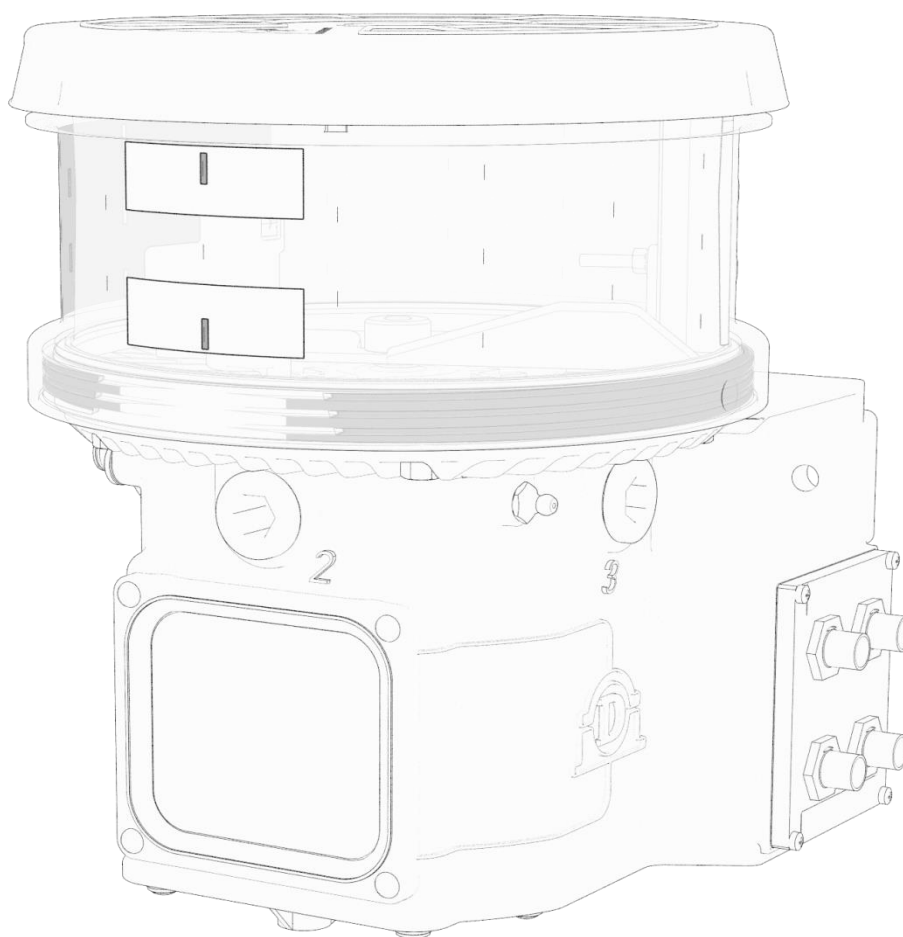


Electric Lubrication pump for fixed and mobile applications

Operation and Maintenance Manual

Translation of original instructions



*Manual drawn up in accordance with EC
Directive 06/42*

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Index

1. INTRODUCTION	2
2. GENERAL DESCRIPTION	2
2.2 BRAVO ELECTRIC GREASE PUMP	2
3. PRODUCT IDENTIFICATION	3
4. TECHNICAL SPECIFICATIONS	3
5. PUMP COMPONENTS	4
5.1 ONBOARD CONTROLLER	5
5.2 MINIMUM LEVEL	5
5.3 CONNECTIONS & WIRING	5
6. UNPACKING AND INSTALLATION	5
6.1 UNPACKING.....	5
6.2 INSTALLING THE CONNECTOR BASEPLATE*	5
6.3 INSTALLATION OF THE PUMP.....	6
6.4 INSTALLING PUMP ELEMENTS.....	6
6.5 HYDRAULIC CONNECTIONS	7
6.6 INSTALLING THE OPTIONAL SMP OR SMPM DIVIDER VALVE.....	7
6.7 INSTALLING IP69K PROTECTION EQUIPMENT (OPTIONAL)*.....	7
6.8 ELECTRICAL CONNECTIONS & WIRING.....	8
6.8.1 Connector Types.....	9
6.8.2 Remote Control switch and Lamp.....	11
7. INSTRUCTIONS FOR USE	11
7.1 BEFORE PUTTING INTO OPERATION	11
7.2 OPERATION	11
7.3 SETTING OF ADJUSTABLE PUMPING UNIT	11
7.4 REFILLING THE RESERVOIR	12
7.5 CONFIGURATION	12
7.5.1 Operating mode: MANUAL VERSION	13
7.5.2 Operating mode – Automatic version CYCLE MODE	13
7.5.3 Operating mode – Automatic version PULSE MODE.....	13
7.5.4 Operating mode – Automatic version OFF MODE	14
7.6 PROGRAMMING THE CONTROLLER BOARD.....	14
8. PROBLEMS AND SOLUTIONS	16
9. MAINTENANCE	17
9.1 SCHEDULED MAINTENANCE	17
10. DISPOSAL	17
11. ORDERING INFORMATION	18
12. Dimensions	19
.....	19
13. HANDLING AND TRANSPORT	20
14. PRECAUTIONS FOR USE	20
14.1 Lubricants.....	20
15. CONTRAINDICATIONS FOR USE	21
Copyright.....	23

1. INTRODUCTION

This operating and maintenance manual refers to the **Bravo electric pump** and contains important information to protect the health and safety of personnel using this equipment.

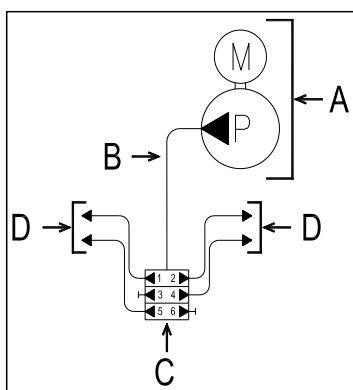
The latest version of this manual is available from the Technical-Commercial Office or on our website: <http://www.dropsa.com>.

Please read this manual carefully and keep it in a safe place so that it is always available to operators who wish to consult it.

2. GENERAL DESCRIPTION

2.1 CENTRALIZED LUBRICATION – GENERAL OPERATING INFORMATION

Centralised systems are designed for automatic lubrication of friction points. These systems considerably reduce the maintenance costs of the machines on which they are installed, eliminating downtime due to lubrication operations and extending the life of the lubricated components. Additionally, a centralized lubrication system makes it possible to lubricate points to be lubricated at frequent intervals, especially those that would otherwise be hard to access.



Below is a diagram of a central lubrication system in its simplest configuration; it consists of the following components:

- A – Electric pump with reservoir**
- B – Primary lubrication line for distributing grease**
- C – Distributor element that meters grease into a number of points**
- D – Secondary tubing that delivers grease to the lube point**

Through the primary hose (from the pump unit) the electric pump feeds a distributor which serves to distribute and control the flow of lubricant among the various friction points.

Bravo Pump has been designed to provide the pumping solution for such systems used in industrial and mobile applications for greases up to NLGI 2 consistency and Oils with minimum 46cSt. Any use other than what is intended is considered non-compliant.

2.2 BRAVO ELECTRIC GREASE PUMP

The BRAVO electric pump is a piston pump driven by an eccentric system, designed to operate with up to three pumping units, making it possible to feed several independent lines or combine the outlets of two or three mounted pumping units to double or triple the flow rate.

It is supplied, as standard, with a pumping unit and is available with a 2, 5, 8 litre modular tank, complete with a magnetic minimum level sensor. As an optional accessory, a remote button with light is available.

Bravo is available as both with an integrated automatic control board that controls and monitors the pump and lubrication cycle or a manual version where the pump motor is controller externally by applying and removing power.

The main body of the pump is made from high performance robust plastic and is compact in size designed to withstand tough environments.

In the grease versions, the system with a shaped spatula and a reservoir seal eliminates the presence of air bubbles in the lubricant contained in the pump, ensuring correct operation even at low temperatures.

The direct-current geared motor drive arrangement, is controlled remotely in the manual version or via the built in control system in the automatic version. There are three operating modes for the controller version. (Refer to 5.1 paragraph).

