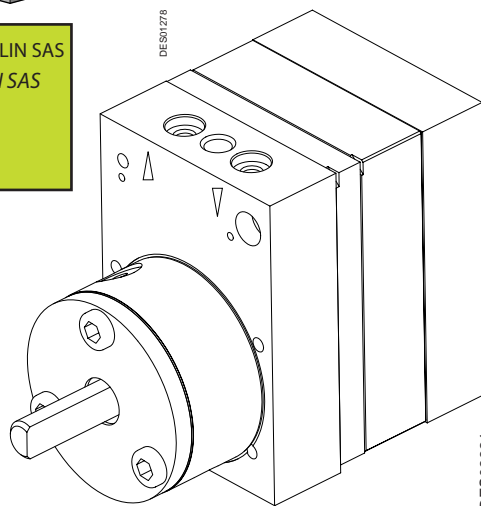


From February 1st, 2017 SAMES Technologies SAS becomes SAMES KREMLIN SAS  
A partir du 1/02/17, SAMES Technologies SAS devient SAMES KREMLIN SAS



# User manual

## Gear Pumps 1.2 cc - 2.4 cc - 6 cc - 10 cc

FRANCE

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# Gear Pumps

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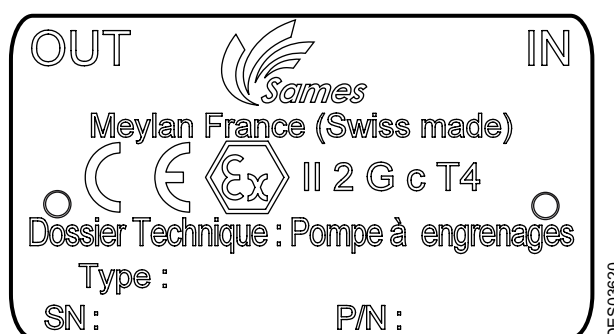


**WARNING :** This document also related to the following user manuals:

- [see RT Nr 6243](#) user manual for the pneumovalve.
- [see RT Nr 6021](#) user manual for the microvalve.

## 1. Health and Safety Instructions

### 1.1. Marking



Type of the pump: H (for H-sole gear pumps) and C (for compact gear pumps).

**Example:**

- Pump 1.2 cc H P/N: 758704
- Pump 2.4 cc C ADLC P/N: 910000903

### 1.2. Simplified analysis of the potential sources of ignition according to Standard EN 13463-1

Risk of ignition		Action applied to prevent anu ignition source to become effective
Potential source of ignition	Description / Main cause (What are the conditions engendering the ignition risk?)	Description of the applied action
Hot surface	Warm-up of the exterior surface of the pump due to a temperature of the metered fluid or to mechanical frictions or to an excessive speed.	Test to define the maximum temperature of surface
Spark of a mechanical origin	Friction of the gears and axes	Rotation speed is lower than 1m/s, ( <a href="#">see § 3.1 page 9</a> ).
Electrostatic discharge	Incorrect grounding	Electrostaic discharge is impossible because all the parts of the pump are metallic and are connected between them, ( <a href="#">see § 1.5 page 7</a> )
Electrostatic discharge	Insulated pump	For an electrostatic installation, respect the rules: <a href="#">see § 1.5 page 7</a> .

### 1.3. Precautions for Use

This document contains information that all operators should be aware of and understand before using this material. This information highlights situations that could result in serious damage and indicates the precautions that should be taken to avoid them. The equipment must only be used by personnel trained by SAMES Technologies.

### 1.4. Warnings



**WARNING : Safety may be jeopardized if this equipment is not operated, disassembled and reassembled in compliance with the instructions given in this manual and in any European Standard or national safety regulations in force.**



**WARNING : Equipment performance is only guaranteed if original spare parts distributed by SAMES Technologies are used.**

Pump assemblies must be kept clean so that it is possible to detect any leaks and their severity.

Electrostatic spraying equipment must be serviced regularly in accordance with the information and instructions given by SAMES Technologies.

Cleaning operations must be carried out either in authorised areas equipped with a mechanical ventilation system, or using cleaning liquids with a flash point at least 5 °C higher than room temperature.

The operator must use the protections adapted for the eyes and the skin when the proportioned product presents dangers.

After having carried out repairs, adjustments or cleaning with polluting products, a particular care will be taken to the ecological elimination of waste.

It is strictly forbidden to any operator to interfere on equipment under operation.

Any modification of the pump being able to decrease the operating safety is prohibited.

The pump must be used in a surrounding area clear and clean.

Only metal containers can be used for cleaning liquids and they must have a reliable ground connection.

The storage of the pumps or its components must be done in a dry room and safe from dust.

Before the installation of the pump, it is important to store it, as a preliminary, at the temperature to which the pump will be used in order to avoid any risk of seizing.

### 1.5. Insulation or Grounding

Use of these pumps with conductive products must comply with the rules concerning electrical insulation and enclosure-access reserved for this material. The possibility of the access to the enclosure must be checked to the switch-off of the high voltage in order to avoid any risk of electric shocks to the people. In all cases, the connection equipment must comply with the characteristics relative to the transport of pressurised liquid products up to 50 bar.

Pumping of conductive products and presence of **HV**:

- The configuration of the installation will be established by SAMES specialists.
- Any modification without consultation will result in the invalidity of the certificate of conformity.

Pumping of insulating products with or without the presence of **HV**:

- It is necessary to connect the pump to the ground with the connection screw located on the pump.

## 2. The SAMES Process

The process is a method for the electrostatic application of paint. An electrical source supplies a high-voltage current to a static or rotary atomizer, creating an electrostatic field between the atomizer and the target object.

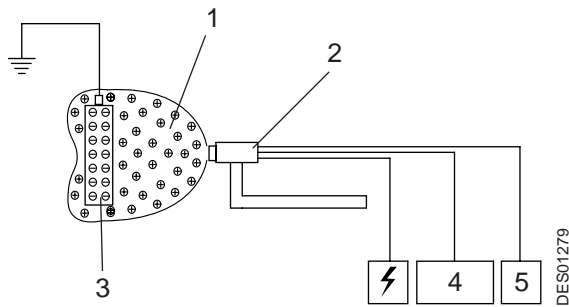
This target is connected to ground through its fixed or mobile support.

A feed and regulation system delivers the paint to the atomizer, which sprays it in the form of a mist.

Thus, the particles of paint are electrically charged under the influence of the electrostatic field.

The latter are attracted and settle on the grounded object.

The forces between the charged particles and the target are sufficient to surround the target and ensure improved wraparound, thus increasing the deposition rate.



1	Electrostatic field.
2	Atomizer
3	Grounded target
4	Paint
5	Air

### 2.1. The SAMES Pumps

These pumps (H-sole or compacts) are designed to guarantee a paint flow rate that is proportional to its rotation speed with a minimum of internal leaks.

There are three ranges of flow rate:

- 10 cc / rev
- 6 cc / rev
- 2.4 cc / rev

There is a pump intended for use with catalysts:

- 1.2 cc / rev

They may be chosen according to the required flow rate and the accuracy of the rotation speed.

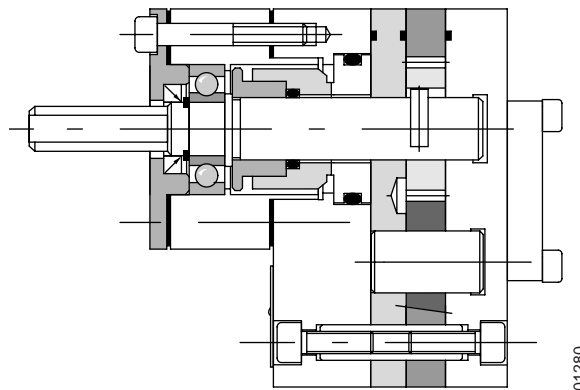
Two types of material are available:

- austenitic stainless steel the valve that may be fitted to it (SHUNT or RINSING) is made with the same material.
- ADLC : Amorphous diamond like carbon.

This coating improves a better hardness on the surface, has a better coefficient of friction and facilitates the rinsing.

The ADLC treatment makes it possible to proportion products abrasive and / or very viscous.

This pump may be completely rinsed by the injection of solvent along the length of the teeth.





### 3. Characteristics

#### 3.1. General Characteristics

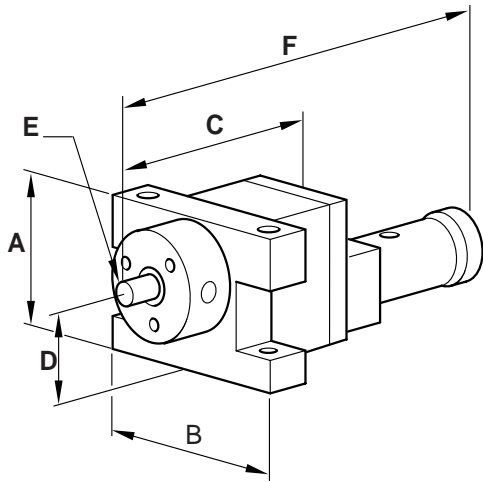
- Air Pressure: (valve pilot)
  - 3 bar min.
  - 6 bar max.
  
