V DC
3155155	Solenoid 24V AC 50/60 Hz
3155156	Solenoid 110V AC 50/60 Hz
3155157	Solenoid 230V AC 50/60 Hz

5.4 PRESSURE CONTROL VALVE MOUNTED ON THE PUMP

Pump group unit

The pump has a pressure control valve, mounted on the manifold unit on the right side of the pumping elements. The valve can be easily dismantled for inspection if required. It is calibrated by turning the bypass pressure adjustment nut:

- clockwise (increase of pressure)
- anticlockwise (decrease of pressure)

Once the bypass has been calibrated, the position of the pressure adjustment nut is locked using a lock nut. It is important to bear in mind that line inversion is controlled by closing the contacts of the pressure switch. Adjusting the pressure switch provides an operating pressure which is lower than the maximum pressure controlled by this valve.

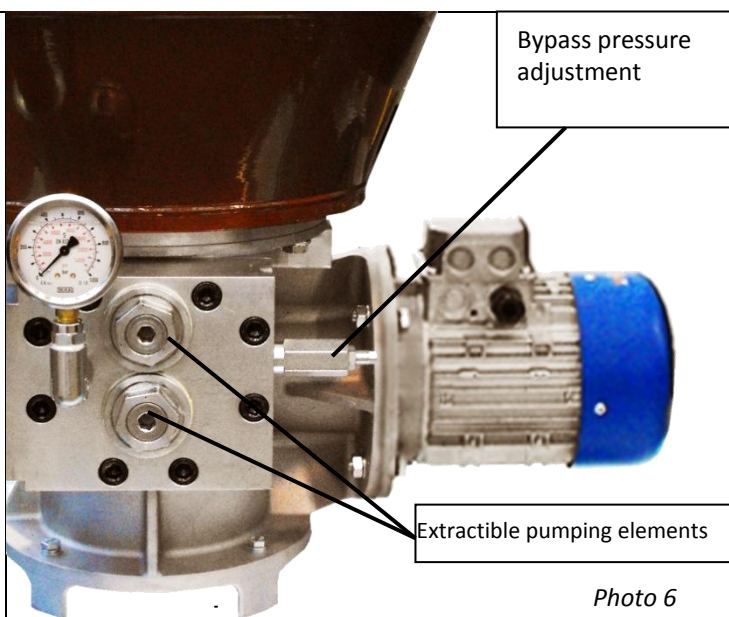


Photo 6

Code	Description
3191311	Pressure 100 ÷ 450 bar (1470 ÷ 6615psi)
3191314	Pressure 50 ÷ 200 bar (735÷ 2940 psi) on request

5.5 PUMPING ELEMENTS WITH FIXED AND VARIABLE DELIVERY.

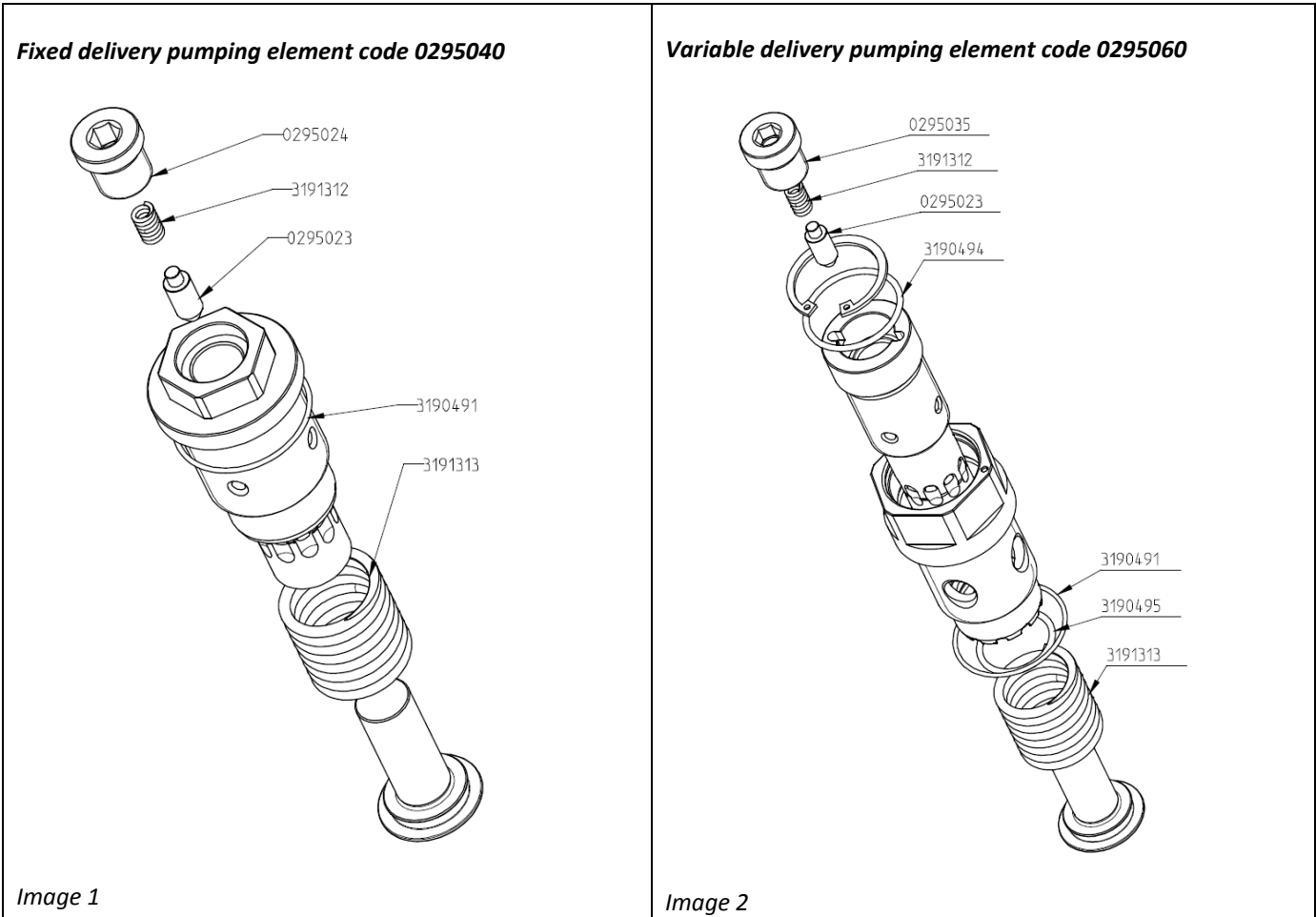
The standard pump has two pumping elements with fixed delivery (Image 1). On request it is possible to have a solution with variable delivery (Image 2). The pump can offer variable delivery by replacing a pumping element with fixed delivery with one with variable delivery.

Ref.	Code	Description
Image 1	295060	Pumping element with variable delivery 100÷ 200 cm ³ /min
Image 2	295040	Pumping element with fixed delivery 200 cm ³ /min

The main parts of the pumping element with variable delivery are:

- External body of the pumping element assembled with seal threading on the manifold group;
- Internal body of the pumping element equipped with delivery adjustment with threaded screws;
- Piston;
- Non-return valve manufactured with tapered cone seal system;
- Spring which guarantees contact between the piston and the control excentric gear.

Ref.	Code	Description	Code	Description
Image 1	0295040	Fixed pumping element unit	3190491	OR 2187 gasket in polyurethane CHPU95
			0295024	Stop valve cap
			3191312	Tapered spring
			0295023	Valve cone
Image 2	0295060	Variable pumping element unit	3190491	Gasket OR 2187 in polyurethane CHPU95
			3190494	Gasket OR 3156 in polyurethane CHPU95
			3190495	Gasket OR 3118 in polyurethane CHPU95
			0295035	Stop valve cap
			3191312	Tapered spring
			0295023	Valve cone



5.6 ADJUSTMENT OF PUMPING ELEMENT DELIVERY.

Delivery is adjusted by unscrewing (reducing delivery) or tightening (increasing delivery) the internal pumping element: each complete turn corresponds to an 11.5% change in delivery. There are two references on the fixed and mobile pumping element bodies (Photo 8) which allow identification of rotation at every $\frac{1}{4}$ turn (90°). The internal pumping element possesses a threaded adjustment of M36x2: each complete turn corresponds to an adjustment of the pumping element's stroke of 2 mm. We use the reference height obtained with calibration, between the exterior of the fixed pumping element and the exterior of the internal pumping element (height X). We use Y to indicate the actual displacement of the internal pumping element ($Y=13-X$).

