HYDRAULICALLY CONTROLLED PUMP

Series 3414...

Operation and Maintenance Manual

Translation of original instructions

CONTENTS

CE

Manual drafted in compliance with Machine Directive CE 2006/42

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DropsA S.p.A.
Via Benedetto Croce, 1
Vimodrone, MILAN (IT)
tel. +39 02 250 791

1. INTRODUCTION

This operation and maintenance manual refers to the ***Hydraulically controlled pump - Series 3414...*** and contains important information for the health and safety protection of the personnel who use this equipment.
The most recent version can be obtained by requesting it from the Sales Technical Office or online at http://www.dropsa.com.

This manual must be read carefully and kept so that it is always available to the operators who want to consult it.

2. GENERAL DESCRIPTION

The ***Hydraulically controlled pump - Series 3414…***, of sturdy construction and highly reliable, is made up of a galvanized steel body, piston in hardened and lapped steel and a hydraulic control cylinder in which a piston slides with anti-oil rubber gasket.
The control requires a 4-way solenoid valve (line - cylinder - discharge) for dual action pumps. The solenoid valve can also be used 3 ways (plugging one of the outlets) for single acting pumps. The solenoid valve is supplied on request by Dropsa Spa.
It can also come with an electrical contact for the minimum level check.
The pump can be supplied without reservoir for applications on special reservoirs or reservoirs owned by the customer. Fitted with plate with holes for lubricant entry with G½ UNI-ISO 228/1 threading.

3. PRODUCT IDENTIFICATION

A yellow is located on the front part of the pump that indicates the product code and the basic characteristics.