- Fluid pressure at inlet: (boosting)
  - 0.5 bar min. - (7 psi)
  - 2 bar max. - (30 psi)
  
- Fluid pressure at outlet: (in use)
  - Maximum back pressure of 10 bar in continuous operation mode.
  
- Maximum rotation speed. : 220 rpm with product.
  
- Temperature of the metered fluid : 100°C max. for an ambient temperature between - 20°C and 40°C.



**WARNING :** To avoid risks of seizure, this pump must never be operated without the appropriate paint or solvent.

#### 3.2. Overall dimensions

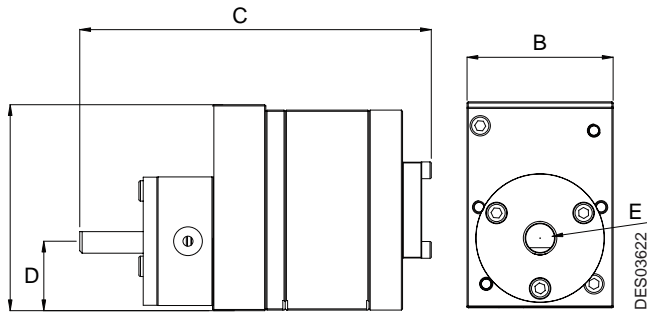
##### 3.2.1. H-sole gear pumps



S01314

	10 cc	6 cc	2.4 cc	1.2 cc
A	83 mm	83 mm	83 mm	83 mm
B	110 mm	110 mm	110 mm	110 mm
C	160 mm	146 mm	120 mm	117 mm
D	57 mm	57 mm	57 mm	57 mm
E	10 mm	10 mm	10 mm	10 mm
F	255 mm	255 mm	-	-
Wt.	3.7 kg	3.35 kg	2.83 kg	2 kg

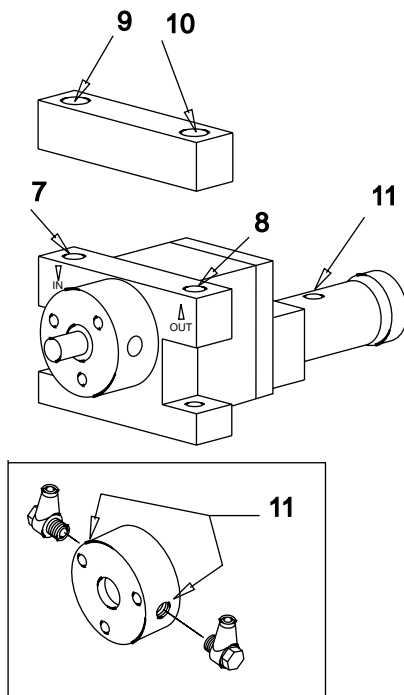
### 3.2.2. Compact gear pumps



Dimensions are in mm.

	10 cc	6 cc	2,4 cc	1,2 cc
<b>A</b>	86	86	86	86
<b>B</b>	61	61	61	61
<b>C</b>	147	133	119	116
<b>D</b>	29	29	29	29
<b>E</b>	10	10	10	10
<b>Wt.</b>	3.78Kg	2.96Kg	2.82Kg	2.66Kg

### 3.3. Connections



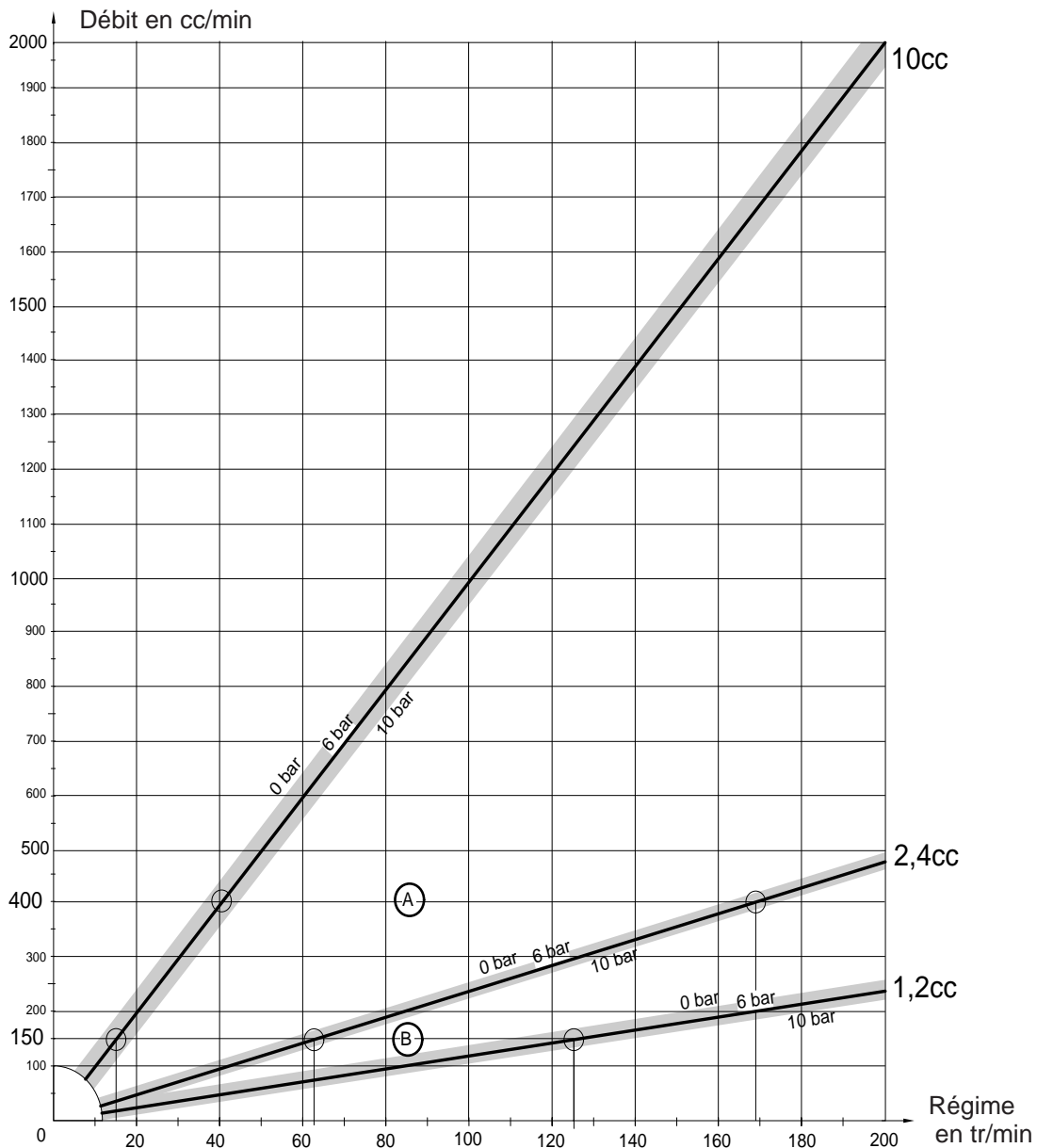
7	Pump inlet
8	Pump outlet
9	1/4"BSP thread.
10	1/4"BSP thread.
11	Shunt or rinsing valve: Air: 2.7 x 4

The pumps (H-sole or compact) may be equipped with a Mesamol air-tight seal system (in the case of use with a hardener fluid):  
Supply by pipe with dimensions of 2.7 x 4 mm on item 11.

Concerning use of the pneumo valve [see RT Nr 6243](#).

ES01315

### 3.4. Flow Curve



The black curve shows the flow rate of the pump, used with a back pressure of 6 bar. The shaded area of the curve shows the different flow rates obtained according to the back pressure at the outlet of the pump (at 0 bar and 10 bar). For example, at a rotation speed of 100 revs/min the flow rate will be:

- 1000 cc with a back pressure of 6 bar.
- 1050 cc with a back pressure of 0 bar.
- 950 cc with a back pressure of 10 bar.



**WARNING :** Do not select a pump with a flow rate that is too close to the minimum or maximum speed limits.

The mechanical alignment of the pump with the motor shaft must be perfect and completed using a BOWEX-type coupling with a high torsional rigidity co-efficient.

Check the non-cavitation conditions by sizing the circulating supply pipe.

## 4. Installation

### 4.1. Pump Selection

Using the graph opposite [see § 3.4 page 11](#), selection of the type of pump is immediate.