X height measured mm	Y= 13-X pumping element adjustment stroke	% variation of delivery per pumping element	Actual stroke of pumping element mm	Effective pumping element delivery Cm^3/min
13	0	0	17.5	200
11	2	11.5	15.5	176
9	4	23	13.5	154
7	6	34.5	11.5	132
5	8	46	9.5	108

N.B. Delivery values are valid in the absence of outgoing counterpressure.



5.7 MAXIMUM AND MINIMUM GREASE LEVEL INDICATORS

Standard grease pumps have two types of level:

- Minimum capacitive level;
- Maximum visual level (float).

Code	Description
0295100	Maximum visual level kit (float).
0295120	Minimum capacitive level kit (24V cc) per tank kg 30 (68.1 lb)
0295110	Minimum capacitive level kit (24V cc) per tank kg 100 (220.5 lb)
3289166	Capacitive probe (24V cc)
0295121	Minimum capacitive level kit (250V cc) per tank kg 30 (68.1 lb)
0295122	Minimum capacitive level kit (250V cc) per tank kg 100 (220.5 lb)
3289180	Capacitive probe (250V cc)

5.7.1 Minimum capacitive level

The minimum level is produced by a capacitive probe, positioned on the end of a pipe mounted on the tank cover. The capacitive probe is normally closed. When it reaches the minimum level the probe indicates a lack of lubricant. To make the solution valid for NLGI2 grease as well, the capacitive probe interfaces with the scraper whose function is to clean the lower face of the grease probe. If the capacitive probe is replaced then it must be recalibrated (see calibration procedure).

The minimum level contact is indicated by a light signal on the control panel. In addition it controls any command for the pump to automatically refill the tank.

5.7.2. Maximum visual level (floating)

The phase for loading the lubricant into the tank is carried out by the operator, with an appropriate pump. Once the maximum level of lubricant has been reached, the small rod which indicates that the tank is full intervenes.

5.8 INDICATORS OF MINIMUM AND MAXIMUM OIL LEVEL.

Standard oil pumps have two types of level:

- Minimum and maximum level float;
- Maximum visual level (float).

Code	Description
0295100	Maximum visual level kit (float).
0295033	Maximum visual level float
0295150	Level float kit for 30 kg tanks (68.1 lb.) (minimum and maximum level)
0295160	Level float kit for 100 kg tanks (68.1 lb.) (minimum and maximum level)

5.8.1 Minimum and maximum level float

A probe rod with dual float mounted on the pump cover provides a reading of the minimum oil level (reserve) and the maximum level (which allows the automatic refilling of the tank to be halted).

The minimum level contact is indicated by a light signal on the control panel. In addition it controls any command for the pump to automatically refill the tank.

5.8.2. Maximum visual level (floating)

See point 5.7.2.

5.9. Stirring paddle for grease and oil (standard performance)

Four tanks are provided with a capacity of 30 and 100 kg. (22 – 66.1 – 220.4 lb) two for oil and two for grease.

The tanks have a stirring paddle and scraper as standard, and they must not be dismantled when they are being assembled and replaced. Under the stirring paddle a galvanized steel mesh with 0.5 mm holes (0.02 in.) is provided as standard. In this way the pump is protected from any foreign bodies which might be inadvertently present during the tank refilling process.

5.10 Pressure gauge

The pressure gauge is of the glycerin filled type, so it is protected from any pressure leaks which might damage its functioning. It is mounted directly in the manifold group (positioned on the front of the pump).

Code	Description
3292078	0 -1000 Bar (0 -14.700 psi)

5.11 Electrical control panel

“DROPSA” electrical control panel has been designed to provide a system complete with all the controls necessary for automatic functioning controlled by safety signals from centralized lubrication installations. The primary voltage is 400 VAC and 50 Hz, the other voltages are on request.

Type of probe	Type of inverter	Voltage V	Code Electrical apparatus	Code Electric diagram
CAPACITIVE PROBE (24V cc standard version)	electromagnetic	24 VDC	1637008	1327252
		110 VAC	1637009	1327253
		220 VAC	1637010	1327254
	electropneumatic	24 VDC	1637011	1327255
		110 VAC	1637012	1327256
		220 VAC	1637013	1327257
LASER PROBE	electromagnetic	24 VDC	1637001	1327237
		110 VAC	1637003	1327247
		220 VAC	1637004	1327248
	electropneumatic	24 VDC	1637005	1327249
		110 VAC	1637006	1327250
		220 VAC	1637007	1327251

6. UNPACKING AND INSTALLATION



WARNING: The unit is only to be opened and repaired by specialist personnel.

No pump assembly operations are envisaged. The pump is fixed on a metal pallet, which allows safe handling using a transpallet or forklift truck. This pallet has been designed so that it can be installed in the installation, being equipped with 4 (four) holes of Ø 14 mm suitable for fixing to the floor. Provide adequate space (as shown on the installation diagram) to avoid abnormal posture or possible impact. Then, as described previously, the pump must be connected hydraulically to the machine and then connected to the control panel.

7. INSTRUCTIONS FOR USE

7.1 GOING INTO OPERATION

Damage to the supply cable and housing may involve contact with live parts at high voltage and consequently fatal danger:

- Check the integrity of the supply cable and the unit prior to use;
- If the supply cable or the unit is damaged, do not start up the system!
- Replace the damaged supply cable with a new one;
- The unit can be opened and repaired only by specialist personnel;
- In order to prevent the danger of electrocution due to direct or indirect contact with live parts the electric supply line must be adequately protected by an appropriate magnetothermal differential switch with threshold of intervention of 0.03 ampere and max intervention time of 1 second;
- The *interruption power of the switch must be ≤ 10 kA and rated current $I_n = 6$ A.*
- The pump must not be used when submerged in fluids or in a particularly aggressive or explosive/inflammable atmosphere unless prepared in advance for this purpose by the supplier;
- to fix the pump correctly check the pitch dimensions shown in the figures in chapter 12;
- Use safety gloves and goggles as indicated in the safety sheet for the lubrication oil;
- Do NOT use lubricants which are aggressive towards NBR gaskets, and if in doubt consult the Dropsa SpA technical office which will supply a detailed list of the recommended oils;
- Do not ignore dangers to health and comply with health and safety regulations;
- Warning! All the electric components must be earthed. This applies to both the electric components, and to the control devices. To this end make sure that the earth wire is connected correctly. For safety reasons the earth conductor must be approximately 100 mm longer than the phase conductors. If the cable is accidentally removed, the earth terminal must be the last one to be removed.

7.2 ACTION TO BE TAKEN BEFORE START-UP

- Check the integrity of the pump.
- Refill the tank with suitable lubricant.
- Check that the pump is at working temperature and that there are no air bubbles in the pipes.
- Check that the electric connection has been carried out correctly.

7.3 USE

- check the data sets imposed.
- press the start button on the machine to which the Sumo pump is connected.
- check pump start-up.
- check that the machine is adequately lubricated (if there are still some doubts about its correct functioning you can contact the Dropsa S.p.A Technical Office and request a test procedure).
- check that the direction of rotation of the electric motor is the one indicated by the indicator arrow, positioned on the protective housing of the motor fan;
- check that the hydraulic connection is correct.

