INSTRUCTION MANUAL

FOR INSTALLATION OPERATING, AND MAINTENANCE.

PRIMERoyal N ®
DRIVE MANUAL

This manual should be made available to the person responsible for installation, operating and maintenance.

Translated version
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GUARANTEE

LIST OF « TECHNICAL ASSISTANCE » AND « SPARE PARTS » DEPARTMENTS
PART I – DESCRIPTION

I - 1. UNPACKING AND STORAGE

UNPACKING
The packaging must be carefully examined on receipt in order to ensure that the contents have not sustained any obvious damage. Precautions must be taken when opening the packaging in order to avoid damaging accessories which may be secured inside the packaging. Examine the contents and check them off against the delivery note.

STORAGE PRECAUTIONS
- Storage for less than six months
  Equipment shall preferably be stored in its original packaging and protected from adverse weather conditions.

- Storage for more than six months
  - Grease all visible unpainted sections. Rubber parts (such as semi-flexible couplings) must be protected from sunlight and sudden temperature changes.
  - Store the pump in its original packaging. In addition, packaging in heat-sealing plastic cover and dessicant bags must be provided for. The quantity of dessicant bags should be adapted to the storage period and to the packaging volume.
  - Store protected from adverse weather conditions.

I - 2. DESCRIPTION
The PRIMEROYAL Pump is a compact electro-mechanical metering pump, oil-lubricated with a sealed housing, allowing adjustment of its capacity when stopped or in operation.

It is designed for industrial operation in continuous mode.

It is made up of the following items:
- a driving device consisting of a motor,
- a mechanical assembly,
- a liquid end assembly
I - 3. OPERATING PRINCIPLE OF THE MECHANICAL ASSEMBLY

Drawing 1066136410

The movement of rotation of the motor is transmitted by the worm [052] to the tangent wheel. The system of rod [014] and eccentric [016A] transforms the rotative movement in a linear movement. The crosshead [010] connected to the connecting rod [014] move with an adjusting linear stroke. The stroke of the crosshead [010] depends to the position of the slide [016] and the eccentric female [016A]

1 - 4. SAFETY AND HEALTH INSTRUCTIONS

The personnel responsible for installing, operating and maintaining this equipment must become acquainted with, assimilate and comply with the contents of this manual in order to:

• avoid any possible risk to themselves or to third parties,
• ensure the reliability of the equipment,
• avoid any error or pollution due to incorrect operation.

Any servicing on this equipment must be carried out when it is stopped. Any accidental start-up must be prevented (either by locking the switch or removing the fuse on the power supply line). A notice must be attached to the location of the switch to warn that servicing is being carried out on the equipment.

During oil changing operations, the waste oil must be collected in a suitable receptacle. Any overflow of oil which may result must be removed using a degreasing agent suitable for the operating conditions.

Soiled cleaning cloths must be stored in suitable receptacles. The oil, degreasing agent and cleaning cloths must be stored in accordance with the rules on pollution.

Switch off the power supply as soon as any fault is detected during operation: abnormal heating or unusual noise.

Special care has to be taken for chemicals used in the process (acids, bases, oxidising/reducing solutions, etc).
PART II - INSTALLATION

II - 1. HYDRAULIC INSTALLATION

All the information concerning the hydraulic installation of a metering pump is detailed in a volume, « Generalities about dosing pumps installation ». You should consult that manual to define the installation required for your application. However, the main items are described hereafter.

GENERAL

- Piping layout
- There must be no swan-necks or stagnant volumes which can trap air or gas.
- Stresses due to incorrect alignment of piping with respect to the centerline of valves must be avoided as far as possible.
- Remove burrs and clean the piping before fitting.
- It is advisable to provide for a calibrating chamber in order to calibrate the pump in service conditions.

PIPING ON THE SUCTION CIRCUIT

- Provide for a filter with suitable mesh size upstream of the pump.
- Check whether the diameter and length of pipe are compatible with the pump's maximum capacity.