### 4.2. General Information

It is advised to clean the pump before its assembly. The inlets / outlets must be free from any impurities which could block the openings. Observe the direction of the rotation as well as the inlets/ outlets which are indicated on the front face of the pump. Turn manually the axis of the pump of some turns in order to check the rotation. Turning the axle of the pump in the bad direction can cause damage and destroy the pump.



**WARNING :** In any case, the pump should not turn without paint or appropriate solvent with the risk to seize up this one.

### 4.3. Installation Guide

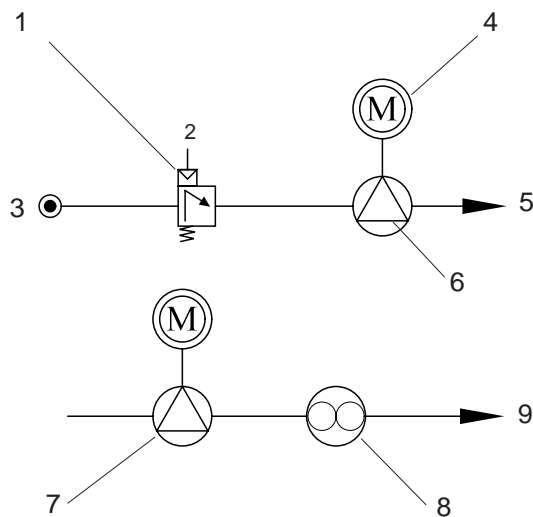
Elements linked to pump operation:

- A pump must always be boosted at between 0.5 and 2 bar in order to facilitate its priming and bleeding; this boost pressure must be as regular as possible, which is why a pressure regulator is used.
- For connection in series with the flowmeter, the latter must always be located after the pump.
- Check the pipes upstream and downstream from the pump. If impurities appear at the inlet of the pump or if the product to be proportioned is not perfectly clean, a filter must be installed.

### 4.4. General Elements

A pump will be used for:

- Increasing circulating pressure to 6 bar or higher,
- Calibrating a flow rate; in this case the pump will be connected to an encoder so that the motor is controlled by the flowmeter.

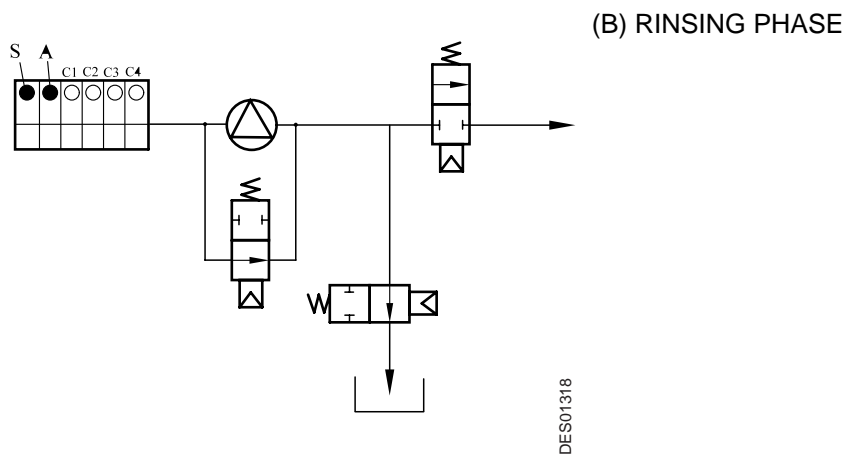
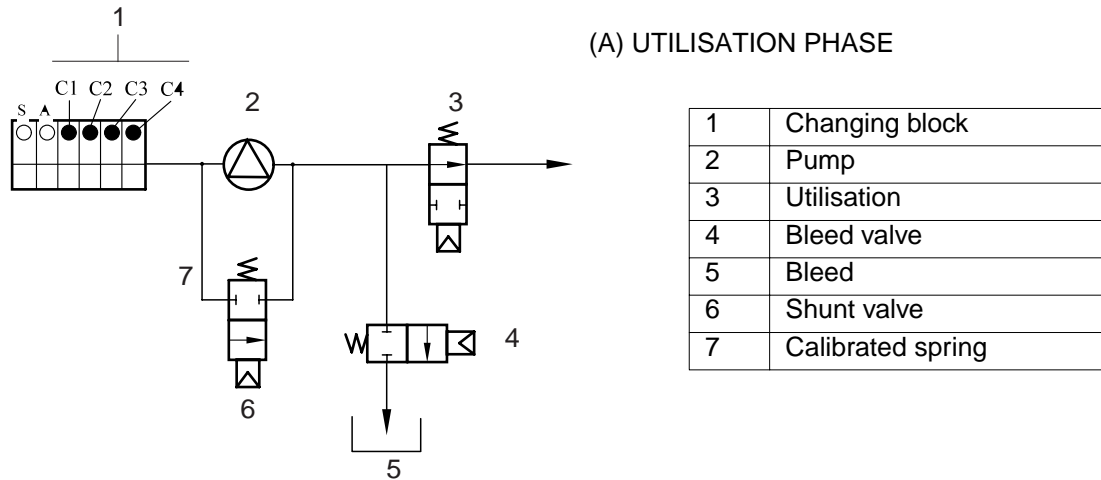


1	Regulator
2	Air
3	Paint supply
4	Motor
5	Use
6	Pump
7	Pump
8	Flowmeter
9	Use

DES01317

## 5. Implementation

In order to avoid burst pipes and pump blockages, it is advisable to equip the pump with a shunt valve. This latter will also serve to rinse the inside of the pump by injection of solvent from the changing block.



**WARNING** : The shunt valve may be supplied with a spring, calibrated at a specific opening pressure (standard version: 20 bar) [see RT Nr 6243](#).

## 6. Maintenance

### 6.1. Tools

- ALLEN keys: 2, 3, 4 mm
- Flat wrenches: 10, 11, 12, 13 mm
- Seal repair kit ([see § 8 page 20](#))

### 6.2. Preliminary Procedures

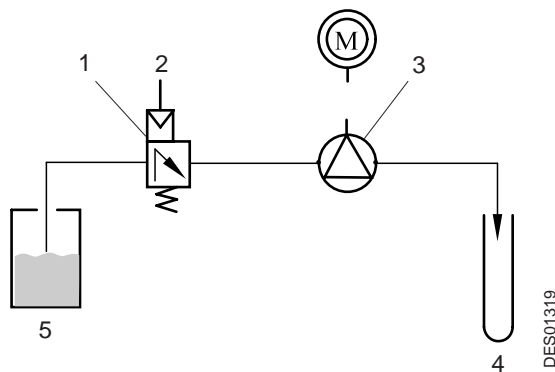
Before dismantling the pump, the following operations must be carried out:

- 1 Rinse the inside of the pump and complete the cycle by prolonged blowing (4 to 5 seconds),
- 2 Lock the air and fluid valves, then disconnect the product pipes from the pump after having marked their respective positions,
- 3 Remove the pump from its support, carry out the inspections defined below.

### 6.3. Inspection

Connect the pump as shown in the diagram opposite.

- Inject solvent into the pump for 1 minute through the regulator, set at 0.5 bar for 4 pump shaft positions (0 – 90 – 180 – 270).
  - 1 If the average for the 4 flow rates is < 150 cc/min: the state of wear of the pump is acceptable and an internal inspection plus a change of seal kit should be planned.
  - 2 If the average for the 4 flow rates is between 150 and 200 cc / min: the pump is in advanced wear phase and its replacement should be envisaged.
  - 3 If the average for the 4 flow rates is > 200 cc/min: the pump must be replaced.



1	Pressure Regulator
2	Air: 0.5 bar
3	Pump disconnected from motor
4	Test tube
5	Pressurised vessel, approximately 3 to 4 bar

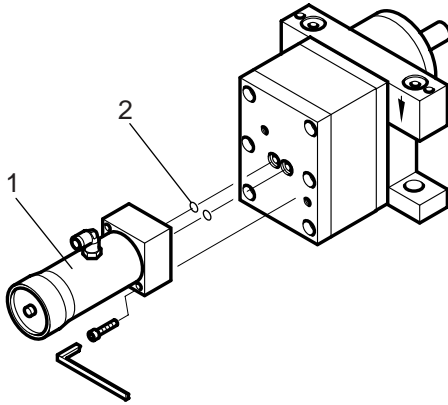


**WARNING :** In the case of a pump with a major internal leak, return it to Sames Technologies for repairs.

## 6.4. Pump Dismantling Procedure

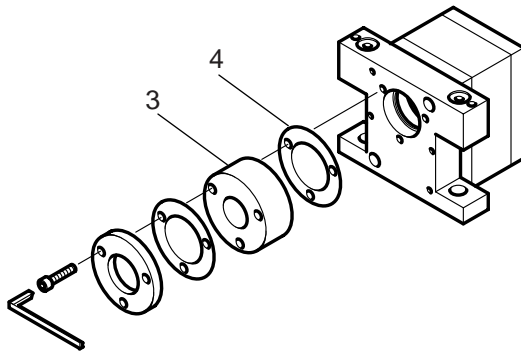


**WARNING :** All the elements of the pump must be handled with an extreme delicacy, any shock between the various components could harm the future correct operation of the pump.  
**Remark:** the procedure described below remains applicable to a compact pump.



