TECHNICAL SPECIFICATIONS

DEFINITION

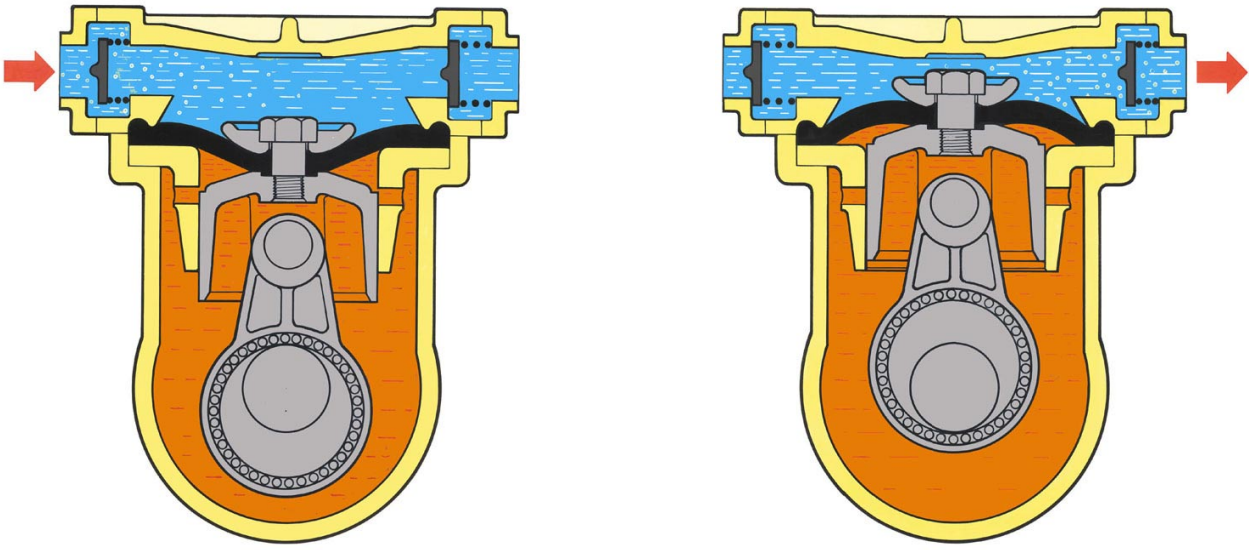
- It's an Operating Machine (needs an engine)
- Transfer a fluid giving Energy
- Transform the Mechanical energy (given by the engine) in Pressure Output

TECHNICAL DATA

- FLOW RATE (lt/min)
- PRESSURE (bar = atm = Kg/cm2)
- POWER (absorbed from the engine, given to the pumped fluid) (C V = H P) , (kW)
  1 CV = 0,736 kW
- EFFICENCY (ratio : given power / absorbed power)

APPLICATIONS ON OPERATING MACHINES

- Nozzles ……
- Tank Filling (direct or indirect)
- Fluid agitation (direct or indirect)
- Other use (cleaning applications, liquid transfer, etc)



ALTERNATIVE VOLUMETRIC PUMPS
DIAPHRAGM PUMPS

MANUFACTURING SPECIFICATIONS

- Presence of an elastic separation disc (diaphragm) on the piston.
- Radial placement of pistons
- Driven by eccentric shaft and connection rod system
- Diaphragm supported by Oil cushion
- Pressure generated by a restriction on the delivery
- A By-pass system is needed
- Presence of suction and delivery valves
- Possibility for direct application on Tractor's PTO

PERFORMANCES

- Flow rate depends only from the Rpm (Round per Minute) from 10 to 305 lt/min
- Flow rate almost independent from the pressure
- Pressure from 10 to 50 bar
- Maximum speed: 550 Rpm
- Total efficiency: from 0,6 to 0,85;
- Absorbed power

LIMITS

- Vulnerability of diaphragm
- Pulsating delivery (it needs a pressure accumulator)

USE

- All treatments except the suspension liquid fertilizer.