7.4 ADJUSTMENT/ CALIBRATION OF LEVEL PROBES

7.4.1 Pressure

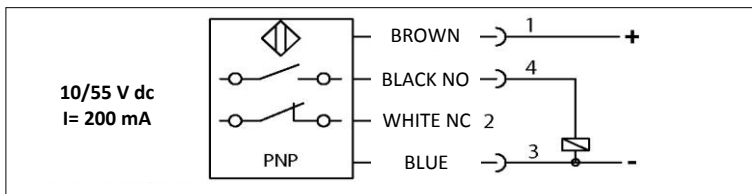
It is possible to adjust working pressure by rotating the bypass screw clockwise to increase pressure or anticlockwise to reduce pressure. During this operation pay attention to the pressure gauge positioned on the edge of the pump.

7.4.2 Procedure for calibrating the capacitive probe

Before being assembled the capacitive probe must be calibrated in accordance with the following sequence:

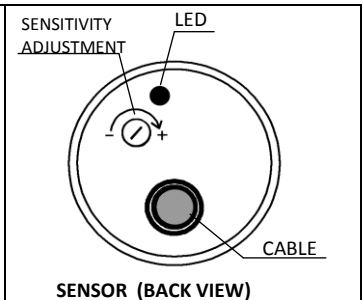
1. connect the sensor electrically;
2. immerse the sensor in the lubricant, down to half of its length;
3. remove the sensor from the lubricant until it skims the surface of the lubricant;
4. at this point there can be two possible types of operation:
 - the sensor status does not change: its sensitivity must be reduced (by acting on the screws for adjusting sensor sensitivity) until its state of excitation is reached
 - if its status changes, the sensor already possesses the correct sensitivity
5. after checking that the sensor has been correctly read, the sensor reading must be repeated at least three times
6. Tighten the capacitive probe on the probe carrier rod, complying with the following assembly height:
 - 450 mm (from below the cover up to the lower surface of the sensor) for a 30 kg tank
 - 900 mm (from below the cover up to the lower surface of the sensor) for a 100 kg tank

Operating instructions for the capacitive probe (model Sc18m-c5 pnp no + nc)

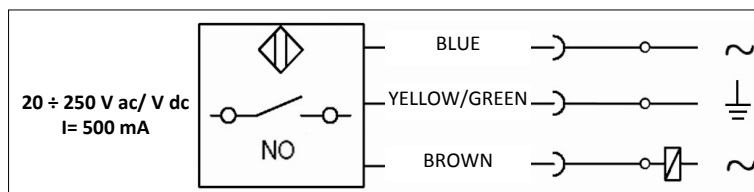


Sensors operating under C for continuous current (4 wires)

They are sensors which are amplified in continuous current and which incorporate, in addition to the oscillator, the outlet amplifier. They are supplied with 4 wires with an antivalent function in the NPN or PNP versions. In this operation the sensors offer as standard characteristics protection against permanent short circuit of the load, absolute safety against inversion of polarity and protection from the peaks produced by disconnecting inductive loads. They can be supplied together with model ALNC – ALTP feeders. They are compatible with programmable controller inputs.

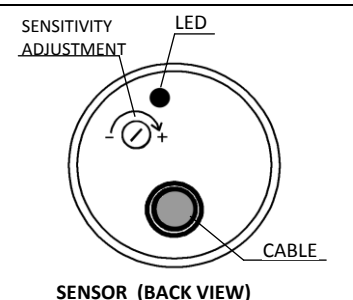


Operating instructions for the capacitive probe (model Sc30sp-a20 no)



Sensors in version with direct current and alternate current (2 wires)

These are direct current amplified sensors DC/AC. In this version, the standard characteristics of the sensors include protection against permanent load short circuit, and protection against the peaks produced when the inductive loads are disconnected.



7.4.3 Procedure for calibrating the laser probe

The laser probe possesses a representative and programming display mounted on board. It is possible to operate in analogue mode (with signal from 4 to 20 mA) or in digital mode (two outputs and four intervention thresholds).

We attach a table showing the calibration parameters for the laser probe, for 30 and 100 kg tank.

Image 6

LASER PROBE CALIBRATION							
				30 kg tank		100 kg tank	
Pos.	Level	Output signal	set-up	height X [mm]	Quantity of grease [kg]	height X [mm]	Quantity of grease [kg]
A	Maximum absolute level	OUT 2 = Fno	nsP2	200	22	200	81
C	Minimum level		fsP2	390	11	720	25
B	Maximum level	OUT 1 = Fno	nsP1	230	20	230	78
D	Minimum absolute level		fsP1	440	8	820	14

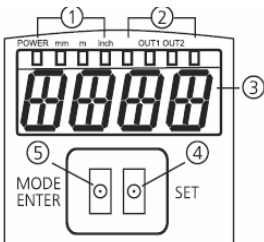


N.B.: In the 30 kg pump tank at minimum absolute level there is still a reserve of 7 kg.

In the 100 kg pump tank at absolute minimum level there is still a reserve of 15 kg.

Operating instructions for the IFM laser probe model O1D100 (code 3289172)

Image 7

Applications The optical distance sensor <ul style="list-style-type: none"> measures distances between 0.2 and 10 m. It has a background suppression at > 10..19 m. The measured value is shown in a 10-segment display. According to the set output functions 2 output signals can be generated. O1D100: Certification 21 CFR PART 1040 	
Operating and display elements 	
1: 4 x LED green	Lighting LED = power and set display unit (mm, m, inch)
2: 4 x LED yellow (two not connected)	Indication of the switching status; lights, if the corresponding output is switched.
3: 4-digit alphanumeric display	Indication of the measured distance, the parameters and parameter values.
4: Programming button [SET]	Setting of the parameter values (scrolling by holding pressed; incrementally by pressing once).
5: Programming button [MODE/ENTER]	Selection of the parameters and acknowledgement of the parameter values.

Functions

4.1 Output function hysteresis
The hysteresis keeps the switching state of the output stable if the measured value varies about the sensing range. Both outputs (OUT1 and OUT2) can be set as hysteresis function. → 10.2.4 Hysteresis function

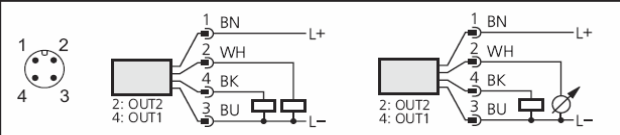
4.2 Output function window
The window function enables the monitoring of a defined acceptable range. Both outputs (OUT1 and OUT2) can be set as window function. → 10.2.6 Window function

4.3 Analogue output function
The sensor can also output an analogue signal on output 2 (OUT2) which is proportional to the distance. → 10.2.11 Scaling of the measuring range (analogue output).

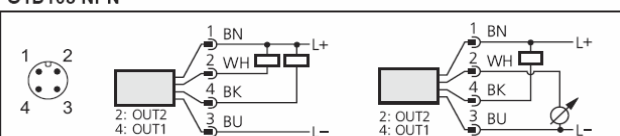
Electrical connection

► Connect the cable as follows:

O1D100 PNP



O1D103 NPN



Core colours of ifm sockets:
1 = BN (brown), 2 = WH (white), 3 = BU (blue), 4 = BK (black)

Instructions for calibrating the Laser Probe O1D100

Rotate the wording on the Display by 180°.

1. Press the **MODE ENTER** key 7 times: **EF.** appears on the Display.
2. Press the **SET** key.
3. Press the **MODE ENTER** key 5 times: **diS.** appears on the Display.
4. Press the **SET** key. **d3.** appears on the Display.
5. Keep the **SET** button pressed down for 5 sec.
6. When the wording on the Display no longer flashes, press **SET** once.
7. **rd1.** appears on the Display.
8. Press **MODE ENTER** once.
9. Check that the Display wording has rotated by 180°.

Calibrate outlet 1 (OUT 1) operating with window nsP1 (B) & fsP1 (D) (see Calibration table for Laser probe)

1. Press the **MODE ENTER** key once: **OU1** appears on the Display.
2. Keep the **SET** button pressed down for 5 sec.
3. When the wording on the Display no longer flashes, press **SET** twice until **Fno** appears on the Display.
4. Press the **MODE ENTER** key once: **nsP1** appears on the Display.
5. Keep the **SET** button pressed down for 5 sec.
6. When the wording on the Display no longer flashes, press **SET** once.
7. The value of the height read appears on the Display.
8. Press the **SET** button until the desired height appears.
9. Press the **MODE ENTER** button once and the height set is memorised.
10. Press the **MODE ENTER** key once: **fsP1** appears on the Display.
11. Repeat the previous points from N° 5 to N° 9.