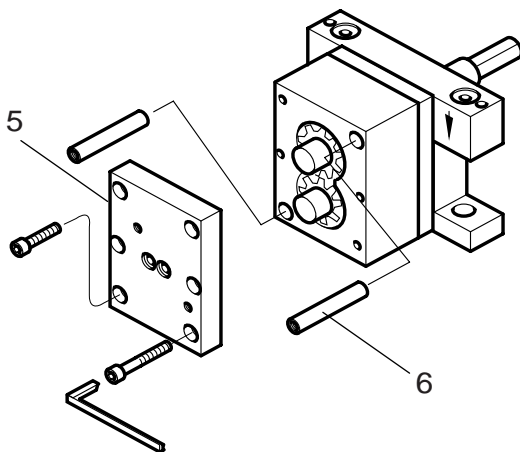
Remove the shunt valve (1) using the 3 mm ALLEN key. The Teflon seals (2) must be discarded since their replacement is compulsory.

DES01342



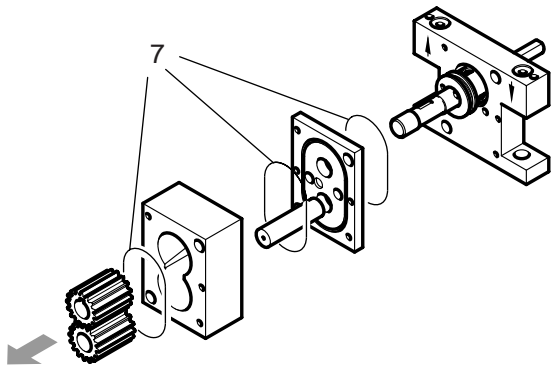
Dismantle the box (3) using the 4 mm ALLEN key. The Teflon seals (4) are to be discarded.

DES01343



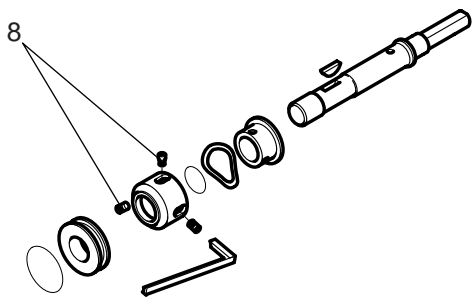
Remove the rear flange (5) using 2 x 4 mm ALLEN keys to prevent the columns (6) from turning. Mark the location of the columns.

DES01246



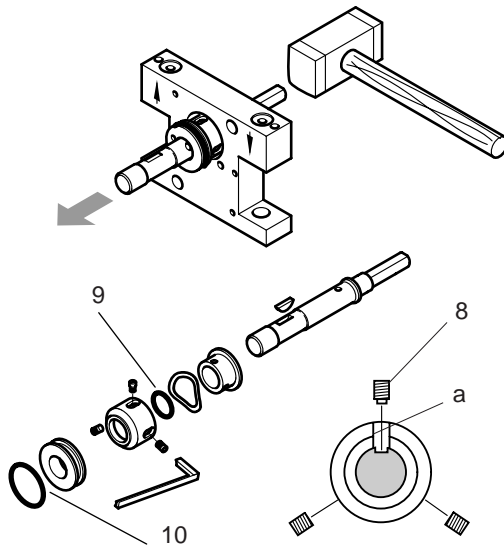
DES01247

Remove the stator/output shaft assembly after marking the location of each component with an indelible felt tip pen (no engraving or mechanical marking).



DES01248

Dismantle the rotating part of the lining by removing the 3 screws at 120° (8). Take care not to lose these screws; they must be fitted to the replacement lining. Discard the three O-ring seals (7).



DES01320

Using a wooden mallet, drive the input shaft from the base plate by tapping on the “drive” side. Any resistance to extraction is caused by the fixed grain O-ring seal (10).

**Note:** Discard the two grains (fixed and moving), along with O-ring seals (9) and (10) of the lining.



**WARNING :** Dismantling may be assisted by tapping with a wooden mallet or by the introduction of blades made from synthetic material (nylon). Use of materials that are harder than the pump material may result in permanent damage to the components.



### Cleaning:

Using a nylon brush or flexible scraper, remove the traces of paint and seals remaining on the components, possibly soak them in solvent appropriate with the product conveyed by the pump. Dry with compressed air.

### 6.5. Reassembly

Applicable whatever the degree of pump wear.

Note: All the components must be laid out flat in the order shown in the exploded view ([see § 8 page 20](#)) to see if any are missing.

- The three O-ring seals (7) ([see § 6.4 page 15](#)) are fitted into the recesses in the flanges.
- The same applies to the two Teflon O-ring seals (2) ([see § 6.4 page 15](#)).
- The moving grain is dismantled:
  - The original screws are removed,
  - The stop, followed by the sine spring, are fitted to the input shaft,
  - The seal is moved along the shaft, taking care not to damage it when passing over the keyway.
- The moving grain is inserted over the seal and stop.
- The three screws (8) (1 with dog point and 2 without), set aside during the dismantling phase, are inserted. The screw with the dog point is placed opposite the spot-facing (a) on the input shaft, thus carrying out the grain drive function ([see § 6.4 page 15](#)).

**Note: These screws are fitted using weak Loctite.**

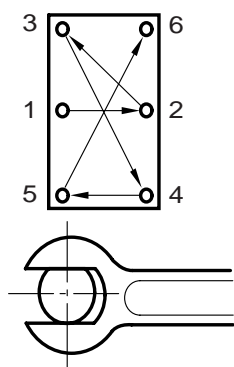
- Tighten the three screws.
- Insert the input shaft into the base plate.
- Insert the fixed grain with its seal into the base plate (by hand).
- The rest of the re-assembly procedure is the opposite of the dismantling procedure, respecting the location marks in the case of a change of seal kit.



**WARNING :** The columns must not be fully tightened until after the input shaft has been turned several times by hand.

Tightening torque for the rear flange screws. C = 1.2 mkg, diagonally starting from the centre and in two runs: the first to 0.8 mkg and the second to 1.2 mkg.

Tightening torque for the screws M5 on the box. C = 0.8 mkg clockwise.



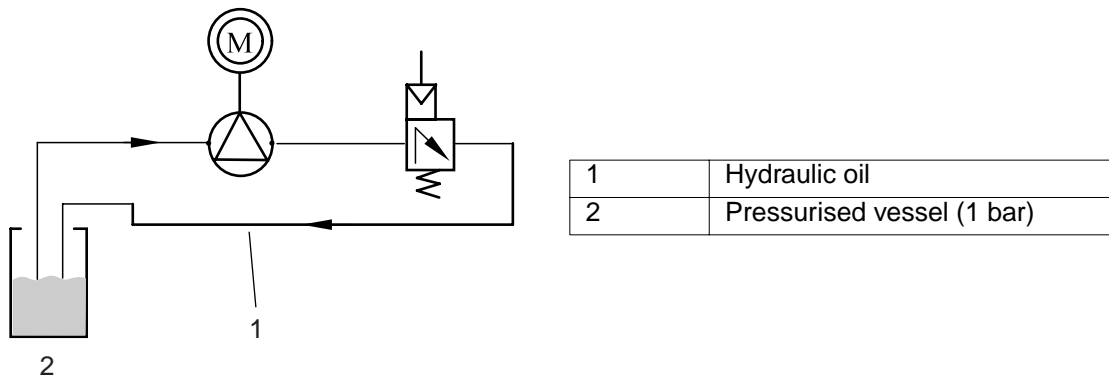
DES01321

**Note: It must be possible to turn the pump freely by hand, using a 10 mm flat wrench on the input shaft.**



**WARNING :** Never tighten the flanges if they can not be fitted together correctly by hand. During cleaning, the components must be dealt with individually. Do not place them all together in a tank; their close proximity could result in them being damaged.

## 6.6. Running-in



DES01322

Install the pump on its support and connect it as shown in the diagram opposite.

