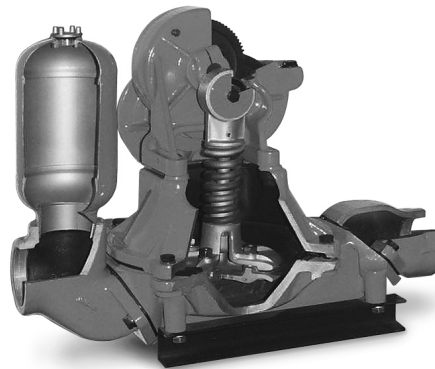


# USE AND MAINTENANCE INSTRUCTIONS

**SELF-PRIMING**

**DIAPHRAGM PUMPS**

**LIBELLULA 1/3" SERIES**



Read this user manual before installing, operating, using and maintaining this equipment.

TRANSLATION OF THE ORIGINAL INSTRUCTIONS



**WARNING**

**DO NOT OPERATE THE PUMP UNTIL YOU HAVE READ AND UNDERSTOOD THIS MANUAL.**

**CAFFINI PUMPS DECLINES ALL AND EVERY LIABILITY FOR DAMAGE DUE TO NEGLIGENCE AND FAILURE TO COMPLY WITH THE INSTRUCTIONS IN THIS MANUAL.**

**CAFFINI PUMPS WILL NOT BE LIABLE FOR DAMAGE CAUSED BY INCORRECT INTERPRETATION OF THE INSTRUCTIONS IN THIS MANUAL OR FOR DAMAGE CAUSED BY INCORRECT INSTALLATION AND/OR BY IMPROPER USE OF THE PUMP ITSELF.**

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## **1. PRESENTATION**

This manual contains all information considered necessary for the knowledge, good use and routine maintenance of the Libellula 1/3" pump (hereinafter, also called machine), manufactured by CAFFINI CIPRIANO S.r.l., hereinafter also called Manufacturing company or Manufacturer. The non-compliance with this manual causes the cancellation, by the Manufacturing company, of the warranty it supplies with the machine. For any repairs or revisions entailing complex operations, directly contact the Manufacturing company for ready and accurate after-sales technical assistance.

These are COPY of the original instructions.

## **2. WARRANTY**

Upon receipt of the material, immediately check it for damages due to transport. Also check the exact correspondence of the transport document. Any claims must, under penalty of expiration, be immediately contested to the courier in the transport document and notified within seven days to the Manufacturer by means of registered letter with acknowledgement receipt. When sending any communication, always indicate the type and model of the machine printed on appropriate plate or punched near the oil introduction plug, and the serial and/or series number. All our products have a 12 month warranty starting from the commissioning date and, however, for not more than 18 months from the date of delivery. The repairs carried out under warranty do not interrupt the warranty period. The warranty refers to material or processing defects that jeopardise the functioning of the product or make it unsuitable for the use for which the product is intended, as long as timely notified and, however, not later than 2 days after their finding. The damages deriving from the physical/chemical features of the sucked liquid are excluded, as are the damages of the parts that are, for nature or destination, subject to wear or deterioration (seal gaskets, diaphragms, vacuum and pressure valves, rubber or plastic parts), or that depend from the non-compliance with our use or maintenance instructions, bad or inadequate use or storage of the product or amendments or repairs made by staff not authorised by ourselves.

## **3. MANUFACTURER**

The Libellula 1/3" series pumps are manufactured by CAFFINI CIPRIANO S.r.l. with offices in Lemignano di Collecchio (Parma) - ITALY - post code 43044 - Via G. Di Vittorio n. 46 - Tel. +39 0521 804325 Fax +39 0521 804145 – e-mail: [info@caffinipumps.it](mailto:info@caffinipumps.it) Registered with the Chamber of Commerce of Parma with n. 175881 - in the Company Register - nr. Mechanized PR017469 - tax code and VAT n. IT02002550347.

#### 4. INFORMATION ON PLATES

Each pump has a nameplate that provides information about the pump. The nameplates are located on the gearbox support or on protection. When ordering spare parts, you must identify the following pump informations:

- Model
- Dimensions
- Serial number
- Item numbers of the required parts

Refer to the rating plate on the gear unit support for assistance. The article numbers are found in the parts list annexed.