4. TECHNICAL CHARACTERISTICS

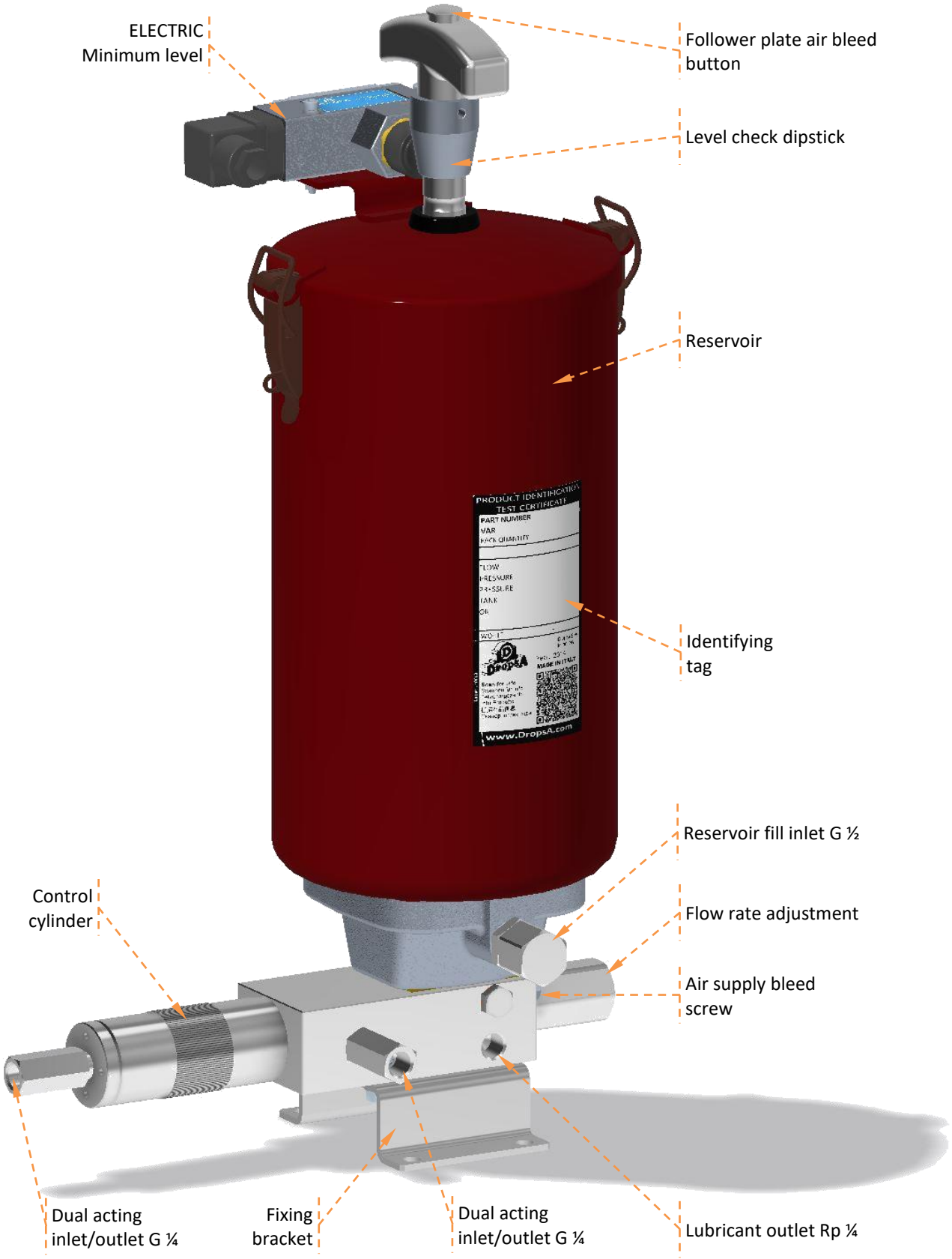
GENERAL TECHNICAL CHARACTERISTICS		
CHARACTERISTIC	**U.M.**	***VALUE***
Operating temperature	°C - [°F]	*-5 ÷ +80 - [+23 ÷ +176]*
Storage temperature	°C - [°F]	*-20 ÷ +50 - [-4 ÷ +122]*
Operating relative humidity	%	*90*
Flow rate	cm^3/stroke [cu.in./stroke]	*0.5 ÷ 2* *[0.17 ÷ 0.31]*
Filling filter	Type	*Metallic*
Sound pressure level	dB(A)	*<70*
Lubricant outlet	Thread	*Rp ¼ UNI-ISO – 7/1*
Control oil inlet	Thread	*G ¼ UNI ISO – 228/1*
Control oil viscosity	cSt - [SUS]	*15 ÷ 100 - [77.31 ÷ 462.6]*
Version WITH RESERVOIR for GREASE		
Reservoir capacity	kg - [lb]	*2 ÷ 5 - [4.4 ÷ 11.2]*
Lubricant grade	NLGI	*1 ÷ 2*
Reservoir filling	Thread	*G ½ UNI ISO – 228/1*
Version WITHOUT RESERVOIR for OIL		
Lubricant oil viscosity	cSt - [SUS]	*15 ÷ 2000 - [77.31 ÷ 9256]*
Lubricant inlet	Thread	*G ½ UNI ISO – 228/1*
SINGLE ACTING versions		
Compression ratio	R	*4.8:1*
Control oil pressure	bar - [psi]	*30 ÷ 60 - [441 ÷ 882]*
DUAL ACTING versions		
Compression ratio	R	*1:1*
Control oil pressure	bar - [psi]	*30 ÷ 150 - [441 ÷ 2205]*

ATTENTION: Do not power the machine with pressure different than what is indicated on the label.