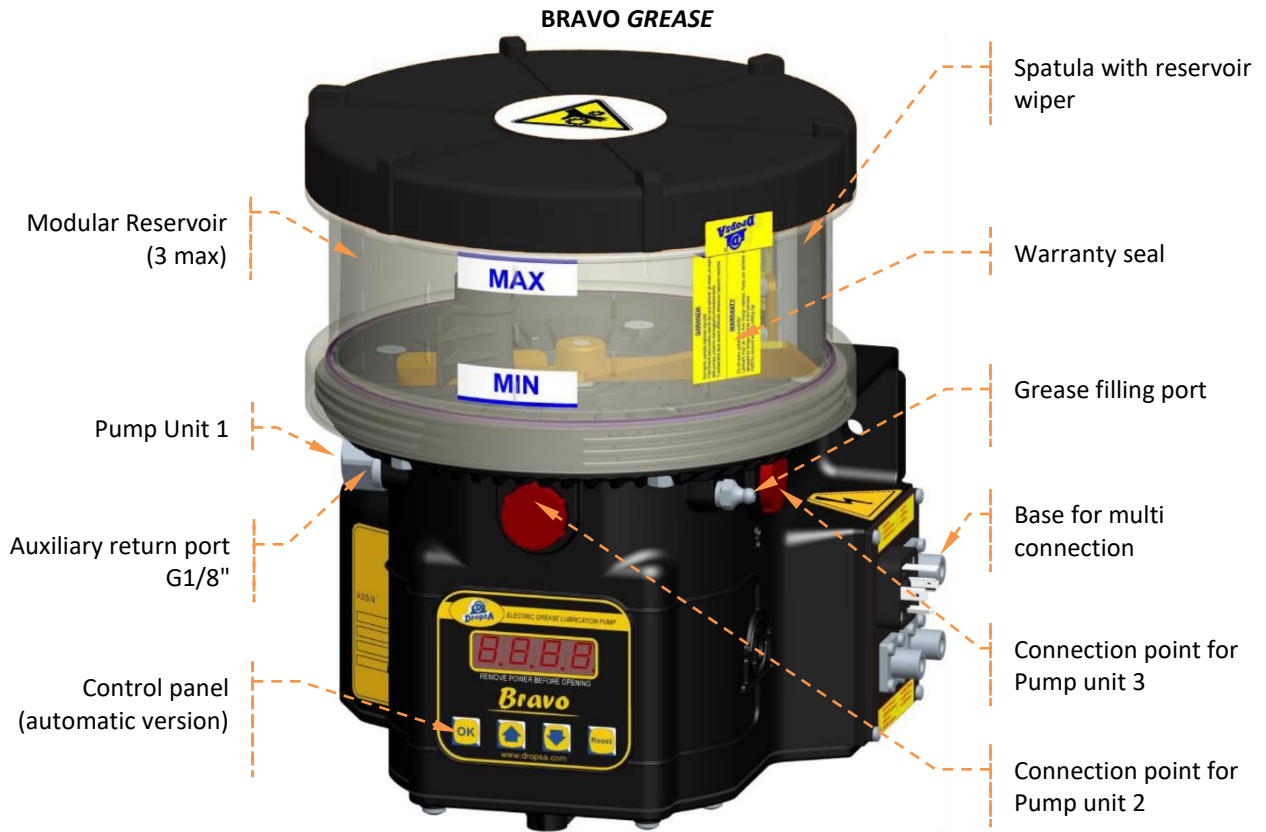
3. PRODUCT IDENTIFICATION

A plate on the side of the pump shows the product code, power supply voltages and basic specs.

4. TECHNICAL SPECIFICATIONS

GENERAL TECHNICAL CHARACTERISTICS							
Power supply voltage	AC		DC		AC - 50Hz		AC - 60Hz
	12 V	24 V	12 V	24 V	110 V	230 V	110 V 230 V
Current (nominal)	1A	0.5A	1A	0.5A	0.2A	0.1A	0.2A 0.1A
Current (peak)	6.5A	3A	6.5A	3A	0.3A	0.2A	0.3A 0.2A
Net weight	2 Liter	5,5Kg (12.12lb)			6,5 Kg (14.33lb)		
	5 Liter	6 Kg (13.22 lb)			7 Kg (15.43 lb)		
	8 Liter	6,5Kg (14.33lb)			7,5Kg (16.53lb)		
Number of outputs (pumping units)	1 (3 max.)						
Outlet thread	G1/4"						
Nominal output per pump element (20 RMP)*	4 cm ³ /min (0.24 in ³ /min) 0.6–4 cm ³ /min (0.04–0.24 in ³ /min) - Adjustable						
Working pressure	280 bar (4061 psi)						
Reservoir Capacity	2, 5, 8 litres (0.53, 1.32, 2.11 gallons)						
Max Grease consistency	NLGI 2						
Oil viscosity min.	46 cSt						
Operating temperature	-25°C to +80°C						
Storage temperature	-30°C to +90°C						
Humidity	90%						
Degree of protection	IP 65 (IP 69K with special equipment)						
Noise	< 70 db (A)						
CONTROL PANEL SPECIFICATIONS							
Operating Voltage	12VDC ±20%						
	24VDC ±20%						
	110VAC		Includes internal transformer				
	230VAC						
Maximum output load capability	5A						
Short circuit and overload protection	7.5A typical				10A max.		
Operating temperature	-20°C to +80°C						
Storage temperature	-30°C to +90°C						
Hardware protection	<ul style="list-style-type: none"> • Overload protection on motor and lamp • Integrated motor protection • Surge protection • Inverted polarity protection 						
Memory for parameter storage	EEPROM						
Memory Life	Unlimited (no battery requirement)						
MINIMUM LEVEL TECHNICAL SPECIFICATIONS							
Max. load	AUTOMATIC Version				1A	@	30 V
	MANUAL Version				0.3A	@	230 V
				0.25A	@	120 V	
ELECTRICAL CONNECTIONS							
P/N Connector	Nominal Voltage	No. of poles	Max. section	IP	Max. A		
0039975 (MPM 203)	250 V–300 V	3+ $\frac{\perp}{\perp}$	1 mm ²	65	10A		
0039820 (M12)	150 V	4	0.5 mm ²	68	4A		
0039823 (Amphenol)	1680 V	17 + PE	1 mm ²	65	6A		
0038962 (IP69K)	600 V	3	0.5 mm ²	69K	7.5A		
0039834 (IP69K)	600 V	4	0.5 mm ²	69K	7.5A		

5. PUMP COMPONENTS





CAUTION: Do not power the machine using voltages other than the ones indicated on the rating plate.



* **NOTE:** Pump output has been determined at the following conditions: grease, NLGI 2, Standard environmental conditions (temperature 20°C/68°F, pressure 1 bar), back pressure on outlet 50 bar (735 psi) 12V and 24V nominal voltage.

5.1 ONBOARD CONTROLLER

In the automatic version, pump and cycle control is managed by the onboard controller. Three operating modes are possible:

1. **CYCLE:** the pause is defined by time or external pulse count; the two conditions work with any combination. The lubrication cycle is defined by time or external sensor counting, which can be set by the user.
2. **PULSE:** lube and pause cycles are determined by external inputs. During of Lube Cycle, the cycle sensor can be monitored to ensure a correct system working. Pump can suspend the lube cycle if external pulses are not found.
3. **OFF:** pump works as slave regarding the control of the machine.

BRAVO pump has a multi connection system that allows to apply various standards types of connectors to the product to satisfy OEM and end users requests.

Pump has been designed to quickly integrate SMP and SMPM metering elements.

Programming instructions can be found in Chapter 7 of this manual.

5.2 MINIMUM LEVEL

In the manual version (**N.C.**) the minimum level switch opens when the minimum level is reached.

A changeover output with **N.C./N.A.** contacts is available in the automatic version. The N.C. contact opens when the lubricant is depleted. It is possible to bypass the minimum level alarm (see Section 7.6).

5.3 CONNECTIONS & WIRING

Different connectors and wiring are available as standard by fitting a selection of connector plates. It is also possible to customize settings for OEM clients.

6. UNPACKING AND INSTALLATION

6.1 UNPACKING

Once you have identified a suitable location for installation, open the packaging, take the pump out and make sure it has not been damaged during transport or storage. The packaging material does not require special disposal precautions, as it is not dangerous or polluting in any way. Refer to local regulations for proper disposal.

6.2 INSTALLING THE CONNECTOR BASEPLATE*

The pump and the base plate are sold separately.

