COMET
AGRICULTURAL DIVISION

Comet Guide

DIAPHRAGM PUMPS

INSTALLATION, DIAGNOSTIC AND TROUBLESHOOTING

COMET

SINCE
1959

Established in Reggio Emilia, in the heart of the Italian *pump Valley*, in 1959, **over a period of 60 years**, Comet has managed to skilfully integrate **experience and innovation**. A unique combination which has made the company a major representative of the Italian manufacturing industry.

more than
130
Countries

The **outstanding quality** of our products has made Comet a premium brand known and respected in over **130 countries of the world**.

+750
World **employees**

Our group consists of **people** who share a **single goal:** to produce **added value** for our customers.

made in
Italy

Today, Comet is **world leader in the spraying and weeding sector** and contributes to Italian excellence worldwide. All the pumps of the Agriculture division are proudly **Made in Italy**.

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01 - OPERATION AND MAINTENANCE

Here are a few indications for the correct utilization and the basic maintenance of Comet pumps.
Please refer to Comet user manuals for more detailed information.

1.1 General Precautions

These are a few precautions for personal safety and correct operations with Comet pumps and equipment.

	**Maintain equipment** Do not operate equipment in need of repair or service. Proper maintenance will help avoid equipment downtime, loss of production and injury to personnel
	**Safety first** Observe all local safety codes and regulations. Do not operate equipment in unsafe conditions. Before any maintenance be sure that no parts are moving.
	**Read the instruction manual** The instruction manual must be read and thoroughly understood by those responsible for the installation, operation and maintenance of this equipment.

	**Operator training** Comet recommends a technical training program for operators prior to use, for a proper and safe use of equipment. On-site factory training programs can be arranged by contacting Comet Spa.
	**Safety guards must be in place** All guards must be in place while equipment is running to protect against bodily injury.
	**Stop equipment** The equipment should always be shut down before any attempt is made to repair, maintain, or remove trapped material.
	**Dress properly** Do not operate equipment while wearing jewelry, loose fitting clothing, ties, shirt sleeves or unprotected long hair.
	**Stay alert** Do not operate equipment while under the influence of medication, drugs or alcohol.

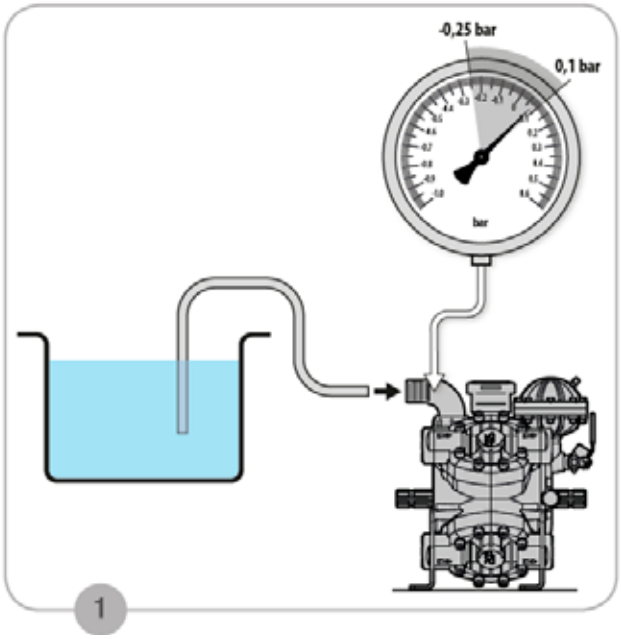
	**Electrical repairs** Electrical power must be turned off before attempting any repairs to electrical components. Lock the control panel and all starting switches.
	**Hydraulic/Pneumatic Repairs** Do not repair or service pneumatic or hydraulic components while equipment remains connected to the pneumatic/hydraulic power supply or is under pressure.
	**Handle Chemicals with Care** Always consult vendor safety data sheets before handling chemicals. Do not handle or inhale chemicals for process conditioning, cleaning or any other purpose without the proper eye, skin and respiratory protection.
	**Respect the Environment** Wastes such as oil, toxic substances, chemical containers and contaminated parts, must be stored in specific recycle-bins.