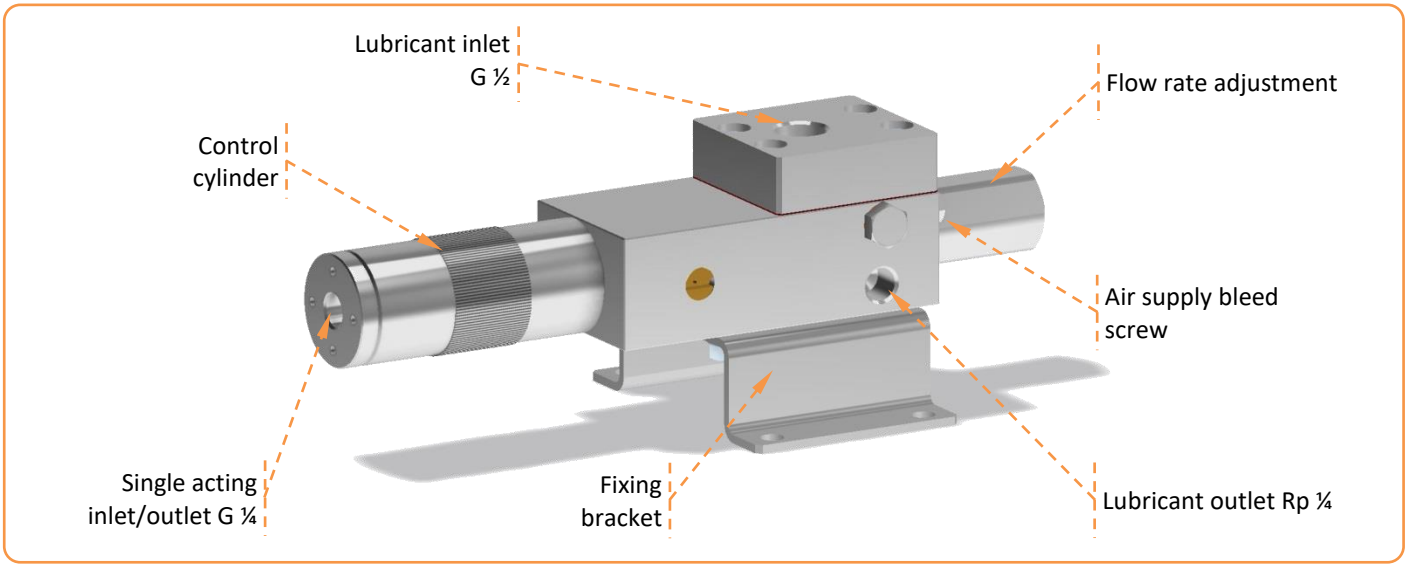
5. COMPONENTS

In the following, the main components are indicated that make up the pump in the various versions.