DIAPHRAGM PUMP

PUMP ARCHITECTURE

- Crankshaft (eventually through shaft)
- Crankcase with stellar position of pistons (from 2 to 6)
- Driven with all the connection rods on the same eccentric shaft
- Pumping elements (piston, diaphragm, head, suction and delivery valves)
- Semi-hydraulic thrust pump
- Manifolds (internal or external)
- Suction and delivery couplings
- Pressure accumulator
- Mounting bracket

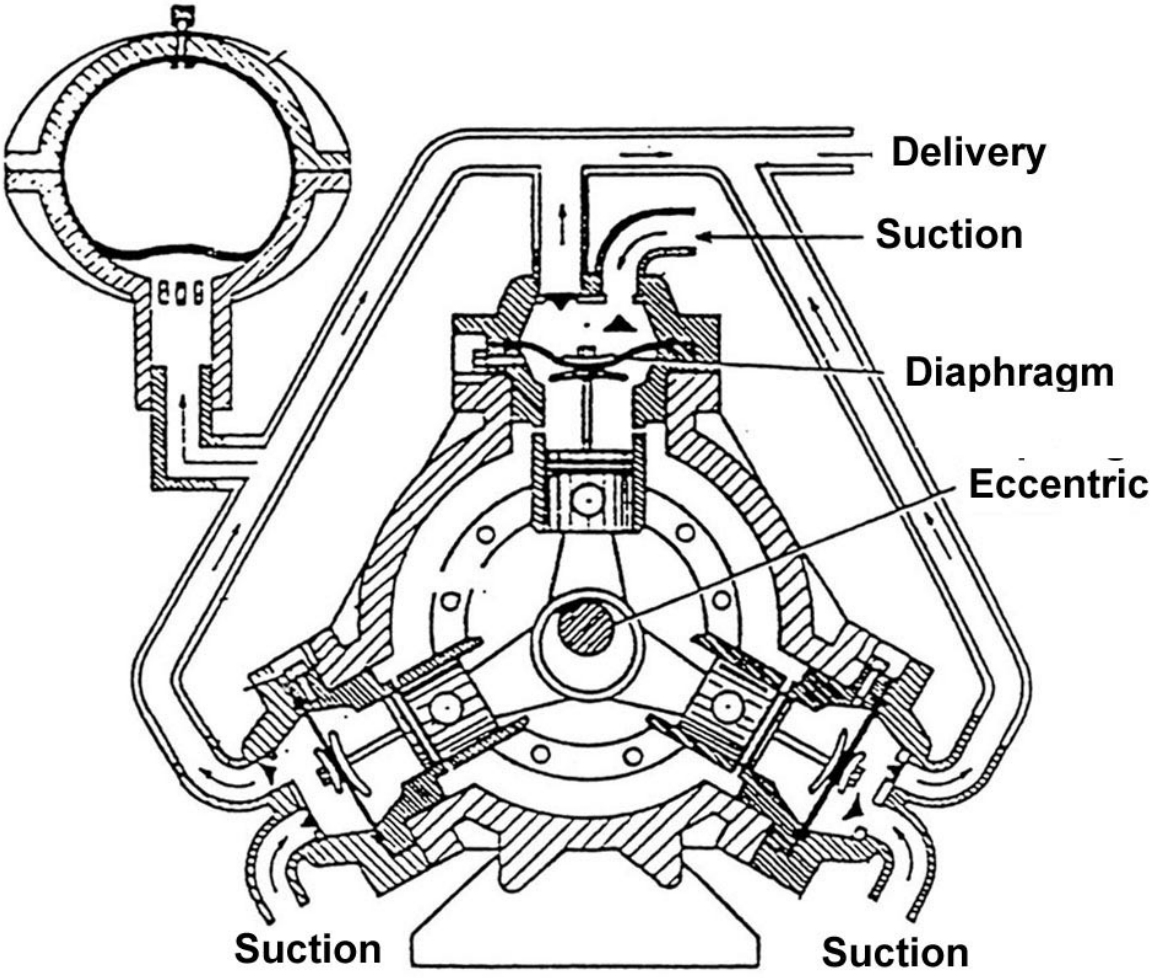
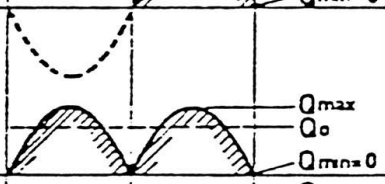
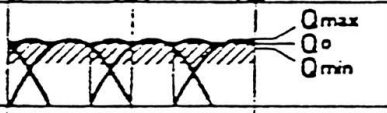
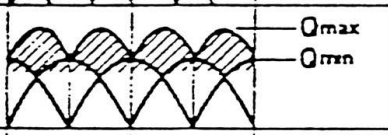
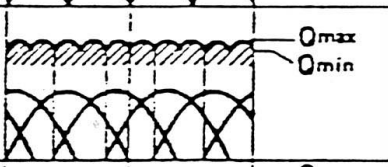
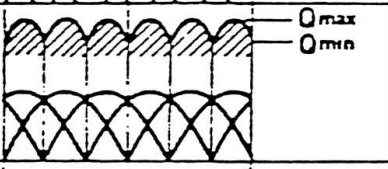
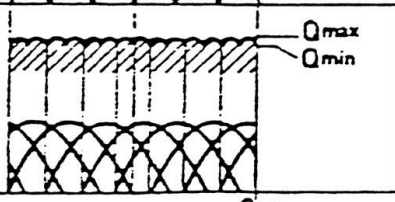
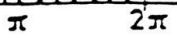