Calibrate outlet 2 (OUT 2) operating with window nsP2 (A) & fsP2 (C) (see Calibration table for Laser probe)

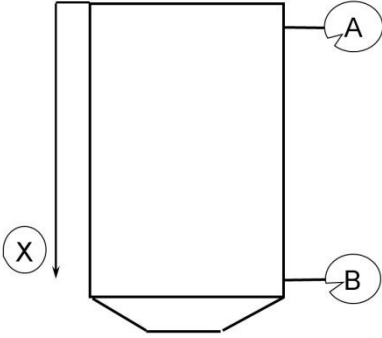
1. Press the **MODE ENTER** key once: **OU2** appears on the Display.
2. Keep the **SET** button pressed down for 5 sec.
3. When the wording on the Display no longer flashes, press **SET** 4 times until **Fno** appears on the Display.
4. Press the **MODE ENTER** key once: **nsP2** appears on the Display.
5. Keep the **SET** button pressed down for 5 sec.
6. When the wording on the Display no longer flashes, press **SET** once.
7. The value of the height read appears on the Display.
8. Press the **SET** button until the desired height appears.
9. Press the **MODE ENTER** button once and the height set is memorised.
10. Press the **MODE ENTER** key once: **fsP2** appears on the Display.
11. Repeat the previous points from N° 5 to N° 9.

7.4.4 Procedure for calibrating the ultrasound probe model ZWS-70/CI/QS (code 3289173)

Before being assembled the probe must be calibrated in accordance with the following sequence:

1. electrically connect the sensor (following the electric diagram shown below);
2. keep the sensor button pressed down until the two LED (green and yellow lights) flash together;
3. position it in front of the minimum absolute level to be read, entering the height by releasing the button (the two LEDs display a fixed light);
4. press the button for 3 or 4 seconds (the probe has acquired the Minimum absolute level);
5. keep the sensor button pressed down until the two LED (green and yellow lights) flash together;
6. position it in front of the maximum absolute level to be read, entering the height by releasing the button (the two LEDs have a fixed light);
7. press the button for 3 or 4 seconds (the probe has acquired the Maximum absolute level);
8. In this way the sensor is calibrated.

N.B.: green Led on indicates that the probe is supplied. Yellow Led on indicates operating mode for reading.
We attach a table with the calibration parameters for the ultrasound probe, for 30 and 100 kg tanks.

Image 8 		Calibration of ultrasound probe				
Pos.			30 kg tank		100 kg tank	
	Level	Output signal	height X [mm]	Quantity of grease [kg]	height X [mm]	Quantity of grease [kg]
A	Maximum absolute level	Threshold 1	50	26	50	95
B	Minimum absolute level	threshold 2	450	0	800	0



N.B.: In the 30 kg pump tank at the minimum absolute level there is still a reserve of 7 kg.
In the 100 kg pump tank at the minimum absolute level there is still a reserve of 15 kg.

Photo 9

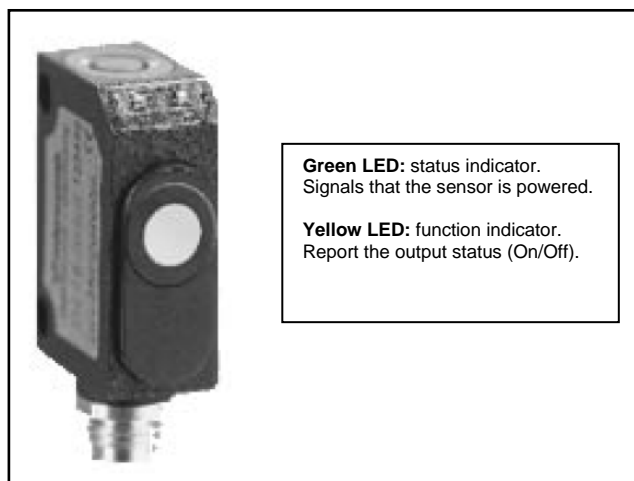
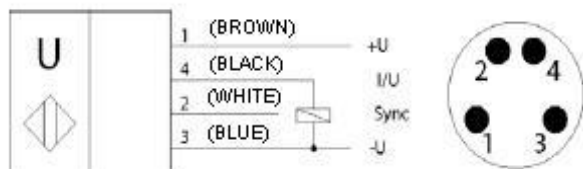
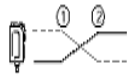
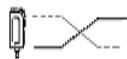
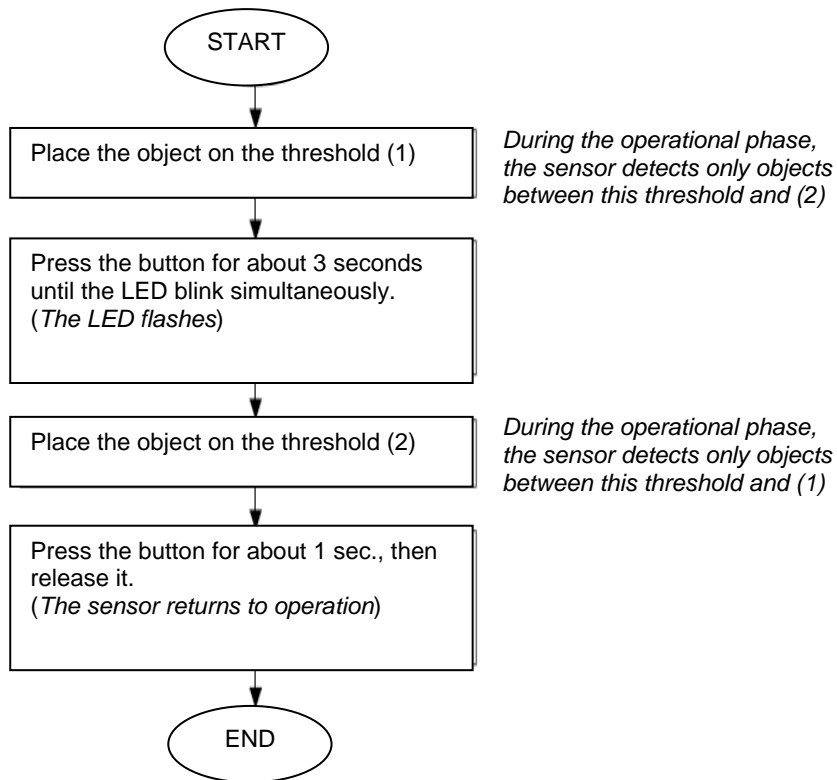