To install the base plate, follow these steps:

- Connect the multi pin connector from the base plate until security locking (fig.1).
- Fit the base plate into position as shown in figure 2 and use the 4 screws to lock into position (fig.2)

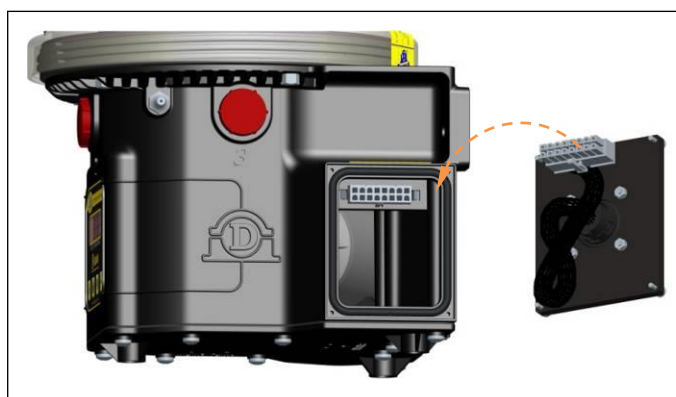


fig. 1

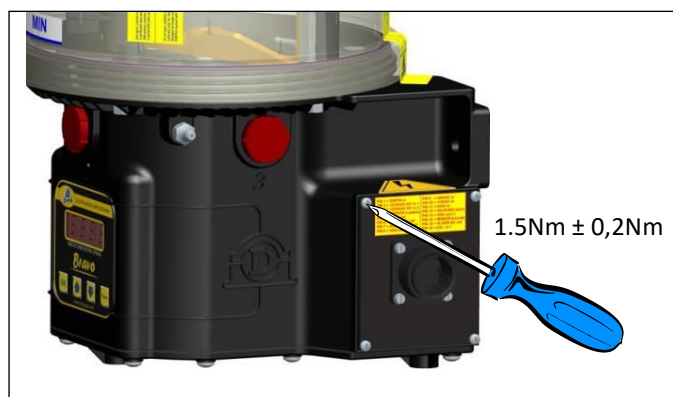
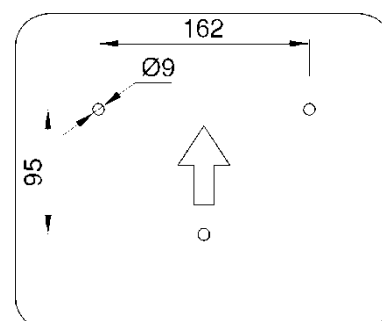


fig. 2

***Note:** for the 110V/230V version 2 internal connectors

.3 INSTALLATION OF THE PUMP

- There is a template at the bottom of the packaging (see fig. 3) for positioning the electric pump and attaching it to its support using the designated holes $\varnothing 9\text{mm}$ ($\varnothing 0.35\text{in}$) and 3 suitable screws.
- Assemble the pump so that the filling point and the control panel are accessible by the user.
- Leave a 100-mm (3.93 inch) perimeter around the pump for easy access.
- Ideally, install the pump at a height that is easily and comfortably accessible by the user to facilitate maintenance and refilling.
- Do not install the pump submerged in liquid and/or in a particularly aggressive environment.



- Do not install the pump in an environment where there are explosive or flammable mixtures.
- Do not install the pump near heat sources or electrical equipment that may disrupt the correct operation of the electronics.
- Ensure that pipes and cables are properly secured and protected from impact.



CAUTION: In the absence of a pump unit with a bypass, be sure to insert an external bypass with a maximum value of 320 Bar.

6.4 INSTALLING PUMP ELEMENTS

The system comes with a single 4-cm³/min pump installed in Port 1. Additional pumping units can be installed on any of the free outlets 2 and 3

- Unscrew and remove the plastic plug with the O Ring that is installed on the standard product.
- Insert and screw the pump element until it is fixed in position.
- Use 20Nm torque to secure the element.



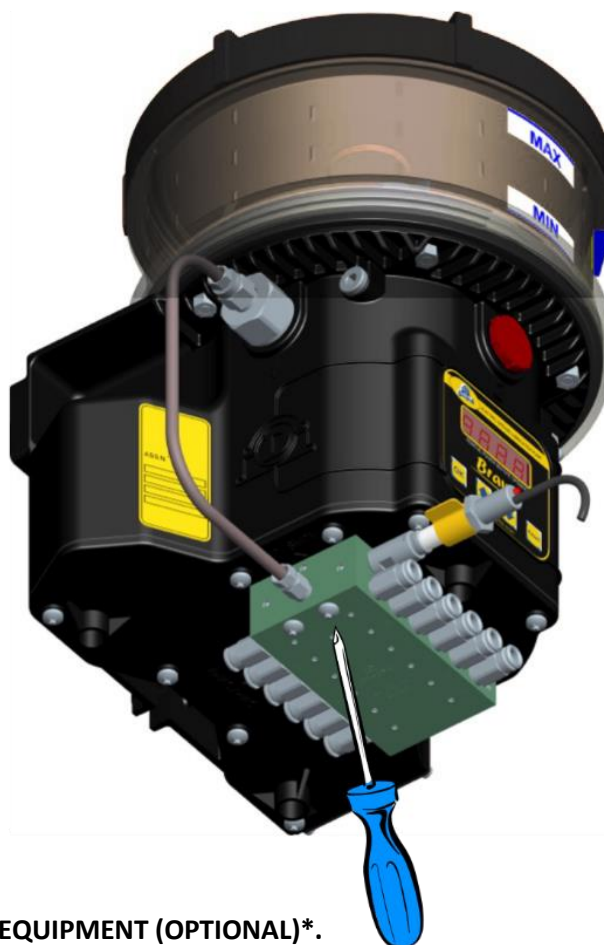
CAUTION: Based on the position of the internal cam drive, it may be difficult to screw in the pump unit as it compresses the return spring. In this case, use another outlet or pay particular attention when inserting the pump unit and ensure that it does not cross-thread.

6.5 HYDRAULIC CONNECTIONS

The hydraulic connection to the pump is via the pump outlets using adequate 1/4BSP fitting and tubing. It is possible to have the return in the pump with G1/8" threads.

6.6 INSTALLING THE OPTIONAL SMP OR SMPM DIVIDER VALVE

It is possible to install an SMP or SMPM distributor valve on the base of the pump to further divide the lubricant. This should be secured using fixing screws. Refer to the diagram below:



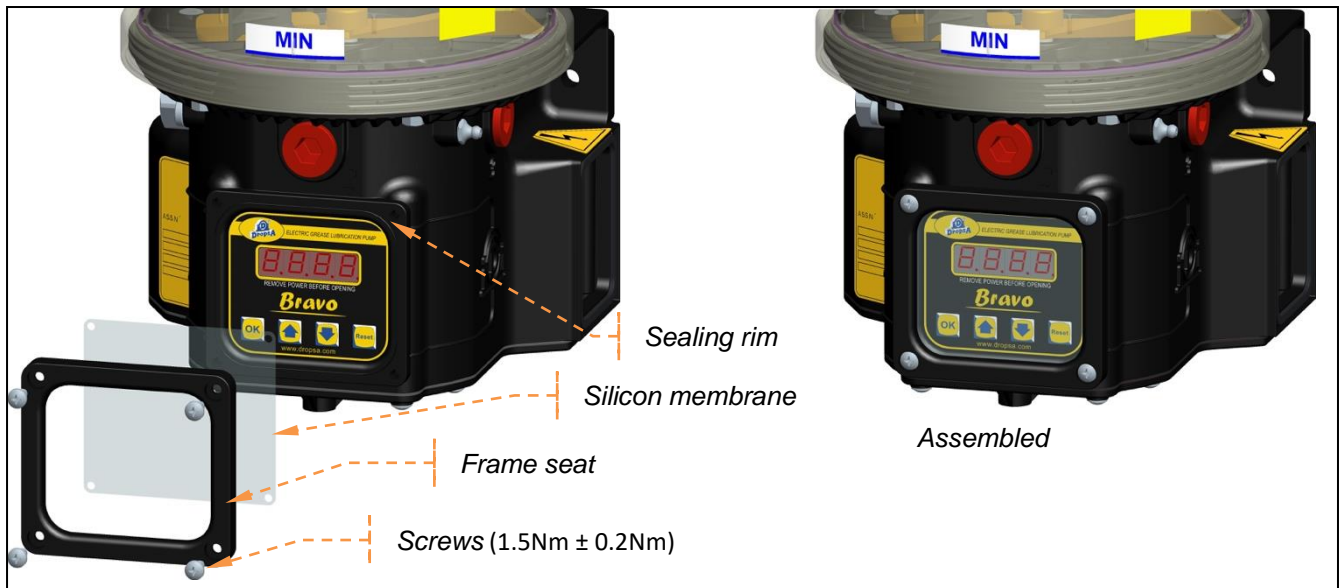
6.7 INSTALLING IP69K PROTECTION EQUIPMENT (OPTIONAL)*.

The Bravo Press pump can be configured with IP69K class protection according to DIN 40050.

To do this, it is necessary to install the right connector plate as mentioned in section 6.2. In addition, the keyboard protection cover must be in place.

For cover assembly, proceed according to the following steps:

- Remove the four plugs on the pump body using a screwdriver avoiding the sealing rim damage;
- Fit the silicon membrane into the square frame seat;
- Fit the four screws into the holes assembling the membrane;
- Fit the complete frame avoiding a membrane movement;
- Screw in the 4 screws.