DIAGRAM OF INSTANTANEOUS FLOW RATE AND DEGREE OF IRREGULARITY OF ALTERNATIVE VOLUMETRIC PUMPS

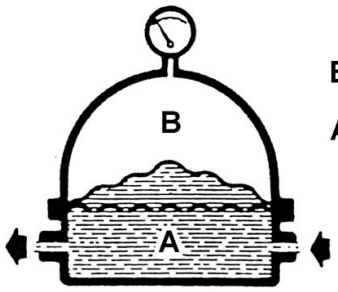
Numero Membrane	Diagramma della portata istantanea	G (%)
1		314
2		157
3		14
4		32,5
5		5
6		14
7		2,5
		

$$G\,(\%) = 100 \times \frac{Q\,\text{Max} - Q\,\text{Min}}{Q\,0}$$

Low value = more stable

High value = less stable

For those pumps a Pressure accumulator is needed (see drawing here below) to absorbe the instantaneous pressure peeks



B - Aria

A - Acqua

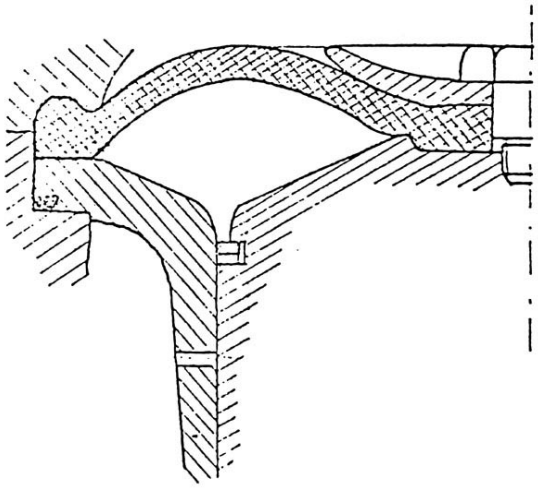
PRESSURE ACCUMULATOR

PUMP'S WORKING PRESSURE (A)		INFLATION PRESSURE OF ACCUMULATOR (B)	
bar	**psi**	**bar**	**psi**
2 -5	29 - 73	2	29
5 –10	73 - 145	2 -5	29 - 73
10 - 20	145 - 290	5 -7	73 - 102
20 - 50	290 - 725	7	102

DANGEROUS CONDITIONS ON DIAPHRAGMS

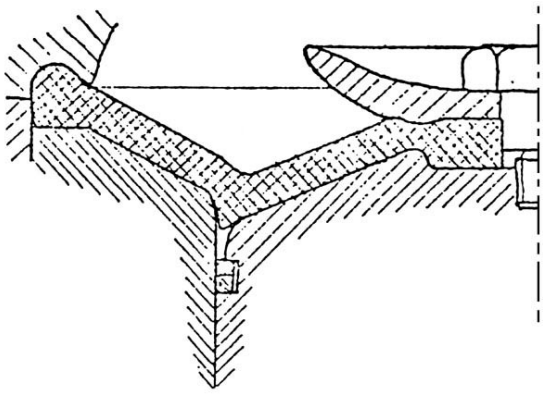
1) DIAPHRAGM "loads to much oil"

