



*edizione italiana*

# OIL LUBRICATION

## TOTAL LOSS OIL LUBRICATION

Used in a large range of applications, total loss oil lubrication involves creating a thin oil-film between moving parts which is renewed at regular intervals by an automated lubrication system.

### System 33V - Positive Displacement Injectors.

The 33V Injector System consists of the latest **direct positive displacement injector** technology developed by Dropsa.

This technology provides precise and failsafe dosage of oil independent of viscosity, temperature or pressure.

Additionally, the new cartridge format allows substantial new application possibilities. Also it is entirely produced, assembled and tested on an automated production line offering unprecedented value for money and quality.

When combined with a competitive pump package such as the electrically driven Smart Pump, a high performance system can be obtained at prices previously only available on Manual Orifice systems.

Our push-lock system allows further reduction in installation costs.



System 33V



## Orifice System 01

An alternative to the 33V for entry level low cost manual systems.

The 01 System consists of meter units (calibrated 'orifices') that balance the distribution line pressure and divide the oil from the pump proportionally across the meter units.

A Smile pump with an 01 system represents one of the lowest priced entry level centralized lubrication systems on the market today whilst maintaining high reliability and appearance.



System 01

## PUMP PACKAGES :

Dropsa has developed a wide range of standard electric, pneumatic and hydraulic pump packages suitable for Oil loss systems. A custom design service is available to tailor pump packages to specific customer applications.



OIL LUBRICATION

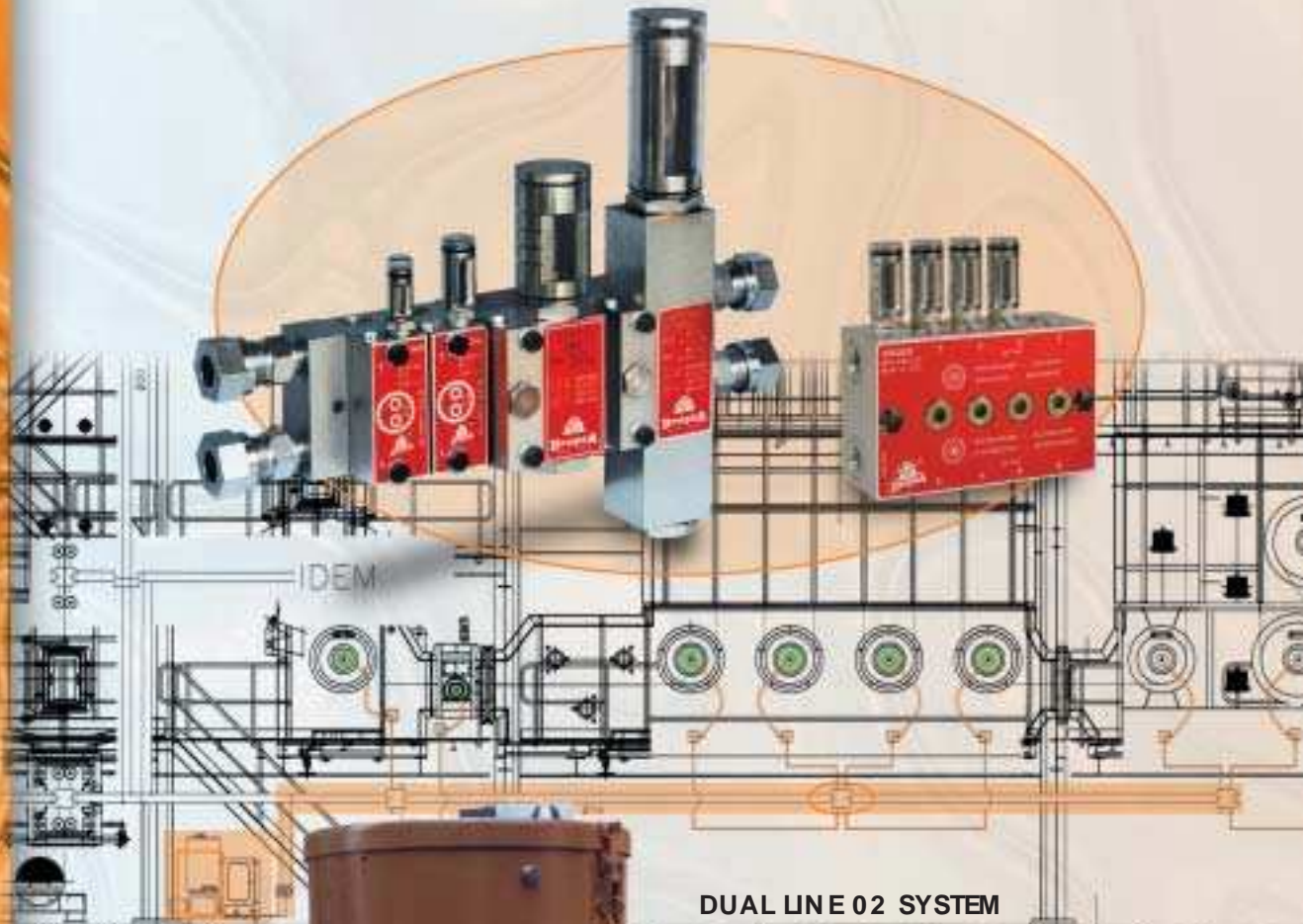
# GREASE LUBRICATION

## GREASE LUBRICATION

Grease lubrication has a wide field of application ranging from small machines such as woodworking machinery to large heavy industry such as Steel Plants or Paper Mills.

Dropsa provides an extensive line of equipment for grease lubrication and system monitoring. The most popular systems used for grease lubrication are Dual Line and Progressive Divider.

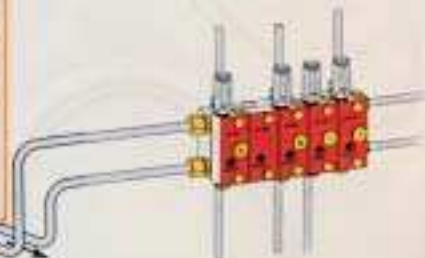
The Modular design pioneered by Dropsa allows easy configuration and expandability of the system. Active components can be substituted during maintenance without the need to disrupt the interconnecting pipe-work.



### DUAL LINE 02 SYSTEM

Found traditionally on more complex heavy industrial machinery such as Steel Plants, the key characteristics of the Dual line system are simplicity and reliability particularly in harsh environmental conditions. In the event of one lubrication point becoming blocked or failing, the remainder of the system is not affected and continues working without problems. Dual Line systems often can exceed 60 meters in length.

The large selection of pump packages together with many custom design options allows any grease application to be developed reliably and cost-effectively.

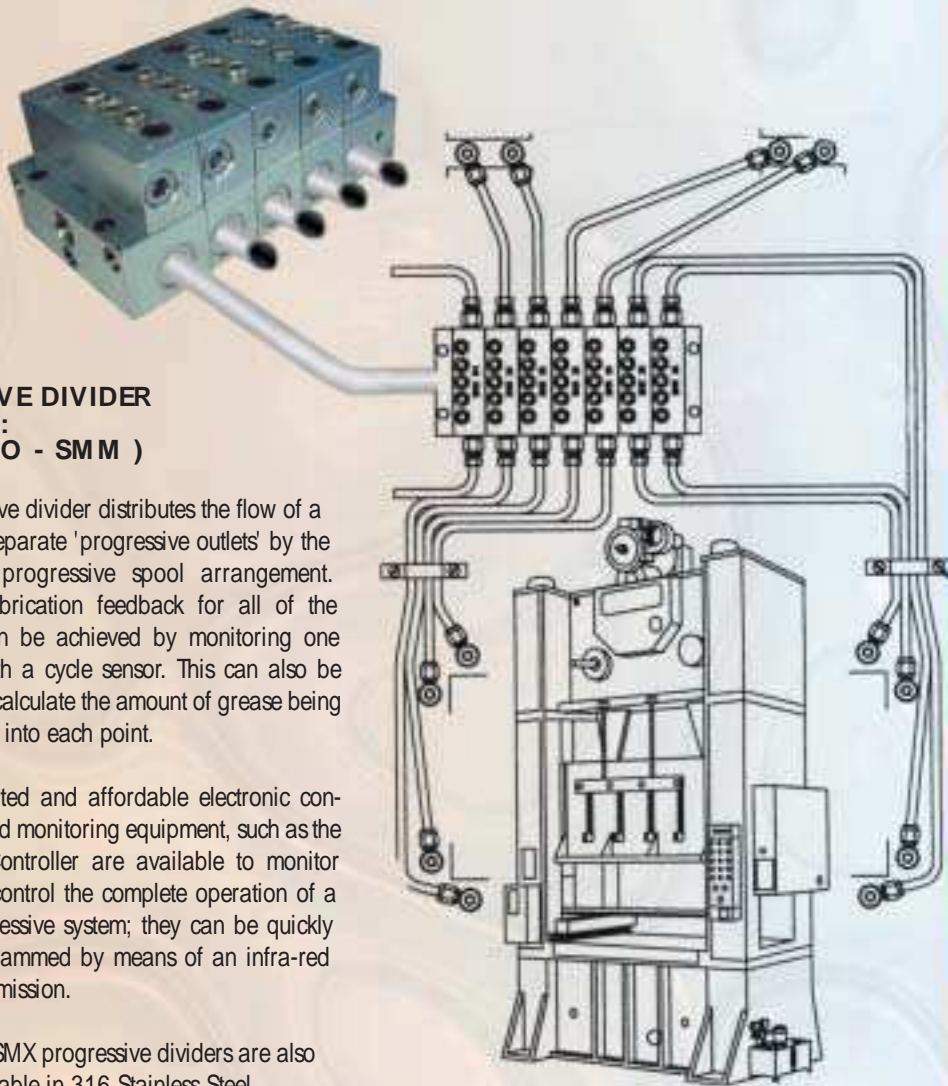


**PROGRESSIVE DIVIDER  
SYSTEM 26:  
(SMX - SMO - SMM )**

The Progressive divider distributes the flow of a pump into separate 'progressive outlets' by the use of a progressive spool arrangement. Positive lubrication feedback for all of the points can be achieved by monitoring one outlet with a cycle sensor. This can also be used to calculate the amount of grease being injected into each point.