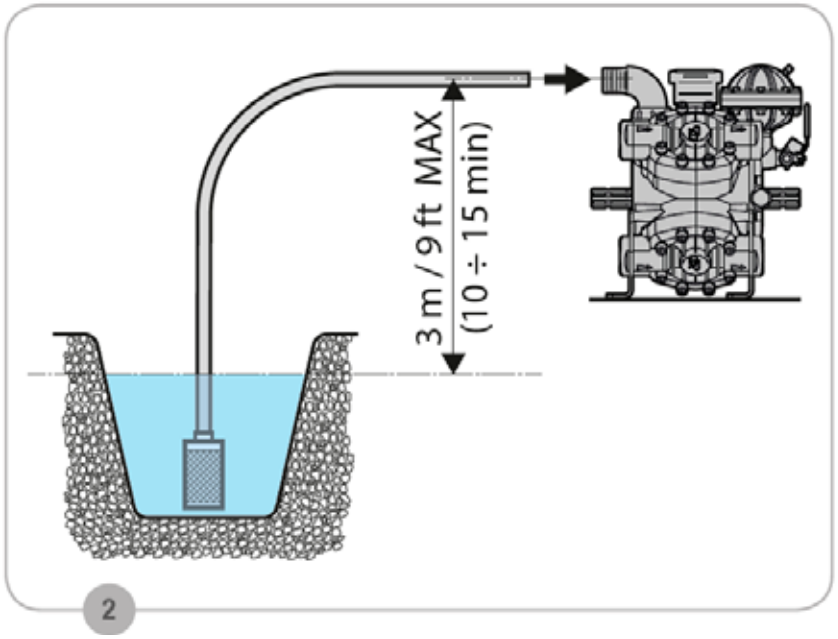
1.2 – First installation

Basic rules for correct installation and better operating results.

	**Warning** Always make sure that the plumbing circuit is equipped with the following safety devices (see user's manual): - pressure-limitation valve or pressure-regulation valve. - safety-valve, in order to dump the overpressure, thus avoiding failures of the plumbing circuit. - PTO shaft guard.
	**Hose dimensioning** Hoses should have at least the same inner diameter as pump's hose barbs. - Use reinforced suction hoses (equipped with an inner spiral) and rigid enough to prevent twists and kinks. - With the use of a vacuum gauge, make sure that the negative pressure on the suction line does NOT exceed -0.25 bar (-360 PSI). - Use approved pressure hoses, capable to resist the max nominal pressure of the pump. - Use by-pass hoses capable to resist a nominal pressure of 10 bar (145 PSI)
	**Plumbing recommendations** The plumbing length should be the shortest possible, with no rises, and a minimum number of bents, elbows, restriction and valves.
	**Filters size and maintenance** It is mandatory to equip the circuit with a suction filter large enough for the pump (approximately twice the flow-rate of the pump). Inspect the filter daily and flush it when necessary.

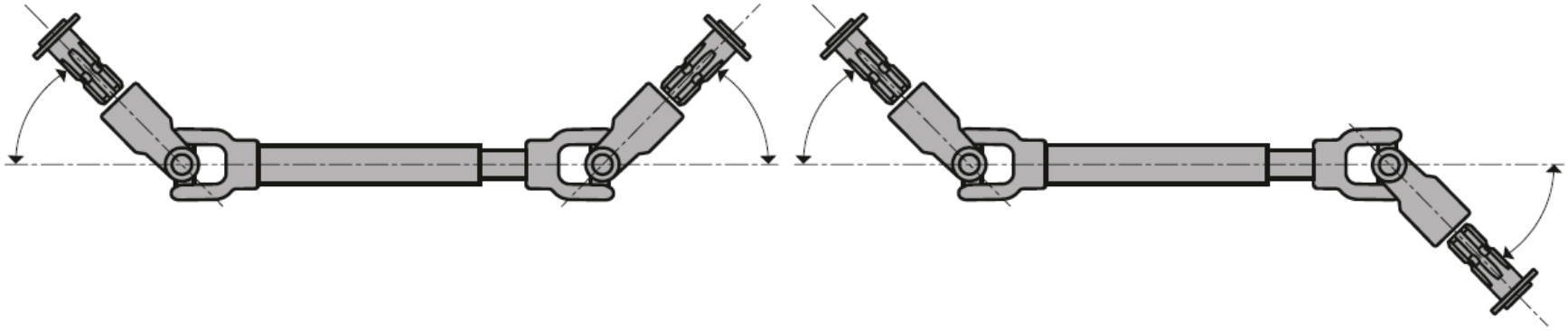
	**External power supply** Never connect the pump to a water supply (i.e. aqueduct, etc.) as a positive pressure can interfere with the closing of the valves and determine early damage.
	**Gravity-powered water supply** In order to avoid cavitation, always install the pump below the water-tank and supply it with the sole use of gravity power (pic. 1). N.B. Never let the pump run dry other than the short time necessary for priming the circuit.
	**Water-supply by negative pressure (suction from canals, reservoirs, etc.)** In case the pump is installed above the max water level, (choice not recommended) the height between the water and the inlet of the pump must be max 3 mt (9.8 feet). See pic. 2.