***Note:** The IP69K kit can be installed on pumps manufactured with a WO greater than 1207322.

6.8 ELECTRICAL CONNECTIONS & WIRING



CAUTION: Before carrying out any electrical wiring you should verify the label on the pump to ensure that the correct operating voltage is being used and ensure that all power is removed.

The electrical connection should be carried out by an electrician who understands and can identify the various connectors and wiring that have been selected for the system (operating voltage, connector types, remote control, cycle sensors).

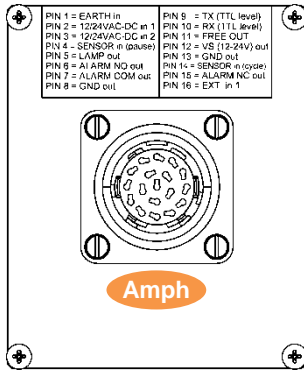
Connect the pump to the power supply using the appropriate power connector, as indicated on the plate (see section 6.7.1). The power cable should be adequately chosen to ensure it can handle the current at the specified voltage.

On 110V/230VAC versions, it is advisable to install a 1A fuse T and a differential circuit breaker with a trip threshold of 30 mA and a trip time of 1 millisecond max. on the line. The insulation value of the circuit breaker should be = 10kV and the rated current $\geq 4A$.

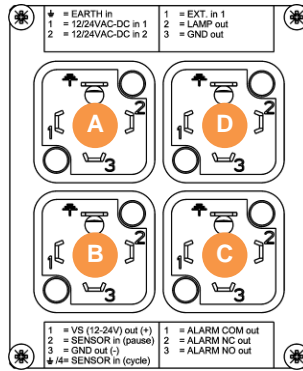
The connection screws between the baseplate and the pump should be tightened to a torque of 0.5 Nm.

6.8.1 Connector Types

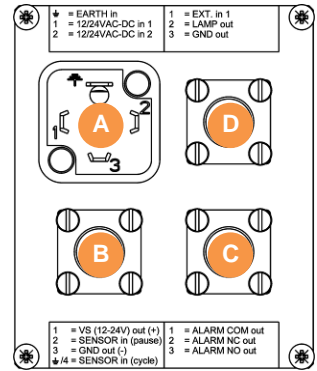
VERSIONS 12V/24V



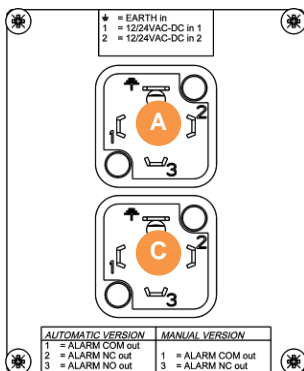
0888102



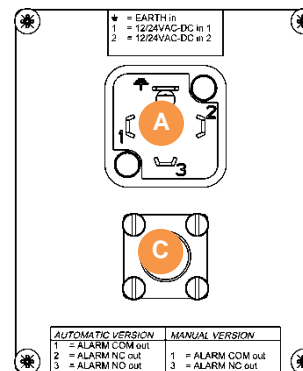
0888059



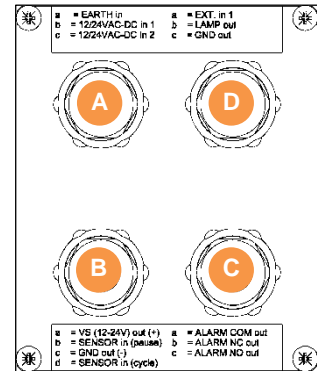
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0888141

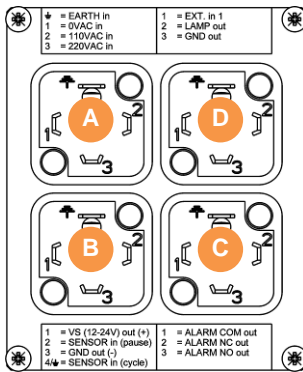


0888142

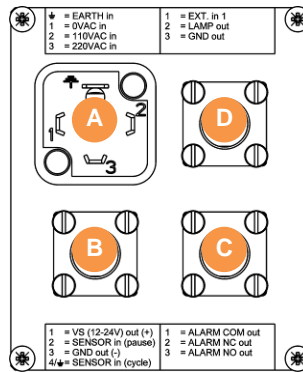


0888437 (IP69K)

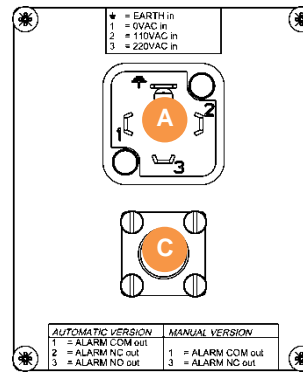
VERSIONS 110V/230V - 50Hz/60Hz



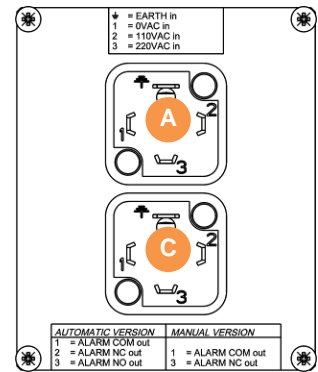
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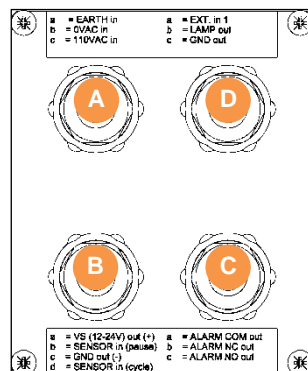
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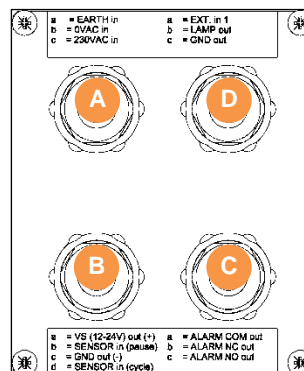
0888137



0888138



110V - 0888472 (IP69K)



230V - 0888474 (IP69K)

Diagram **Amph** MULTIPOLAR

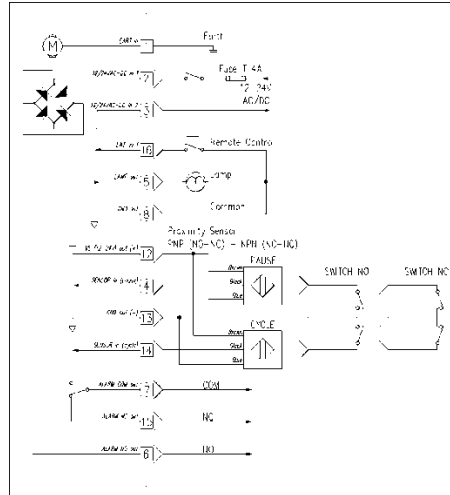
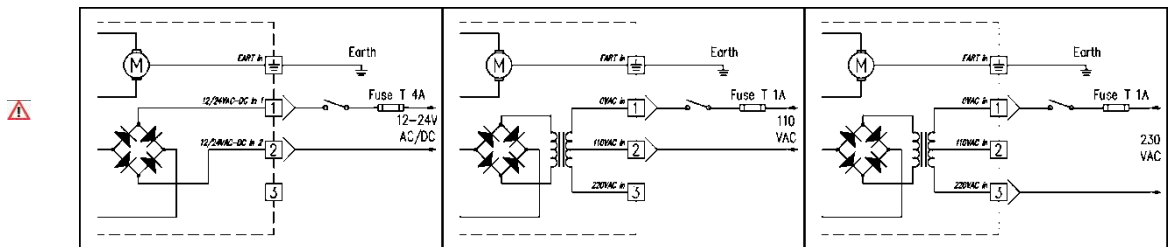


Diagram **A** SUPPLY

12/24 VAC-VDC

110 VAC

230 VAC



⚠ On 12/24 VAC-VDC manual version, do not connect earth terminal.