DUAL ACTING VERSION WITH RESERVOIR



SINGLE ACTING VERSION WITHOUT RESERVOIR



6. UNPACKING AND INSTALLATION

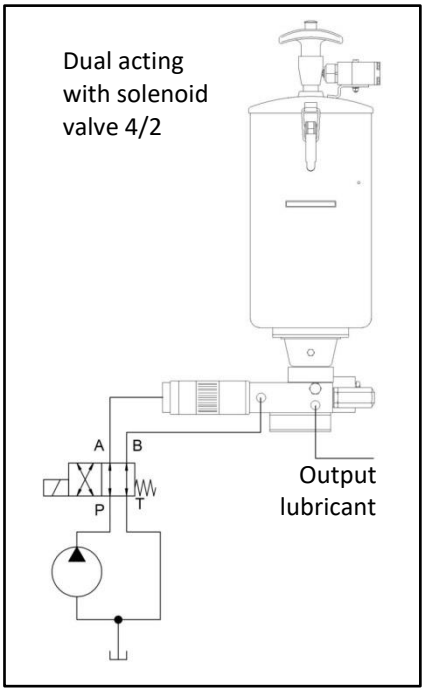
6.1. UNPACKING

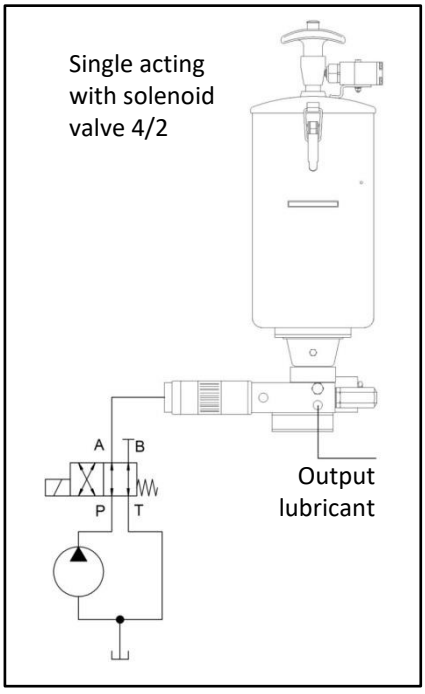
Once you have identified the suitable place for installation, open the package and remove the pump, and check that it has not suffered any damages during transport and storage. The packing material does not require special disposal precautions as it is in no way dangerous or pollutant. For disposal, refer to local regulations.

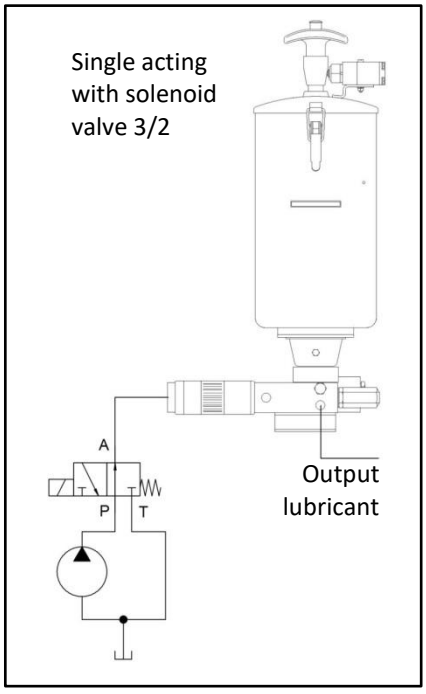
6.2. INSTALLATION

- The unit has a bracket with 4 holes Ø 8.5 mm (0.33 in) for securing the pump to the floor.
- Leave at least 100 mm (3.94 in) as a perimeter distance with respect to other equipment or barriers to prevent access to the pump.
- Assemble the pump at “labourer height” in order to prevent abnormal posture or possible impact.
- Do not install the pump submerged in liquids and/or in aggressive environments.
- Do not install the pump in environments where there are explosive or flammable mixtures.
- Ensure that the pipes and wires have been properly fastened and protected from any possible impact.
- Verify that the grease used is fit for operating temperatures, especially at temperatures below 0° C. If in doubt, contact our Sales Technical Office for the correct choice of lubricant.

6.3. HYDRAULIC CONNECTIONS



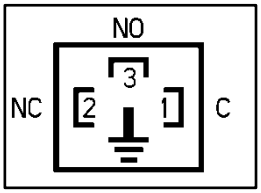




ATTENTION: The pipeline must reach the point of lubrication along the shortest route possible.

6.4. ELECTRICAL CONNECTIONS

Only for the versions with electrical contact for minimum level check, carry out the connection as per the diagram indicated below. Nominal capacity of the contacts = 15A 125/250V AC



7. OPERATING INSTRUCTIONS

7.1. MEASURES TO BE TAKEN PRIOR TO START-UP

- The unit may be put into operation by specialized personnel.
- Use gloves and eye protection as provided for in the lubricant safety data sheet.
- DO NOT use lubricants that are aggressive to NBR gaskets. If you are unsure, contact the Dropsa S.p.A technical office for a detailed list of recommended lubricants.
- Never ignore health hazards and always follow sanitary regulations.
- Always use suitable piping for the operating pressure.
- Check the integrity of the pump.
- Check the lubricant level using the dipstick located on the reservoir. If the level is low, proceed as described in section 7.2. FILLING LUBRICANT
- Ensure that the pump operates at operating temperature and that the pipelines are free of any air bubbles.
- Check the correct connection of electrical devices.