**Attention!** When worn labels will re-apply.



#### 5. DESCRIPTION OF THE MACHINE

The Libellula 1/3" is a self-priming diaphragm pump with DN80 flanged or Gas 3" threaded suction and delivery ports.

The diaphragm is driven by a self-lubricated spring or rigid connecting rod that does not require maintenance for the first 5000 hours of work.

The reducer connecting the engine to the connecting rod-handle system can be made of light aluminium alloy or in cast iron. The transmission gears can be straight or helical teeth with drive ratio 1:43 or 1:38 or 1:30, to supply the requested capacity upon varying of number of rpm of the driving engine.

The manufacturing materials of the metal parts in contact with the liquid can be: aluminium alloy, anticorrosive aluminium alloy, cast iron, bronze, stainless steel AISI 316, aluminium alloy with Rilsan coated.

The diaphragm and the valves can be realised with the following materials: Neoprene, Hypalon, Viton, Oil resistant, TPV in conformity with FDA rules.

The Libellula 1/3" contractor version is realised with pump body, suction and delivery ports, reducer support and aluminium die casting connecting rod.

The Libellula 1/3" pump can be activated by different types of engines, which:

##### Petrol engines:

Lombardini type Kohler CS6T – CH270	Briggs & Stratton type 93432/36A-3.5HP
Honda type GX120 or GX160	Robin type EX13 or EX17
Kawasaki type FE120	

##### Diesel engines:

Lombardini type 15LD225	Honda type GD320
Hatz type 1B20	Robin type DY23D
Yanmar type L48AE	Petter type AC1

### Electric motors:

- a) closed three-phase, self-ventilated externally insulated in class F, IP55 protection, unified Standards IEC or NEMA C.
- b) flame proof three-phase compliant with Directive 2014/34/EC (ATEX).
- c) externally self-ventilated closed single-phase.
- d) externally self-ventilated closed direct current.

The pump-engine coupling is monobloc with adapter and appropriate pinion.

The speed variator Stoeber type R37.0000 or other brands with same features can be installed between the engine and the reducer.

The Libellula 1/3" can be installed: on fixed base, on carrying frame, on trolley for electric motor, petrol or diesel with driven handles or wraparound.

The machine is provided with permanent PVC protection or metal net with connecting rod-handle system cover to prevent accidents due to operator-moving parts contact. The permanent protection is locked and held in its right position by fastening bolts.

The machine is provided with lifting hook suitable for handling the pump coupled with the engine supplied by the manufacturer and in the installation version (trolley or frame), envisioned during ordering.



## 6. USE

### 6.1 INTENDED USE

The pump is suitable for handling liquids or muds with solid parts in suspension.

The pump has dry functioning possibility at indeterminate time.

The Libellula 1/3" can also be suitable for the transfer of food liquids; in this case, the user must ascertain that the materials in contact with the product are compliant to the relative Directives.

The machine is designed and manufactured so that the parts in contact with the product to be pumped can be cleaned before each use; all coupling elements are smooth, without roughness or spaces where organic materials can be stored; the surfaces in contact with food products can be easily cleaned and disinfected.

### 6.2 NON-INTENDED USE

The pump is not suitable for pumping dangerous, flammable liquids or that can generate a potentially explosive atmosphere, except for the ATEX certified version. Should the pump be used for pumping particularly dangerous chemical products for contact with persons or things, it will be necessary to check with the supplier, the correct choice of the metal materials and of the elastomers of the pump parts that come into contact with the fluid. It will, however, be necessary for the installer to create a suitable basin in the operational area for containing the fluid that might leak due to accidental breaking of the pumping diaphragm and install remove controls for the machine start-up and switch-off and draining pipes of the fluids collection basin to enable maintenance operations.

## 7. SOUND LEVEL

During functioning, the machine in the aluminium version equipped with 2800 rpm electric motor shows a measured acoustic power level  $L_{WA}=89$  dB and a guaranteed acoustic power level equal to 90 dB(A).

In the cast iron version with electric motor, during functioning it shows a measured acoustic power level  $L_{WA}=77$  dB and a guaranteed power level equal to 78 dB(A).

With regard to the other versions of the Libellula 1/3" pump equipped with petrol or diesel engine, refer to the acoustic power level of the installed engines indicated on the CE Certificate of Conformity.