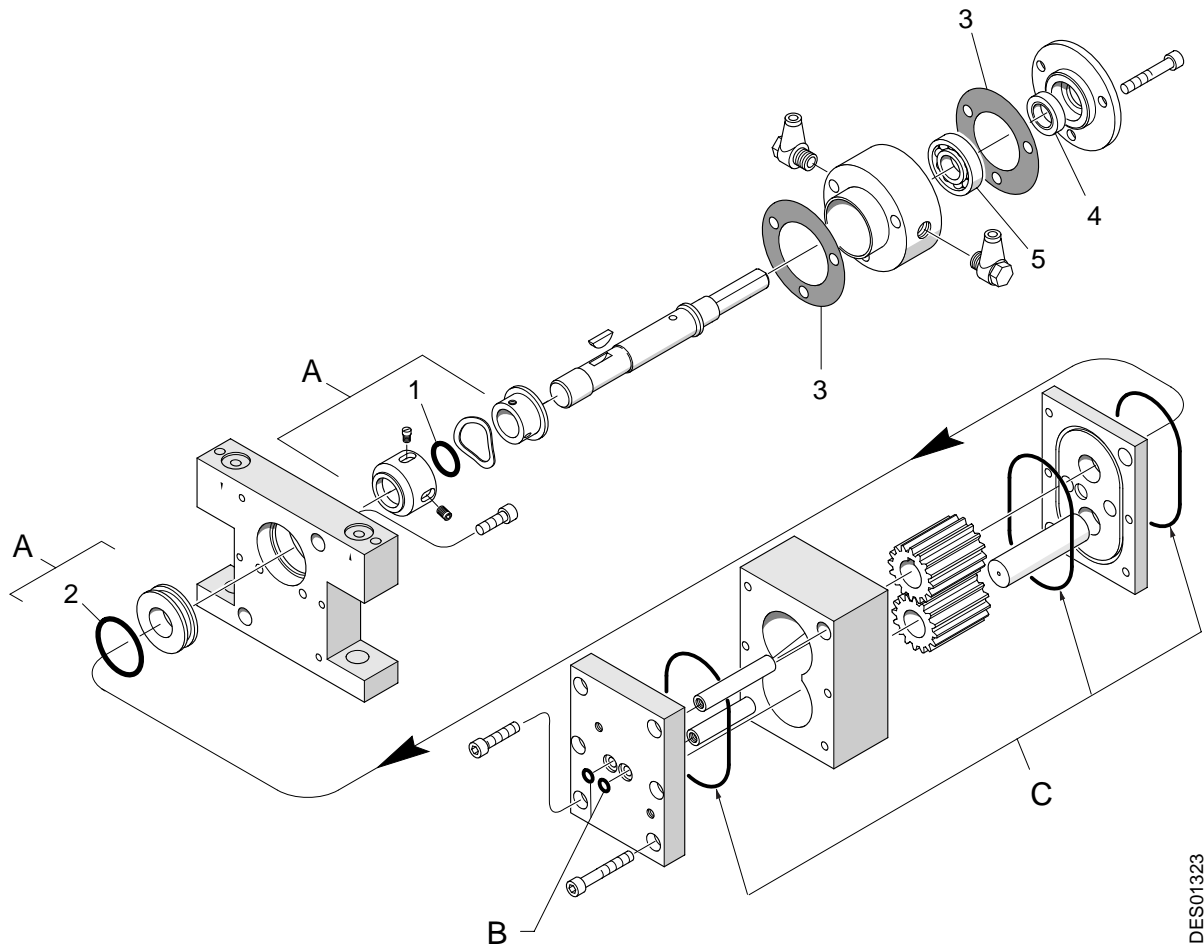
- Run the pump at 20 to 30 rpm, with the product which will be used, with a back pressure of 3 bar and 0 bar during one hour (in if possible closed circulation).  
With the same conditions, increase the outlet pressure to 5 bar and run during 30 minutes. then gradually increase the pressure by always respecting 30 minutes between the various stages until reaching the maximum pressure of use.
- Reconnect the pump to the main circuit.
- Rinse the pump with solvent.

## 7. Troubleshooting

Symptoms	Probable Causes	Remedies
Leak of the product on the shaft	Driving shaft worn	Replace the driving shaft.
	Defective lip seals	Replace the lip seals
Leak of the product on the plates	Impurities between the plates. Authorized pressures exceeded	Disassemble and clean the pump. Check the tightening of the screws. Decrease the pressures.
	Defective o-rings	Replace the o-rings.
No precision in proportioning	Wear of the components of the pump. Impurities in the pipes Inlets/Outlets. Supply pressure too low. Pump unsuited to the product. Fault of the assembly.	Disassemble and check the components of the pump as well as the pipes of the inlets and outlets. Check the viscosity of the product.
No flow (the pump does not run)	Motor does not run. The coupling is broken or is lacked	Check the motor and its electrical connection Check the coupling and the driving keys.
No flow (the pump runs)	The Inlets / outlets are badly connected or stopped. The driving rod of the gear is broken goupille. No product at the inlet of the pump.	Check the Inlet/outlets connections. Check the boosting of the pump. Disassemble the pump and check the rod and the gears.

## 8. Spare parts

### 8.1. Seals – Common Portion



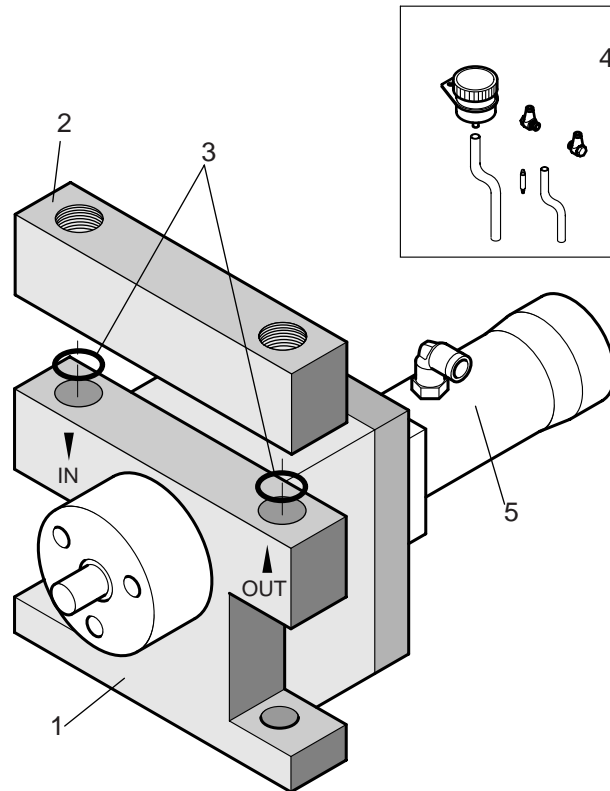
DES01323

Item	Part number	Description	Qty	Unit of sale
	<b>758167</b>	<b>Seal kit comprising A, B and C</b>	<b>1</b>	<b>1</b>
<b>A</b>	Y1AJDP054	Pump stuffing (included items 1 and 2)	1	1
<b>B</b>	J3TTCN009	O-ring	2	5
<b>C</b>	J2FTDF526	O-ring	3	1
1	J3STKL174	O-ring - chemically inert	1	1
2	J2FTDF298	O-ring	1	1
3	546141	Flat seal	2	1
4	J3TPRF144	Lip seal	1	1
5	K6RKBR176	Bearing	1	1

**Remark: The part number as well as the position of the parts are common to both types of pumps.**

## 8.2. Gear pump, H-sole

### 8.2.1. 10 cc - Pumps



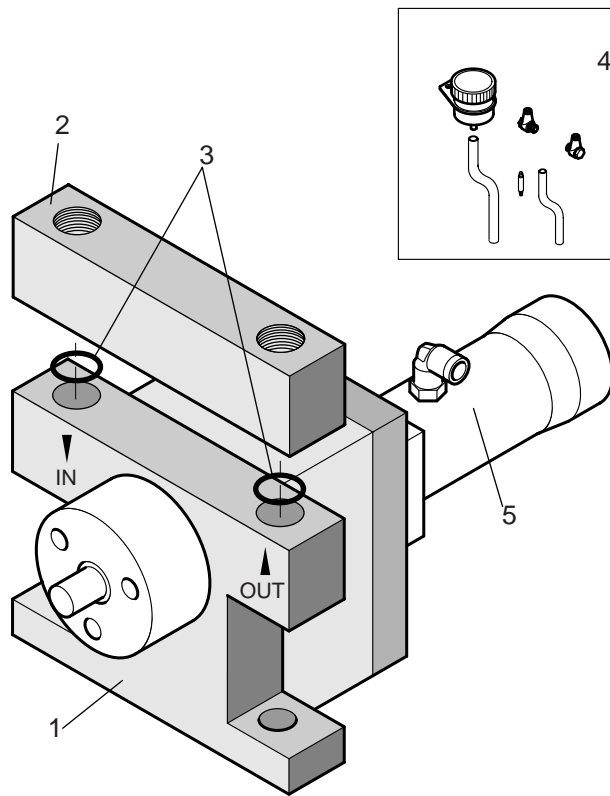
DES01249

Item	Part number	Description	Qty	Unit of sale
1	756560	10 cc Pump	1	1
2	730269	Connecting bar <a href="#">see § 8.3 page 25</a>	Option	1
3	J3TTCN011	O-ring	2	1
4	854279	MESAMOL Adaptation	Option	1
5	854270	Shunt valve	Option	1
	H1HMIN037	MESAMOL oil	Option	1