Diagram **B** CYCLE SENSOR

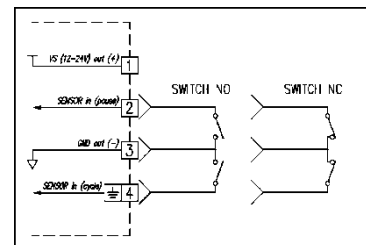
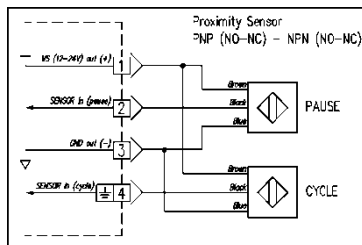
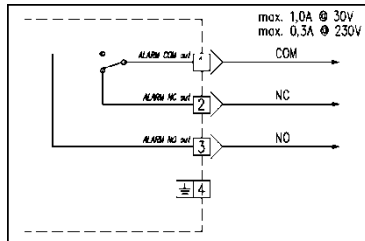


Diagram **C** MINIMUM LEVEL

AUTOMATIC VERSION



MANUAL VERSION

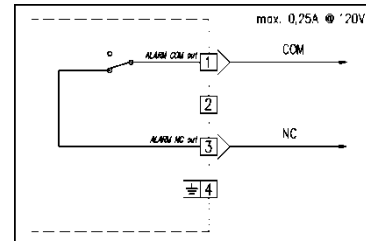
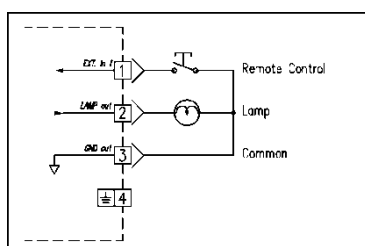


Diagram **D** REMOTE CONTROL



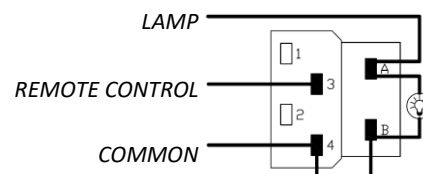
6.8.2 Remote Control switch and Lamp

After connecting the pump, it is possible to continue the installation by connecting the remote switch/lamp for systems where this has been installed.

Install the remote switch near the control panel of the vehicle or machine.

Refer to the following diagram to connect the switch and lamp.

POWER	LAMP	OPTIONAL
230 VAC	12 VDC (3A max)	0039433
110 VAC	12 VDC (3A max)	0039433
24 VAC/DC	24Vdc (3A max)	0039434
12 VAC/DC	12 VDC (3A max)	0039433



7. INSTRUCTIONS FOR USE

7.1 BEFORE PUTTING INTO OPERATION

- The unit can only be operated by qualified personnel;
- Do not submerge the pump in liquid or use it in a particularly aggressive or explosive/flammable environment unless it has been prepared for this purpose by the supplier in advance;
- Use safety gloves and goggles as instructed on the lubricant safety data sheet;
- DO NOT use aggressive lubricants on NBR seals. When in doubt, contact Dropsa S.p.A. technical support for a detailed data sheet on recommended lubricants;
- Do not ignore health hazards, and follow hygiene rules;
- Always use tubes/hoses that are suitable for the operating pressure;
- Check the integrity of the pump;
- Ensure that there is no damage. Check and fill the reservoir. If the reservoir is below the minimum level, follow the procedure in section 7.4 to refill;
- Check that the pump is at the correct operating temperature and tubes/hoses are free of air bubbles;
- Check that electrical devices are properly connected.

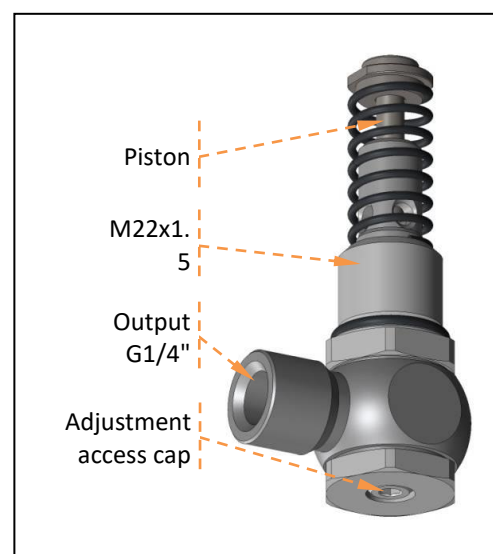
7.2 OPERATION

- Check and set the operating mode and parameter if using the automatic version;
- Press the remote start button on your machine if using a manual version;
- Check that the pump is running;
- Check that the machine is properly lubricated (if there is any doubt as to whether it is working properly, please contact the Technical department of Dropsa S.p.A. to request the testing procedure).

7.3 SETTING OF ADJUSTABLE PUMPING UNIT

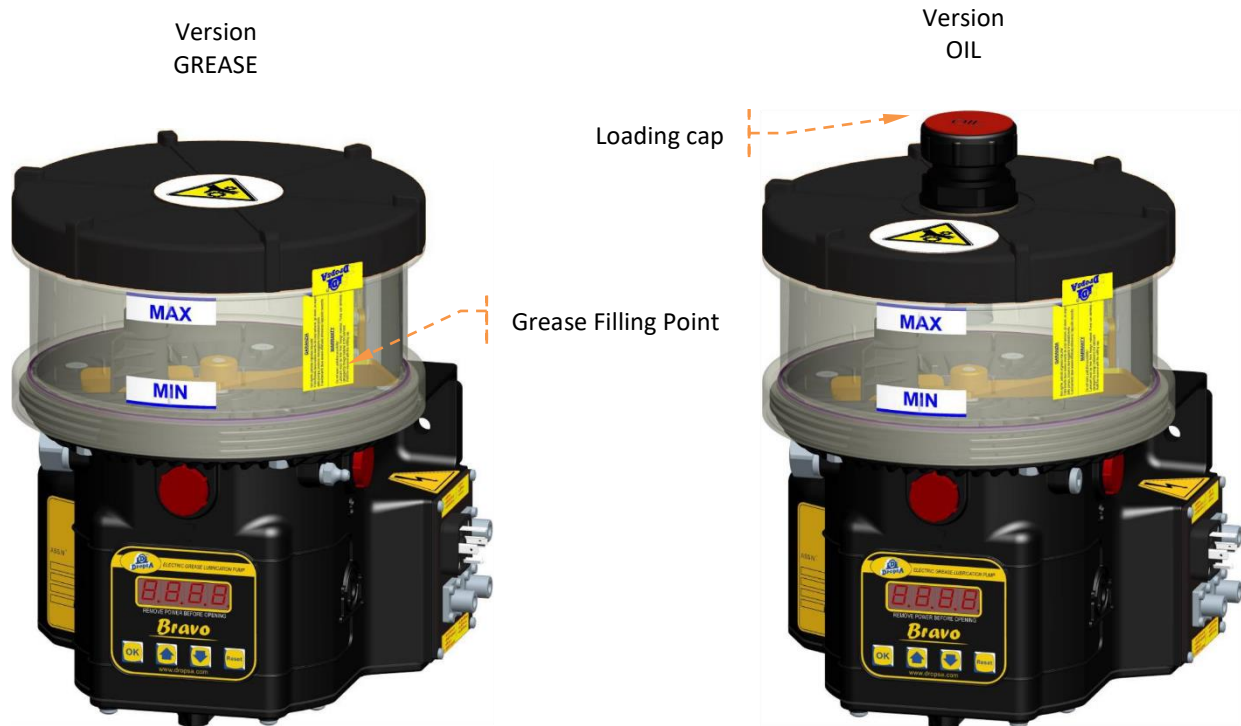
To set the progressive pumping unit with adjustable flow, proceed as follows:

- Ensure that there is no residual pressure in the discharge tube;
- Remove the adjustment access cap using a 4-mm Allen wrench;
- Turn the pump unit sleeve using a 4-mm Allen wrench inserted into the grub screw on the inside;
- Each full rotation of the wrench corresponds to approximately 0.04 cc/cycle. Adjustment range from 0.6 to 4 cc/min. for a total of 4 rotations;
- Check the presence and integrity of the copper seal (replace if necessary);
- Replace the plug using a 4-mm Allen wrench.



7.4 REFILLING THE RESERVOIR

Refill the reservoir using the special device with filter. Continue to fill unit until the max level is reached/ this level should not be exceeded. In the event the user overfills the tank, the excess lubricant will be expelled through vent holes located under the lid.



CAUTION: To prevent malfunctions and voiding the warranty, it is advisable to refill with impurity-free lubricant only using the dedicated filling system. Refer to 14.2 for more information about lubricant characteristics.