The manufacturing company is at the users disposal for the sending of the curves of cumulative distribution, of measurement in time and in frequency of the acoustic pressure level of the Libellula 1/3" pump for every required soundproofing intervention.

## 8. SAFETY AND ACCIDENT PREVENTION



**IMPORTANT!** It is compulsory for the employer to provide I.P.D. (Individual Protection Devices) and inform staff on their correct use and maintenance



**IMPORTANT!** The operator must always observe the prescriptions indicated by the sign on the machine

The I.P.D. the operator must use during the Maintenance and Cleaning operations are:

- Work wear
- gloves
- accident-prevention shoes and steel toe cap
- ear protectors



## 9. SAFETY STANDARDS



Do not carry out maintenance operations during functioning.



Do not run the petrol or diesel engine inside a closed environment. The exhaust gases contain carbon monoxide, an odourless and deadly poison.



Do not near hands or feet to the moving or rotating parts.



Do not hold, pour or use combustibles in presence of naked flame, and of devices like stoves, boilers or appliances able to generate sparks.



Do not refill fuel in closed and scarcely ventilated environments.



Do not refuel during functioning. Leave the engine to cool before refuelling. Keep the combustibles in appropriate containers, safety Standards approved.



Do not remove the fuel tank plug while the engine is running.



Do not run the engine if you smell petrol or there is some other risk of explosion.



Do not activate the motor if fuel leaks.



Do not transport the engine with petrol in the tank.



Do not check ignition with the spark plugs or cable of the spark plug disconnected: use an appropriate tester.



Do not run the engine with the spark plug dismantled.



Do not hit the flywheel with sharp or metal objects as this can cause the breaking and disconnection of metal parts during movement.



Do not touch silencers, cylinders or cooling fins when hot, as contact can cause burns.



To avoid certain parts hitting persons in case of machine falling, ensure that during the lifting operations, no persons are within the action range of the machines for lifting.



The lifting, transport and placing operations must be carried out by qualified technical staff and trained in the specific intervention fields.

Before every handling, always ensure the lifting mean with relative tools (ropes, hooks, etc...) are suitable for lifting the load to be handled and check the required stability of the latter.

**Do not use the PUMP differently to that envisioned by the manufacturing company and that indicated in the Use and Maintenance instructions.**



Suspended loads danger



It is forbidden to stand under the loads



It is forbidden to remove the Safety protections



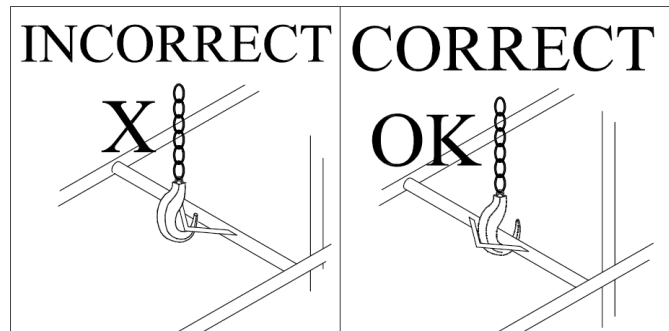
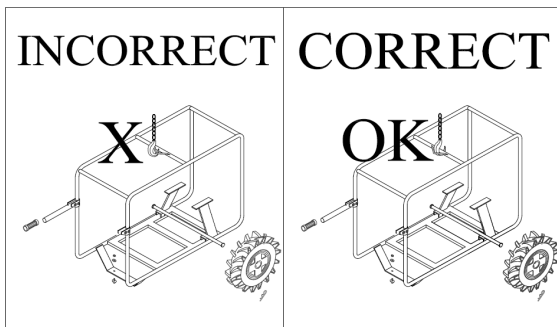
ATTENTION  
Do not open with the engine running



## 10. HANDLING AND TRANSPORT

The machine can only be handled with the suction and delivery piping disconnected and with the power supply motor still or disconnected.

The machines installed on frame can be handled with lifting appliances that can be connected to the lifting hook envisioned on the same machine, using suitable safety systems.



The machine must be transported in horizontal position and in optimal safety conditions.

Lift the unit using only the lifting points.