Dedicated and affordable electronic control and monitoring equipment, such as the VIP Controller are available to monitor and control the complete operation of a progressive system; they can be quickly programmed by means of an infra-red transmission.

The SMX progressive dividers are also available in 316 Stainless Steel.



**GREASE LUBRICATION**

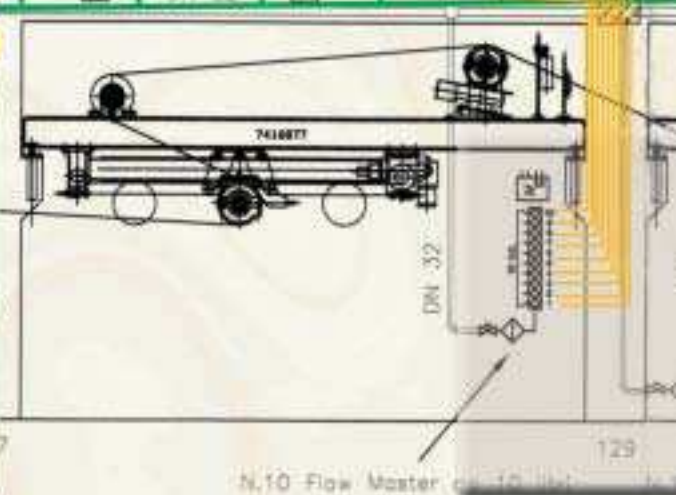
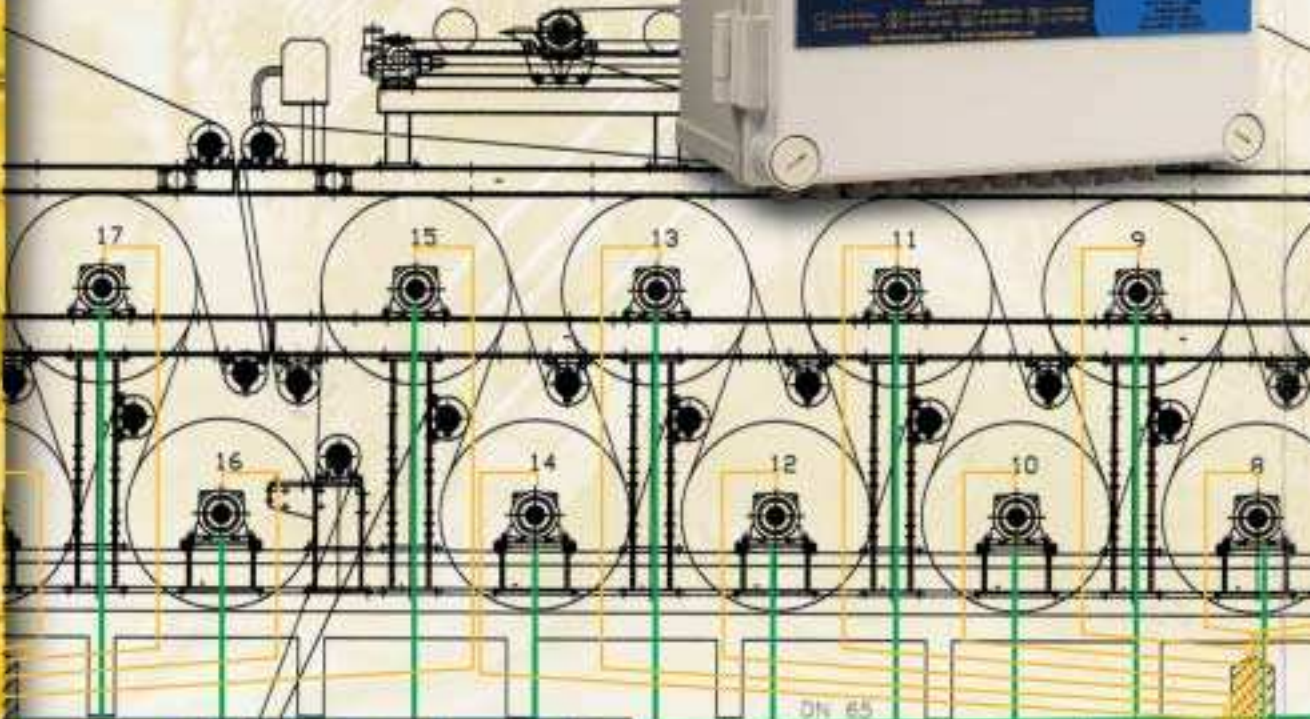
# RE-CIRCULATING OIL

## CONTINUOUS OIL RE-CIRCULATION

Oil re-circulation involves a continuous oil flow to the lubrication point. The oil is collected by drains to a supply tank and re-circulated back to the point. The pump station is equipped with cooling, heating and instrumentation to maintain the lubricant at optimal temperature.



FACT-2000



Example of a paper mill recirculating lubrication system

In an oil re-circulation system the bearing housing is kept full of oil whilst the fast change-over of lubricant removes heat allowing the user increases in speed and performance.

The key to a good lubrication system is the careful monitoring of the lubricant supply - Dropsa has one of the most advanced systems available to achieve this.

### FACT-2000

The FACT2000 Controller is a dedicated controller that provides monitoring capability for up to 64 Flowmaster Modules and allows the user to visualize in real time the flow and status of each lubrication point.

With the optional servomotors fitted to the Flowmaster the FACT-2000 controller can adjust the flow rates on a point-by-point basis without the need for a maintenance engineer to manually regulate the device on the spot - that can be inaccessible or dangerous when the machinery is running.



Typical Flow master assembly

### FLOW MASTER

The *Flow master* is a volumetric flow device which provides a constant positive feedback. Being volumetric the measurements are independent of temperature or viscosity ensuring accurate reading without the need for calibration or compensation.

Optionally the Flowmaster has a servomotor module that allows automatic closed-loop adjustment of the flow based on operating parameters.



FLOW MASTER

### PROJECT MANAGEMENT

Dropsa provides a complete project management service including site survey, pump station design, manufacture, installation and turn-key implementation of Oil Re-circulation systems.

Simply call one of our technical sales engineers to get started.

RE-CIRCULATING OIL

# AIR/OIL LUBRICATION

## AIR / OIL LUBRICATION

Air/ Oil lubrication is a relatively new emergent lubrication system. The recent developments in lubricant technology have expanded air/ oil lubrication to dry machining applications.

It has also replaced many mist systems due to their negative environmental impact.

The air stream, that normally operates continuously, provides both a transport for the oil to the lubrication point and cooling.

The oil - injected into the air stream at regular intervals- coats the surfaces to be lubricated and reduces friction and wear.

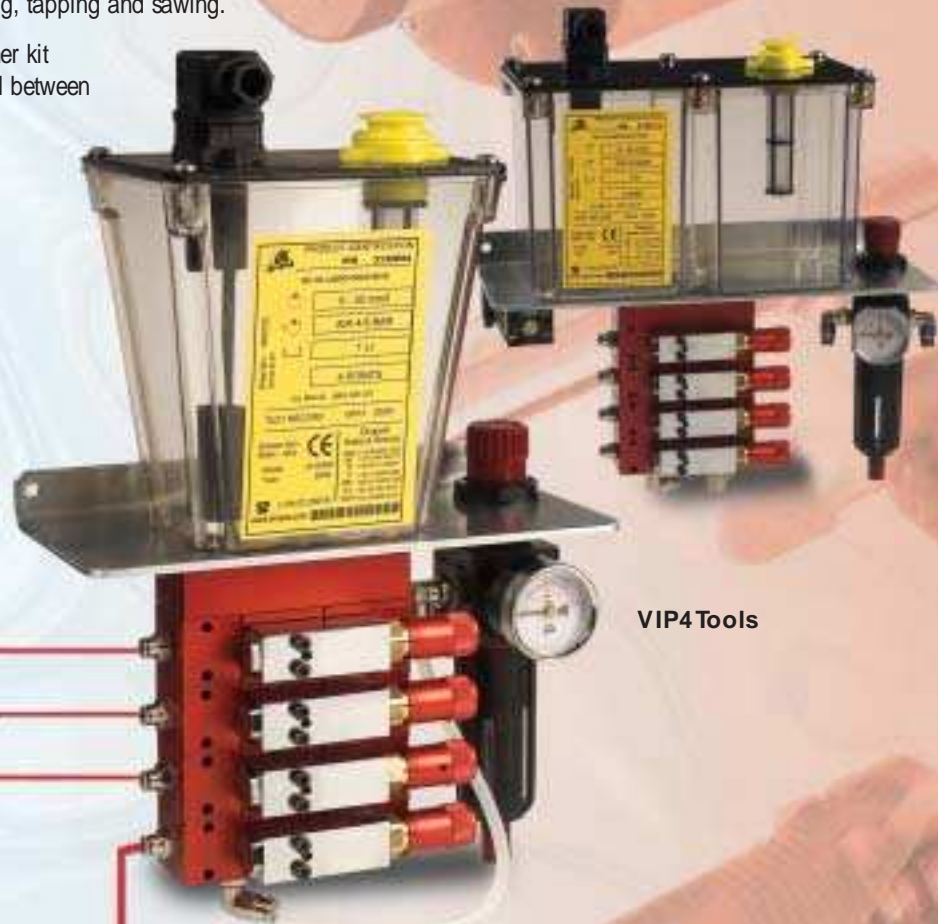
Dropsa offers many articulated solutions to Air/ Oil lubrication - the VIP4 Family of products is the latest addition to this range.

### VIP4Tools

#### Dry Machining and Tool Lubrication.

A simple yet effective system without the need for electronic monitoring. It is ideal for dry machining applications such as milling, drilling, tapping and sawing.