- Suction lift too high
- Blocked suction strainer
- Suction hose blocked or kinked
- Spray mixture too thick (dense)
- Suction valve not sealing
- Restricted suction
- Cylinder sleeve holes not in correct position
- Pump RPM above specification
- Chemical incompatible with diaphragm material



2) DIAPHRAGM "oil discharge"

- Excessive wear between cylinder sleeve and piston
- Suction has too much pressure
- Low pump RPM
- Cylinder sleeve holes not in correct position
- Delivery valve not sealing
- Low oil level in the pump



3) Air trapped under the DIAPHRAGM

- Incorrect air bleeding

4) Fatigue breakage

- Diaphragm worn out

5) Chemical incompatible with DIAPHRAGM material

PERFORMANCE DATA

- RPM (from 400 to 550)
- Pressure (given by pressare regulator and nozzles)
- Flow rate (it only depends from RPM)

RESISTANCE AGAINST CORROSION

- Inoxidables materials (Stainless steel, plastic materials, brass)
- Superficial Coating treatment (plastic coating, anodizzation, zinc coating, painting)

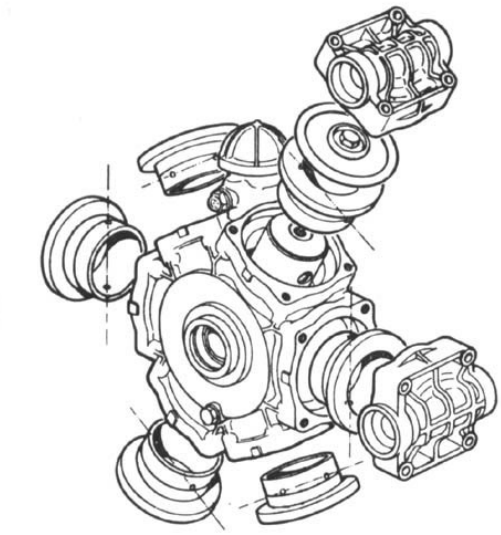
DIAPHRAGMS MATERIALS

• Nitrilic Rubber (BUNA)	(NBR)	
• Fluorirated Rubber	(FPM)	i.e. Viton
• Polyurethan	(EU/AU)	i.e. Desmopan

OILS AND POSITON OF CYLINDER SLEEVES

- To verify the correct air bleeding (when it's substituted) into the crankcase, rotate by hand the crankshaft and incline the pump on both sides until air is completely out. After that Top-up oil level, and tighten the Oil cap.