PIPING ON THE DISCHARGE CIRCUIT

- Provide for a safety valve on the discharge pipe, designed to protect the installation.
- It is advisable to install a priming valve on the discharge circuit in order to make starting and maintenance of the pump easier.

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Tank</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Suction circuit isolating valve</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>Calibrating chamber</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Pump</td>
<td>9</td>
</tr>
<tr>
<td>5</td>
<td>Discharge circuit isolating valve</td>
<td>10</td>
</tr>
</tbody>
</table>

Fig. 1 : Installation example
II - 2. DRIP COLLECTION

- It’s recommended to install a drain system to collect the leakage and the drip, especially if the liquid pumped is harmful

II - 3. HANDLING

Handling the pump

The lifting equipment must be compatible with the pump weight.
Simplex pump without motor: 270Kg/595lbs max

The handling requires the following precautions:

- Fit the sling through the rings [4350] on the pump
- Check that the assembly is correctly balanced before starting to move it.
- Fix the pump as soon as it is positioned in correct location (see Chapter II - 4. Setting up).

Handling the Motor

The lifting equipment must be compatible with the motor weight (Refer to the motor signaletic plate).

Fit a sling on the motor.

Check that the motor is correctly balanced before starting to move it.

II - 4. SETTING UP

Pump Installation

Mount by fixing the holes to the pump to a horizontal support correctly dimensioned. Leave enough clear space around the pump to be able to carry out servicing operations and adjustments.

Pumps installed outdoors must be protected by a shelter (according to the climatic conditions).

Noise level, in dB (A) < 75

II - 5. ELECTRICAL INSTALLATION

Connecting The Motor

Check the specifications of the motor and compare them with the voltage available on your installation before making connections. Connect the motor in accordance to the indications specified in the connecting box.

Check the motor rotation as indicated on the motor spacer

- Do not forget to connect the earth terminal of the motor [PE] to the equipment earth conductor.

The electrical protection for the motor (fuse or thermal protection) must be suitable for the motor’s rated current.
Electrical Connections

To reduce the risk of electrical shock, the metering pump must be plugged into a properly grounded grounding-type receptacle with ratings conforming to the data on the pump control pane. The pump must be connected to a good ground. DO NOT USE ADAPTERS! All wiring must conform to local electrical codes. If the supply cord is damaged, it must be replaced by the manufacturer, stocking distributor, or authorized repair center in order to avoid a hazard.
PART III - START UP

III - 1. PROCEDURES BEFORE START UP (See general arrangement drawing)

Special care has to be taken for chemical product used in the process (acids, bases, oxidizing /reducing solutions, etc).

- Check the pump fixation (Chapter II - 4.).
- Fill the housing with the lubricating oil (Chapter IV-1)
- Check the opening of all isolating valves installed on the suction and discharge circuits. Disconnect discharge circuit (caution to the liquid pumped). This procedure is to verify that there is liquid present (pump is installed in flooded suction), or to prime the pump (pump installed in suction lift).
- Check that the pump capacity is set to “0%” (hand-knob).
- Connect your temperature control process to the connections provided for this purpose.
- Refer to the instructions of your process to regulate the temperature of the liquid end

III - 2. START UP

- Once all the checks and procedures described in the previous section have been carried out, start up the pump.
- Check visually and by listening. (In particular, check that there are no suspicious noises).
- Make sure that the hand-knob is unlocked.
- Adjust the pump capacity gradually from 0 % to 100% and control the liquid output at priming valve.
- As soon as the liquid to be pumped flows out of the priming valve, priming on the process side has been achieved. Close the priming valve or reconnect the discharge pipe, as applicable.
- Once the priming is obtained, adjust the pump to the desired capacity.
- Lock the hand-knob with the locking screw

III - 3. TROUBLE SHOOTING START UP

The motor runs with difficulty and heats up

- One phase is incorrectly connected.
- The characteristics of the electrical power supply do not match the specifications of the motor.
- The electrical connection used is not suitable.
- The housing does not contain any oil. Fill up with oil (See Chapter IV - 1).