Either a Solenoid or Pneumatic timer kit can be used to set the time interval between lubrication cycles. On this system, manually adjustable micro-pumps are used. This allows the user to individually set each point from 0 - 30 mm<sup>3</sup> per cycle.



VIP4Tools





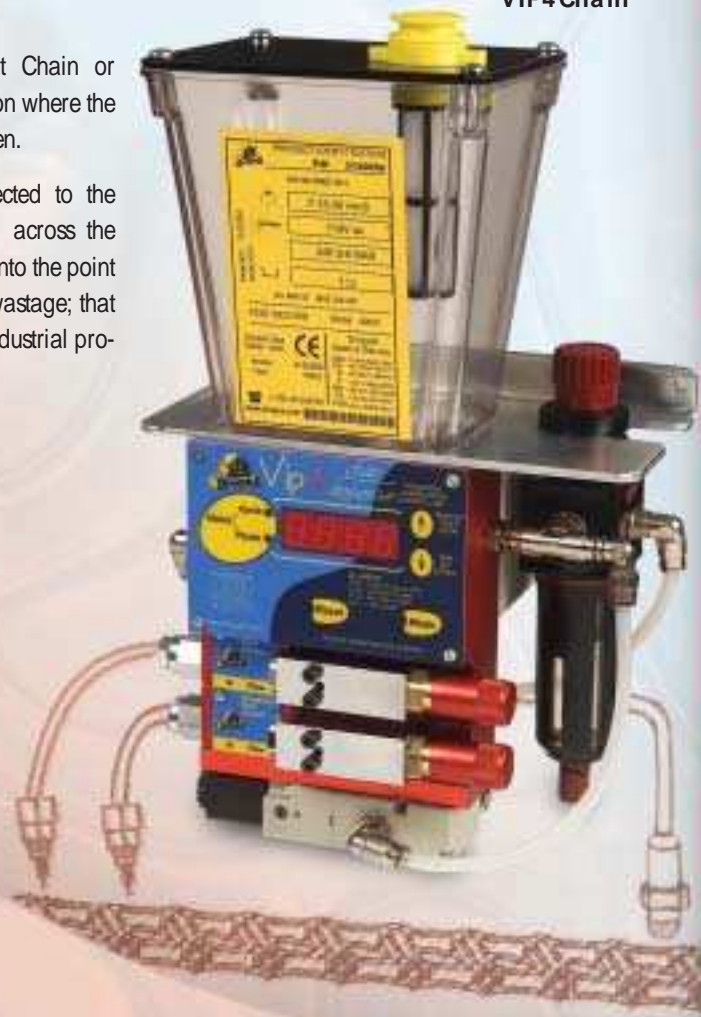
## VIP4Chain

### Conveyor and Chain Lubrication

A variant of the VIP4Air, specifically aimed at Chain or Conveyor application can be used on any application where the lubrication cycle is not time-driven but impulse driven.

On a typical chain application, a sensor connected to the Vip4Chain monitors the number or links passing across the lubrication nozzle and fires a micro quantity of oil onto the point increasing chain or conveyor life without lubricant wastage; that often can drip off the chain and contaminate the industrial process.

VIP4Chain



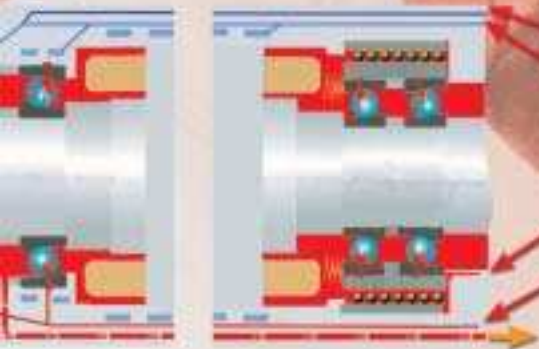
## VIP4Air

### Spindle, Bearing and Gear Lubrication.

Minimal lubrication involves minuscule oil quantities with frequent lubrication intervals. This leads to micro precise quantity requirements, typically around  $0.005 \text{ cm}^3$  - one sixth of a drop of oil - in order to avoid long periods between lubrication cycles. A critical condition exists that should a lubrication system fail to meter this quantity, significant machinery damage could result - such as a spindle failure.

The VIP4Air System offers one of the most compact and feature-rich air/ oil systems available for spindles. It is able to achieve a significantly reduced amount of lubricant dispensing and monitoring via a unique differential magnetic field monitoring concept. Positive feedback is a must for such systems!

VIP4Air



AIR/OIL LUBRICATION

### Characteristics

- A simple inline design with highly efficient flow dynamic minimizing pressure drop.
- Standard SAE-12 fittings SAE-10
- Built from Aluminum Alloy or Stainless Steel
- Small and efficient system protection
- Bi-directional
- Two core in-line unit
- Max. operating temperature 302° F (150 ° C)  
Aluminum: 3,000 psi (200 bar)  
Stainless: 6,000 psi (414 bar)
- Burst pressure  
Aluminum: 16,000psi (1103 bar)  
Stainless: 1655 bar (24,000psi)

### Applications

- Hydraulics
- Engine Protection
- Lubrication Oils
- Fuel
- Transmissions
- Ideal for critical component protection in smaller transmissions, lines and hydraulic systems including auto-motive diesel.

Magnom filters can be used for various types of liquids (water, tar, oils, lubricants, coolants, cutting, fuel, hydraulic fluids and transmission), and working conditions characterized by different pressure, viscosity, temperature and flow rate.

## Magnom CP

### Bi-directional magnetic in-line filters for plant liquids, gases and greases

Built from Aluminum Alloy or Stainless Steel, the Circuit Protection Unit CP is a small 2 core Magnom™ in-line unit.

The CP has a very high pressure capability making it highly suitable for a variety of industrial and hydraulic applications. In particular it is designed to protect key components, such as pumps and valves in fluid circuits.

*Magnom™ magnetic filters* excel at extracting abrasive ferrous particles from fluid systems - thus removing the major cause of wear, performance drop, system failure or product damage

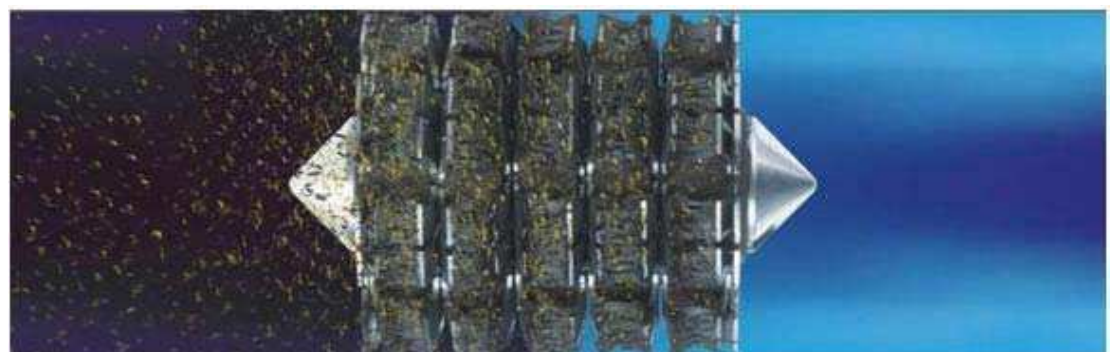


### Why use a Magnom technology Magnetic Filters to eradicate microscopic ferrous particles?

Microscopic ferrous particles damage industrial fluid systems & degrade finished products. **Magnetic Filters** are the solution to ferrous contamination of industrial fluids.

Microscopic ferrous particles tend to be the hardest material found in industrial fluids, water or gas systems. In turn, they cause wear on softer materials in the system and this causes a chain reaction that results in larger non ferrous wear particles .

By eliminating the microscopic ferrous particles, the primary cause of all subsequent wear is removed and therefore system cleanliness is greatly increased.



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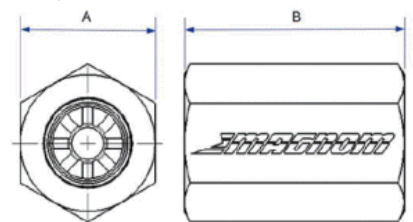
Magnom™ core elements are comprised of an annular magnet and two innovatively formed steel plates. The steel plates direct the lubricant flow and magnetic flux through channels designed to bring all the ferrous contaminants in the lubricant within the range of the magnets.

The plates also multiply the force of the magnet increasing dramatically the capturing force of the core. Finally, the plates create a “collection zone” out of the normal flow path of the lubricant, preventing re-introduction of the contaminants into the flow stream.

TECHNICAL CHARACTERISTICS	
MOUNTING METHOD	In-line
FLOW DIRECTION	Bi-directional
CONSTRUCTION MATERIALS	
Housing	Stainless Steel or Aluminum Alloy
Mandrel	Aluminum Alloy
Flux Plate	Mild Steel
Magnet	Samarium Cobalt (SmCo)
FLUID COMPATIBILITY	Compatible with a wide range of mobile hydraulic and lubricating fluids, petroleum oils, synthetic fluids, water-glycols, water emulsions.
MAX. OPERATING TEMP.	302° F (150 °C)
PORT SIZE	SAE- 12 Standard – SAE - 10



Stop the Chain Reaction of Wear!



**Order Information**

INFORMATION ON WEIGHT AND DIMENSIONS						
PART NUMBER	WEIGHT	(A) mm	(B) mm	MATERIAL	BURST PRESSURE	MAX. OPERATING PRESSURE
1525195	5.6 oz (160 g)	33	65	CP-10 Aluminium	16,000 psi (1103 bar)	3000 psi (207 bar)
1525197	14.5 oz (410 g)	33	65	CP-10 Stainless Steel	24,000 psi (1655 bar)	6000 psi (414 bar)
1525196	16 oz (454 g)	44.5	72	CP-12 Aluminium	16,000 psi (1103 bar)	3000 psi (207 bar)
1525198	24 oz (681 g)	44.5	72	CP-12 Stainless Steel	24,000 psi (1655 bar)	6000psi (414 bar)

### Characteristics

- Fine filtration without risk of pump cavitation
- Negligible pressure drop & full fluid flow even when full of contaminant
- Removes ferrous and some nonferrous particles down to submicron sizes
- Contaminant storage without 'wash off' of collected particles
- Bi-directional operation
- Compatible with a wide range of petroleum oils, synthetic fluids, water-glycols, hydraulic & lubricating fluids and gases

### Applications

- Hydraulics
- Transmissions
- Fuel
- Lubrication Oils
- Coolants

# Magnom PumpMate

## Magnetic filters of aspiration for systems liquids, gas and grease

The Magnom™ PumpMate Magnetic Filter (Magnetic Suction Strainer) is specifically designed to protect hydraulic pumps on the suction side, inside the tank (reservoir).