To determine the maximum operating pressure, it is necessary to know the pressure drop of the pipeline connected to the pump: internal diameter, length, operating temperature and type of lubricant.
Depending on these variables to achieve a proper supply to the delivery point, it is always necessary to ensure that the pipeline pressure loss plus the pressure required at the lubrication point does not exceed the maximum pressure supplied for pump delivery.

7.2. FILLING LUBRICANT

For the versions with built-in reservoir, you must proceed as follows:

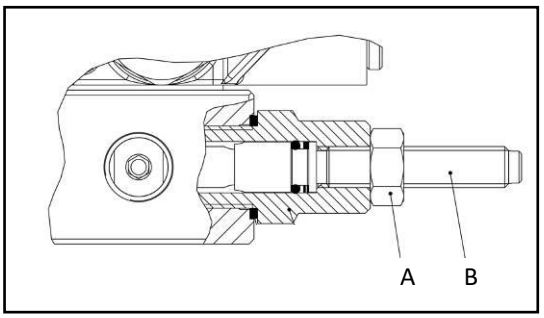
- Remove the protection plug.
- Tighten the fittings necessary for filling (thread present G ½ UNI ISO – 228/1 male).
- Start the fill pump until reaching the desired level (without exceeding the max level line).
- For the first filling, you must press the button on the handle of the dipstick to evacuate the air inside.
- If the maximum level is exceeded, you will notice a leakage of lubricant from the hole on the reservoir itself.
- Remove the fitting. The valve will keep the grease from coming out.
- Refit the protection plug.

7.3. REGULATIONS

The delivery pressure is in a 4.8:1 ratio (single acting versions) or 1:1 (dual acting versions) with the feed pressure, therefore adjust the latter based on the needs of the system.

For the adjustment of the flow rate, you must proceed as follows:

- Remove the protection plug.
- Loosen the locknut (A) using a number 13 wrench to release the screw (B)
- Use the appropriate size screwdriver to tighten (decrease flow rate) or loosen (increase flow rate).
- Once the regulation has been completed, tighten the locknut (A).
- Refit the protection plug.



7.4. USE

- Check the setting data indicated on the control panel (if present).
- Press the start button on the machine where the pump is connected.
- Ensure that the pump starts.
- Ensure the adequate lubrication of the machine (if there are doubts on correct operation, you can contact the Dropsa S.p.A. Technical Office and ask for the testing procedure).

8. PROBLEMS AND SOLUTIONS

Below is a troubleshooting table where the main faults, probable causes and possible solutions to be carried out immediately are indicated (contact Dropsa).
In the event of doubts and/or irresolvable problems, do not search for the fault disassembling parts of the pump, but rather contact the Dropsa Technical Office.

TROUBLESHOOTING TABLE		
FAULT	**CAUSE**	**REMEDIAL ACTION TO BE TAKEN**
The pump does not dispense lubricant or does not dispense the prescribed quantity.	The lubricant in the reservoir is below the minimum level.	*Top up the reservoir without exceeding the MAX level line.*
	The pump control solenoid valve does not vent.	*Ensure that the pump control solenoid valve is a 3-way valve for single acting pumps or 4-way for dual acting pumps. Also ensure that the oil in the pump chamber discharges regularly.*
	Air bubbles in the lubricant.	*Open the bleed valve and activate the pump according to the manual operating cycle until lubricant comes out of the connection without any air bubbles. Close the valve. You can manually press the cartridge itself in order to favour priming of the pumping unit.*
	The fittings are loose.	*Carefully tighten all the fittings, ensuring that there are no leaks.*
	The piston of the pumping element is worn out.	*Replace the piston* ⚠.
	The delivery valve is blocked.	*Replace the valve* ⚠.
The pump does not dispense lubricant at the prescribed pressure.	The pressure regulation of the incoming control oil is incorrect.	*Appropriately regulate the oil pressure as prescribed by the general characteristics and bearing in mind the compression ratio.*

⚠ **Operation may only be carried out by Dropsa specialised personnel.**

9. MAINTENANCE PROCEDURES

The pump does not require special tools for any check and/or maintenance operations. In any case, it is recommended to use suitable equipment and personal protective equipment (gloves, protection goggles, etc.) that in good condition in accordance with applicable regulations to avoid injury or damage to parts of the pump.
The unit has been designed and built in such a way that it requires a minimum level of required maintenance. Nevertheless, it is recommended to always keep the body of the equipment clean and periodically check the tube joints in order to be able to readily detect any leaks.