Before handling the machine, check dimensions and weights on the plate.

Do not stand within the action range during handling of the machine.

During the start-up and maintenance interventions, envision a safe transport of all components using appropriate harness. Handling must be carried out by specialised staff to avoid damaging the machine and causing accidents to staff.

The lifting points of the various components must only be used to lift the components for which they were supplied.

Do not stand or transit underneath and near-by the machine when it is lifted from the ground.

To anchor the machine to the transport surface, block the same using ropes or chains.

***N.B. No additional accessory can be connected to the motor pump or electric pump unit during the lifting or the handling.***

## 11. STORAGE

In case of storage, arrange the machine in a closed place; if left in the open, cover it with a waterproof lining. Avoid humidity accumulating around the machine. Do not leave the pump body full of liquid. Drain it through appropriate drain plug. The liquid may freeze during the winter months and damage the system. When the liquid is dangerous, take all necessary precautions before draining the tank to prevent damages and accidents. Periodically start the pump for a few seconds to avoid scaling inside the same pump.

## 12. INSTALLATION

With regard to the use of engines coupled with pump, reference is made and the Standards given by the manufacturers of the same engines are expressly recalled, attached to this use and maintenance manual.

Install the electric pump or motor pump units provided with metal frame on stable foundations and well anchored to the ground.

The connection piping to the pump must be of flexible type or provided with flexible rubber bolt to dampen the vibrations due to the button flow rate.

It is a good rule to prevent entry of large solids (max dimension 50 mm), that might break the diaphragm or the connecting rod, by mounting a protective film at suction, supplied upon request.

The suction and delivery piping must have a diameter equal or above that of the suction and delivery ports of the pump.

Avoid curves, elbows or bottlenecks as much as possible that might limit the inflow or flow rate of the liquid to or from the pump.

Do not assemble shut-down valves: the pump is provided with clapet valves that work as check valves. In some cases it may be useful to install a pressure relief valve.

Do not assemble flow choking valves on the delivery; to reduce the flow rate, envision a by-pass piping on the delivery, with return to suction basin, adjusted by ball or shutter valve.

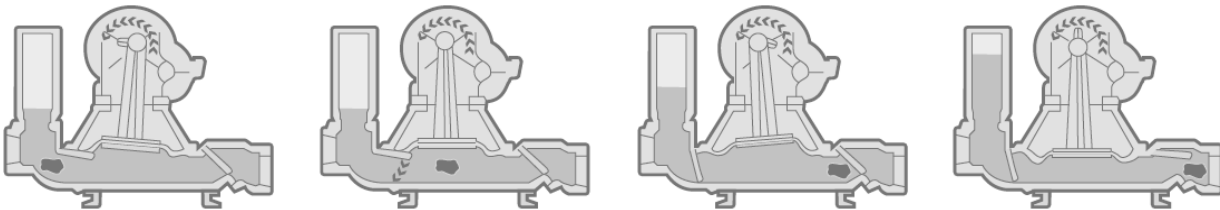
Ensure all joints are perfectly air sealed: check the threads, the gaskets of the adapters, of the ports, and of the quick couplings.

Install the pump as close as possible to the fluid to be pumped, trying to decrease the length of the suction piping as much as possible (the maximum suction height is of 7 metres); in this way, the priming time decreases and greater flow rate is obtained.

The maximum head of the pump is of 15 metres of water column; greater hydraulic loads negatively influence the functioning of the pump and limit the life-span of the diaphragm. For continuous uses, the total manometric head must not exceed the 10 metres of water column.

The correct installation of the suction and delivery piping is assured by observing the flow direction recalled in most versions using directional arrows on the suction and delivery nozzles or, however, verifying that suction is on the nozzle with plug or air case.

In installing units with endothermic engine, ensure maximum inclination of the engine does not exceed the 35° in transversal or longitudinal direction, in order to guarantee a correct lubrication value.



### 12.1 ELECTRIC CONNECTIONS

For versions with electric motor, the pump must be connected to an electric plant provided with earth system according to local technical Standards in force.

For the single-phase version, keep to the current technical Standards.

Ensure the plate voltage corresponds to that of the power supply network.

Ensure the electric pump is disconnected from the electric power supply before carrying out any installation or maintenance operation.