The flow rate is lower than desired

- The pump capacity is incorrectly adjusted: adjust the capacity to the desired value and lock the hand-knob.
- The suction power is insufficient (pipe cross-section too small or pipe too long): replace the pipe with ones that have a larger cross-section or install the pump in flooded suction.
- The leak-tightness of suction pipe is unsatisfactory.
- The viscosity of the liquid is incompatible with the pump’s capabilities.
The capacity is greater than desired

- The stroke adjustment setting of the pump is incorrect: to adjust set the flow to the desired value and lock the setting.
- A syphoning phenomenon is observed: check if the suction pressure is not superior to the discharge pressure. It is necessary to place a back-pressure valve on the discharge line.

The capacity is variable

- This problem may be due to particles from the piping which interfere with the operation of the valve assemblies: clean the piping and the valve assemblies (by checking the assembly sequence of different components).

III - 4. SCHEDULE FOR CHECKS AND MAINTENANCE OPERATIONS

- The program of checks and maintenance operations depends on the conditions in which the equipment is used. For this reason, the following frequencies are given as an example only. Individual users should adapt these frequencies to their own specific operating conditions.

<table>
<thead>
<tr>
<th>When?</th>
<th>Check</th>
<th>Maintenance</th>
<th>See</th>
</tr>
</thead>
<tbody>
<tr>
<td>After 2000 first hours</td>
<td>Change lubricating oil</td>
<td>Chapter IV-1</td>
<td></td>
</tr>
<tr>
<td>Every month</td>
<td>Check the oil level of the housing and the spacer - if incorrect - *</td>
<td>Trace lubricating oil leak</td>
<td></td>
</tr>
<tr>
<td>Every 3 months</td>
<td>Check the oil temperature - if &gt;95°C - *</td>
<td>Verify the date of the last oil change - the oil contamination - the equipment operating conditions</td>
<td></td>
</tr>
<tr>
<td>Every 750 hours</td>
<td>Check tight sealing of plunger - if incorrect - &gt;</td>
<td>Adjust sealing: if adjustment impossible - &gt; change packings</td>
<td>Chapter VII-3</td>
</tr>
<tr>
<td>Every 8 000 hours or 1 year</td>
<td></td>
<td>Change lubricating oil</td>
<td>Chapter IV-1</td>
</tr>
<tr>
<td>Frequency to be defined according to process</td>
<td>Check conformity of capacity</td>
<td>Check the pump capacity</td>
<td>Chapter IV-2</td>
</tr>
<tr>
<td></td>
<td>Check the temperature of liquid end</td>
<td>Verify your temperature control process</td>
<td></td>
</tr>
</tbody>
</table>

A model maintenance sheet is shown hereafter to help you ensure follow-up of your servicing actions (checking or maintenance).
# MAINTENANCE SHEET

<table>
<thead>
<tr>
<th>Intervention</th>
<th>Date</th>
<th>functioning hours</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Maintenance sheet model
PART IV - ROUTINE MAINTENANCE

IV - 1. OIL CHANGE

⚠️ To avoid any risk of burning by the hot oil in the drive, personal protection equipment must be used (Gloves, safety glasses, etc).

- Perform the first oil change after 2000 hours’ operation. Subsequent oil changes will be carried out every 8000 hours operation or every 1 year
- Disconnect the pump electrically, check that the equipment cannot be switched on accidentally. Position a notice at the location of the switch.
- Unscrew the plug and drain the oil into a tray. Degrease the plug and screw it into place.
- Remove any overflow of oil immediately with a suitable degreasing agent for the operating conditions.
- Fit the plug and fill up the housing to the middle of the oil level indicator with a mechanical oil suitable for service conditions.

![Picture of Housing](image)

<table>
<thead>
<tr>
<th>Designation</th>
<th>Qty (liters)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical housing</td>
<td>20L</td>
</tr>
<tr>
<td>Mechanical housing for multiplex version</td>
<td>22L per pump</td>
</tr>
</tbody>
</table>
IV - 2. OTHER MAINTENANCE OPERATIONS

CHECKING THE PUMP CAPACITY

This is a question of determining the straight line representing the pump's capacity according to its adjustment. Four measurements are sufficient (adjustment at 100%, 75%, 50% and 25%). There are two possible methods:

If the pump is installed in pressurizing mode
Measure the volume of pumped liquid in a calibrating chamber for a given period of time. It may be necessary to reproduce actual operating conditions (suction pressure).