Image 9

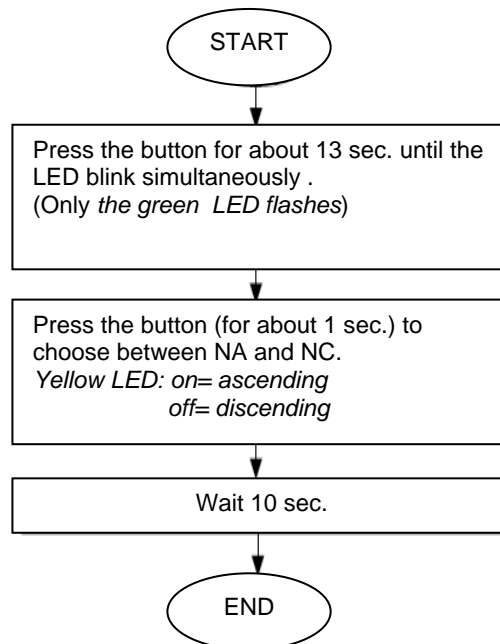




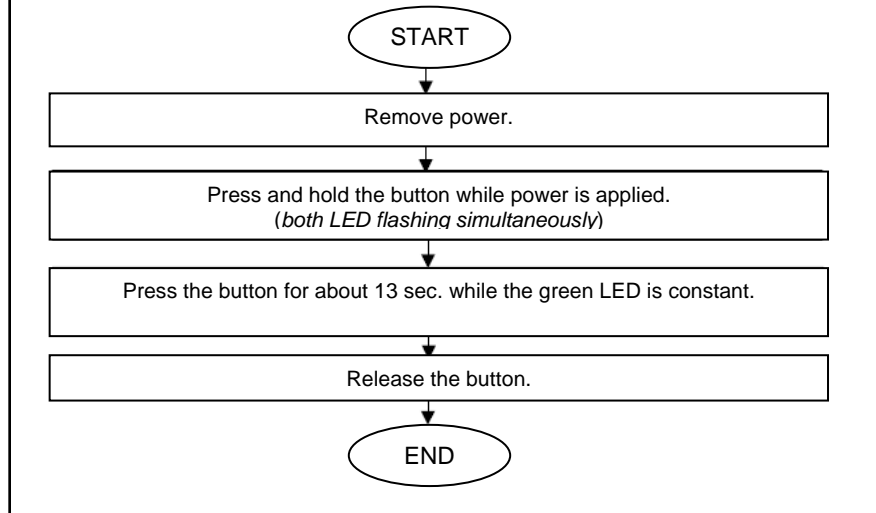
Window setting:



Output feature selection in ascending or descending:



Re-setting to factory settings:



8. PROBLEMS AND SOLUTIONS

Below is a diagnostic table showing the main faults, the probable causes and the possible solutions.

In the event of doubts and/or problems which cannot be solved, do not proceed to look for the fault by dismantling parts of the machine, but contact the Dropsa Technical Office.

Fault	Cause	Solution
The electric pump is not delivering any lubricant.	<p>The electric motor is not functioning.</p> <p>The tank is empty.</p> <p>The pump is not triggered. Causes of the pump's failure to trigger:</p> <ul style="list-style-type: none"> • The motor is turning in an inverted direction (clockwise); • The motor is turning in the right direction but the stirring paddle is not turning; • Presence of air bubbles in the lubricant. <p>The pressure adjustment valve (bypass) has been calibrated at too low a value</p> <p>Presence of dirt in the non-return valve.</p>	<p>Check the connection between motor and electric supply line.</p> <p>Check the motor winding.</p> <p>Check that the connection plates for the motor terminal box are positioned in accordance with the supply voltage.</p> <p>Fill the tank. N.B.: If the tank was emptied without the electric signal for reaching the minimum level being given, the minimum level contact must be checked.</p> <p>Remove the cover from the tank and check that the stirring paddle is turning anticlockwise and that the lubricant is moving; if not invert two of the three motor phases. See above.</p> <p>Remove the pump delivery pipe and drain off the lubricant until the air bubbles have been eliminated.</p>
The pump will not go under pressure.	<p>Possible dirt on the cone of the pump stop valve</p> <p>Internal gasket between pumping element and manifold unit broken.</p>	<p>Clean the cone and the pumping element stop valve housing, draining off the lubricant.</p> <p>Replace the gasket (code 3190489).</p>
No signal indicating minimum level when there is no lubricant in the tank.	Incorrect adjustment of minimum level.	<p>Check the correct functioning of the level probe in the following way:</p> <p>Dismantle the minimum level unit and recalibrate the capacitive probe.</p>
Selection of minimum level, with lubricant below the minimum and pump working.	Incorrect adjustment of minimum level.	The light on the control panel is still on: check the electric connection and, if necessary, replace the capacitive probe.

Lubrication installation accessories		
METERING UNIT AG6 Alarm signal indicating non-delivery of lubricant. The small rods visible inside the metering unit turrets must move sequentially up and down and activate the control microswitch when the pump is working. If this is not the case the two outlets or the single outlet of that metering unit will not deliver lubricant.	<p>Metering unit small piston jammed.</p> <p>Piping between metering unit outlet and point requiring lubrication obstructed.</p> <p>Pressure on the line too low (the lubricant is not delivered by any outlet or only by a few outlets).</p> <p>Metering unit arranged for two outlets by used for only one outlet.</p>	<p>Replace the metering unit with another one having the same characteristics. However it is advisable to make sure that the metering units have been correctly assembled, particularly with regard to fixing. Over-locking of the fixing screws may damage the metering unit and cause the small piston to jam.</p> <p>Remove the outlet pipe and check to see if the metering unit is delivering lubricant.</p> <p>Change the pressure control valve adjustment (bypass) or the adjustment of the control pressure gauge (and of line).</p> <p>Check that, when one single outlet is used, the right pad is assembled and that the other outlet is sealed.</p> <p>See instruction sheet for AG6 metering units.</p>
END OF LINE PRESSURE GAUGE <p>The pressure gauge is not sending the signal to the electric command and control panel.</p> <p>The pressure gauge sends the signal before the end of the lubrication cycle.</p>	<p>Electrical connection incorrect.</p> <p>Incorrect adjustment of the control pressure gauge. The pressure value set is too high and the pressure adjustment valve (bypass) intervenes before the pressure gauge can be activated.</p> <p>Incorrect adjustment of the control pressure gauge. The pressure value set is too low.</p>	<p>Check the electrical connection.</p> <p>Reduce the pressure gauge calibration pressure until an electrical contact is obtained.</p> <p>Increase the pressure gauge calibration valve. The optimum calibration value is the one which allows a pressure of 50-70 bar (735 – 1029 psi) at the end of the lubrication line.</p>

9. MAINTENANCE PROCEDURES

Use the individual protective devices needed to avoid contact with mineral oil or grease.

Regular inspection

The following regular checks must be carried out:

Check	
the lubrication status	1000 hours
Cleanliness of the loading and suction filter	4000 hours

The machine does not require any special equipment for any checking and/or maintenance activity, however the recommendation is to use suitable equipment which is in a good condition in order to avoid causing damage to persons or machine parts (according to current regulation).

If necessary clean the tank paying due attention (when the machine is off and without it being possible to restart it). Remember to reseal the tank once the operation has been completed.

Make sure that the electric and hydraulic supply has been disconnected before carrying out any maintenance intervention.

10. DISPOSAL

In the course of machine maintenance, or if the machine is scrapped, do not dispose of polluting parts into the environment. Refer to local regulations with regard to their correct disposal. When scrapping the machine the identification plate and any other documents must be destroyed.