7.5 CONFIGURATION



Illuminated button (optional)



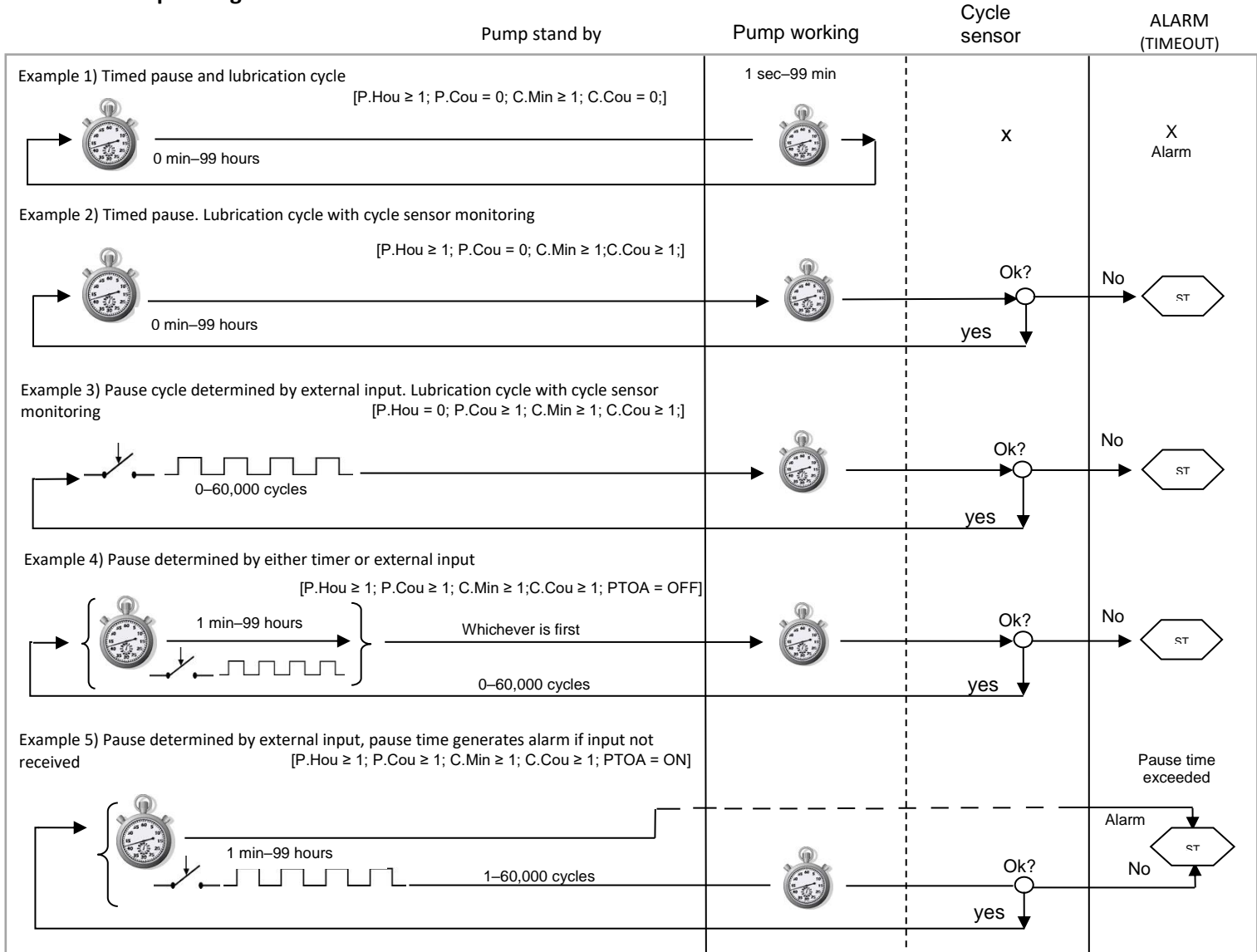
The light stays lit when the pump is running.
Flashes when a minimum level or other alarm is detected by the control system in the pump. The number of flashes defines the anomaly code.
When pressed during the pause (standby) cycle, it will make the pump start a lubrication cycle and then return to normal automatic operation.
Pressing the button for 6 seconds RESETS the pump.

7.5.1 Operating mode: MANUAL VERSION

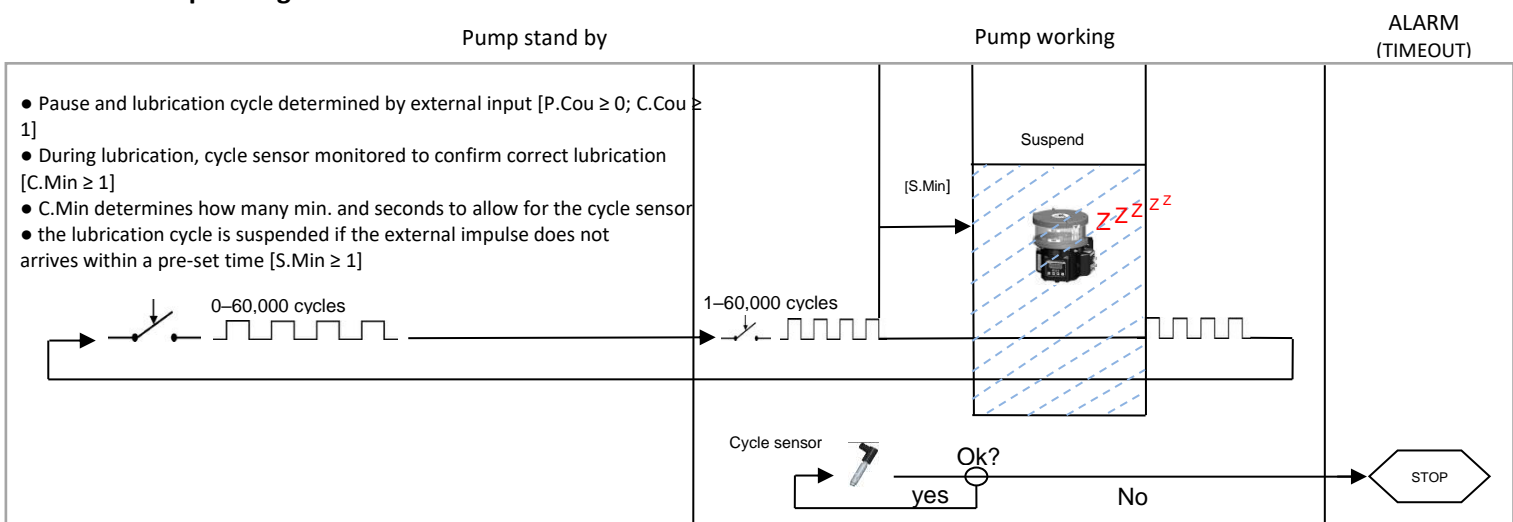
The Bravo Press manual version does not have any settable features, as there is no local controller. You should arrange to control the pump with a host system that turns the pump on and off as needed and monitors the lubrication system, including checking the level and cycle switches when installed.

To operate the lubrication system, please refer to the operating and control instructions of the machine on which the pump is installed.

7.5.2 Operating mode – Automatic version CYCLE MODE



7.5.3 Operating mode – Automatic version PULSE MODE



7.5.4 Operating mode – Automatic version OFF MODE









Pump operates when external signal is given.





NOTE: When power is removed from the Bravo, the electronic control will save the cycle condition in memory. When power is reapplied, the controller will resume the logic from exactly the same point (unless the PRELUBE option is set).




















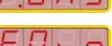
When switched on or if the RESET button is pressed again, the installed firmware revision is displayed for 2 seconds. For all modes, the Prelube parameter, set to ON, causes the pump to start with a lubrication cycle. For Cycle and Pause inputs, the cycle is considered complete when the input returns to the position it was at the start of the cycle. For example, if the switch is in the ON position at the start of the lubrication cycle, then it must change the position to OFF and then back to ON to count as one cycle.













7.6 PROGRAMMING THE CONTROLLER BOARD

PROGRAMMING SEQUENCE		
STEP	BUTTONS	OPERATION
1	 for more than 5 sec.	Enter programming mode
2	 or 	Select PARAMETER to change
3		Confirm the selection and view the current value
4	 or 	Increase/Decrease PARAMETER VALUE/SETTING
5		Confirm value/setting and return to menu
6	 for more than 2.5 sec.	Save settings and exit programming mode



NOTE: To modify the operating parameters, repeat steps 2 through 5 for all necessary values and then follow step 6 to save and exit. During programming, if the buttons are not pressed for more than 20 sec. or if the  and/or  are pressed for more than 2.5 sec., it will prevent the new settings from being saved.