The patented design filters the suction side of pumps. Unlike a standard Suction Strainer which really is NOT a filter Magnom™ provides the performance of a 1 micron absolute hydraulic filter cartridge on the suction side of a pump. This is accomplished without wash-off of collected particles as seen with standard magnetic filters, suction strainers or standard hydraulic filters.



This is a generational leap in technology for the protection of critical hydraulic and lubrication pumps with virtually no pressure drop or restriction to flow, even when the PumpMate unit is 'full' of contaminant.

With negligible risk of pump cavitation, the Magnom™ PumpMate removes fine ferrous and some nonferrous materials to sub-micron levels and has a very high contaminant holding capacity, offering OEMs and Operators a true 'fit and forget' solution

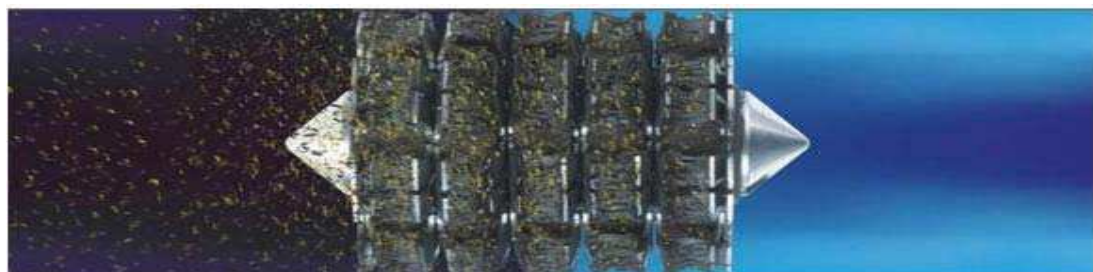
## Why use a Magnom technology Magnetic Filters to eradicate microscopic ferrous particles?

Microscopic ferrous particles damage industrial fluid systems & degrade finished products. **Magnetic Filters** are the solution to ferrous contamination of industrial fluids.

Microscopic ferrous particles tend to be the hardest material found in industrial fluids, water or gas systems. In turn, they cause wear on softer materials in the system and this causes a chain reaction that results in larger non ferrous wear particles .

By eliminating the microscopic ferrous particles, the primary cause of all subsequent wear is removed and therefore system cleanliness is greatly increased.

Magnom filters can be used for various types of liquids (water, tar, oils, lubricants, coolants, cutting, fuel, hydraulic fluids and transmission), and working conditions characterized by different pressure, viscosity, temperature and flow rate.



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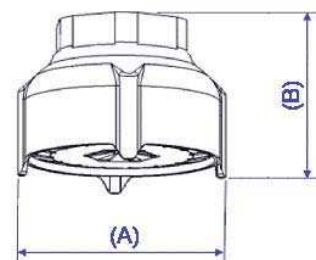
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The plates also multiply the force of the magnet increasing dramatically the capturing force of the core. Finally, the plates create a “collection zone” out of the normal flow path of the lubricant, preventing re-introduction of the contaminants into the flow stream.

TECHNICAL CHARACTERISTICS	
MOUNTING METHOD	Suction-Line
FLOW DIRECTION	Bi-directional
CONSTRUCTION MATERIALS	
Housing	Acetal
Flux Plate	Chemically Blackened or Mild Steel
Magnet	C8 Ceramic Ferrite
HOUSING PRESSURE AND TEMPERATURE RATING	
Max. Operating Pressure	Not applicable (Suction Unit)
Burst Pressure	Not applicable (Suction Unit)
Max. Temperature	212° F (100°C)
FLUID COMPATIBILITY	Compatible with a wide range of petroleum oils, synthetic fluids, water-glycols, water emulsions, hydraulic and lubrication fluids.



Stop the Chain Reaction of Wear!



Order Information

INFORMATION ON WEIGHT AND DIMENSIONS					
PART NUMBER	UNIT	WEIGHT	(A)	(B)	CONTAMINANT CAPACITY
1525189	¾" BSPP	1 lb 5oz (600 g)	3 ⅜" (86 mm)	3 ⅛" (80 mm)	140 g
1525190	1" BSPP	1 lb 5oz (600 g)	3 ⅜" (86 mm)	3 ⅛" (80 mm)	140 g
1525191	1 ¼" BSPP	1 lb 5oz (600 g)	3 ⅜" (86 mm)	3 ⅛" (80 mm)	140 g
1525192	1 ½" BSPP	2 lb 5oz (1050 g)	4 ¾" (122 mm)	3 ¾" (95 mm)	200 g
1525193	2" BSPP	2 lb 5oz (1050 g)	4 ¾" (122 mm)	3 ¾" (95 mm)	200 g
1525194	3" BSPP	2 lb 5oz (2450 g)	7 ⅝" (186 mm)	4 ⅝" (118 mm)	400 g

### Characteristics

- Mounted in line need a minimum space
- Compact and efficient
- Bi-directional flow
- Two core unit
- Max. Operating pressure: 1,500psi (104bar)
- Burst Pressure: 10,000psi (695 bar)

### Applications

- Hydraulics
- Engine Protection
- Lubrication Oils
- Fuel
- Ideal for critical component protection in smaller transmissions, lines and hydraulic systems including auto-motive diesel.

# Magnom MINI – MIDI - MAXI

## Bi-directional magnetic in-line filters for plant liquids, gases and greases

The bi-directional unit **mini, midi and max** is a compact small unit in-line adapted to very high pressure for hydraulic transmissions and fuels.

Consists of a double magnetic element threaded on both sides.

There are three units:

**MINI:** It is the ideal choice for critical component protection in smaller transmissions, for use on hydraulic lines, and “on vehicle” automotive systems, including fuel lines.

**MIDI:** Built from Aluminum Alloy, is a 2 core Magnom™ in-line unit that has a high pressure capability making it suitable for a variety of industrial and hydraulic applications.

**MAXI:** Has been specifically designed for the needs of the off highway vehicle market. It is the Magnom™ of choice for fitment to many larger off highway vehicle transmissions and hydraulic systems, where it uses the patented Magnom™ technology to provide critical component protection.



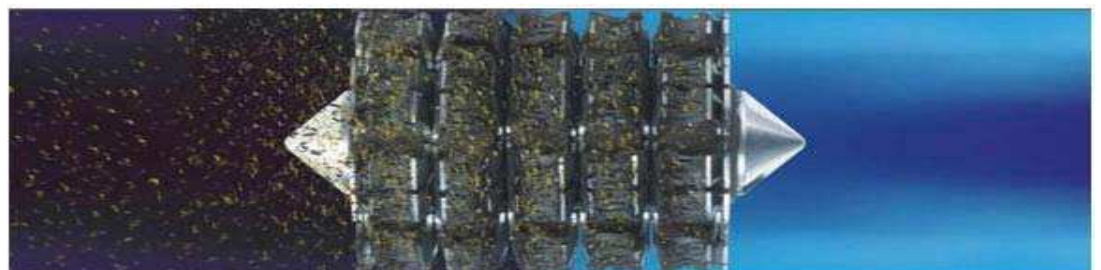
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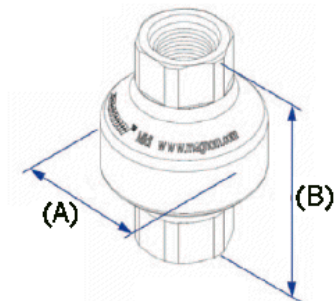
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TECHNICAL CHARACTERISTICS	
<b>MOUNTING METHOD</b>	In-line
<b>FLOW DIRECTION</b>	Bi-direzionale
CONSTRUCTION MATERIALS	
Housing	Aluminum Alloy
Mandrel	Aluminum Alloy
Flux Plate	Mild Steel
Magnet	Ceramic Ferrite
C-Clip	Steel
O-ring	Viton
Back up -ring	PTFE
<b>FLUID COMPATIBILITY</b>	Compatible with a wide range of mobile hydraulic and lubricating fluids, petroleum oils, synthetic fluids, water-glycols, water emulsions.
<b>MAX. OPERATING PRESSURE</b>	1500psi (100 bar)
<b>BURST PRESSURE</b>	Mini - 10.000 psi( 690 bar) Midi - 7000 psi (480 bar) Maxi – 6000 psi (410 bar)
<b>MAX. OPERATING TEMP.</b>	248 °F (120°C)



Stop The Chain Reaction Of Wear!



**Order Information**

INFORMATION ON WEIGHT AND DIMENSIONS						
PART NUMBER	UNIT	WEIGHT	(A)	(B)	PORT CONNECTIONS	SPARE PARTS
1525187	Mini	8oz (210 g)	1 7/8" (48 mm)	3" (78 mm)	SAE - 8	1525204
1525188	Midi	1 lb 2oz (480 g)	2 7/8" (73 mm)	3 7/8" (98 mm)	SAE – 12	1525205
1525199	Maxi	2 lb 10oz (1170 g)	4 1/4" (108 mm)	4 1/4" (107mm)	SAE - 20	1525206

## Characteristics

- **Ultra Small:**  
smallest sensor on the market today.  
Small size means easier installation on tricky machinery.
- **Ultra fast:**  
no mechanical moving parts means the sensor can read any practical cycle speed.
- **Ultra reliable:**  
completely solid state operation for high reliability and durability.
- **IP 67 protection**
- **Fully potted solid state device:**  
means circuit is isolated from the environment.
- **360° Led monitoring:**  
allows you to see signal status from any angle.
- **NPN and PNP:**  
both included as standard.
- **M12 connector:**  
automotive specifications provides robust wiring solutions.