If the pump is installed in suction mode
Measure the volume of discharged liquid. It may be necessary to reduce actual operating conditions (discharge pressure).

The first method is recommended. In addition, this method avoids placing the operator in contact with the liquid, which is important if the pumped liquid is hazardous. For a precise check, it may be necessary to use an electromagnetic flow-meter.

IV - 3. TRACING CAUSES OF FAILURE

PROBLEMS WITH MOTOR

The motor does not run:

- The thermal relay has been tripped.
- The motor is defective.
- Wiring is defective.

The motor heats abnormally:

- The quantity of lubricating oil is incorrect: trace the leak (see Chapter IV - 2.)
- The quality of the lubricating oil is incorrect. Check the date of the last oil change and the specifications of the oil used.
- The pump is used in conditions it was not designed for.

PROBLEMS WITH NOISY MECHANICAL PARTS

- The bearings can wear down, replace them if necessary
- The motor coupling can wear down, replace it if necessary

PROBLEMS WITH FLOW RATE

The pump produces no flow

- The pump capacity is adjusted to « 0 % » : Adjust the capacity to the desired value and lock the hand-knob.
- Check the leak-tightness of the piping safety valve
- The liquid end is not primed: release the pressure on the discharge pipe and prime the liquid end, or check the leak-tightness of the suction circuit.
- The balls of the valve assemblies are blocked by particles: clean or replace the valve assemblies.
• First, check whether the presence of the particles in the valve assemblies is normal and take corrective action if necessary.

• If the problem is not solved check the mechanical assembly and liquid end functioning if **The pump does not provide the required flow rate.**

• The pump capacity is incorrectly adjusted: adjust the capacity to the desired value and lock the hand-knob.

• The valve assemblies are blocked by particles: clean or replace the valve assemblies.

• The suction circuit leak-tightness is unsatisfactory
IV - 4. ORDERING SPARE PARTS
   To make it easier to register your order for spare parts and ensure a quick delivery, please provide us the following details:

   - Information on the pump: type and contract number. These two items of information are shown on the identification plate mounted on the pump.

   - Information on the spare part: reference, description and quantity. These items of information are specified in the spare parts list supplied with the pump.

You will find the phone and fax number of the Spare Parts Department at the end of this document.

![Identification Plate]

**Fig. 3 Typical identification plate**
PART V - PREVENTIVE MAINTENANCE

V-1. GENERAL

The preventive maintenance consists in replacing the wear parts included in a "spare parts kit". The kits are available on request at the spare part department.

The corresponding action is detailed in the chapter VI and VII : Servicing of the mechanical assembly.

V-2. MECHANICAL ASSEMBLY PRÉVENTIVE MAINTENANCE

<table>
<thead>
<tr>
<th>Renewal</th>
<th>Frequency* (hours)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wheel and worm assembly</td>
<td>25,000 h</td>
</tr>
<tr>
<td>Bearings</td>
<td>25,000 h</td>
</tr>
<tr>
<td>Crosshead and seals</td>
<td>8,000 h</td>
</tr>
<tr>
<td>Flexible shock absorber</td>
<td>8,000 h</td>
</tr>
</tbody>
</table>

* Approximate hours number when operating under max performances and normal using conditions

V-3. OIL CHARACTERISTICS

V-3.1 MECHANICAL OIL CHARACTERISTIC

Oil: Mobil Gear 600 XP 300

References:

56966- Conditioning 60 Liters/ 63.4 Quarts
56967- Conditioning 25 Liters/ 26.4 Quarts

Temperature Range:

Minimum Temperature: -5°C/23°F
Maximum Temperature: 80°C/176°F

Equivalencies Table:

<table>
<thead>
<tr>
<th>Agip</th>
<th>Blasia 320</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aral</td>
<td>Pontamac 320</td>
</tr>
<tr>
<td>Avia</td>
<td>Gear RSX 320</td>
</tr>
<tr>
<td>BP</td>
<td>Energoles-GRx 320</td>
</tr>
<tr>
<td>Petronas</td>
<td>Gear STR 320</td>
</tr>
</tbody>
</table>
VI-SERVICING THE MECHANICAL ASSEMBLY

REMARKS

• By measure of simplification, the described procedures don't mention the washers fitted with fasteners (such as screws and nuts) and the magnet.

⚠️ Do not to forget to go put them together!

• Some parts have been bonded during the workshop assembly. Clean the residual glue before a second assembly
• Replace the seal at each servicing

PRECAUTION

Before all servicing perform the following operations:

• Disconnect the electrical power. Any accidental start-up must be prevented. Position a notice at the switch location to avoid start up.
• Check that there is no temperature before starting to operate
• Disconnect the hydraulic power
• Remove the suction valve to drain the liquid end, if necessary rinse the liquid end
• Drain the oil from the housing

TO BE PREPARED BEFORE SERVICING

• Handling material compatible to the weight of the equipment
• Glue Loctite 221
• Degreasing agent.
• Grease
• Heating system for bearing assembly
### VI-1 Assembly / Disassembly Setting Guide

#### Drawing 1066136400D00 rev00

<table>
<thead>
<tr>
<th>Disassembly</th>
<th>Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perform the following steps before this disassembly:</strong></td>
<td>**Position</td>
</tr>
<tr>
<td>- disassembly of the adjusting stroke system</td>
<td>[439]</td>
</tr>
<tr>
<td>- disassembly of the wheel-connecting rod assembly</td>
<td>[435A]</td>
</tr>
</tbody>
</table>

1. Unscrew the screw [435A] Qty 1
2. Remove the part [008]
3. Remove the assembly [016],[016A] from the upper side of the mechanical housing
4. Remove the part [068A] with the bearings [439B]
5. Remove the bearings [439B]
6. Fit the part [016A],[016] and insert the part [037A] in the same time
7. Insert the bearing [439B] on the part [068A]
8. Heat the internal cage of the bearing [439B] (110°C/230°F)
9. Insert the heated internal cage on the part [016]
10. Fit the external cages of the bearing [439B] on the part [068A]
11. Insert the part [068A] into the part [016]
12. Insert the internal cage of the bearing [439B] on the [016]
13. Fit a new washer [439A].
14. Degrease and place glue (Loctite 221) into the nut [439].
15. Tighten the nut [439] (two time)
16. Fold the washer [439A]
17. Fit the part [434A]
18. Insert the assembly into the mechanical housing from the upper side
19. Fit the [016] in mechanical stop
20. Fit the part [008]
21. Tighten the screw [435A]
## VI-2 Assembly / Disassembly of the wheel and connecting rod

### Disassembly

<table>
<thead>
<tr>
<th>Perform the following steps before this disassembly:</th>
</tr>
</thead>
<tbody>
<tr>
<td>- disassembly of the worm</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Position</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>[435A]</td>
<td>40 N.m (29.4 ft-lb)</td>
</tr>
<tr>
<td>7</td>
<td>[435E]-[435F]</td>
<td>280 N.m (206 ft-lb)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>Unscrew the screw [435F] Qty 4</td>
</tr>
<tr>
<td>7</td>
<td>Remove the part [037]</td>
</tr>
<tr>
<td>8</td>
<td>Remove the parts[072A],[052]</td>
</tr>
<tr>
<td>9</td>
<td>Unscrew the screws [435A]</td>
</tr>
<tr>
<td>10</td>
<td>Remove the part [052]</td>
</tr>
<tr>
<td>11</td>
<td>Unscrew the screws [435E]</td>
</tr>
<tr>
<td>12</td>
<td>Remove the parts [068]</td>
</tr>
<tr>
<td>13</td>
<td>Remove the connecting rod [014]</td>
</tr>
<tr>
<td>14</td>
<td>Grease the connecting rod [014]</td>
</tr>
<tr>
<td>15</td>
<td>Position the connecting rod [014] on the part [016A]</td>
</tr>
<tr>
<td>16</td>
<td>Fit the part [068] equipped with the part [434B] to the pump</td>
</tr>
<tr>
<td>17</td>
<td>Tighten the screws [435E]</td>
</tr>
<tr>
<td>18</td>
<td>Fit the parts [072A],[052]</td>
</tr>
<tr>
<td>19</td>
<td>Tighten the screws [435A]</td>
</tr>
<tr>
<td>20</td>
<td>Insert the assembly into the pump</td>
</tr>
<tr>
<td>21</td>
<td>Fit the parts [037] to the pump</td>
</tr>
<tr>
<td>22</td>
<td>Tighten the screws [435F]</td>
</tr>
</tbody>
</table>
## VI-3 Assembly / Disassembly of the crosshead and spacer