	**Pressure damper** When installed, check the damper before use and inflate it up to the required pressure (see the user's manual). This will: - minimize pulsation - avoid water hammering - reduce pump overloads - reduce the noise
	**Temperature** Comet pumps are designed to operate between 0ºC (32ºF) and 60ºC (140ºF).
	**Rpm** Use Comet pumps at indicated speed. Excessive or insufficient speed can lead to premature failure.
	**Installazione della pompa** Install the pump on a horizontal surface (max inclination: 5%) and make sure it is aligned with the transmission parts (i. e. tractor's PTO; gearboxes, etc). Bolts and screws must be matching and not smaller than the fixation holes. Tighten the pump with the torque necessary to fix it firm on the frame, using anti-skid devices.

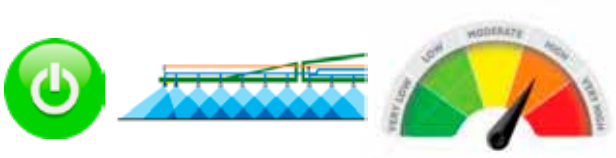
	**Power transmission** Never exceed the max transmissible power of the pump (check the user's manual).
	**Drive-shaft** Drive shaft and safety devices must be matching the power requirements of the pump. In order to avoid irregular rotations, Comet recommends the use of constant velocity joints (CV drive-shafts) and to limit the use of single drive-shafts when angles are reduced or equal to each-other.



1.3 Basic operating instructions

For complete operating instructions please refer to Comet user manuals.

	Set control unit in the by-pass mode: pressure equal to 0.
	Start the pump and make it run, so that it can prime.
	Set control unit on ON - pressure mode.
	Adjust control-unit regulation knob to required pressure.

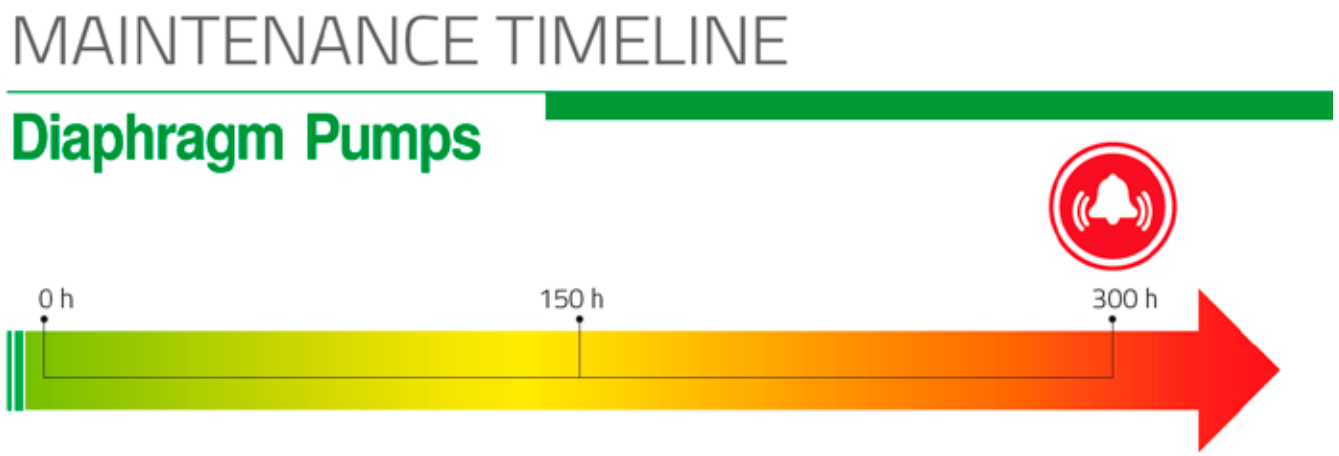
	Start the job.
	Once the job is done, shut-off the sprayer, according to the manufacturer's instructions. Make sure that no mechanical parts are running and there is no pressure inside plumbing.
	Set the control unit in the "bypass" mode: pressure equal to 0.
	Shut the pump down.

1.4 - Maintenance

Regular maintenance is the best investment for a longer life of both your pump and sprayer.

	**Tightening** Make sure the pump is securely fastened to the chassis of the sprayer and hoses are properly tightened to the plumbing circuit.
	**Flush** After each use, carefully flush the pump with clean water. Most of chemical attacks occur when chemicals are left inside. Special attention must be given to rinsing strainers and filters, as obstructions could cause major damages to the pumps.
	**Oil level** Oil has a double purpose: it lubricates mechanical parts and acts as a hydraulic support to diaphragms during pressure strokes. Always maintain oil level as marked on the oil glass and refill when necessary.