## Applications

- Any SMX or SMP system.

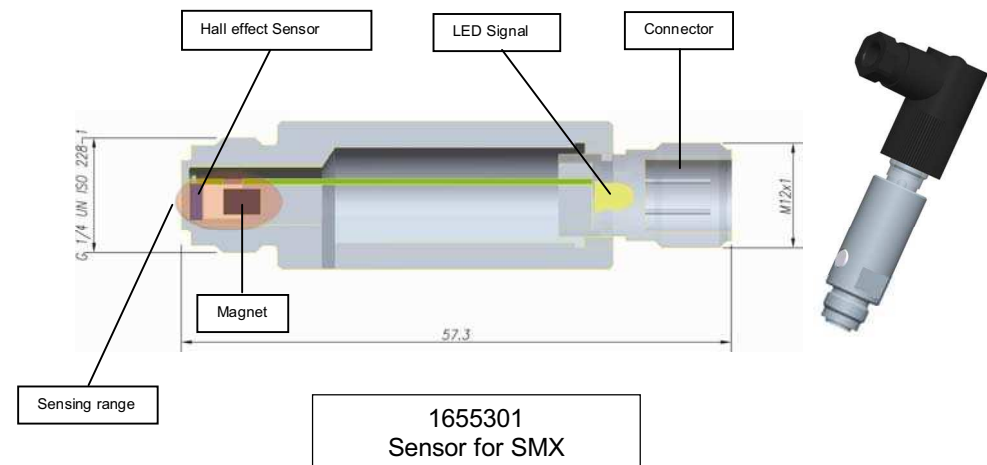
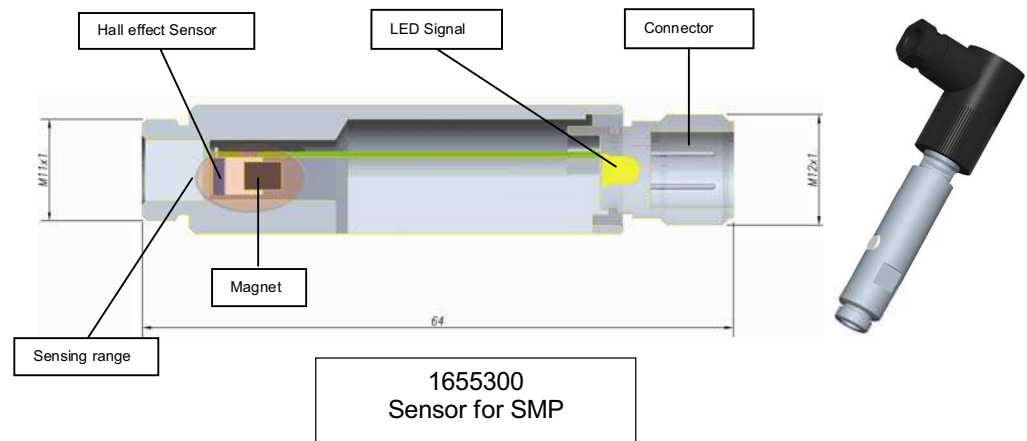
### Patented:

*UltraSensor* technology is protected by international patents.

Patent: **US 20080284415 A1**

# UltraSensor

## Ultra small, Ultra fast, Ultra reliable



The UltraSensor has been designed as a next generation replacement of Proximity and Micro switch systems for monitoring spool movement in progressive divider elements.

A single model will work with all standard SMX and SMP divider blocks as a screw-on accessory without requiring special arrangement or modification to the spool.

The patented concept works by monitoring magnetic flux variations through a hall-effect sensor as the spool enters the sensing range. There are no moving parts which means the solid state device is completely wear free.

NPN and PNP connection options are standard within the same sensor.



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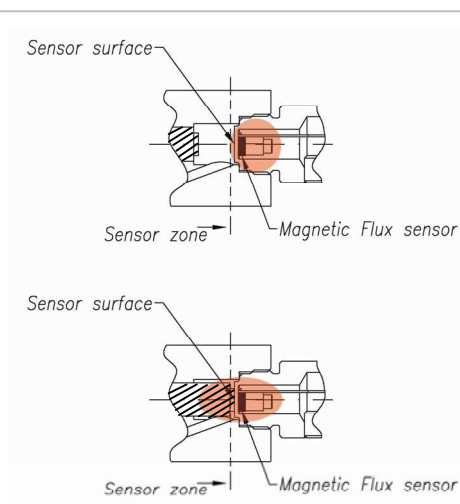
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## Technical Information

### TECHNICAL CHARACTERISTICS

Material	AISI 316	Protection degree	IP 67
Max. Cycle per minute	1000	Operating temperature	-10 °C ÷ +60 °C (-4 °F ÷ +158 °F)
Voltage	8 ÷ 28 V DC	Connector	M12x1
Short circuit protection	YES	Output signals	NPN 2A N.O. PNP 0,7A N.O.

## Operating Principle

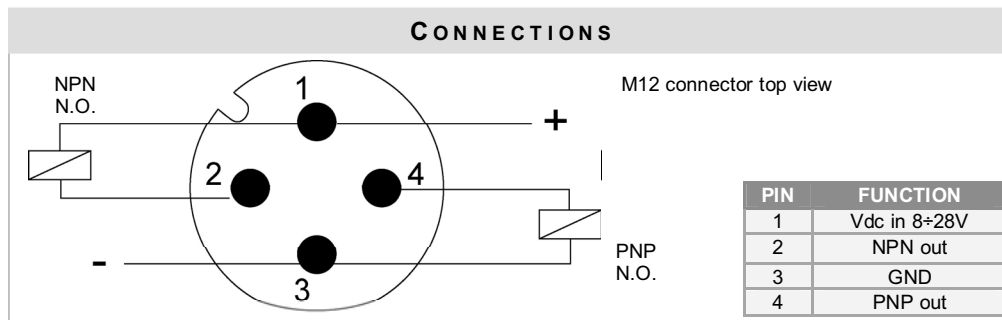


Normally, the magnetic field is balanced around the hall sensor.

With the spool in the sensing range, the flux density is modified allowing the hall effect sensor to detect the presence of the spool.

The use of a Magnetic Flux variation allows an extended sensing zone which avoids problems on systems with low flow rates and backpressure where the spool can often stop or bounce on the sensing surface.

## CONNECTIONS



## Ordering Information

Part. No.	Description
1655300	Sensor for SMP
1655301	Sensor for SMX
39999	Connector



# Pump Series *SUMO*

## The flexible high performance heavy duty electric grease pump solution

### Characteristics

- **Dual pump modules** as standard for maximum uptime and redundancy
- **Quick swap** pump modules mean zero downtime and disruption to pipe-work during pump maintenance.
- High output and pressure make large extended systems possible:
  - 400cm<sup>3</sup>/min (24cu. in)
  - 2x200 cm<sup>3</sup>/min Modules
  - 400 Bar (5880 psi)
- Electrical dual line inverter integrates directly onto outlet
- Minimum level capacitance switch and visual maximum level as standard
- Handles Grease NLGI 2
- Supplied on a fixing pallet as standard for ease of transportation and installation.

### DUAL PUMPING MODULE

A generous 400 cm<sup>3</sup>/min flow, is provided by twin 200cm<sup>3</sup>/min pump modules installed in tandem configuration providing up to 400bar (5880 psi).

The twin pump module provides redundancy for high uptime – it allows the system to continue working even if one pump module becomes ineffective.

Sumo pump is suitable for large single line or dual line systems.

### INSTRUMENTATION MODULES

Sophisticated add on instrumentation modules and options means even complex requirements can be met with off-the-shelf standard product.



### QUICK SWAP SYSTEM

BOTH **PUMPING MODULES** can be quickly replaced from the front mounting of the pump. No pipe work needs to be disrupted meaning near-zero downtime during maintenance.

### DUAL LINE OR SINGLE LINE IS EASY

The outlet plate fixing system has both Pressure and Return ports.

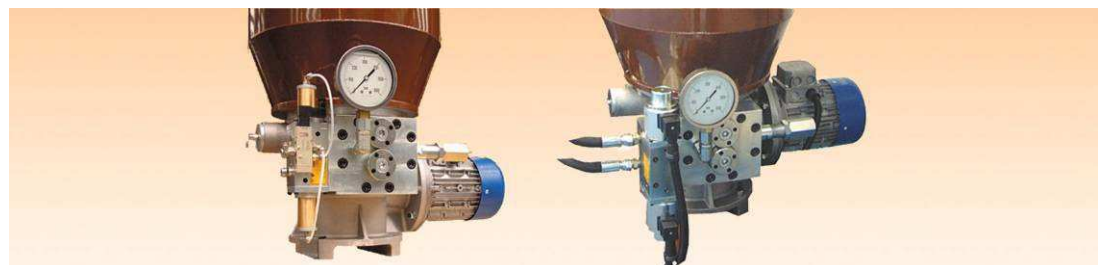
The outlets are directly compatible with Dropsa's electrical or pneumatic line inverters (including Modular version).

### ADVANTAGES :

- **Adjustable pump element:** available as optional.
- **Reduced investment:** with *Dual Pumping Modules*, the system can continue even if one pump module becomes ineffective providing redundancy and reducing need for a complete second standby pump.
- **Fast maintenance:** *Quick swap* pump modules can be replaced in seconds. Pipe work untouched means less contamination
- **Compact modular design:** eliminates external piping of components.

### Applications

A high performance pump solution for heavy duty applications in demanding environments such as the pulp & paper and steel industry.