SPECIAL FUNCTIONS AND PARAMETERS		
BUTTONS	DISPLAY	DESCRIPTION
 + 		Lock key board. Reset in progress
 + 		Unlock the keyboard.
 +  +  Release 		Reset the default values in the current operating mode.
 +  Release 	     	Display total days in working state Display total minutes in working state Display total days in pause state Display total minutes in pause state Display total days in alarm state Display total minutes in alarm state

OPERATIONAL PARAMETERS					
DISPLAY	DESCRIPTION	MODE	DEFAULT	RANGE	NOTES
		CYCLE PULSE OFF			Cycle 100%
	PAUSE TIMER: SET Hours and Minutes	CYCLE	10 min	0 min–99 hours	Both
	TIMER to suspend the cycle	PULSE	0 sec	0 sec–99 min	
	PAUSE COUNTER: number of divider switch cycles to wait in pause	CYCLE PULSE	1 cycle	0–60,000	Complete Cycle
	CYCLE TIMER: if timed cycle it indicates the duration; if cycle with control impulses, indicates the waited maximum time of the single impulse before alarm	CYCLE PULSE	1 min	99 min–1 sec	
	CYCLE COUNTER: number of divider switch cycles per lubrication cycle; input used: Input used: <ul style="list-style-type: none"> • Sensor Cycle if Cycle Mode • Sensor Pause if Pulse Mode 	CYCLE PULSE	1 cycle	0–60,000	Complete Cycle
	PRELUBE: Start –controller in Lubrication mode when powered on.	CYCLE PULSE	OFF	ON-OFF	
	Motor DUTY: allows reduction in pump output by adjusting motor speed	CYCLE PULSE OFF	100	100–50	
	Number of cycles given from the manual input (allows system refill if needed)	CYCLE PULSE	1	0–9999	
	If OFF, to expiry of the pause time, starts the lubrication cycle If ON, to expiry of the pause time, gives Pause Time Overrun alarm.	CYCLE	OFF	ON-OFF	
	If OFF, the minimum level is bypassed.	CYCLE PULSE OFF	ON	ON-OFF	



NOTE:

Continuous Cycle: Continuous cycle can be achieved by setting the pause timer to zero.





Complete cycle: Valid on input full cycle ON>OFF>ON or OFF>ON>OFF.

Both: When the pause timer is not set to zero, the system operates in a combined mode. The cycle will start EITHER on input Count OR Pause Time being reached.

8. PROBLEMS AND SOLUTIONS

Below is a diagnostic table highlighting the main faults, probable causes and possible solutions to be implemented immediately (contact DropsA).

In case of any issues and/or problems that cannot be resolved, contact the **Dropsa Engineering Department** rather than search for the fault by disassembling the components of the pump.


DIAGNOSTICS TABLE		
FAULT	CAUSE	SOLUTION
Pump Motor does not operate	No power	Check the power supply, ensure that any fuses installed are still intact
	controller board does not function	Replace controller board 
	Gear motor no longer works	Replace gear motor assembly. 
Pump is operating but no lubricant reaches points	Pipes are disconnected.	Check the tubes/hoses and connections to the fittings. Replace the worn pipes
	Presence of air in the lower casing of the pump	Detach the pump fitting. Start the pump until the grease starts coming out. Reattach the fitting and verify that the pump distributes properly.
	Pump blocked	Disassemble and clean the pump  or Replace the pumping unit.
	The progressive distributor is blocked	Unblock the progressive distributor by removing the cap corresponding to the piston and shift the position of the piston. Replace and tighten the cap and verify that the pump distributes properly. In case the fault persists, replace the progressive distributor.
The lubricant is distributed to the lubrication points in irregular doses	Distributor valves are incorrectly connected to the lubrication points	Check doses with the system diagram
	Incorrect Pause/Cycle Settings.	Reprogram the pause time
The display is not lit	Incorrect power/voltage.	Check that the supply voltage is as indicated on the nameplate.
No lubricant from pump	Reservoir is empty.	Refill and check any low level alarms.
	Air bubble in grease	Disconnect the primary tube/hose from the pumping unit connection. Check that clean, air-free grease is coming from the pump and then reconnect the hose.
	Incompatible lubricant.	Some lubricants are not suitable for automatic pumping systems. Replace the grease.
	Blocked pump unit.	Disassemble the pump unit and check for contamination. Clean and reinstall or replace.
	Worn pump unit.	Replace pump unit.
	Pump unit check valve worn.	Replace pump unit.
The pump starts the greasing phase but ends it immediately.	Defective or blocked pump motor.	Allow the pump to cool. Retry the lubrication cycle. If the problem persists, it will be necessary to replace the pump motor assembly 

 Operations to be carried out by DropsA specialists only.

ALARM CODES			
DISPLAY	BUTTON ILLUMINATED	ALARM	SOLUTION
A LL	1 Flash	Low lubricant level in reservoir	Refill and check any low level alarms.
A CS	2 Flashes	Cycle Sensor overrun	The cycle sensor was not received within the specified time. Ensure Timer overrun is set to appropriate value and that there is no problem on the lubrication circuit.
A EO	3 Flashes	Pause timer overrun	Verify input pause sensor
A LP	4 Flashes	Pump Motor Blocked	Replace gear motor assembly
A OL	5 Flashes	Pump motor overload	Allow system to cool. If the problem persists, replace the motor unit.
A CO	6 Flashes	C.COU pulses counter in Pulse Mode	Modify C.COU parameter
A EE	7 Flashes	Eprom Error	Replace controller board

 **NOTE:** To delete the alarm message, press  and  simultaneously.

9. MAINTENANCE

 **CAUTION:** Before any maintenance or cleaning, ensure that the hydraulic and electrical power are disconnected.

The pump does not require special equipment for inspection and/or maintenance. In any case, it is recommended to use equipment and PPE suitable for use (gloves, goggles, etc.) and in good condition in accordance with current regulations to avoid personal injury or damage to parts of the pump.

The unit has been designed and built to require minimal maintenance. It is, however, advisable to always keep the equipment body clean and periodically check the tube/hose joints to promptly detect any leaks.

9.1 SCHEDULED MAINTENANCE

The following table lists the periodic checks, frequency and action to be performed by the maintenance technician to ensure the efficiency of the system over time.

CHECK	FREQUENCY	PROCEDURE
Tube/hose attachments	After the first 500 hours Every 1,500 hours	Check the connection to the fittings. Check that components are correctly affixed to machine
Tank level	As needed	Top up the lubricant level in the reservoir
Refilling filter	As needed	Check and replace if necessary (see next paragraph)

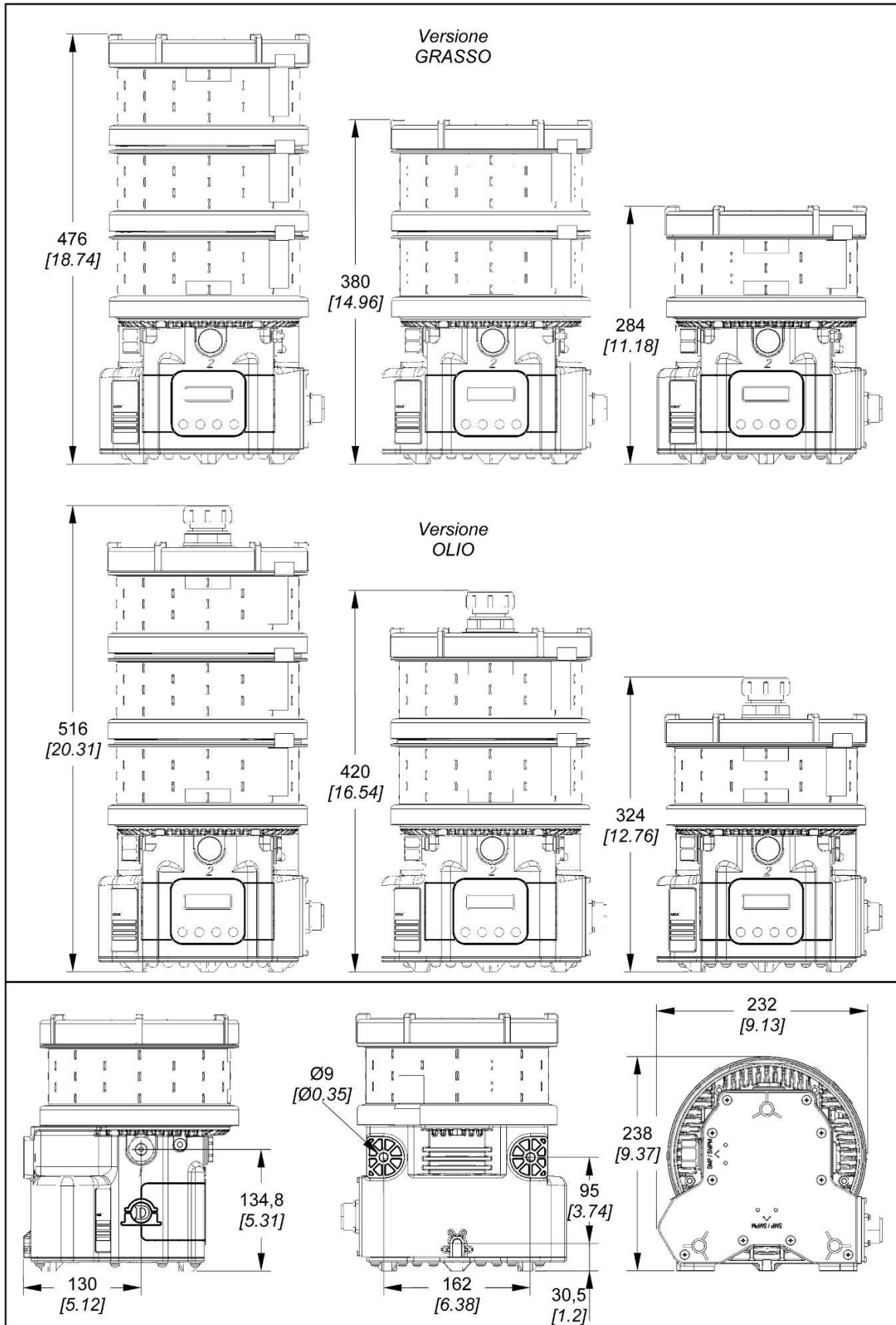
10. DISPOSAL

During pump maintenance, or in the event of its demolition, do not dispose of polluting parts in the environment. Refer to local regulations for their correct disposal. When disposing of this unit, it is important to ensure that the identification label and all the other relative documents are also destroyed.