### Drawing 1066136410D00 rev02

#### M0227001

<table>
<thead>
<tr>
<th>Disassembly</th>
<th>Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Perform the following steps before this disassembly:</strong></td>
<td><strong>Position</strong></td>
</tr>
<tr>
<td>assembly of the liquid-end assembly</td>
<td></td>
</tr>
<tr>
<td></td>
<td>[435B]</td>
</tr>
<tr>
<td></td>
<td>[435A]</td>
</tr>
<tr>
<td>1. Unscrew the screws [435B] Qty: 4</td>
<td>1. Protect the crosshead [010] with a cloth</td>
</tr>
<tr>
<td>2. Protect the crosshead [010] with a cloth</td>
<td>2. Position the crosshead [010] on the connecting rod [014]</td>
</tr>
<tr>
<td>15. Remove the spacer [072B]</td>
<td>3. Insert the part [068B]</td>
</tr>
<tr>
<td>4. Remove the retaining ring [434]</td>
<td>4. Tighten the screws [435C] (mechanical stop)</td>
</tr>
<tr>
<td>5. Remove the parts [037B],[072C]</td>
<td>5. Unscrew the screws [435C] of ¼ turn</td>
</tr>
<tr>
<td>6. Remove the seals [438C]</td>
<td>The screws [435C] cannot be use a second time</td>
</tr>
<tr>
<td>23. Unscrew the 2 screws [435C]</td>
<td>6. Fit the seal [438C] to the part [037B]</td>
</tr>
<tr>
<td>24. Remove the part [068B]</td>
<td>the lip of the seal [438C] must be positionned to the internal side</td>
</tr>
<tr>
<td></td>
<td>8. Insert the part [072C] into the spacer [072B]</td>
</tr>
<tr>
<td></td>
<td>9. Insert a seal [438B] into the spacer [072B]</td>
</tr>
</tbody>
</table>

Insert the part [037B] into the spacer [072B]

Oil the internal diameter of the spacer 072B

Fit the seals [438A],[438],[438L] on the spacer [072B]

Fit the spacer [072B] to the pump

Fit the retaining ring [434]

Tighten the screws [435B]
PRIMEROYAL N
COULISSEAU-LANTERNE
CROSSHEAD-SPACER

MILTON ROY
EUROPE

106.6136.410.D00

STUDIO WORKS
**Disassembly**

<table>
<thead>
<tr>
<th>Position</th>
<th>Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td>[435F]</td>
<td>120N.m (88.3 ft-lb)</td>
</tr>
<tr>
<td>[435]</td>
<td>17N.m (12.5 ft-lb)</td>
</tr>
<tr>
<td>[435A]</td>
<td>10N.m (7.4 ft-lb)</td>
</tr>
</tbody>
</table>