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## Technical Information

### TECHNICAL CHARACTERISTICS

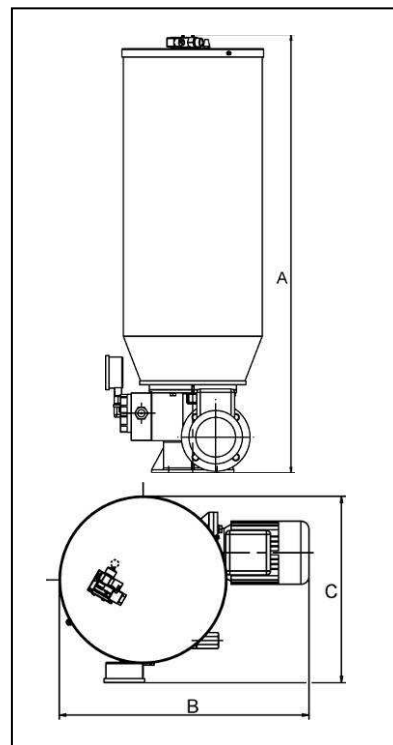
Max. Pressure	Max. Pressure
Output Flow Delivery	Output Flow Delivery
Operating Temperature	Operating Temperature
Operating Humidity	Operating Humidity
Protection grade	Protection grade
Mineral Oil Lubricant	
Viscosity at operating temperature	Viscosity at operating temperature
Grease Lubricant	
Viscosity at operating temperature	Viscosity at operating temperature

### STANDARD EQUIPMENT

Electric Motor	Three phase 0.75kW, Protection Grade IP55 class B Voltage: 220-380 Volt ± 5% 50 Hz 240-440Volt ± 5% 60 Hz S1 Continuous Duty
Reservoir	30 kg (66lb) or 100 kg (220 lb)
Level Indicator	Low Level capacitance level electrical signal (PNP) Visual maximum level
Adjustable By-Pass	200-400 bar (2950 – 5800 psi) 300 Bar (4410 psi) standard setting
Electrical Inverter Module	24V DC Inverter for pump outlet 110V AC 50/60Hz Inverter for pump outlet 230V AC 50/60HZ Inverter for pump outlet
Filling	Filling valve with filter
Pressure gauge	0-1000 bar (0-14700 psi) Front mounted

### DIMENSIONS MM (INCHES)

A	1020 (40.15), reservoir 30 kg 1350 (53.14), reservoir 100 kg
B	615 (24.21), reservoir 30-100 kg
C	460 (18.11), reservoir 30-100 kg



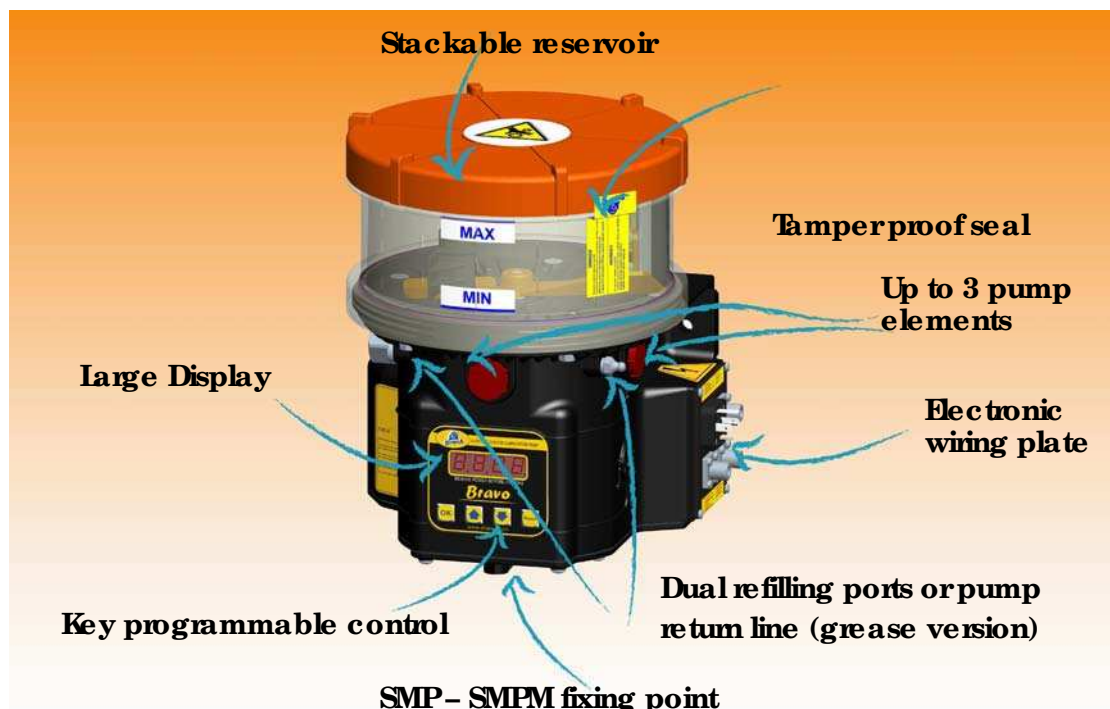
## Order Information

Standard Equipment				
EQUIPMENT	DESCRIPTION	PART No.		
Sumo pump package with electrical inverter 24V DC	Grease pump 400 cm3/min (24 cu. in/min) 30 kg (66lb) reservoir	2477000		
	Grease pump 400 cm3/min (24 cu. in/min) 100 kg (220 lb) reservoir	2477001		
	Oil pump 400 cm3/min (24 cu. in/min) 30 kg (66lb) reservoir	2477050		
	Oil pump 400 cm3/min (24 cu. in/min) 100 kg (220 lb) reservoir	2477051		
Optional Add-ons and Instrumentation			Inverter	+ Base
Dual line electrical inverter + base	24V DC	0083420		
	110V AC 50/60Hz	0083421		
	230V AC 50/60Hz	0083422		
Dual line electrical inverter	24V DC	0083400		
	110V AC 50/60Hz	0083401		
	230V AC 50/60Hz	0083402		
Pneumatic inverter	24 VDC	0083450		
	24V AC 50/60Hz	0083451		
	110V AC 50/60Hz	0083452		
	230V AC 50/60Hz	0083453		
Ultrasound Level	Ultra sounds level switch continuous reading 4..20mA	0295140		
Laser Level	Laser level 2 digital outlets with 4 levels or 4..20mA	0295130		
Pump Modules	Spare 200cm <sup>3</sup> /min (24 cu. in) pump module	0295040		
	Adjustable 100 - 200cm <sup>3</sup> /min (12-24 cu. in) pump module.	0295060		
	Blanking plug for unused pump cavity	0295049		
Oil conversion	Conversion kit for Oil system 30 Kg (66lb) w/filler cap	0295150		
	Conversion kit for Oil system 100 Kg (220lb) w/filler cap	0295160		
	Filling cap with filter	3130138		

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# Bravo

The small pump package with big features.



**Grease and Oil lubrication for industry and mobile plant.**

## Key Features

- **Modular stackable reservoirs & Minimum level** as standard.
- **Voltages available:**  
12V AC/DC  
24V AC/DC  
110V/230V 50/60 Hz, as standard.
- **Integrated fixture:** for SMP and SMPM distributors
- **VARIO-Drive:** allows electronic variation of pump motor 50-100% of nominal output.
- **Diagnostic and event logging.**
- **Multi Lube cycle:** multiple sensor counts and selectable pre-lube function.
- **Multi connector system:** allow many electrical connector types to be applied to the standard product to suit varied OEM and end user requirements.
- **Dual access ports:** for convenient refilling and grease return line.
- **Minimum level** as standard.

## Applications

- **Mobile plant and vehicle** lubrication
- **Machine tools:** like glass working machines or wood-working machines.
- **Heavy vehicles:** like earth moving machines, harvesters and other uses for special machines or vehicles.
- **Heavy industries:** like mining or construction.
- **Chain & gear** lubrication.

### DESIGN AND ADVANCED SOLUTIONS

This small pump package contains many innovative features exclusive to DropsA that allow fresh possibilities in lubrication systems engineering.

It is suited not only for indoor industrial applications but also mobile plant and vehicle lubrication systems.

### VARIO-DRIVE

VARIO-Drive is a new power management system for the pump motor that protects and adjusts the pumping system electronically. That means increased reliability and greater lifespan of the pump motor as well as the ability to electronically adjust the pump output from 50% to 100% of its nominal value. You will find that you are able to precisely control and engineer systems like never before.

Bravo Controller also has built in Diagnostic logging features as standard.