Do not use the power supply cable of the pump to lift it or transport it.

It is advised to install a differential switch with high sensitivity as additional protection against electric shocks in case of insufficient earthing.

In the three-phase version, connect the earth wire (yellow-green) of the power supply cable to the earthing system of the power supply network.

The installer has the responsibility of assuring that the earth system of the power supply network is in accordance with Standards.

In the three-phase version, connect the pump to the feeder using a magneto thermal motor protector or a contactor with thermal relay.

Every time the pump with a three-phase engine is connected to a different feeder, there are equal opportunities it turns in one direction or the other.

The incorrect rotation direction causes a significant reduction of the flow rate and an incorrect functioning of the reducer.

The correct rotation direction is that indicated with an arrow on the reducer body.

If the engine does not turn in the right direction, invert the two phases between them after having disconnected the line.

### 13. BEFORE START-UP

Read the instructions and the safety standards of the engines coupled with the pump unit supplied and rigorously comply with the dispositions of the manufacturer of the same engine.

With regard to the Libellula 1/3" pump unit, before start-up fill the carter of the reducer oil up to the notch of the filling plug rod.

Consult the following table for the amount and brand of the oil to be used.

<i>LIBELLULA 1/3"</i>	
REDUCER OIL QUANTITY (Viscosity ISO150)	
Pressed aluminium version = L. 0,65	Cast iron helical version = L. 0,75
BRAND	TYPE
Shell	Omala 150
BP	Energol GR-XP150
Esso	Spartan EP 150
Mobil oil	Mobilgear 600 XP150
Agip	Blasia 150

Lubricating the gears happens automatically for splashing inside the reducer carter.

**14. MAINTENANCE**

All maintenance operations must be carried out with machine still, disconnected from any feeders and disconnected from the suction and delivery piping.

Change the reducer oil after the first 50 hours of functioning by loosening the drain plug in the lower part of the reducer. Subsequently, the oil must be changed every 1000 hours of functioning or annually. For synthetic type oil, follow the supplier instructions.

Do not forget to regularly check the oil level through the refuelling plug rod.

Every three months check the diaphragm and the valves for wear.

During the winter period with the machine still, protect the pump from freezing; drain any liquids from inside the pump body making them leak out of the delivery valve, prior to tilting the same pump or through the pump body drain plus found underneath the same body.

**MAINTENANCE SHEET**

MAINTENANCE PROGRAM		Before every use	After every use	First month or 20 hours	Every 3 months or 50 hours	Every 6 months or 100 hours	Yearly or 300 hours
ITEMS							
Body pump	- wash		X				
Pipes and filter	- check	X					
Connecting rod bearing	- check						X
Reducer oil	- level check				X		
	- change						X
In/Out valves	- inspection						X
Diaphragm	- inspection						X
Nuts and bolts	- check fastening						X

**RECORDING INTERVENTIONS**

Date	Fault description	Intervention description	Outcome	Operator signature

## 15. SPARE PARTS

To order spare parts indicate:

- a) Serial number of the pump and of the engine.
- b) Serial number and name of the wanted spare part.

### 15.1 REPLACING THE SPARE PARTS

**Diaphragm:** Use a 19 mm wrench. Loosen the bolts connecting pump body to reducer support; loosen the bolts fixing the connecting rod to the diaphragm locking adapter. To assemble proceed in reverse order.

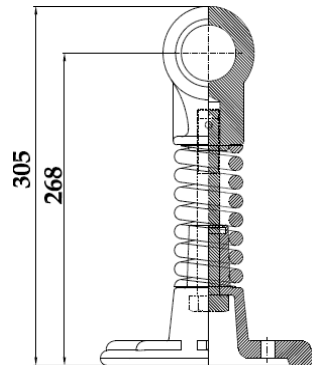
Attention: support the engine-reducer during this operation using appropriate lifting means ensuring the pump lifting hook is suitable for the correct balancing of the load; therefore use appropriate means.

**Suction and delivery valves:**

Use a 19 mm wrench; loosen the two fastening bolts and replace. A valve fixing pin is positioned on the pump body that facilitates correct installation.

**Spring connecting rod:**

In case of repairing the connecting rod item 218L540I, ensure the total length of the same is 305 mm.