1. Unscrew the screws [435A]
2. Position the part [072] on the side [A]
3. Remove the assembly [440],[055]
4. Insert the seal [438] on the part [056]
5. Unscrew the screws [435F]
6. Screw the screw [056] into the part [072] to obtain the dimension X=30mm
7. Remove the assembly [072],[056]
8. Tighten the locking assembly [043],[438A],[056A],[440A]
9. Remove the seal [438E],[438]
10. Fit the seals [438E],[438B]
11. Unscrew the locking screw [440A]
12. Exit the nut [008] to the maximum
13. Remove the part [056]
14. Fit the assembly to the pump (left-hand) and screw of 9 turns
   1. Push the assembly into the housing
   2. Tighten the screw [435F]
   3. Fit the part [055]
   4. Tighten the screw [435A]
   5. Fit the part [440]
   6. Tighten the screw [435B]
   7. Turn of 10 turns to set the « 0% »(no crosshead displacement)
   8. Unscrew the screw [435A]. Set the « 0 » of the part [055] with the « 0 » of the part [072]
   9. Push the part [055] to the part [072].(dimension Z=0)
10. Tighten the screws [435A]
11. Set the pump « 100% » (10 turns)
12. Tighten the screw [056A]
13. Ti
PRIMEROYAL N
REGLAGE MANUEL
MANUAL STROKE ADJUSTMENT

DOSAPRO MILTON ROY

04.10.04  EMISSION INITIALE

Date

00

043

435B

435A

435F

056A

438A

440A

055

440

056A

438B

435

072

053

438E

438A

008

081
### VI-5 - Assembly / Disassembly of the motor

**Drawing:** C0519980012D00

<table>
<thead>
<tr>
<th>Disassembly</th>
<th>Assembly</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Position</strong></td>
<td><strong>Torque</strong></td>
</tr>
<tr>
<td>[435]</td>
<td>120 N.m (88.3 ft-lb)</td>
</tr>
<tr>
<td>[435A]</td>
<td>30 N.m (22.1 ft-lb)</td>
</tr>
<tr>
<td>[435B]</td>
<td>120 N.m (88.3 ft-lb)</td>
</tr>
<tr>
<td>[435C]</td>
<td>70 N.m (51.5 ft-lb)</td>
</tr>
</tbody>
</table>

16. Unscrew the screws [435B].
17. Remove the motor
18. Unscrew the screws [435A] and remove the parts [052], [052A]
19. Unscrew the screws [435] and remove the part [072].
20. Remove the part [440]
26. Fit the part [072]. and screw the screws [435]
27. Fit the part [052] on the pump at the dimension C = 158
28. Fit the part [052] on the pump and screw the screw [435A]
   Respect a clearance J = 3.5mm between the two parts [052], [052A]
29. Fit the part [440] on the part [052]
30. Fit the motor and screw the screws [435B] Start up : Refer to chapter III
Perform the following steps before performing:

Disassembly of the motor

<table>
<thead>
<tr>
<th>Position</th>
<th>Torque</th>
</tr>
</thead>
<tbody>
<tr>
<td>[439C]</td>
<td>80 Nm - 30 Nm (58.9 ft-lb - 22.1 ft-lb)</td>
</tr>
<tr>
<td>[435G]</td>
<td>20 Nm (14.7 ft-lb)</td>
</tr>
<tr>
<td>[435F]</td>
<td>120 Nm (88.3 ft-lb)</td>
</tr>
</tbody>
</table>

16. Fit the external cages of the bearing [439F],[439G] to the part [068D]
17. Heat the internal cage of the bearing [439G] (110°C)
18. Insert the internal cage of the bearing [439G] on the worn [052]
19. Insert the part [068D] on the worn [052]
20. Insert the bearing cage [439F] on the worn [052]
21. Fit a new washer [439D]
22. Tighten the nut [439C] in two time
23. Fold the washer [439D]
24. Fit the bearing [439E] on the worn [052]
25. Insert the worm [052] from the bottom of the housing
26. Tighten the screws [435G]
27. Protect the groove of the part [434C] with adhesive ribbon
13. Insert the seal [438I],[438G] on the part [068E]
15. Fit the part [068E]
28. Tighten the screws [435F]
29. Fit the part [434C]
30. Fit the part [438]
31. Fit the part [434]