11. ORDERING INFORMATION

AUTOMATIC VERSION							
Power supply VOLTAGE	GREASE			OIL			
	RESERVOIR 2 l (0.53 gal)	RESERVOIR 5 l (1.32 gal)	RESERVOIR 8 l (2.11 gal)	RESERVOIR 2 l (0.53 gal)	RESERVOIR 5 l (1.32 gal)	RESERVOIR 8 l (2.11 gal)	
110 V/230 V	0888400	0888401	0888402	0888415	0888416	0888417	
12 V	0888403-12V	0888404-12V	0888405-12V	0888418-12V	0888419-12V	0888420-12V	
24 V	0888403-24V	0888404-24V	0888405-24V	0888418-24V	0888419-24V	0888420-24V	
MANUAL VERSION							
Power supply VOLTAGE	GREASE			OIL			
	RESERVOIR 2 l (0.53 gal)	RESERVOIR 5 l (1.32 gal)	RESERVOIR 8 l (2.11 gal)	RESERVOIR 2 l (0.53 gal)	RESERVOIR 5 l (1.32 gal)	RESERVOIR 8 l (2.11 gal)	
110 V/230 V	0888406	0888407	0888408	0888421	0888422	0888423	
12 V	0888409	0888410	0888411	0888424	0888425	0888426	
24 V	0888412	0888413	0888414	0888427	0888428	0888429	
AUTOMATIC VERSION 12V/24V							
CONNECTION		FEMALE CONNECTOR		CONNECTIONS AVAILABLE			
CODE	DESCRIPTION	CODE	DESCRIPTION	Power Supply	Alarm contact	Cycle sensor	External switch
0888102	AMPH connector	0039828	AMPH connector	•	•	•	•
0888059	4 MPM connector	0039976	MPM connector	•	•	•	•
0888141	2 MPM connector	0039976	MPM connector	•	•		
0888139	1 MPM connector 3 M12 connector	0039976 0039999	MPM connector M12 connector	•	•	•	•
0888142	1 MPM connector 1 M12 connector	0039976 0039999	MPM connector M12 connector	•	•		
0888437	IP69K – 12V/24V	0038963 0039835	3 pin IP69K connector 4 pin IP69K connector	•	•	•	•
AUTOMATIC VERSION 110V/230V							
CONNECTION		FEMALE CONNECTOR		CONNECTIONS AVAILABLE			
CODE	DESCRIPTION	CODE	DESCRIPTION	Power Supply	Alarm contact	Cycle sensor	External switch
0888134	4 MPM connector	0039976	MPM connector	•	•	•	•
0888138	2 MPM connector	0039976	MPM connector	•	•		
0888136	1 MPM connector 3 M12 connector	0039976 0039999	MPM connector M12 connector	•	•	•	•
0888137	1 MPM connector 1 M12 connector	0039976 0039999	MPM connector M12 connector	•	•		
0888472	IP69K – 110V	0038963 0039835	3 pin IP69K connector 4 pin IP69K connector	•	•	•	•
0888474	IP69K – 230V	0038963 0039835	3 pin IP69K connector 4 pin IP69K connector	•	•	•	•
MANUAL VERSION 12V/24V							
CONNECTION		FEMALE CONNECTOR		CONNECTIONS AVAILABLE			
CODE	DESCRIPTION	CODE	DESCRIPTION	Power Supply	Alarm contact	Cycle sensor	External switch
0888141	2 MPM connector	0039976	MPM connector	•	•		
0888142	1 MPM connector 1 M12 connector	0039976 0039999	MPM connector M12 connector	•	•		
MANUAL VERSION 110V/230V							
CONNECTION		FEMALE CONNECTOR		CONNECTIONS AVAILABLE			
CODE	DESCRIPTION	CODE	DESCRIPTION	Power Supply	Alarm contact	Cycle sensor	External switch
0888138	2 MPM connector	0039976	MPM connector	•	•		
0888137	1 MPM connector 1 M12 connector	0039976 0039999	MPM connector M12 connector	•	•		
OPTIONAL							
CODE	DESCRIPTION	CODE	DESCRIPTION				NOTES
0039433	Remote control switch and lamp 12V	0880104	4 cm ³ /min pump unit				
0039434	Remote control switch and lamp 24V	0880060	0.6- 4 cm ³ /min adjustable pump unit				
0888038	Grease filling cartridge kit	0010509	Screw for assembling SMP-SMPM				
0038966	IP69K protection plug connector						
0888470	IP69K protection kit						

12. Dimensions



Dimensioni in mm [in].

13. HANDLING AND TRANSPORT

Before shipping, the pumps are carefully packed in a cardboard box. When transporting and storing the equipment, pay attention to the orientation indicated on the box. Upon receipt, check the packaging for damage and store the pump in a dry place.

14. PRECAUTIONS FOR USE



CAUTION: Carefully read the warnings about the risks involved in using lubrication machines. The user must be familiar with operation through the Operation and Maintenance Manual.

Electrical power supply

Do not do any type of maintenance before unplugging the machine from the power supply. Make sure that no one can start it up again while maintenance is in progress. All installed equipment (electrical and electronic) must be connected to the earth line.

Flammability

The lubricant generally used in lubrication circuits is not a flammable liquid. However, all necessary related precautions must be taken to prevent it coming into contact with hot parts or open flames.

Pressure

Before any work is carried out, check that there is no residual pressure in any branch of the lubricating circuit, which could cause oil splashes when fittings or parts are removed.

Noise level

Pump produces noise, not more than 70 dB(A).

14.1 Lubricants



NOTE: The pump is designed to operate with lubricants of max. NLGI 2 (grease version) and min. 46 cSt (oil version).

Use lubricants compatible with NBR seals.

Any residual lubricant that was used for assembly and testing is NLGI 2 grade.

The following table shows the comparison between NLGI (National Lubricating Grease Institute) classification and ASTM (American Society for Testing and Materials) for greases and cSt (Centi stokes) e SUS (Saybolt Universale) for Oil

GREASE		OILS	
NLGI	ASTM	cSt	SUS
000	445–475	46	213.3
00	400–430	70	323
0	355–385	100	462.6
1	310–340	150	694.2
2	265–295	220	1018
		320	1480
		450	2082
		700	3239
		1000	4628

For further information on the technical specifications and safety measures required, see the Product Safety Data Sheet (Directive 93/112/EEC) for the type of lubricant chosen and supplied by the manufacturer.

15. CONTRAINDICATIONS FOR USE

Verification of compliance with the essential safety requirements and the provisions of the Machinery Directive was carried out using the prepared check lists contained in the technical dossier.

Three types of lists were used:

- list of dangers (appendix A, EN 1050).
- application of essential safety requirements.
- Electrical safety requirements (EN 60204-1).

The hazards that have not been completely eliminated but considered acceptable are listed below:

- During installation, there may be some low-pressure oil seepage from the pump. (Maintenance must therefore be carried out using appropriate PPE).
- Contact with lubricant during maintenance or tank filling. → Protection against direct or indirect contact with lubricant must be provided by the machine user. (See specification on the suitable use (in accordance with current regulations)).
- Moving parts and crush danger. → All moving parts are enclosed within the pump unit. Do not open the pump unit. Appropriate danger labels are located on the pump.
- Electric shock. → All electrical connections must be carried out by a qualified electrician who has studied the connection to ensure no electrical danger.
- Abnormal operation posture. → The correct dimensions and installation instructions are given in this manual.
- Use of unsuitable lubricant. → Lubricant specifications are indicated on the pump and in this user manual. **Contact Dropsa SpA Technical Support with any questions.**

FLUIDS THAT ARE NOT PERMITTED	
Fluid	Danger
Lubricants with abrasive additives	High consumption of contaminated parts
Lubricants with silicone additives	Seizing of the pump
Petrol, solvents, flammable liquids	Fire, explosion, damage to the gaskets
Corrosive products	Pump corrosion, harm to people
Water	Pump oxidation
Food substances	Contamination

DropsA

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