11. INFORMATION ABOUT ORDERING

11.1 STANDARD VERSIONS

				Data Base	1°	2°	3°	4°	5°	6°	7°
				PART NUMBER SUMO PUMP							
STANDARD VERSIONS		SUMO Pump - 30 kg GREASE		2477000	A	0	0	0	0	0	0
		SUMO Pump - 100 kg GREASE		2477001	A	0	0	0	0	0	0
		SUMO Pump - 30 kg OIL		2477050	A	0	0	0	0	0	0
		SUMO Pump - 100 kg OIL		2477051	A	0	0	0	0	0	0
		Description	DROPSA P.N.	CODE	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z
Three phase Electric motor	Voltage	STANDARD - IEC 230/ 400/ 415 V 50 Hz 460 V 60 Hz	3301081	A							
		440 V 60	3301081	B							
		440 V 60 Hz with anti-condensation heater 110V	3301081	N							
		480 V 60 Hz	3301081	C							
		575 V 60 Hz	3301081	D							
		500 V 50 Hz	3301081	E							
		525 V 50 Hz	3301081	F							
		550 V 50 Hz	3301081	G							
		690 V 50 Hz	3301081	W							
	Voltage	UL and CSA standard with IEC 230/ 400/ 415 V 50 Hz 460 V 60 Hz motor	3301528	H							
440 V 60 Hz		3301528	J								
480 V 60 Hz		3301528	K								
575 V 60 Hz		3301528	L								
500 V 50 Hz		3301528	M								
525 V 50 Hz		3301528	N								
550 V 50 Hz		3301528	P								
UL and NEMA standard - 230/ 460 V 60 Hz		3301529	Q								
440 V 60 Hz		3301529	R								
Voltage	440 V 60 Hz	3301529	S								
	480 V 60 Hz	3301529	T								
	575 V 60 Hz	3301529	U								
	UL 480V 60Hz standard with anti-condensation heater 120V	3301556	Z								
Pneumatic motor			3301539	V	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	
Mono phase Electric motor	Voltage	220 V 60 Hz	3301549	X							
		220 V 50 Hz		XX							
Minimum level		STANDARD grease version with Capacitive Sensor (24V cc)	0295120 (30 kg) 0295110 (100 kg)	0	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	
		STANDARD oil version with floating Reed	0295150 (30 kg) 0295160 (100 kg)								
		Laser level Kit - 30 kg	0295130	1							
		Laser level Kit - 100 kg		2							
		ultrasound Kit level - 30 kg	0295140	3							
		ultrasound level Kit - 100 kg		4							
		Laser level Kit - 100 kg – Exd custody	0295135	5							
		Capacive level kit 30 Kg (250 V ca/cc)	0295121	6							
		Capacive level kit 100 Kg (250 V ca/cc)	0295122	7							
available		from 8 to 9									
Maximum level		STANDARD GREASE VERSION NOT PRESENT	0295100 (30 kg and 100 kg)	0	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	
		STANDARD oil version with floating Reed	0295150 (30 kg) 0295160 (100 kg)								
	Variant	Capacitive sensor	0295170 (30 kg ad 100 kg)	A							
	available		from B to Z								
Pumpings		TWO FIXED DELIVERY STANDARD PUMPING ELEMENTS	0295040 + 0295040	0	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	
	Variants	1 Pumping element with variable delivery	0295060	1							
		2 Pumping elements with variable delivery	0295060 + 0295060	2							
		1 Pumping element with fixed delivery	0295040+0295049+319	3							
		available		from 4 to 9							
Electromagnetic reverser with subbase	Variants	24 V DC (IED24) + base	0083420 + 0295046	0	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	
		NOT PRESENT		A							
		110 V AC + base	0083421 + 0295046	B							
		230 V AC + base	0083422 + 0295046	C							
Electromagnetic reverser		24 V DC + Kit	0083400 + 0295047	D	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	
		110 V AC + Kit	0083401 + 0295047	E							
		230 V AC + Kit	0083402 + 0295047	F							
Electropneumatic reverser	Variants	24 V DC + Kit	0083450 + 0295047	G	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	
		24 V AC + Kit	0083451 + 0295047	H							
		110 V AC + Kit	0083452 + 0295047	J							
		230 V AC + Kit	0083453 + 0295047	K							
				From L to Z							
Heater band	Variants	STANDARD NOT PRESENT		0	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	From A to Z	
		100 kg	0295065	1							
		30 kg	0295066	2							
		available		from 3 to 9							

				Part Number SUMO PUMP - 30 kg GREASE						
Example of coding SUMO PUMP - 30 kg GREASE			P.N.	2477000	B	1	0	1	D	0
Electric motor		IEC 440 V 60 Hz standard	3301081	B						
Minimum level		Kit laser level - 30 kg	295180	1						
Maximum level		Not present	295100	0						
Variable pumping		1 Pumping element with variable delivery	295060	1						
Electromagnetic inverter		24 V DC + Kit	0083400 + 029547	D						
Heater band		Not present		0						

				Part Number SUMO PUMP - 100 kg OIL						
Example of coding SUMO PUMP - 100 kg OIL			P.N.	2477051	A	0	A	1	J	1
Electric motor		IEC 230/ 400/ 415 V 50 Hz 460 V 60 Hz	3301081	A						
Minimum level		STANDARD OIL VERSION with floating Reed	295160	0						
Maximum level		Capacitive sensor	295170	A						
Variable pumping		1 Pumping element with variable delivery	295060	1						
Electromagnetic inverter		110 V AC + Kit	0083452 + 0295047	J						
Heater band		100 kg	295065	1						

*The following alphabet letters have been deleted:

- O: to be not confused with 0 number
- I : to be not confused with 1 number.

11.2 SPECIAL VERSIONS

Equipment	Description	Code
	400 cm ³ /min grease pump 80Kg (176 lb) transparent tank with inverter code 0083420 at 24 V DC	2477100
	SUMO ATEX Pump 316	2477201
Pump trolley mounted	400 cm ³ /min grease pump 30 Kg (66 lb) trolley mounted 30 Kg metal reservoir cod. 1140204	1525212

11.3 OPTIONAL

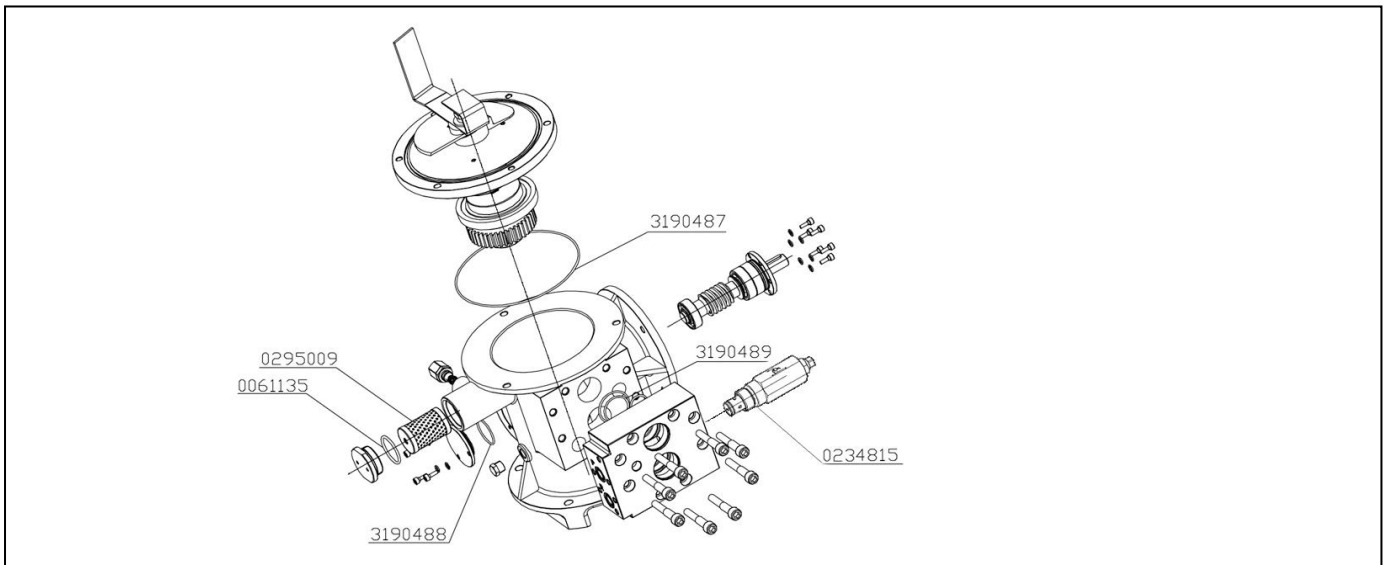
Equipment	Description	Code
Transparent reservoir	Reservoir, including the tank (PN# 0295056) and all accessories required for use(flanges, screws, nuts, seals)	0295210
Pumping element modules	Reserve pumping module 200cm ³ /min (24 cu. in) Variable pumping module 100-200cm ³ /min (12-24 cu. in) Closure cap for fixed delivery pumping element Closure cap for variable delivery pumping element	0295040C 0295060 0295024 0295035
Oil conversion	Min/max oil level float kit 30 Kg (66lb) Min/max oil level float kit 100 Kg (220lb) Filling cap with filter	0295150 0295160 3130138
Terminal Box bracket	Bracket for installing a terminal wiring box onto the base pallet	3044455
Electrical control box Bracket	Bracket for installing a control box onto the base pallet	3044456
Metal pallet	Metal Pallet used as the base of the packaging and also for installation of the pump.	0043446