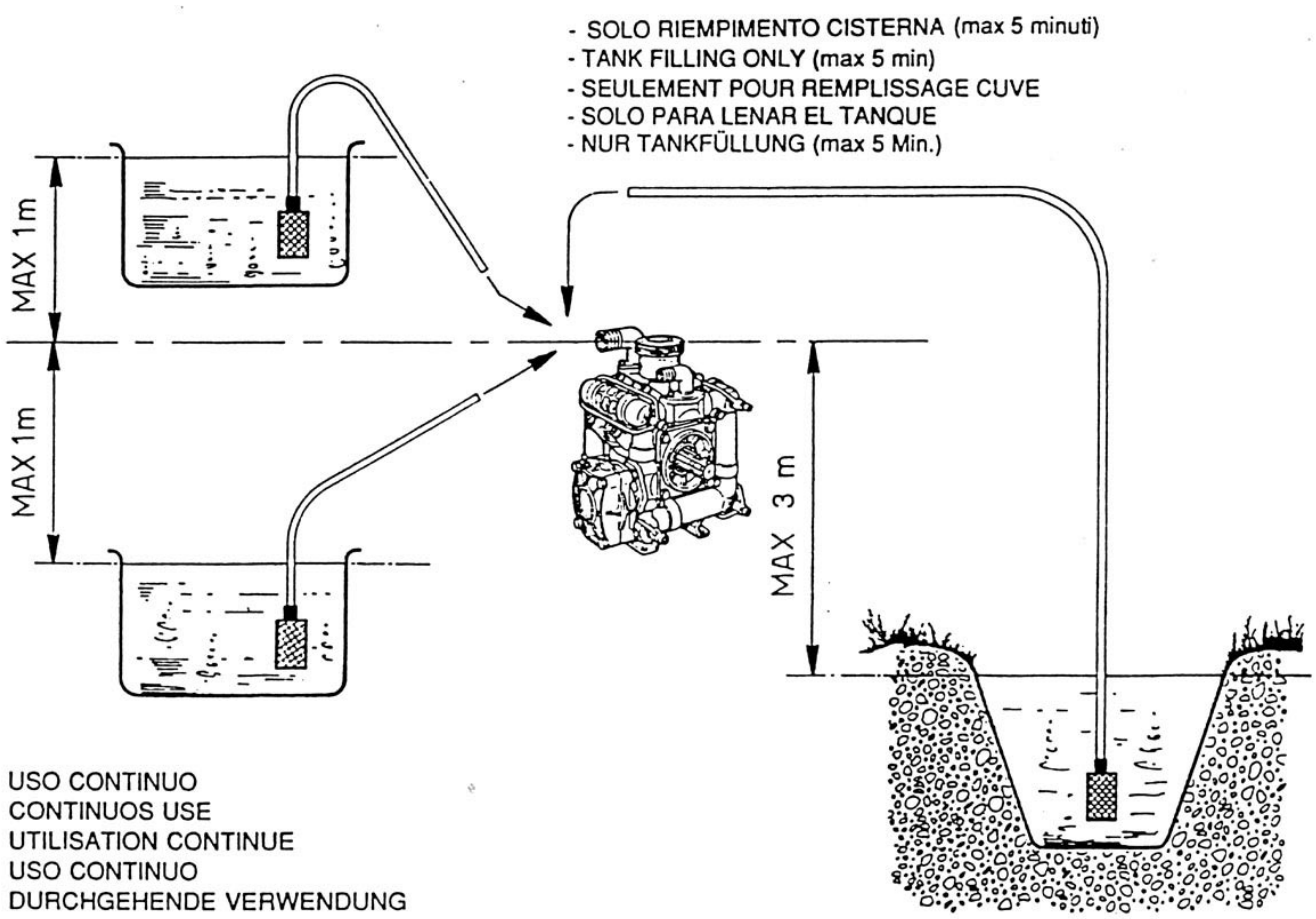
ATTENTION
The cylinder sleeve holes must be oriented as you see on the picture



NOTES ON APPLICATION
WITH DIAPHRAGM PUMPS

SUCTION "HEIGHT"

- Continuous Use: max +/- 1 meter (referred to pump)
- Intermittent Use: max 3 meter of depth (followed by continuous use)
- It's forbidden any connection to pressure pipe lines (i.e. aqueduct or surge tank)



SUCTION HOSE

- Use only COMET couplings on pumps
- Internal diameter equal or superior of external diameter of COMET couplings
- Total length not excessive (max 3-4 meters)
- Material rigid enough or spirald and unde-formable under working condition (chemical product, environment conditions)
- Minimum working pressure 10 bar
- Use suction strainers with adequate dimensions (filtering surface at least 250 mm2 every 100 Lt/min from the pump) and with an adequate net (30 / 50 MESH)
- All devices mounted on suction hose (taps, fittings, etc) must have diameters equal or superior of external diameter of COMET couplings
- Avoid kinks on suction hoses
- Accurate mounting of hose on stainer and couplings with hose clamps, in order to avoid air suctions

DELIVERY HOSE

- Use hoses with working pressure from 1,5 to 2 times higher than pump's maximum pressure
- Unde-formable under working condition (chemical product, environment conditions)
- Between pump and regulation valve use an hose adequate to pump's coupling
- After the regulation valve the diameter of hose has no effect on the pump but only on the effective pressure at the nozzle
- Avoid use of metal hoses directly at pump's outlet (they could generate vibrations) only use rubber hoses

BY-PASS HOSE

- Use hoses with internal diameter equal or superior of external diameter of COMET regulation control by-pass coupling
- Material rigid enough or spirald and unde-formable under working condition (chemical product, environment conditions)
- Minimum working pressure 10 bar
- Ensure backflow to the tank (especially if there is an eddy) avoid any obstruction. Do not install taps along the hose

WORKING TEMPERATURE

- The maximum inlet temperature is 40 °C (104 °F); for higher temperature use piston pumps (up to 60 °C) (140 °F)
- The minimum inlet temperature is 5°C (41 °F)
- For pumps that remain with temperatures close O°C (32 °F) follow those instructions:

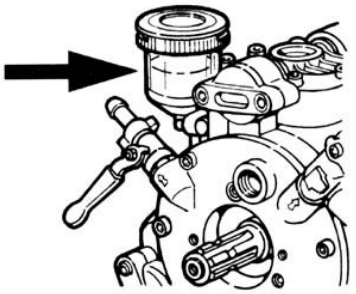
    - Discharge the pump leaving the pump running for 1 minute without water (sufficient in most cases)
    - Circulate anti-freeze (much safer)
    - Open and check suction and delivery valves (much safer)
    - Before starting the pump, make sure that there isn't ice in the pump

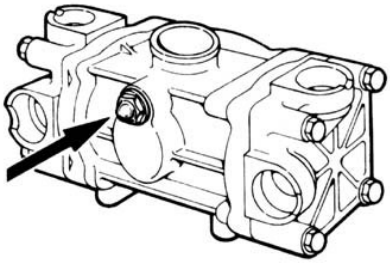
VERIFY PUMP'S RPM (from 400 to 550 Rpm)

- Direct measurement with revolution counter (on pump's through shaft, or on Tractor PTO)
- Misura indiretta con tachimetro trattore

OIL PUMP CHECK

- Verify oil level when pump is off (every 300 hours)
- To re-fill use oil **AGIP MOTOR OIL HD 20W/40** or correspondent products:
    - SAE 20W/40 **MIL-L-46152 C**
    - CCMC G2-D1
    - API SF/CC





LOW PRESSURE DIAPHRAGM PUMPS
BP SERIES

GENERAL FEATURES

- Parts in contact with liquid are made in plastic material and plastic coated aluminium (except models BP20/15 e BP40/15)
- External manifolds (except model BP20/15)
- Materials resistant against aggressive chemical products
- Special version for liquid fertilizer

USE

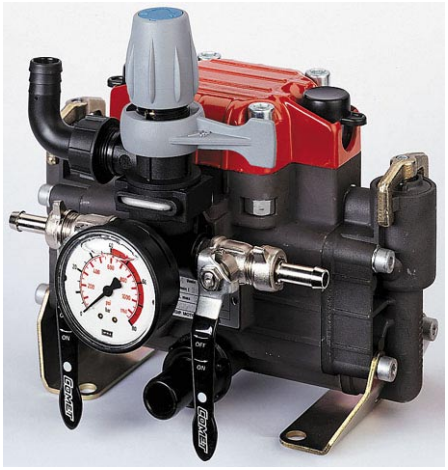
- Trailer mounted weeders (from BP60 to BP235)
- Towed and semi-towed systems for weeding (from BP151 to BP305)
- Weed control and liquid fertilizer treatments (BP20 e BP40/15)

APPLICATIONS

- 1"3/8 male PTO with mounting bracket (BP20-40-60-105-125): on trailed, mounted and self-propelled systems
- Solid shaft 30mm with mounting bracket (BP20-40-60-105-125): on trailed, mounted and self-propelled systems
- 1"3/8 – 30mm through shaft 1"3/8 - 030cii. with mounting bracket (BP151-205 - 235- 280 - 265 305): with eventual use for other auxiliary devices
- Quick coupling 1”3/8 6 spl. (BP20-40-60-105-125): on trailed, with direct application on tractor’s PTO

MEDIUM PRESSURE DIAPHRAGM PUMPS
MP SERIES

GENERAL FEATURES



- Parts in contact with liquid are in anodised aluminium (MP20-30) or plastic material (P48)
- Internal manifolds (MP20-30) or External manifolds (P48)
- Materials in contact with liquid are highly resistant to corrosion
- Compact construction
- Easily applied to small machines

USE

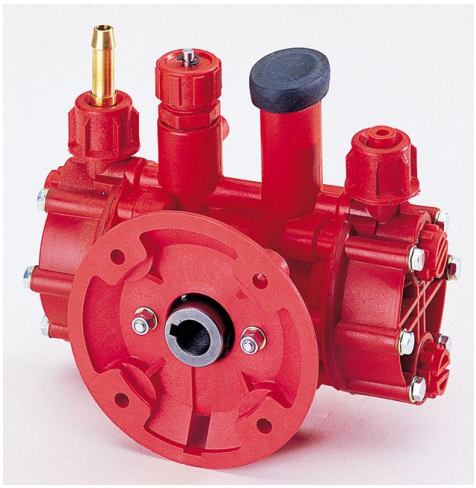
- Trailer mounted dusters
- Walking tractor
- Tractor
- Motor-pump applications

APPLICATIONS

- Flanged to hydraulic motor
- Solis cylindric Shaft 30mm
- 6 holes shaft
- 1” 3/8 male PTO
- Pulley
- Coupled to over-gearbox
- Gearbox applications
- Quick coupling 1”3/8 6 spl.