Item	Part number	Description	Qty	Unit of sale
1	1410030	10 cc Pump - ADLC (Amorphous diamond like carbon)	1	1
	910001957	10 cc Pump - ADLC	1	1
2	730269	Connecting bar <a href="#">see § 8.3 page 25</a>	Option	1
3	J3TTCN011	O-ring	2	1
4	854279	MESAMOL Adaptation	Option	1
5	854270	Shunt valve	Option	1
	H1HMIN037	MESAMOL oil	Option	1

**Remark:** The ADLC treatment is done only on the parts in contact with the product (pinions, flasks...).

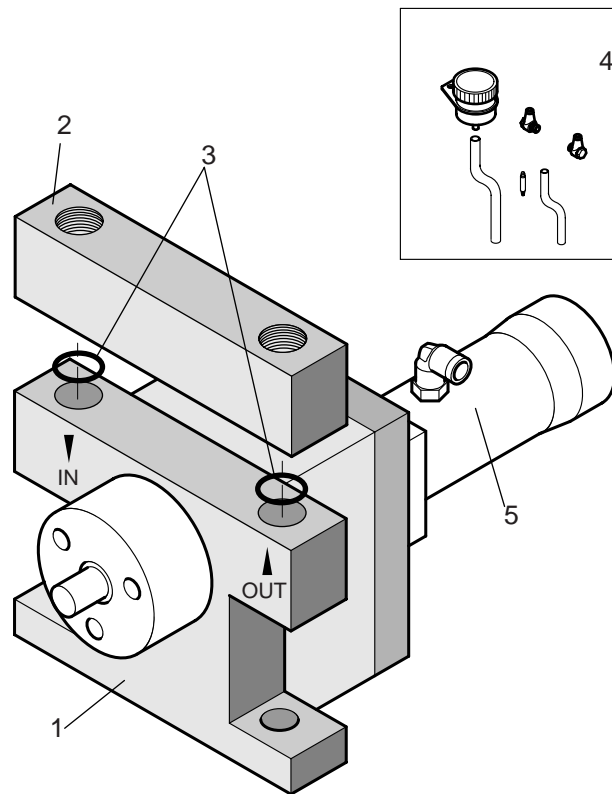
8.2.2. 6 cc - Pumps



DES01249

Item	Part number	Description	Qty	Unit of sale
1	1410031	6 cc Pump - ADLC	1	1
2	730269	Connecting bar <a href="#">see § 8.3 page 25</a>	Option	1
3	J3TTCN011	O-ring	2	1
4	854279	MESAMOL Adaptation	Option	1
5	854270	Shunt valve	Option	1
	H1HMIN037	MESAMOL oil	Option	1

### 8.2.3. 2.4 cc - Pumps

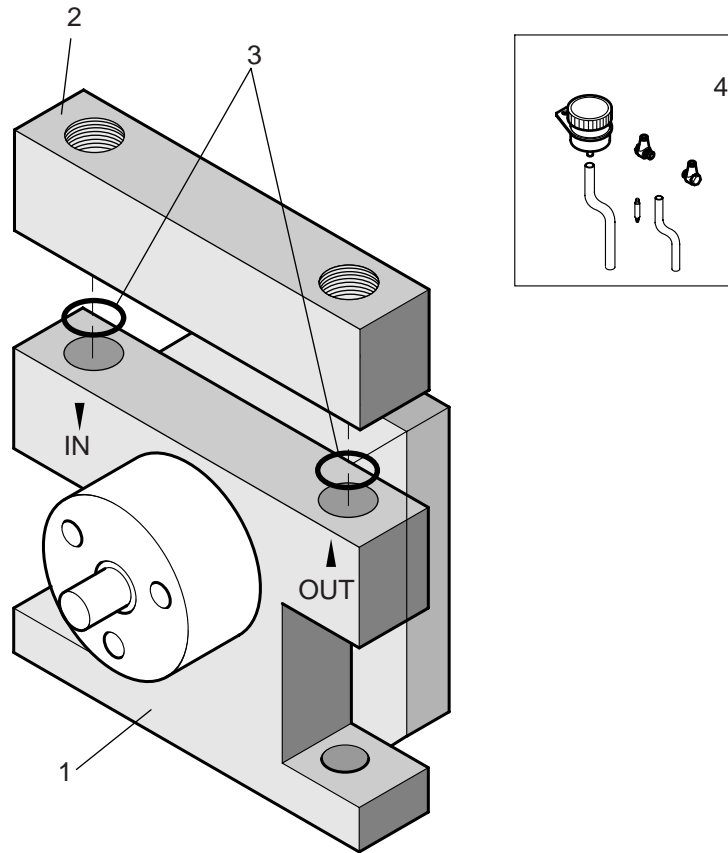


DES01249

Item	Part number	Description	Qty	Unit of sale
1	756515	2.4 cc Pump	1	1
2	730269	Connecting bar <a href="#">see § 8.3 page 25</a>	Option	1
3	J3TTCN011	O-ring	2	1
4	854279	MESAMOL Adaptation	Option	1
5	854270	Shunt valve	Option	1
	H1HMIN037	MESAMOL oil	Option	1

Item	Part number	Description	Qty	Unit of sale
1	1410670	2.4 cc Pump - ADLC	1	1
2	730269	Connecting bar <a href="#">see § 8.3 page 25</a>	Option	1
3	J3TTCN011	O-ring	2	1
4	854279	MESAMOL Adaptation	Option	1
5	854270	Shunt valve	Option	1
	H1HMIN037	MESAMOL oil	Option	1

8.2.4. 1.2 cc - Pumps



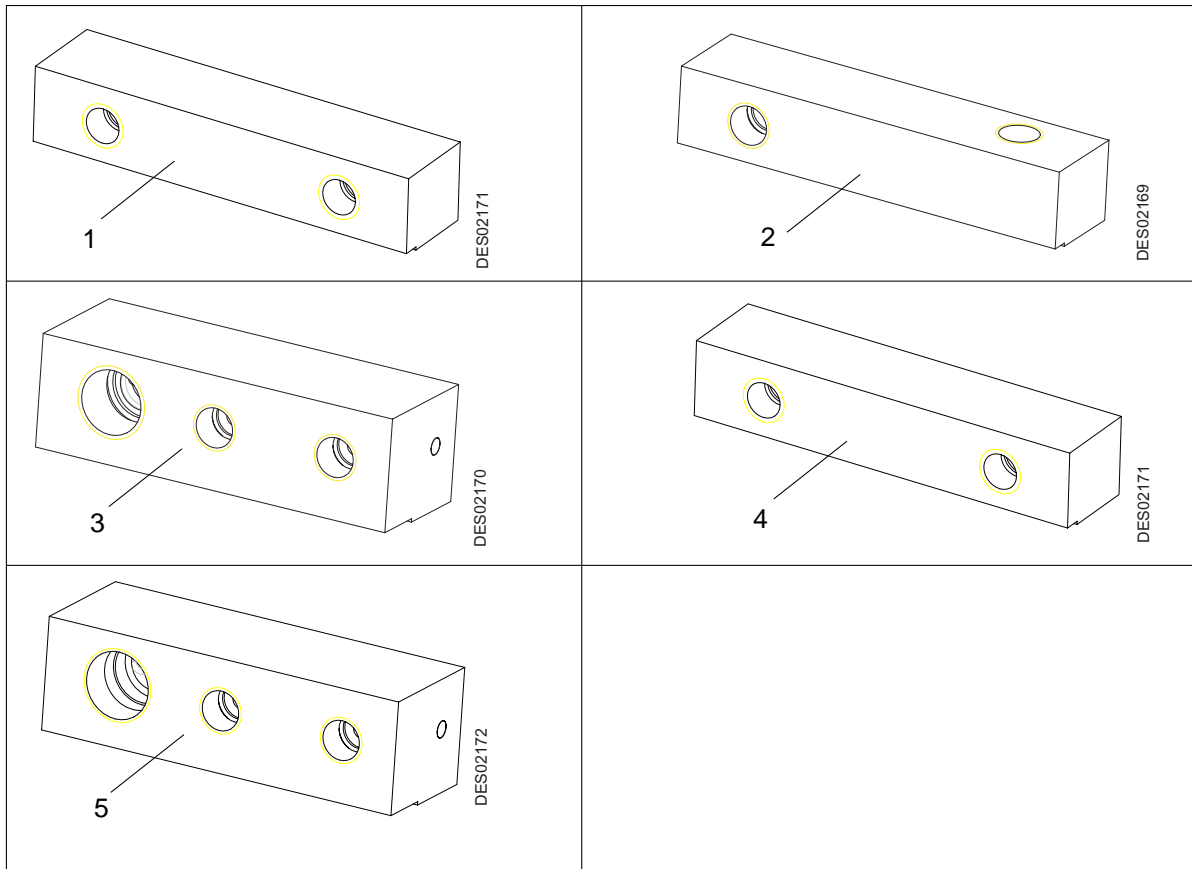
DES01344

Item	Part number	Description	Qty	Unit of sale
<b>1</b>	<b>758704</b>	<b>1.2 cc Pump</b>	<b>1</b>	<b>1</b>
2	730269	Connecting bar <a href="#">see § 8.3 page 25</a>	Option	1
3	J3TTCN011	O-ring	2	1
4	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1