11.4 SPARES

Spares description	Variant	Part number
Minimum level kit (24V cc) 30 kg (grease)		0295120
Minimum level kit (24V cc) 100 kg (grease)		0295110
Minimum level kit (250V cc) 30 kg (grease)		0295121
Minimum level kit (250V cc) 100 kg (grease)		0295122
Maximum level kit 30-100 kg (grease)		0295170
Laser Probe – 30 Kg	2	0295130
Laser Probe – 100 Kg	3	
Minimum and maximum ultrasound level kit 30kg	5	0295140
Minimum and maximum ultrasound level kit 100kg	6	
Maximum mechanical level kit 30-100 kg (grease)		0295100
Maximum and minimum float level kit 30 kg (oil)		0295150
Maximum and minimum float level kit 100 kg (oil)		0295160
Grease loading filter		0295009
By-pass		0234815
Tank flange gasket		3190487
Manifold gasket (pump body)		0018863
Manifold gasket (pumping)		3190489
295009 Filter gasket		3190487
Filter cover gasket		0061135
Wormskrew assembly cover gasket		3190488
Body-pump reservoir gasket		3190485
Helicoidal gear assembly		0295020
Wormskrew assembly		0295010

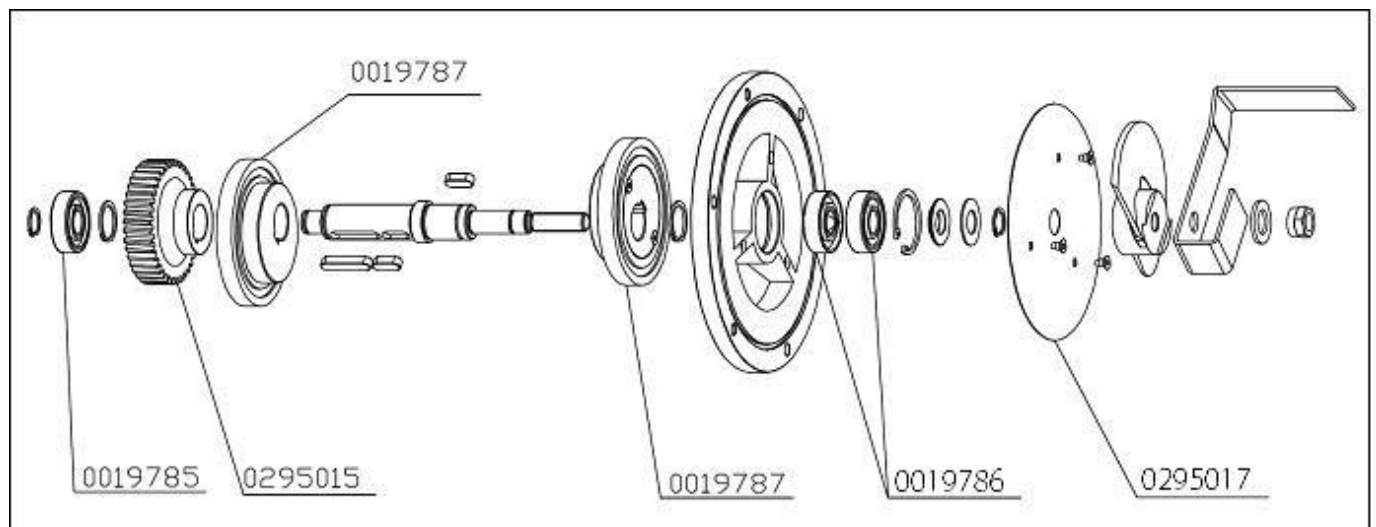
Pump body secondary unit code 0295000

Image 10



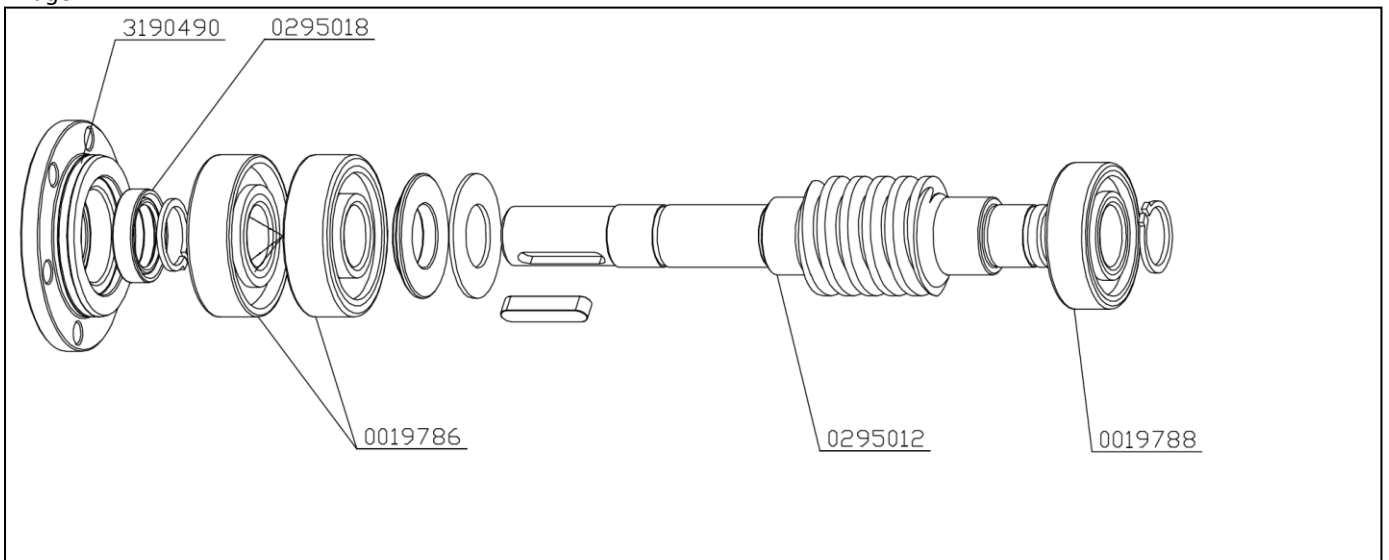
Worm wheel group unit code 0295020

Image 11



Endless screw unit code 0295010

Image 12



12. DIMENSIONS

To facilitate future maintenance, increase the spaces indicated by at least 200 mm (7.87 in.).

Image 13

Dimensions mm (inches)	
A	900 (35.43), 30 kg tank
	1350 (53.14), 100 kg tank
B	615 (24.21), 30-100 kg tank
C	450 (17.71), 30-100 kg tank
D	148.5 (5.84), 30-100 kg tank

Electric system – Technical data

Electrical supply:	230-400 Volt \pm 5% 50 Hz 240-440 Volt \pm 5% 60 Hz
Power absorbed:	0.75 kW

13. HANDLING AND TRANSPORT

A metal pallet is used for transport and storage with packing at the side and a wooden cover.

The pump is fixed on a metal pallet, which allows safe handling using a transpallet or forklift truck. The metal pallet has been designed so that it can be installed in the installation, being equipped with 4 (four) holes of \varnothing 14 mm suitable for fixing to the floor.

The machine components can withstand temperatures, during storage, from -20 to + 50 °C (-4°F - 122°F); it is therefore necessary, in order to avoid damages, for the machine to be started up when the machine has reached a minimum temperature of +5 °C (+41°F).

14. PRECAUTIONS FOR USE

It is necessary to carefully read the warnings and risks associated with using a lubricant pump. The operator must understand how it works and must clearly understand the dangers by studying the user manual.

15. CONTRAINDICATIONS FOR USE

The check on compliance with the essential safety requirements and with the stipulations indicated in the machine directives are to be carried out by means of compiling the checklists already made available and contained in the *technical file*.