DIAPHRAGM PUMPS FOR SMALL SPRAYING JOBS
MC SERIES

GENERAL FEATURES



- Parts in contact with liquid are resistant to chemical products used in agriculture
- Internal manifolds
- Compact construction
- Easily applied to small machines

USE

- For sprayings and pest control in gardens
- Garden-houses
- Lawns
- Small area crops
- Industrial use
- Direct application to motor-pumps

APPLICATIONS

- Electrical single/three phase motor
- Two and Four stroke gas engines
- 1”3/8 male PTO
- Pulley
- Solid shaft 17mm

HIGH PRESSURE DIAPHRAGM PUMPS
APS SERIES

GENERAL FEATURES

- Parts in contact with liquid are in anodised aluminium and resistant to corrosion
- Internal manifolds
- High level of regular pumping and minimum noise
- Easy suction/delivery valve inspection
- Safety valve (except APS 51) and taps on manifold

USE

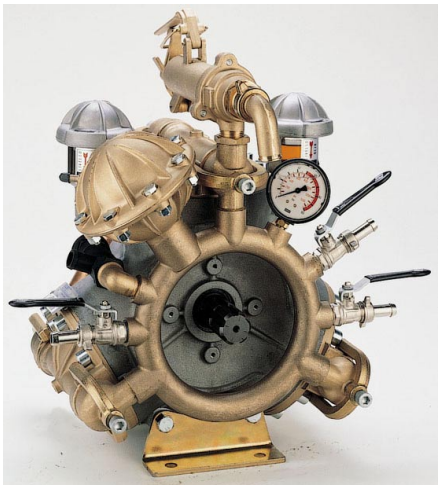
- Tractor weeder
- Trailer mounted weeder
- Sprayer applications
- Tractor
- Walking tractors
- Motor-pump units

APPLICATIONS

- Throughshaft 1” 3/8 Male - 1” 3/8 Male
- Throughshaft 1” 3/8 Male - 1” 3/8 Female
- Throughshaft 1” 3/8 Male – 6 holes 1” 3/8 Female
- 6 holes throughshaft conical 20mm
- 6 holes shaft
- 1” 3/8 male PTO
- Pulley
- Coupled to over-gearbox
- Gearbox applications
- Quick coupling 1”3/8 6 spl.
- Flanged to hydraulic motor
- Flanged to hydraulic pump
- Flanged to over-gearbox

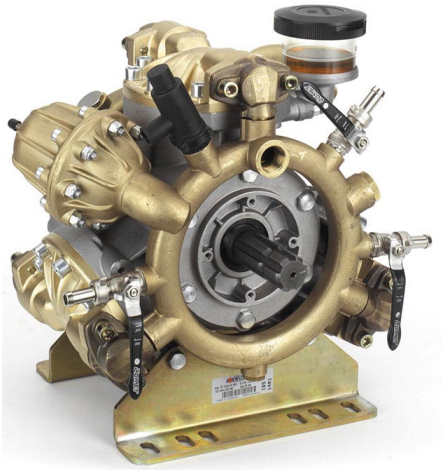
HIGH PRESSURE DIAPHRAGM PUMPS
IDS SERIES

GENERAL FEATURES



- Parts in contact with liquid are brass for maximum resistance to corrosion
- External manifolds
- Available with Regulation Valve
- The best performance in terms of reliability and long life. High level of regular pumping and minimum noise
- Safety valve and taps on manifold

USE



- Tractor duster
- Trailer mounted duster
- Sprayer applications
- Tractor

APPLICATIONS

- Throughshaft 1” 3/8 Male - 1” 3/8 Male
- Throughshaft 1” 3/8 Male – 6 holes 1” 3/8 Female
- Gearbox applications
- Pulley
- Flanged to over-gearbox
- Flanged to hydraulic motor