

USE AND MAINTENANCE INSTRUCTIONS

SELF-PRIMING

DIAPHRAGM PUMPS

LIBELLULA 2" SERIES

TABLE OF CONTENTS

1. PRESENTATION	page 3
2. WARRANTY.....	page 3
3. MANUFACTURER.....	page 3
4. DESCRIPTION OF THE MACHINE.....	page 4
5. USE.....	page 4
6. SOUND LEVEL.....	page 5
7. SAFETY AND ACCIDENT PREVENTION.....	page 5
8. SAFETY STANDARDS.....	page 5
9. HANDLING AND TRANSPORT.....	page 7
10. STORAGE.....	page 7
11. INSTALLATION.....	page 7
12. BEFORE START-UP.....	page 8
13. MAINTENANCE.....	page 9
14. SPARE PARTS.....	page 10
15. DISPOSAL.....	page 11
16. TROUBLESHOOTING.....	page 11
17. FEATURES	page 12

1. PRESENTATION

This manual contains all information considered necessary for the knowledge, good use and routine maintenance of the Libellula 2" 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 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 2" 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 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. DESCRIPTION OF THE MACHINE

The Libellula 2" is a self-priming diaphragm pump with 2"bsp threaded suction and delivery ports.

The diaphragm is driven by a self-lubricated 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. The transmission gears can be 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 diaphragm and the valves can be realised with the following materials: TPV, neoprene and NBR.

The Libellula 2" is realised with parts in contact with liquid in POLYPROPYLENE and the others in aluminium.

The Libellula 2" pump can be activated by different types of engines, which:

Petrol engines:

- 1) Honda GX120
- 2) Robin EX13 or EX17

Electric motors:

- a) closed three-phase, self-ventilated externally insulated in class F, IP55 protection, unified Standards IEC or NEMA C. kw 1,1 t 2800 or 1400 rpm
- b) flame proof three-phase compliant with Directive 94/9/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 Libellula 2" can be installed: on fixed base, on trolley for electric motor or petrol with driven handles .

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.

5. USE

5.1 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 2" 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.

5.2 NON-INTENDED USE

The pump is not suitable for pumping dangerous, flammable liquids or that can generate a potentially explosive atmosphere. 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.

6. 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).
With regard to the other versions of the Libellula 2" pump equipped with petrol 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 2" pump for every required soundproofing intervention.

7. 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



8. 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

9. 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 machines installed on trolleys can be towed using opportune tow hook connection that will be fixed to the frame using pin and safety pin preventing the same pin from coming out. Pre-emptively ensure that the parking stand is lifted and fixed to the frame by means of pin and relative safety pin.

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

Lift the unit using only the eyebolts fixed to the frame.

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.

Maximum movement speed: 0.5 m/s.

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.

10. 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.

11. 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.

Ensure the parking stand of the versions on trolleys is blocked in the support position by means of the fixing pin with insertion of the safety pin preventing the pin coming out from its seat.

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 28 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.

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.

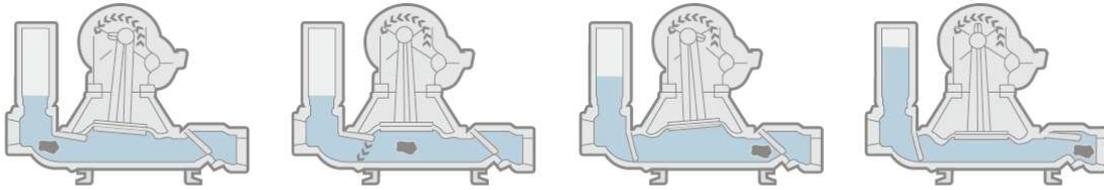
Ensure all joints are perfectly air sealed: check the threads, the gaskets of the adapters, of the ports, and of the quick couplings.

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.



11.1 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.

12. 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 2" 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.

LIBELLULA 2"	
REDUCER OIL QUANTITY (Viscosity ISO150) Lt 0,65	
BRAND	TYPE

LIBELLULA 2"	
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.

13. 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

ITEMS	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
Engine oil	- level check	X					
	- change			X		X	
Air filter	- check	X					
	- clean - change				X		X
Carburettor tank	- clean				X		
Spark plug	- clean					X	
	- change						X
Minimum	- check						X
Valves clearance	- check						X
Tank and filter	- clean						X
Petrol pipe	- check	Every 2 years					
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

14. 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.

14.1 REPLACING THE SPARE PARTS

Diaphragm: a rod removed, use a 13 mm hexagon wrench, cross wrench, pull the 4 nuts respecting the preload (to avoid breakdown voltages on prisoners of the plate) and then the shooting indicated Nm.

Intake valve: remove the 4 socket head screws 6x20 using a 5 mm Allen, replace the valve and, if necessary also the seal mask. Make sure that the mask itself for cracks near the holes. Assemble in this order (from the outside) mouth, seal, and valve mask (entering the wheel studs that act as centering in the mask) and screw it all on the cross, always respecting preload and final shot with a torque wrench. The mask is reversible sided.

Discharge valve: remove the 4 socket head screws 6x30 using a 5 mm Allen and maintaining its nuts on the back with a 10 mm hexagon wrench, replace the valve and, if necessary also the seal mask. Make sure that the mask itself for cracks near the holes. Assemble in this order (from the outside) mouth, valve, mask and seal (by inserting the wheel studs that act as centering in the mask) and screw it all on the cross, always respecting preload and final shot with a torque wrench. The mask is reversible sided.

Body-support:

Disassembly

1. Remove the 4 socket head screws 8x90 (6mm Allen key) media foot (on the shock absorber);
2. Place the comfortable bench (on the breach if the electric motor, DO NOT TILT if combustion);
3. Unscrew the socket head gradually and alternately 8x50 (6 mm Allen key and spanner 13mm) and the two socket head 6x*** opposed to avoid breakdown voltages on the body.
4. Separate the pieces and maintain.

Reassembly:

1. And 'advisable to bet before the two socket head screws (6 mm respectively on the intake, 6x20, blind hole, and 6x30 on the outlet, through-hole) on the brass inserts;
2. Insert the socket head screws 8x50 washer with nut and washer from the top and from the bottom, pulling up to the cross preload with a torque wrench.
3. Reach the preload even with the 6 mm screws
4. Put it all on pins (respecting the notch on foot pvc that goes into place on the body) and fasten the pump on the truck with 4 socket head screws 8x90. Bring to preload them.
5. Pull all the screws, crossed the maximum load indicated.

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-2"	0,2	2,0	Tightens the valve
SUPPORT	BODY	LIB-2"	2,5	25	Tightens the diaphragm
CONNECTING ROD	PLATE	LIB-2"	0,9	9	
REDUCER	SUPPORT	LIB-2"	9,38	92	
COVER	BODY	LIB-2"	1,13	11,1	Tightens cover and reducer carter

15. 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.

16. TROUBLESHOOTING

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

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

17. FEATURES.

DIMENSIONS AND WEIGHT

Model	Libellula 2" on frame with electric motor
Description code	L12TAPART-BHE10
Length x width x height	621X307X527 mm
Net weight	31,5 kg

PUMP

Type	Self-priming diaphragm with self-lubricated rigid connecting rod
Suction ports diameter	2" BSP
Delivery ports diameter	2" BSP
Total maximum head	15 metres
Total maximum suction	6 metres
Maximum flow rate	170 l/min (10 mc/h)
Priming time	45 sec.
Solid bodies maximum passage	28 mm

REDUCER

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

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

CAFFINI CIPRIANO SRL