⚠ **ATTENTION: Before any maintenance or cleaning operation, make sure that hydraulic feed and electric power are disconnected.**

9.1. PUMP DISASSEMBLY

- Empty the reservoir;
- Disconnect the piping;
- Loosen the securing screws;
- Remove the reservoir, taking particular care for the models fitted with a grease pusher spring (could be loaded);
- Remove the pump and any filters;
- Unscrew the hydraulic cylinder from the pump, paying particular attention to the load the spring has;
- Remove all the other components.

Before reassembling the pump, all the components should be washed with petroleum and lubricated.

9.2. SCHEDULED MAINTENANCE

The following table lists the periodic inspections, the frequency and the intervention that the maintenance will have to carry out in order to ensure the efficiency of the system over time.

CHECK	FREQUENCY INTERVAL	INTERVENTION
Attachment of the lines.	After the first 500 hours of operation Every 1500 hours of operation.	Check the joint fittings. Check the fastening to the parts of the machine.
Reservoir level.	As required.	Fill the reservoir with clean lubricant;
Clogging of the filling filter.	400 work cycles.	Disassemble and clean the filter.
Clogging of the return filter (where applicable).	400 work cycles.	Disassemble and clean the filter.
Presence of deposits on the bottom of the reservoir.	600 work cycles.	Clean the reservoir.

10. DISPOSAL

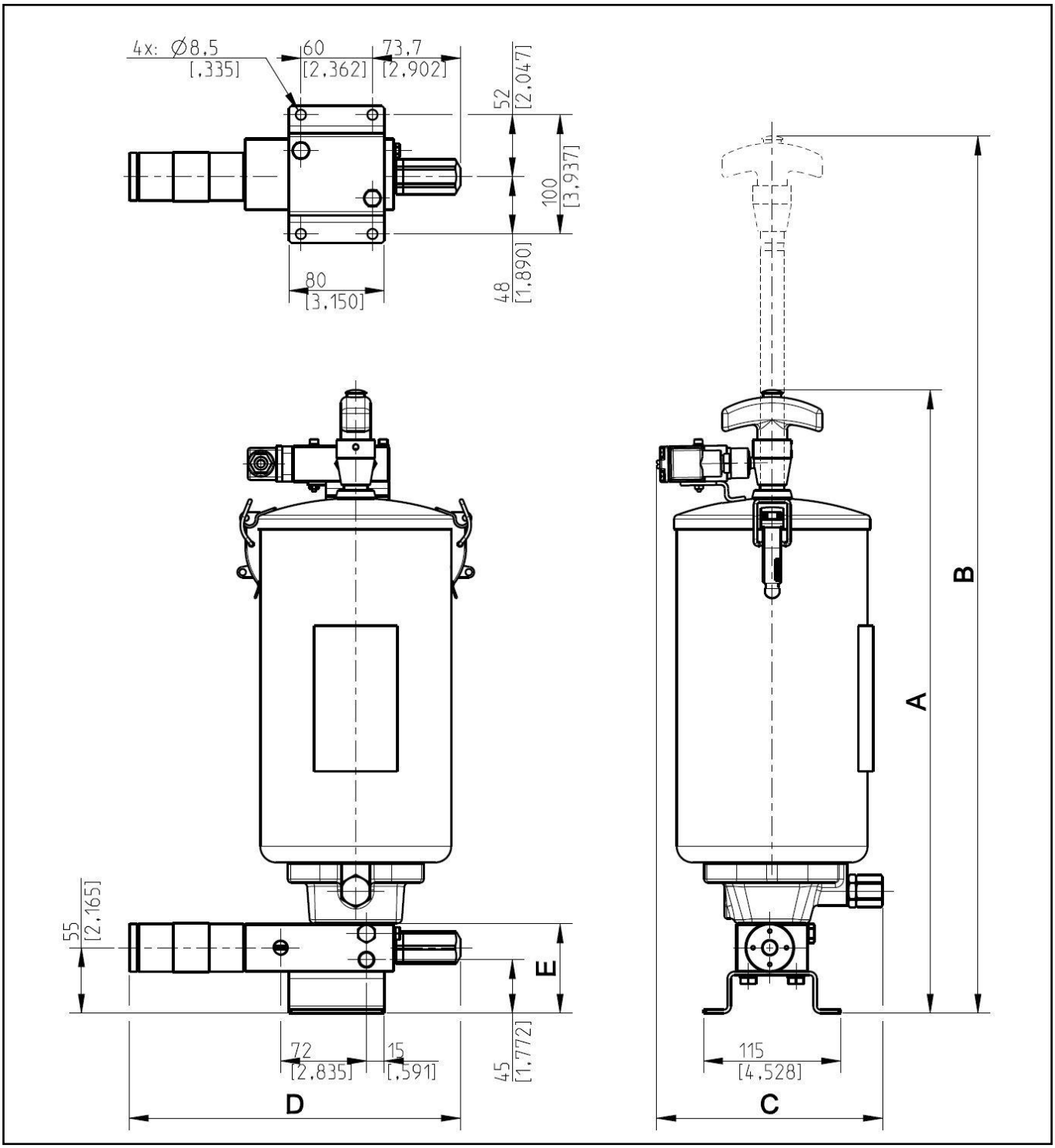
Do not dispose of polluting components in the environment during pump maintenance or in case of demolition; refer to local regulations for correct disposal. Upon demolition of the pump, the identification label and any other document must be destroyed.