### NEW GENERATION CONTROLLER

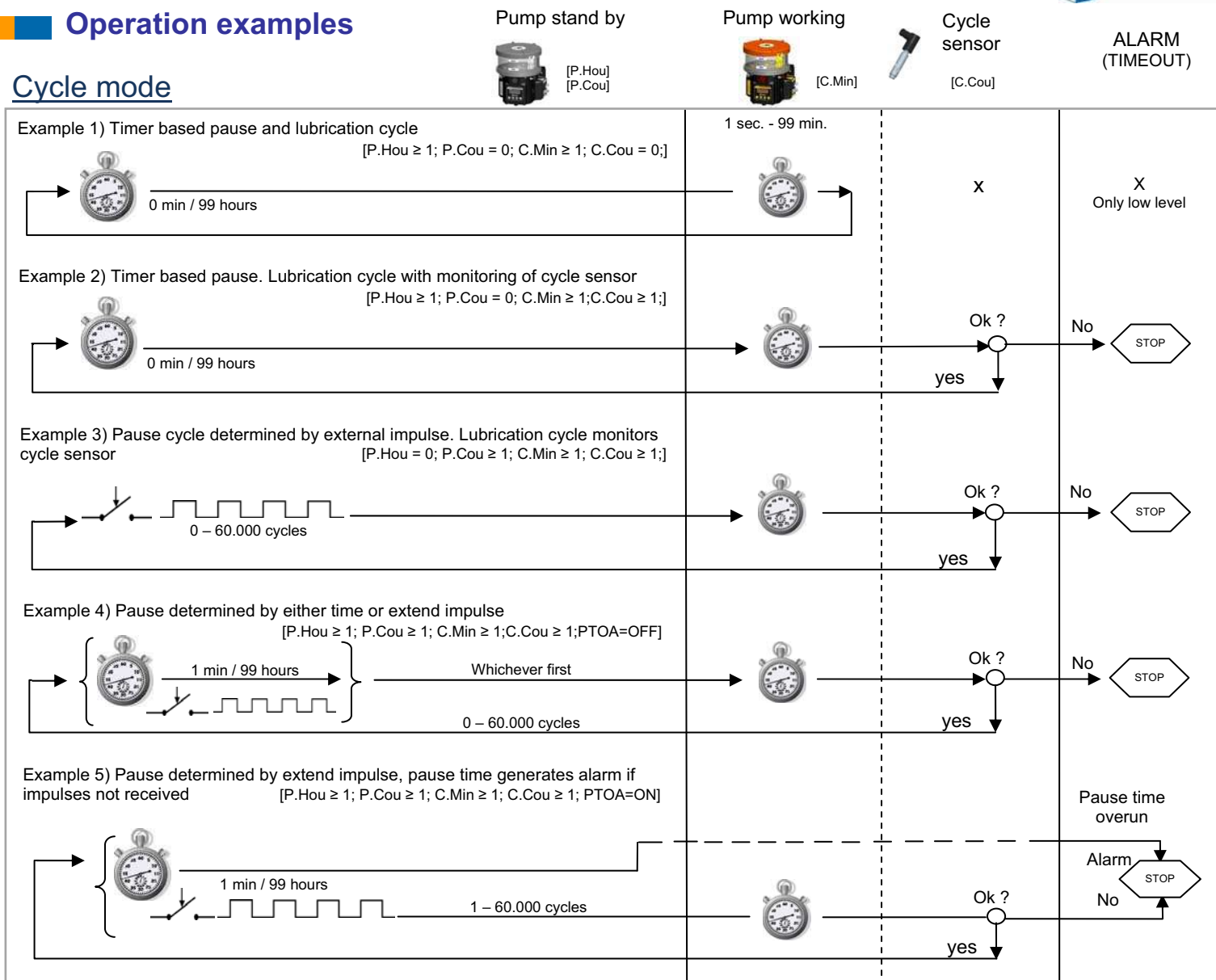
The integrated next generation control system is central to delivering new solutions to the customer.

It allows numerous ways to trigger and control the lubrication event in a system:

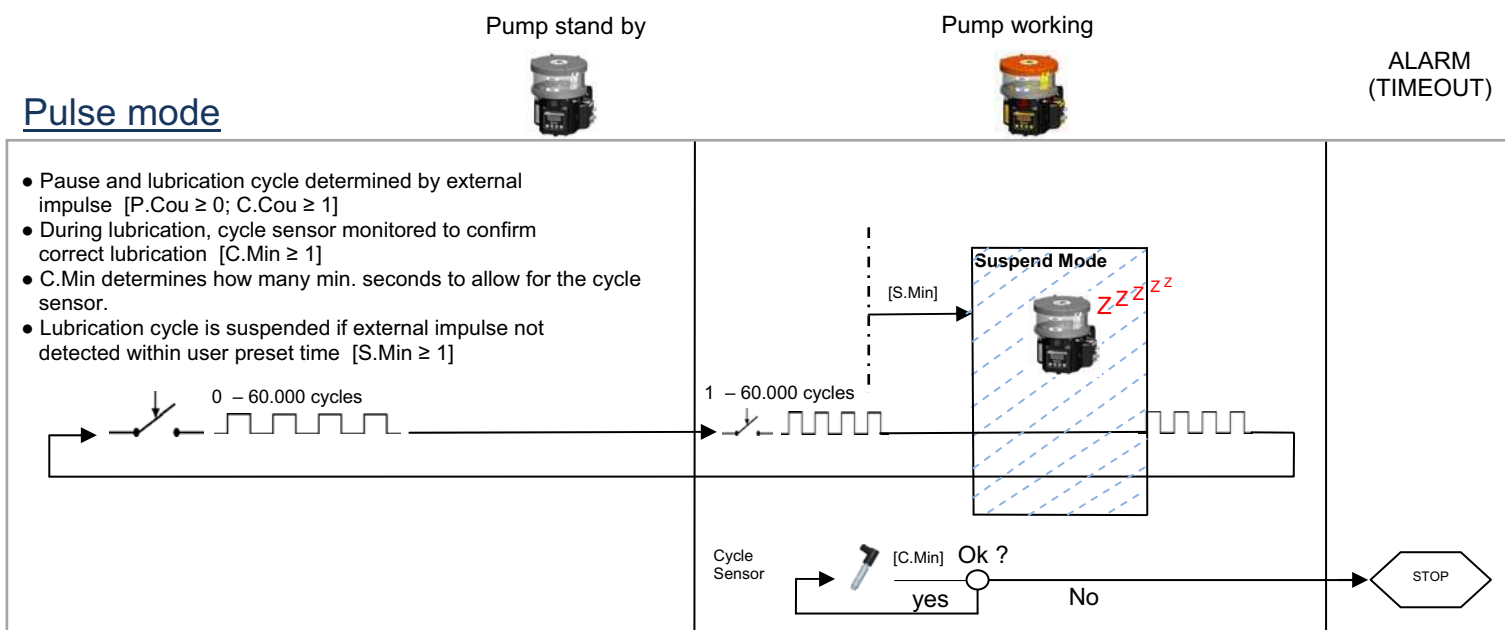
1. **Cycle Mode:** allows pause to be determined by timer or a number of external impulses. These can be in any combination. The lubrication cycle can be set to operate on time basis or on completion of a user settable number of cycle sensor inputs.
2. **Pulse mode:** pause and lubrication cycles are determined by external impulses. Additionally, during the lubrication cycles, the cycle sensor can be monitored to ensure correct operation of the system. The pump can suspend the lubrication cycle if external impulses not detected.
3. **Off Mode:** pump sets as slave to host machine.

## Operation examples

### Cycle mode



### Pulse mode



### Off mode

Pump operates when external signal is given. No monitoring

## Application example: vehicles and heavy vehicles

Bravo is the cost effective solution for many type of vehicles like: trucks, trailers, tractors, earth moving equipment, harvesters and other special vehicles. The complete lubrication system typically comprises:

1. Bravo pump
2. SMP – SMPM distributors
3. Remote status lamp with button

With just a status lamp & button placed in the vehicle cabin, the driver always knows the status of the lubrication system

Whenever needed an extra lubrication cycle, is just a push of a button.



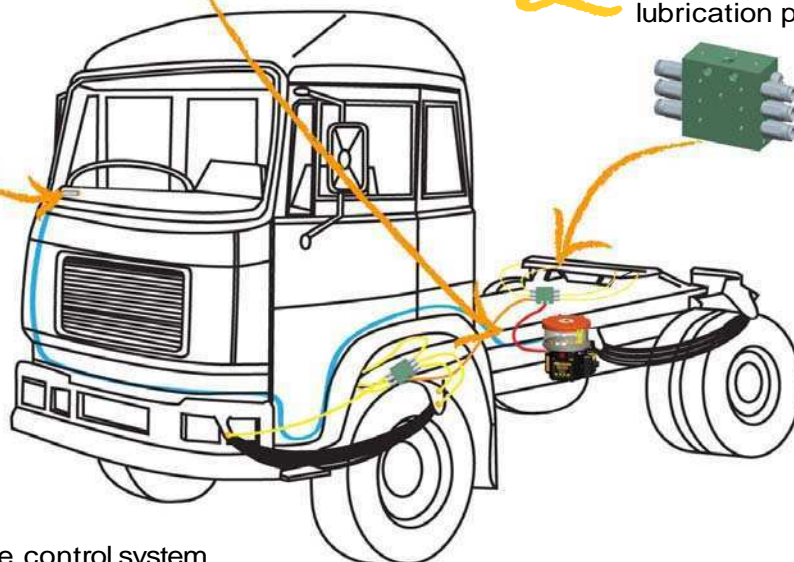
1

Bravo is outfitted with a fixing point for integration SMP – SMPM distributors directly under the pump.

2

SMP – SMPM distributors can also be mounted on crucial point of the chassis in order to easily reach the lubrication pints.

Status Lamp &  
Remote Button

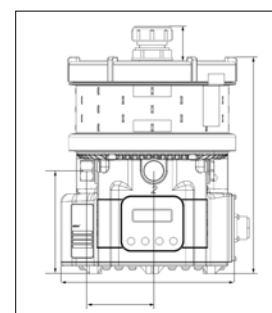


3

Remote control system.  
To have full control of the lubrication system.

The button light has three status:

- Blinking light: the pump is in alarm state. The Number of blinks represents the type of alarm indicates type of alarm
- No light: the pump is in standby
- Fixed light: pump is in lubrication cycle
- Press for extra lube cycle/s.