Item	Part number	Description	Qty	Unit of sale
<b>1</b>	<b>1410767</b>	<b>1.2 cc Pump - ADLC</b>	<b>1</b>	<b>1</b>
2	730269	Connecting bar <a href="#">see § 8.3 page 25</a>	Option	1
3	J3TTCN011	O-ring	2	1
4	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1



### 8.3. Connecting bars

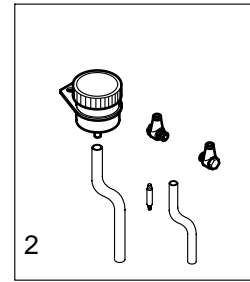
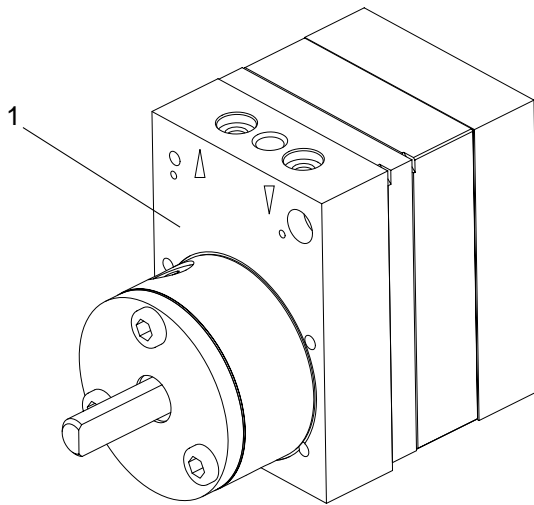


Item	Part number	Description	Qty	Unit of sale
1	730269	Connecting bar	Option	1
2	1306163	Connecting bar	Option	1
3	1307969	Connecting bar	Option	1
4	1310443	Connecting bar	Option	1
5	1311066	Connecting bar	Option	1

**Remark:** Connecting bars make it possible to connect, according to the type, one or two pressure controllers or one or two flowmeters.

## 8.4. Gear pumps with compact sole

### 8.4.1. 10 cc - Compact Pumps



DES03621

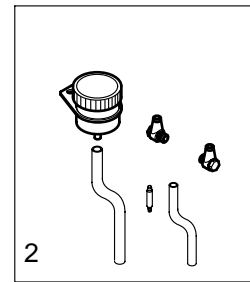
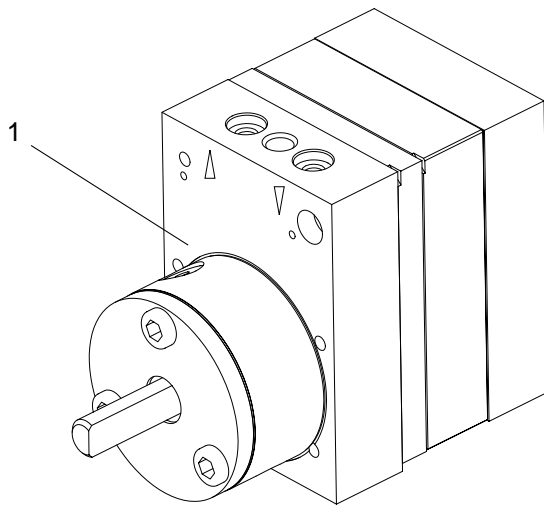
Item	Part number	Description	Qty	Unit of sale
1	1412152	10 cc Pump	1	1
2	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1

Item	Part number	Description	Qty	Unit of sale
1	910001606	10 cc Pump - ADLC	1	1
2	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1

**Remark:** The ADLC treatment is done only on the parts in contact with the product (pinions, flasks...).

For the connecting bars used with the compact pumps [see § 8.5 page 30](#).

8.4.2. 6 cc - Compact Pumps



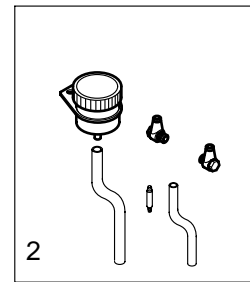
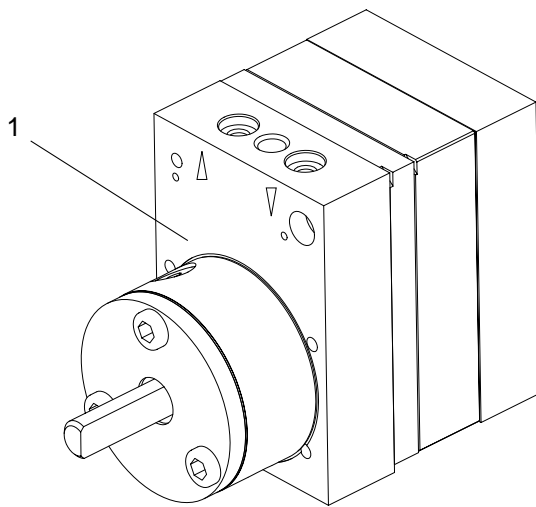
DES03621

Item	Part number	Description	Qty	Unit of sale
1	1412243	6 cc Pump	1	1
2	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1

Item	Part number	Description	Qty	Unit of sale
1	1411476	6 cc Pump - ADLC	1	1
2	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1

For the connecting bars used with the compact pumps [see § 8.5 page 30](#).

### 8.4.3. 2.4 cc - Compact Pumps



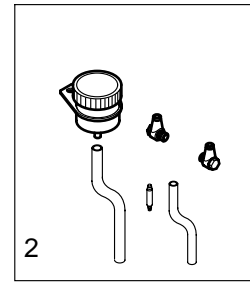
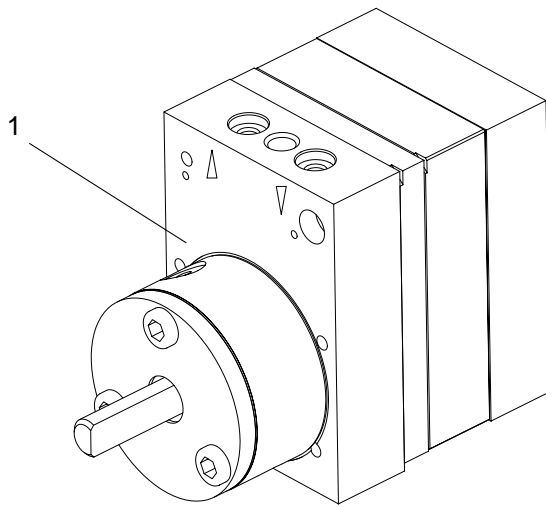
DES03621

Item	Part number	Description	Qty	Unit of sale
1	1412229	2.4 cc Pump	1	1
2	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1

Item	Part number	Description	Qty	Unit of sale
1	910000903	2.4 cc Pump - ADLC	1	1
2	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1

For the connecting bars used with the compact pumps [see § 8.5 page 30](#).