11. ORDER INFORMATION

Version WITH RESERVOIR for GREASE			
Part number	**Command**	**Grease**	**Characteristics**
3414008	*Single acting*	*NLGI 2*	With grease-pusher disc and spring (2kg reservoir).
3414012		*NLGI 1*	With grease-pusher disc and MIN level electrical contact.
3414050		*NLGI 2*	With grease-pusher disc and MIN level electrical contact.
3414022		*NLGI 2*	With grease-pusher disc and spring.
3414014	*Dual acting*	*NLGI 1*	With grease-pusher disc.
Version WITHOUT RESERVOIR for OIL			
Part number	**Command**	**Characteristics**	
3414004	*Single acting*	Special reservoir applications.	
3414009		For pumps P/N: *3414008; 3414012; 3414022; 3414050.*	
3414007	*Dual acting*	Special reservoir applications.	
3414017		For dual acting pumps P/N: *3414014.*	

OPTIONAL KITS and ACCESSORIES		
Part number	**Voltage and frequency**	**Characteristics**
0044307	110V/50Hz	4-way solenoid valve for pumps P/N: *3414004; 3414008; 3414012; 3414022; 3414050.*
0044450	220V/50Hz	
0044306	24V/50Hz	
0044310	110V/50Hz	4-way solenoid valve for pumps P/N: *3414007; 3414014.*
0044311	220V/50Hz	
0044309	24V/50Hz	

12. DIMENSIONS



Version WITH RESERVOIR for GREASE						
Part number	**Command**	**A**	**B**	**C**	**D**	**E**
3414008	*Single acting*	576 - *[22.6]*	876 - *[34.4]*	130 - *[5.11]*	276 - *[10.86]*	75 - *[2.95]*
3414012		511 - *[20.1]*	761 - *[29.9]*	195 - *[7.6]*	276 - *[10.86]*	75 - *[2.95]*
3414050		523 - *[20.6]*	736 - *[28.97]*	196 - *[7.7]*	280 - *[11.02]*	75 - *[2.95]*
3414022		511 - *[20.1]*	661 - *[26.02]*	192 - *[3.5]*	276 - *[10.86]*	75 - *[2.95]*
3414014	*Dual acting*	511 - *[20.1]*	761 - *[29.9]*	192 - *[3.5]*	276 - *[10.86]*	75 - *[2.95]*