**Other spare parts:**

To replace other parts, refer to the spare parts catalogue with exploded view of the parts; it is advisable to contact your usual supplier for particular repairs.

All repair operations regarding the engine must be carried out in compliance with the instructions and maintenance manual of the engine, attached to this manual.

## FASTENING TORQUES

Between	and	Model	Fastening torque		Notes
			[kgm]	[Nm]	
BODY	PORT	LIB-1/3"	2,5	24,5	Tightens the valve
SUPPORT	BODY	LIB-1/3"	4	39,2	Tightens the diaphragm
CONNECTING ROD	PLATE	LIB-1/3"	3,5	34,3	
REDUCER	SUPPORT	LIB-1/3"	3,5	34,3	
COVER	BODY	LIB-1/3"	1,6	15,7	Tightens cover and reducer carter

## 16. DISPOSAL

In case of demolishing the machine or placing it out of service, differentiate the parts according to the manufacturing materials and dispose of them complying with the current Standards in the country where demolition or placing out of service takes place.

**17. OPERATING PROBLEMS: CAUSES AND SOLUTIONS**

MALFUNCTIONING	POSSIBLE CAUSE	SOLUTION
The pump works but does not supply	<ol style="list-style-type: none"> <li>Excessive suction height.</li> <li>The suction piping is not airtight.</li> <li>Blocking of the pump</li> <li>The suction pipe is not fully submerged inside the liquid to be pumped.</li> <li>The suction filter is blocked</li> <li>The suction and/or delivery valves have remained in open position for the presence of a solid body</li> </ol>	<ol style="list-style-type: none"> <li>Reduce the suction height.</li> <li>Restore seal of all gaskets of the piping.</li> <li>Remove any blocking bodies inside the pump.</li> <li>Fully submerge the suction pipe so it does not suck air.</li> <li>Clean the suction filter</li> <li>Remove the solid body</li> </ol>
Low flow rate	<ol style="list-style-type: none"> <li>The rotation speed is too low.</li> <li>The delivery pipe is undersized or blocked</li> <li>Too many curves or delivery pipe too long</li> <li>Use of non-reinforced collapsible sleeve</li> <li>Damaged pipes</li> </ol>	<ol style="list-style-type: none"> <li>Increase engine rotation speed, if possible.</li> <li>Replace the pipe or clean it.</li> <li>Amend the delivery line</li> <li>Shorten or install a reinforced pipe</li> <li>Replace</li> </ol>
Excessive noise	<ol style="list-style-type: none"> <li>Damaging of reducer of speed</li> <li>The pump is not safely fastened to the parking stand</li> <li>Suction is blocked</li> </ol>	<ol style="list-style-type: none"> <li>Repair of reducer by means of intervention of staff authorised by the Manufacturer</li> <li>Ensure the parking stand is blocked by means of the fixing pin with insertion of the safety pin</li> <li>Clean piping</li> </ol>
There is water above the diaphragm	<ol style="list-style-type: none"> <li>The diaphragm is broken</li> <li>The screws tightening the diaphragm are loose</li> </ol>	<ol style="list-style-type: none"> <li>Replace the diaphragm</li> <li>Tighten the screws</li> </ol>
	...	...

For the functioning defects of the supply motors see the attached instruction manuals.

**DIMENSIONS AND WEIGHT**

Model	Libellula/1-3" aluminium on frame	Libellula/1-3" cast iron on frame
Description code	L13TAAALNVBUXE9	L13FGG3LNIBUXE9
Length x width x height	691x352x619 mm	681x352x614 mm
Net weight	36 kg	79 kg

**PUMP**

Type	Self-priming diaphragm with self-lubricated spring or rigid connecting rod
Suction ports diameter	3" BSP or DN80 PN10
Delivery ports diameter	3" BSP or DN80 PN10
Total maximum head	15 metres
Total maximum suction	7 metres
Maximum flow rate	300 l/min ( 20 mc/h)
Priming time	20 sec.
Solid bodies maximum passage	50 mm
Max bar	1,5

**REDUCER**

Number pump pulses (50 hz)	65/min	37/min	47/min
Reduction gears (RR)	1:43	1:38	1:30

A spare parts catalogue is attached to the use and maintenance manual.

CAFFINI CIPRIANO SRL



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