8.4.4. 1.2 cc - Compact Pumps

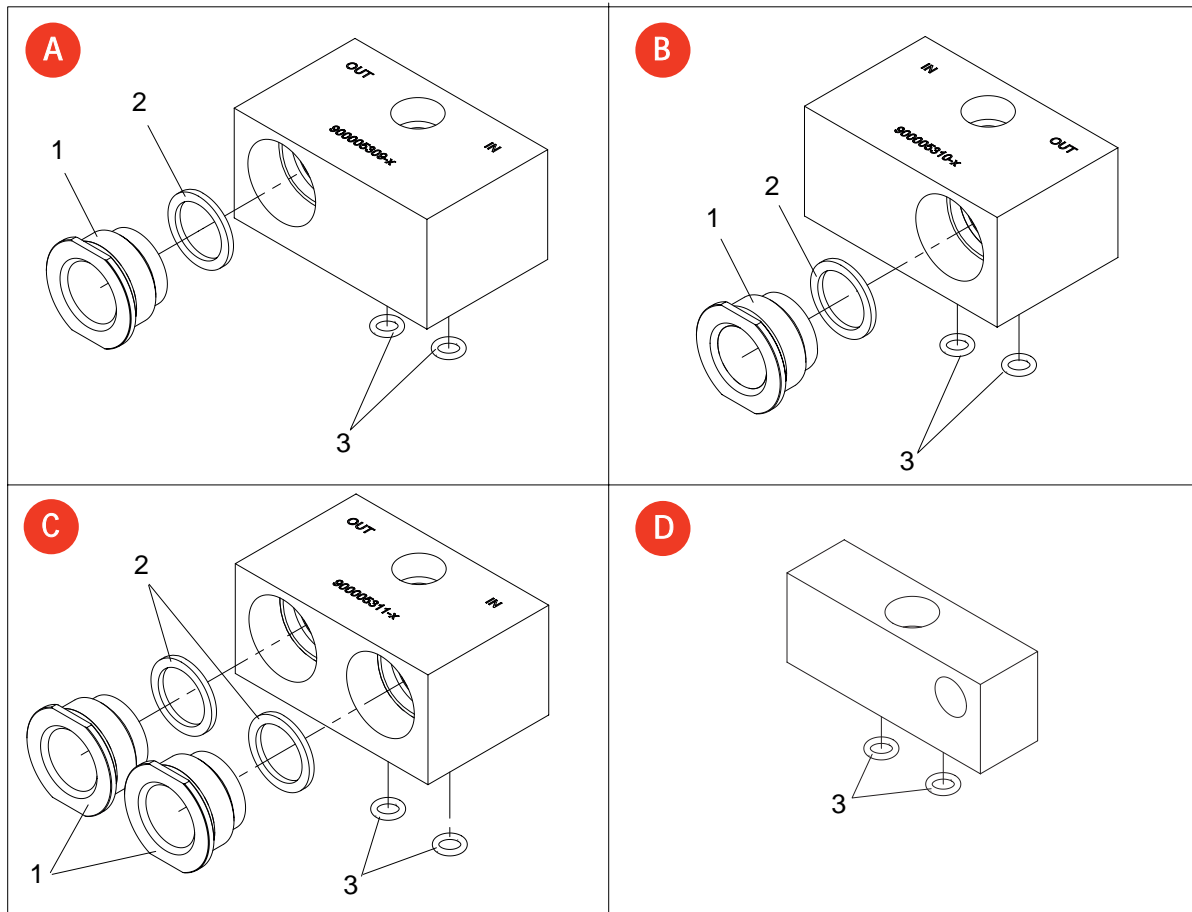


DES03621

Item	Part number	Description	Qty	Unit of sale
1	1412228	1.2 cc Pump	1	1
2	854279	MESAMOL Adaptation	Option	1
	H1HMIN037	MESAMOL oil	Option	1

For the connecting bars used with the compact pumps [see § 8.5 page 30](#).

## 8.5. Connecting bars used with compact pumps



DES03623

Item	Part number	Description	Qty	Unit of sale	Maintenance Level for spare parts (*)
<b>A</b>	<b>910007407</b>	<b>Connecting bar for one pressure switch</b>	<b>Option</b>	<b>1</b>	<b>-</b>
1	270000023	Tightening socket	1	1	-
2	270000024	O-ring - PTFE	1	1	1
3	J3TTCN118	O-ring - PTFE white	2	1	1
<b>B</b>	<b>910007408</b>	<b>Connecting bar for one pressure switch (inverted output)</b>	<b>Option</b>	<b>1</b>	<b>-</b>
1	270000023	Tightening socket	1	1	-
2	270000024	O-ring - PTFE	1	1	1
3	J3TTCN118	O-ring - PTFE white	2	1	1
<b>C</b>	<b>910007409</b>	<b>Connecting bar for two pressure switches</b>	<b>Option</b>	<b>1</b>	<b>-</b>
1	270000023	Tightening socket	2	1	-
2	270000024	O-ring - PTFE	2	1	1
3	J3TTCN118	O-ring - PTFE white	2	1	1
<b>D</b>	<b>910008031</b>	<b>Connecting bar for fittings</b>	<b>Option</b>	<b>1</b>	<b>-</b>
3	J3TTCN118	O-ring - PTFE white	2	1	1

**Remark: Connecting bars make it possible to connect, according to the type, one or two pressure switches**

<b>Item</b>	<b>Part number</b>	<b>Description</b>	<b>Qty</b>	<b>Unit of sale</b>	<b>Maintenance Level for spare parts (*)</b>
	22000068AT	Pressure switch (0 - 50 bar) (pump output)	-	1	3
	22000069AT	Pressure switch (0 - 16 bar) (pump input)	-	1	3
	900005312	Pressure switch plug	-	1	3

**(\*)**

**Level 1: Standard preventive maintenance**

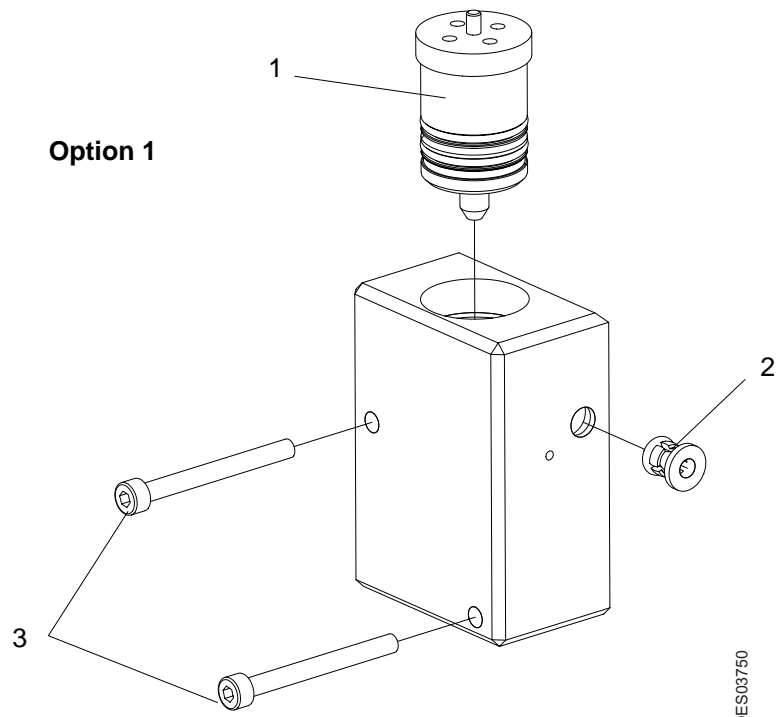
**Level 2: Corrective maintenance**

**Level 3: Exceptional maintenance**

**Remarks**

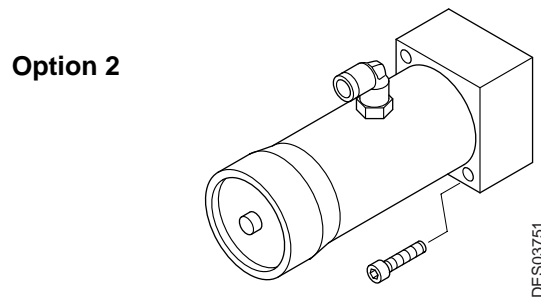
- 1 When a pressure switch is installed, it is imperative beforehand to put in place the tightening socket (P/N 270000023) in the connecting bar.
- 2 Install o-ring (P/N 270000024) then a plug (Ref.: 900005312), when one pressure switch output is not used.

### 8.6. Block of shunt microvalve fitted on compact pumps



Item	Part number	Description	Qty	Unit of sale	Maintenance Level for spare parts (*)
	<b>910007369</b>	<b>Block, shunt microvalve</b>	<b>1</b>	<b>1</b>	<b>3</b>
<b>1</b>	<b>1508516</b>	<b>Microvalve 2 ways, Dia.:7 orange indicator (see RT Nr 6021)</b>	<b>1</b>	<b>1</b>	<b>2</b>
<b>2</b>	F6RXZG081	Stainless steel grip + seal	1	1	3
<b>3</b>	X4FVSY126	Screw Chc M 4 x 35 stainless steel	2	1	3

### 8.7. Safety valve (shunt valve) fitted on compact pumps



Item	Part number	Description	Qty	Unit of sale	Maintenance Level for spare parts (*)
	<b>854270</b>	<b>Safety valve</b>	<b>1</b>	<b>1</b>	<b>1</b>

(\*)

**Level 1: Standard preventive maintenance**

**Level 2: Corrective maintenance**

**Level 3: Exceptional maintenance**