	**Pressure accumulator (pulsation dampener)** The pulsation dampener has the function of reducing pulsation. After every 50 hours of use, check the correct air charge inside the p. d. and fill up when necessary. Please refer to Comet literature for the pressure setting.
	**Winter storage** Perform flushing procedure and circulate some antifreeze inside the plumbing circuit to get rid of any water. Then run the pump dry for about one minute to drain it completely. Most recent pumps are equipped with a dedicated water drain on each manifold.
	**PTO lubrication** Make sure that the PTO input is always properly greased.



After every 300 hours or at season's end (whichever comes first) install a new set of diaphragms and inspect valves. Always drain and flush pump with clean water before servicing or disassembling. For complete service instructions, please refer to Comet literature. **We suggest to use only Comet original Spare parts.**

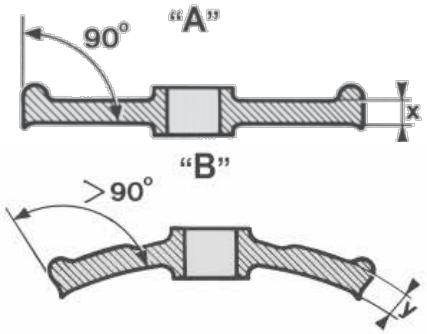
02 – DIAPHRAGM FAILURES DIAGNOSTIC

In case of diaphragm failure, it is important to identify the cause and take action on it to avoid of the future episodes episodes.

FAILURE	CAUSE	REMEDY
  Two cuts matching suction and discharge valves	Obstruction on the suction line	Clean the filter
	Cavitation	Check the priming depth (max 4 mt)
	Excessive viscosity	Use water-based liquids only
	Excessive speed (> 550 RPM)	Slow-down
	Suction valve is open	Check the valve
	Cylinder orifices are misaligned	Inspect orifice positioning
	One of the above mentioned, plus chemical agression	Make sure that diaphragm and liquids used match chemically.
 A cut close to the inside diameter - laceration	Friction caused by the retention disc, due to an overuse of the diaphragm (> 300 hours)	Replace the diaphragm every 300 hours or at season start (whichever comes first)

FAILURE	CAUSE	REMEDY
 A half-round sharp cut	Air inside the lubrication bath below the diaphragm. Air was not removed during assembly or maintenance.	Replace the membrane paying necessary attention to remove all the air. Refer to manuals of use and maintenance for procedure.
  Round cut matching piston diameter	Lack of oil between piston and cylinder	Refill the oil
	Overpressure on the suction line	Check if the pump is connected to a water supply and disconnect it.
	Speed is too low	Increase RPM based on Comet instruction manuals
	Cylinder orifices are misaligned	Inspect orifice positioning
	Discharge valve open	Check the valve
	Oil level unsificient	Refill the oil

FAILURE	CAUSE	REMEDY
 Heavy laceration matching the retention disc, swelling, loss in hardness, expansion of the outside diameter, increase in thickness.	Deformation caused by chemical incompatibility	Make sure that diaphragm and liquids used match chemically.



"A" – Correct shape

"B" – Deformation due to chemical agression

03 - TROUBLESHOOTING

This information is intended to provide guidance on how to deal with malfunctions that may occur during normal use.

Some of the procedures described can be performed by skilled technicians, while others must only be done at specialized service centers.

PROBLEM	CAUSE	REMEDY
 PUMP DOES NOT PRIME PUMPS DO NOT DRAW WATER	Problems at the water intake (suction line): hoses or fittings are drawing in air.	Inspect suction line and make sure of tightening and there are no leaks.
	Clogged suction strainer.	Clean strainer element.
	Regulation valve is on “pressure” mode.	Set regulation valve to by-pass mode.
 NO PRESSURE PRESSURE BELOW DESIRED RANGE	Inadequate rpm.	Restore correct rotation speed.
	Wrong spraying setting (i.e.: nozzles are worn or their volume is larger than pump capacity)	Change nozzles.

PROBLEM	CAUSE	REMEDY
 IRREGULAR PRESSURE	Problems at the water intake (suction line): hoses or fittings are drawing in air.	Inspect suction line and make sure of tightening and no leakages
	Pulsation dampener air-charge is too high.	Reset air-charge.
	Incorrect pressure valve setting (or technical problems)	Adjust pressure valve (or repair if needed).
 EXCESSIVE PULSATION	Pulsation dampener air-charge is too low/too high.	Adjust air-charge.
 EXCESSIVE NOISE ASSOCIATED TO DROPS IN OIL LEVEL	Bottle-necks on the suction line.	Inspect suction line, strainers and remove obstructions wherever necessary.
 EXCESSIVE OIL COMPSUMPTION (likely associated with a characteristic whitish color)	Failure of one or more diaphragms.	Replace diaphragms and change oil.

USE COMET GENUINE SPARE PARTS

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COMET PUMPS ARE PROUDLY MADE IN ITALY

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