Version WITHOUT RESERVOIR for OIL				
Part number	**Command**	**C**	**D**	**E**
3414004	*Single acting*	120 - *[4.7]*	276 - *[10.86]*	80 - *[3.1]*
3414009		115 - *[4.5]*	276 - *[10.86]*	65 - *[2.5]*
3414007	*Dual acting*	115 - *[4.5]*	276 - *[10.86]*	83 - *[3.2]*
3414017		120 - *[4.7]*	330 - *[12.3]*	72 - *[2.8]*

Dimensions in *mm [in]*

13. HANDLING AND TRANSPORT

Before shipment, the pumps are carefully packed inside a cardboard box. During transport and storage of the equipment, pay attention to the direction indicated on the box. Upon receipt, check that the packaging is not damaged and store the pump in a dry place.

14. PRECAUTIONS FOR USE

Flammability

The lubricant generally used in the lubrication circuits is not inflammable fluid. However, it is imperative to take all necessary steps to prevent it from coming into contact with very hot parts or naked flames.

Valve

Before any operation, check for the absence of any residual pressure in all branches of the lubricant circuit, that could cause spurts of oil in the event that fittings or components are disassembled.

Noise

The equipment does not emit noise exceeding 70 dB (A).

ATTENTION: The warnings on risks using a lubricant pump implies must be carefully read. The user must be familiar with operation through the Operation and Maintenance Manual.

14.1. LUBRICANTS

A table is shown that compares the NLGI (National Lubricating Grease Institute) and ASTM (American Society for Testing and Materials) categories for greases, limitedly to the values that involve the OmegaPUMP pump.

NLGI	ASTM
0	355 – 385
1	310 – 340
2	265 – 295

For further information on the technical characteristics and the safety measures to adopt, see the Product Safety Data Sheet (Directive 93/112/EEC) related to the type of lubricant selected and supplied by the manufacturer.

NOTE: The pump is designed to work with maximum NLGI 2 grade lubricants. Use NBR gasket compatible lubricants. Any residual lubricant inside that was used for assembly and testing is NLGI 0 grade.

15. CONTRAINDICATIONS OF USE

Compliance with the essential safety requirements and machine directive provisions has been checked through the completion of check lists already drafted and contained in the technical file.
Three types of lists were used:

- Compliance with essential safety requirements (2006/42 CE - Directive).
- Risk assessment (EN ISO 12100).
- Electrical safety requirements (EN 60204-1).

The hazards that have not been entirely eliminated, but that have been deemed acceptable, are listed below:

- During the maintenance phase, low pressure spurts of lubricant are possible. (For this reason, maintenance operations must be carried out using suitable PPE).
- Contact with lubricant during maintenance or change of the cartridge. → Protection from direct or indirect contact with the lubricant must be ensured by the user of the machine. (See the PPE regulation on proper use according to regulations in force).
- Preload springs in the control cylinder and any in the reservoir.
- Use of unsuitable lubricant. →The characteristics of the lubricant are indicated both on the pump and in this Operation and maintenance manual (in the event of any doubt, contact the Dropsa S.p.A. Technical Office).

PROHIBITED FLUIDS	
FLUIDS	***HAZARDS***
Lubricants with abrasive additives	*High wear of the contaminated parts*
Lubricants with silicon additives	*Seizing of the pump*
Petrol – solvents – flammable liquids	*Fire – explosion – damage to the gaskets*
Corrosive products	*Corrosion of the pump – damage to personnel*
Water	*Oxidation of the pump*
Food substances	*Contamination of the same*