### DIMENSIONS MM (INCHES)

	284 (11"), 1 reservoir
A	380 (15"), 2 reservoirs
	476 (19"), 3 reservoirs

(\*) = Oil version only add 40 mm (1,57 inches) to "A" dimension

## Order Information

### Step 1 – Choose your Bravo version

AUTOMATIC VERSION						
Operating Voltage	GREASE			OIL		
	Reservoir 2Lt. (0.53gal)	Reservoir 5Lt. (1.32gal)	Reservoir 8Lt. (2.11gal)	Reservoir 2Lt. (0.53gal)	Reservoir 5Lt. (1.32gal)	Reservoir 8Lt. (2.11gal)
110V/230V	0888400	0888401	0888402	0888415	0888416	0888417
12V/24V	0888403	0888404	0888405	0888418	0888419	0888420
MANUAL VERSION						
Operating Voltage	GREASE			OIL		
	Reservoir 2Lt. (0.53gal)	Reservoir 5Lt. (1.32gal)	Reservoir 8Lt. (2.11gal)	Reservoir 2Lt. (0.53gal)	Reservoir 5Lt. (1.32gal)	Reservoir 8Lt. (2.11gal)
110V/230V	0888406	0888407	0888408	0888421	0888422	0888423
12V	0888409	0888410	0888411	0888424	0888425	0888426
24V	0888412	0888413	0888414	0888427	0888428	0888429

### Step 2 – Choose the connector system

AUTOMATIC VERSION 12V/24V							
CONNECTION		FEMALE CONNECTOR (optional)		CONNECTIONS AVAILABLE			
Part No.	Description	Part No.	Description	POWER	ALARM CONTACT	CYCLE SENSOR	EXTERNAL SWITCH
0888102	Base Connector "Amphenol"	0039828	Connector "Amphenol"	•	•	•	•
0888059	Base Connector "MPM x 4"	0039976	Connector "MPM"	•	•	•	•
0888141	Base Connector "MPM x 2"	0039976	Connector "MPM"	•	•		
0888139	Base Connector "MPM x 1 + M12 x 3"	0039976 0039999	Connector "MPM" Connector "M12"	•	•	•	•
0888142	Base Connector "MPM x 1 + M12 x 1"	0039976 0039999	Connector "MPM" Connector "M12"	•	•		
AUTOMATIC VERSION 110V/230V							
CONNECTION		FEMALE CONNECTOR		CONNECTIONS AVAILABLE			
Part No.	Description	Part No.	Description	POWER	ALARM CONTACT	CYCLE SENSOR	EXTERNAL SWITCH
0888134	Base Connector "MPM x 4"	0039976	Connector "MPM"	•	•	•	•
0888138	Base Connector "MPM x 2"	0039976	Connector "MPM"	•	•		
0888136	Base Connector "MPM x 1 + M12 x 3"	0039976 0039999	Connector "MPM" Connector "M12"	•	•	•	•
0888137	Base Connector "MPM x 1 + M12 x 1"	0039976 0039999	Connector "MPM" Connector "M12"	•	•		
MANUAL VERSION 12V/24V							
CONNECTION		FEMALE CONNECTOR		CONNECTIONS AVAILABLE			
Part No.	Description	Part No.	Description	POWER	ALARM CONTACT	CYCLE SENSOR	EXTERNAL SWITCH
0888141	Base Connector "MPM x 2"	0039976	Connector "MPM"	•	•		
0888142	Base Connector "MPM x 1 + M12 x 1"	0039976 0039999	Connector "MPM" Connector "M12"	•	•		
MANUAL VERSION 110V/230V							
CONNECTION		FEMALE CONNECTOR		CONNECTIONS AVAILABLE			
Part No.	Description	Part No.	Description	POWER	ALARM CONTACT	CYCLE SENSOR	EXTERNAL SWITCH
0888138	Base Connector "MPM x 2"	0039976	Connector "MPM"	•	•		
0888137	Base Connector "MPM x 1 + M12 x 1"	0039976 0039999	Connector "MPM" Connector "M12"	•	•		

### Step 3 – Optional

Part No.	Description	CODICE	Description
0039433	Remote control switch and lamp 12V	0888058	Pump element Ø6mm with integrated PSV
0039434	Remote control switch and lamp 24V	0010509	Screws for SMP-SMPM base installation
0888354	Grease cartridge filling kit		



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## Characteristics

- **Auto-Adaptive system**, for auto-regulation of the micro-oil mist to have always the best aerosol quality.
- **Minimum Level** as standard
- **Quick and easy installation**, few hours needed to install on existing machines.

## Advantages

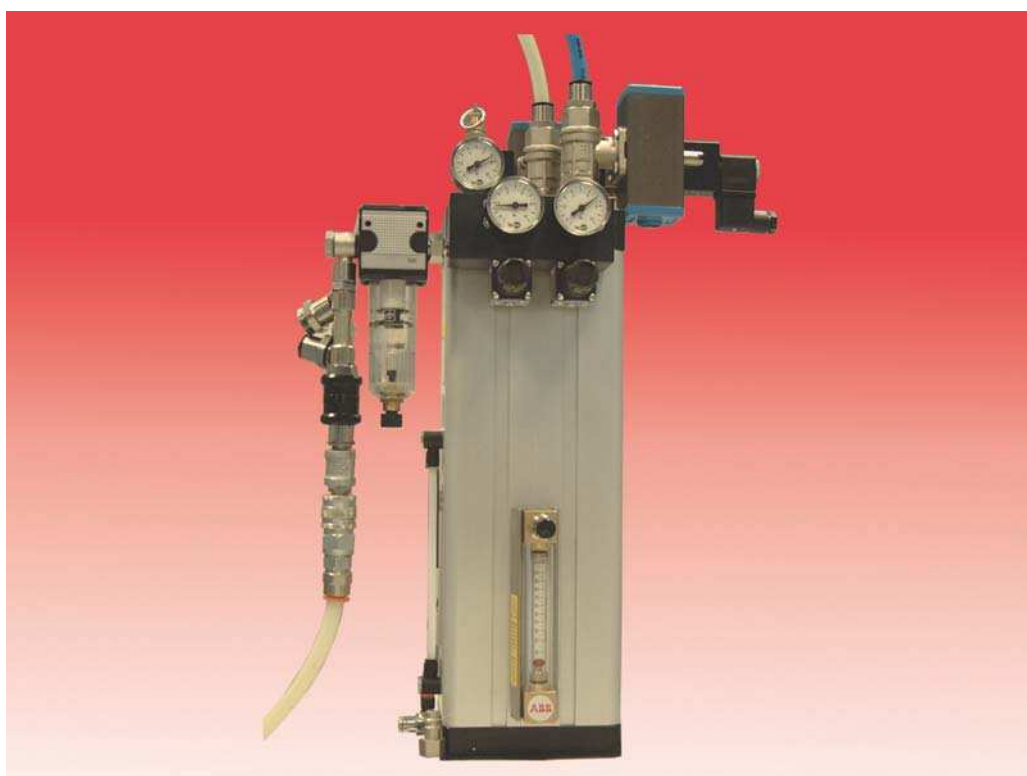
- **Reduce your Cycle time**
- **Increase tool life:** the aerosol mixture prevent machine tool overheating.
- **Better surface finish:** thanks to the most complete and fittest lubrication through the machine tool.
- **Reduced initial investment:** no high pressure or low pressure coolant tanks and pump.  
No coolant filtration

## Applications

- Near Dry-working on machine tool
- High –speed milling applications
- Applications on CNC machines.

# MKD-Dual

The new dimension for internal Minimal Quantity Lubrication in dry-working applications



### MORE PRODUCTIVITY WITH MKD-DUAL

The **MKD-Dual minimal lubrication system** represents the solution for internal lubrication dry machining. MKD-Dual generates a thin film of aerosol that is brought directly to the tool cutting point using the existing tool-internal distribution channels. **Increase of productivity and machine tool lifetime** are the results that you can immediately touch by using MKD-Dual.

### COSTS REDUCTION ALSO FOR EXISTING MACHINES

**MKD-Dual** is easy to install also on machines that are already working; **the installation need maximum one day of downtime.** The costs reduction is evident immediately after the installation. In fact there is no more need of high pressure tools and coolant filtration systems. It is also no more necessary to proceed to the fluid disposal with evident benefit also for the environment.



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Stamp of Distributor:

## Auto-Adaptive System

The auto-regulation is one of the key characteristics of MKD-Dual you will not find on other aerosol generators for near dry machining. Dual Venturi based aerosol generator will automatically compensate when going from one size of tool to another avoiding the deterioration of the aerosol quality that is found when varying the linear velocity of air through the Venturi.

MKD-Dual therefore optimizes the process through an automatic adjustment of the micro-oil mist depending on the air flow – this means best aerosol quality throughout the different sizes of cutting tool and a considerable time saving on initial setup (no complex regulation).

MKD-Dual has been designed mainly for mid-high range applications– this sophisticated technology of generating an ultra thin aerosol with sub micron particle size allows the mixture to flow through the spindle during rotation at high speeds minimizing the effects of centrifugal force on the aerosol avoiding deterioration.

**The Dual unit is provided with two outlets which can be supplied with electro-pneumatically controlled ball valves.**

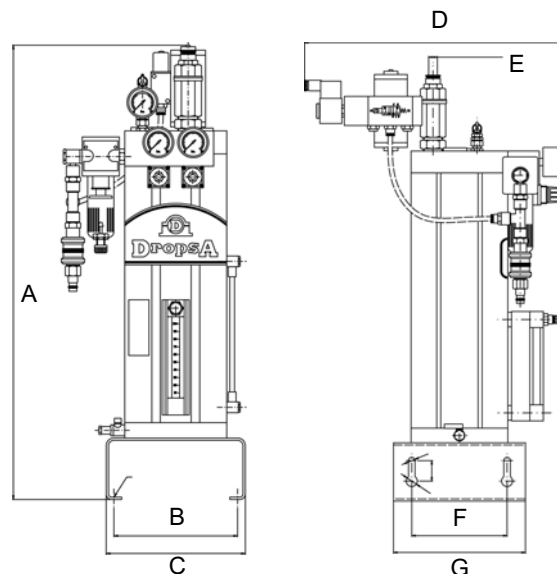
## Technical Information

### TECHNICAL CHARACTERISTICS

Air supply	Max 6 Bar (88.2 psi)
Air inlet pipe	Ø6 ÷ 10 mm (0.23 ÷ 0.4 in.)
Aerosol Outlet	Ø10 ÷ 16 mm (0.4 ÷ 0.6 in.)
Reservoir Capacity	1,8 Litres (0,40 galls)
Electro-pneumatic ball valve input voltage	24VDC 200mA

### DIMENSIONS - MM (INCHES)

A	600 (23,62)	E	Push in tube Ø 12 mm
B	160 (6,29)	F	130 (5,11)
C	180 (7,08)	G	180 (7,08)
D	360 (14,17)		



## Ordering Information

Part. No.	Description
3135086	MKD- Dual with minimum level and with electro-valve
3135088	MKD- Dual with minimum level, without electro-valve

### ACCESSORIES

Part No.	Description
3155187	Electro-valve

### CONSUMABLE

Part No.	Description
3226664	Oil Unitek MK 150 20lt. (42 pt)

C2087PE WK25/07



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