Three types of lists were used:

- list of dangers (section from EN 414 relating to EN 292)
- Application of the essential safety requirements (Machine Dir. – 06/42)
- electrical safety stipulations (EN 60204-1)

See below a list of dangers which have not been completely eliminated, but are considered acceptable:

- During assembly/maintenance it is possible that there may be an oil splash (consequently this operation must be carried out using appropriate individual protective devices);
- contact with oil -> see instructions for using appropriate individual protective devices DPI;
- Use of an inappropriate lubricant -> fluid characteristics indicated both on the pump and in the manual (**if in doubt consult our Technical Office**);
- protection against direct and indirect contact must be provided by the user;
- whenever the cover is opened for an intervention resealing the catch is essential;
- The pump's working logic requires it to operate at all times, so it is necessary to pay attention to the electric connection. If there is no current the customer's machine can only be restarted following a reset while the lubrication pump can restart automatically.

Unacceptable fluids	
Fluids	Dangers
Lubricant with abrasive additives	High consumption of contaminated parts
Lubricant with silicon additives	Jamming of the pump
Benzine – solvents – inflammable liquids	Fire – explosion – damage to gaskets
Corrosive products	Corrosion of the pump – injuries to persons
Water	Pump oxidation
Food substances	Contamination of these substances

16. WARRANTY

All Dropsa products are guaranteed for a maximum of 12 months from the delivery date, for constructional and material faults. The guarantee is extended as indicated below:

Complete installation of the system by Dropsa: 24 months.

Other components: 12 months from the date of installation; if installation takes place 6 months or more following the delivery date, the guarantee will cover a maximum of 18 months from the delivery date.

In the event of equipment malfunction we must be notified of precise details of the fault encountered, supplying the Dropsa code, the test number if present (expressed as: xxxxxx-xxxxxx), delivery and installation date and, finally, conditions of using the product/s in question.

Once this information has been received we will decide at our own discretion whether to provide technical assistance or to provide a return authorisation number (RAN) with precise instructions about returning the equipment.

After receiving the equipment and on the basis of careful analysis Dropsa reserves the right to decide whether to repair or replace the product. If the guarantee is still valid we will proceed to repair or replace the part at our own expense.

If the returned product is not faulty, Dropsa will decide at its own discretion whether or not to charge the customer for the costs incurred (logistics etc.).

This guarantee must be understood to be cancelled if the product shows signs of damage and resulting from incorrect use, negligence, normal wear and tear, chemical corrosion, installation not in compliance with the instructions expressly indicated and use contrary to the manufacturer's recommendations. Any changes, tampering or alterations to the equipment or its parts made without written authorisation from Dropsa S.p.A., relieves the latter from all liability and releases it from the obligations of the guarantee.

Parts subject to normal wear and tear and perishable parts are not covered by the guarantee.

Anything not expressly indicated must be considered to be excluded from the guarantee as well as damages or costs resulting from faults in the actual product.

The conditions of validity of the Dropsa guarantee are understood to be implicitly accepted as soon as the equipment is purchased. Any changes to or departures from this guarantee must only be considered valid after prior authorisation from Dropsa S.p.A.

DROPSA S.p.A. declines any liability for personal injuries or damages to property in the event of failure to comply with the instructions provided in this manual.

Any changes to the component parts of the system or a change in the intended use of the latter or its parts without written authorisation from DROPSA S.p.A. relieve the latter from any liability for personal injuries and/or damage to property and relieve it of any guarantee obligation.

17. DECLARATION OF CONFORMITY



Dropsa Spa
Via Benedetto Croce, 1
20090 Vimodrone (MI)
Italy

Tel.: (+39) 02. 250.79.1
Fax Sales: (+39) 02. 250.79.767
E-mail: sales@dropsa.it
Web site: <http://www.dropsa.com>



DICHIARAZIONE DI CONFORMITÀ/DECLARATION OF COMPLIANCE WITH STANDARDS/ DECLARATION DE CONFORMITE/ KONFORMITÄTSERKLÄRUNG DES STANDARDS /DECLARACIÓN DE CONFORMIDAD/ DECLARAÇÃO DE CONFORMIDADE

La società Dropsa S.p.A., con sede legale in Milano, Via Besana,5/ Dropsa S.p.A., registered office in Milan, Via Besana,5 / Dropsa S.p.A. au Siège Social à Milan, Via Besana,5/ Dropsa S.p.A., Sitz in Milano, Via Besana 5/ La sociedad Dropsa S.p.a., con sede legal en Milán, Via Besana,5/ A Dropsa S.p.A, com sede em Milão, via Besana, nº 5

DICHIARA /CERTIFIES / CERTIFIE/ ZERTIFIZIERT, DASS/ DECLARA/ CERTIFICA:

che la macchina denominata/that the machine named / que la machine dénommée/ Die Maschine mit der Bezeichnung/ que la máquina denominada/ que o equipamento denominado

SUMO

è conforme alle condizioni previste dalle Direttive CEE /has been constructed in conformity with the Directives Of The Council Of The European Community on the standardization of the legislations of member states/ a été construite en conformité avec les Directives Du Conseil Des Communautés Europeennes/ Entsprechend den Richtlinien des Rates Der Europäischen Union, für die Standarisierung der Legislative der Mitgliederstaaten, konstruiert wurde/ cumple con las condiciones establecidas por las directivas comunitarias/ foi construído em conformidade com as diretivas do Conselho das Comunidades Europeias:

- 2006/42 Direttiva macchine /Machinery Directive / 2006/42 Directive machines / Maschinenrichtlinien/ Maquinaria 2006/42/CEE /Directiva 2006/42 Máquinas;
- 2006/95 bassa tensione/ Electrical Safety: Low Voltage Directive/2006/95 Sécurité électrique: Directive Basse Tension/Elektrische Sicherheit: Niederspannungsrichtlinien/Seguridad eléctrica 2006/95: Directiva de baja tensión/Segurança Elétrica 2006/95: Directiva de Baixa Tensão

Vimodrone (MI), April 2011



Technical Director:
Maurizio Greco

Legal representative
Milena Gavazzi

Copy of the original document

18. DISTRIBUTORS



Dropsa S.p.A.

Via B. Croce,1
20090 Vimodrone (MI) Italy.
Tel: (+39) 02 - 250.79.1
Fax: (+39) 02 - 250.79.767
E-mail: sales@dropsa.it (Export)
E-mail: vendite@dropsa.it (National)



Dropsa (UK) Ltd

Unit 6, Egham Business Village,
Egham, Surrey, TW20 8RB
Tel: (+44) 01784 - 431177
Fax: (+44) 01784 - 438598
E-mail: salesuk@dropsa.com



Dropsa USA Inc.

6645 Burroughs Ave
48314-2132 Srerling Hts, Mi Us -USA
Tel: (+1) 586-566-1540
Fax: (+1) 586-566-1541
E-mail: salesusa@dropsa.com



Dropsa Gmbh

Volmerswerther Strasse 80
40221 Dusseldorf 1, Deutschland
Tel: (+49) 0211/39 4011
Fax: (+49) 0211/39 4013
E-mail: sales@dropsa.de



Dropsa Ame

23, Av.des.Morillons
Z.I. des Doucettes 91140
Garges Les Gonesse, France
Tel: (+33) 01 39 93 00 33
Fax: (+33) 01 39 86 26 36
E-mail: salesfr@dropsa.com



Dropsa do Brazil Ind. E Com. Ltda

Rua Sobralia 175,
Sao Paulo, Brazil
Tel: (+55) 011-5631-0007
Fax: (+55) 011-5631-9408
E-mail: salesbr@dropsa.com



Dropsa Lubrication Systems

Nr 8 Dongxing Road,
Songjiang Industrial Zone
(Shanghai) Co., Ltd
Tel: +86 (021) 67740275
Fax: +86 (021) 67740205
E-mail: china@dropsa.com



Dropsa Australia Pty.

C20/148 Old Pittwater Road
Brookvale, NSW 2100
Tel: +61 (02) 9938 6644
Fax: +61 (02) 99 386 611
E-mail: salesau@dropsa.com



Web site: <http://www.dropsa.com> - **E-mail:** sales@dropsa.com