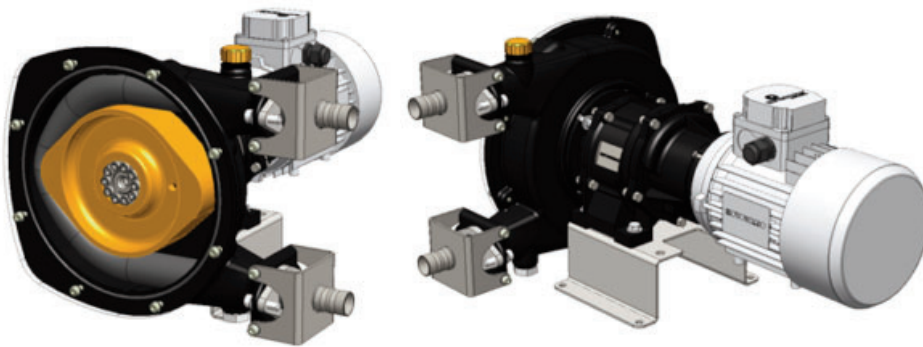


PUMPS

HD10 - HD15 - HD20



Installation
Operation
Maintenance

EC CERTIFICATE OF CONFORMITY :

The EC Certificate of Conformity (paper version) is systematically attached to the equipment when shipped.

WARRANTY :

ABAQUE pumps are covered 24 months by warranty within the limits mentioned in our General Sales Conditions. In case of a use other than that mentioned in the Instructions manual, and without preliminary agreement of ABAQUE, warranty will be canceled.

PATENTS :

For relevant patents on this product refer to : www.psgdover.com/abaque/support/patents



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Your distributor :

ABAQUE PERISTALTIC HOSE PUMPS

SAFETY INSTRUCTIONS, STORAGE, INSTALLATION AND MAINTENANCE

Definition of safety symbols



This is a SAFETY ALERT SYMBOL.

When you see this symbol on the product, or in the manual, look for one of the following signal words and be alert to the potential for personal injury, death or major property damage.



Warns of hazards that WILL cause serious personal injury, death or major property damage.



Warns of hazards that CAN cause serious personal injury, death or major property damage.



Warns of hazards that CAN cause personal injury or property damage.

NOTICE

Indicates special instructions which are very important and must be followed.

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TECHNICAL CHARACTERISTICS

TECHNICAL CHARACTERISTICS

• Maximum flowrate :

- Intermittent service
 - HD10135 l/h (0,59 GPM)
 - HD15450 l/h (1,98 GPM)
 - HD20750 l/h (3,30 GPM)
- Continuous service
 - HD10105 l/h (0,46 GPM)
 - HD15340 l/h (1,50 GPM)
 - HD20580 l/h (2,55 GPM)

• Minimum rotation speed : 10 tr/min (rpm)

This ensures good lubrication of the hose.

• Maximum rotation speed :

- Intermittent service90 tr/min (rpm)
- Continuous service
 - HD1070 tr/min (rpm)
 - HD15 - HD2068 tr/min (rpm)

• Maximum running temperature :

- Hose NR - NBR - NBR FDA - Hypalon70°C (158°F)
- Hose EPDM80°C (176°F)

• Minimum running temperature : 0°C (32°F)

• Maximum pressure : 8 bar (116 psi)

• Maximum viscosity :

- HD1013 000 cP
- HD1516 000 cP
- HD2027 000 cP

NOTES

The ABAQUE peristaltic pumps **MUST** be installed on systems specially designed by qualified staff. Installation **MUST** comply with local standards, national rules and safety regulations.

This manual is designed for installation and start-up of the peristaltic pumps. It **MUST** be supplied with the pump.

Maintenance of the peristaltic pumps must be carried out **ONLY** by qualified personnel. This operation must comply with local and national regulations as well as safety standards.

Read the whole manual and all the instructions and precautions, **BEFORE** using any ABAQUE pumps.

Do not remove any warning and use stickers from the pumps.

NOTES

The numbers after part names correspond to reference numbers in the spare parts lists.

Photos and drawings used in this IOM are not contractual.

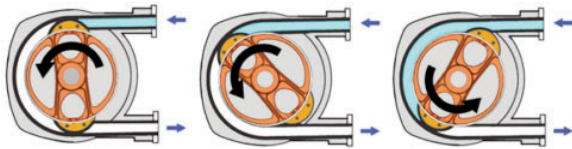
1. INSTALLATION

1.1 Operating principle

The pump operates by alternating contraction and relaxation of a specially designed elastomeric hose.

Two shoes attached 180° apart to a central rotor compress the hose against the pump body in a fluid tight manner.

Rotation of the rotor causes a flow by displacing the product into the hose. The pump body is filled with a special lubricant allowing shoes to slide easily over the hose, which avoids overheating.



1.2 Hose compression

On these pumps sizes, shoes and rotor are a single part.

1.3 Pumped liquid

Under normal operation, the pumped liquid is only in contact with the hose and the inserts. Chemical compatibility between pumped liquid and these two parts must therefore be carefully checked.

Five different quality elastomeric hoses are available :

- NR (natural rubber)
- NBR (perbunan or buna)
- NBR FDA (food perbunan or buna)
- EPDM
- Hypalon

Inserts are available in AISI 316 stainless steel, in polypropylene (PPH) and in polyfluoride vinylidene (PVDF).

This pumping technology is specially adapted to handle abrasive and solid loaded liquids.

During the compression stage, abrasive particles may penetrate the hose wall without damaging it. Immediately after, these particles are released into the liquid (the size of particles does not however have to exceed 15 % of the internal diameter of the hose).

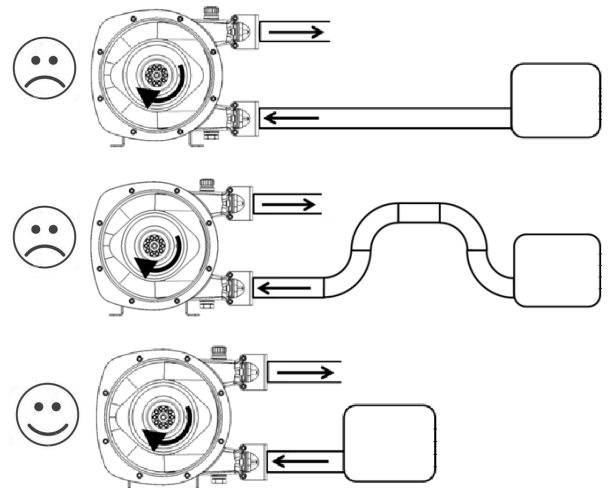
You can contact our Technical Services at any time to ask for the information you require.

1.4 Piping installation

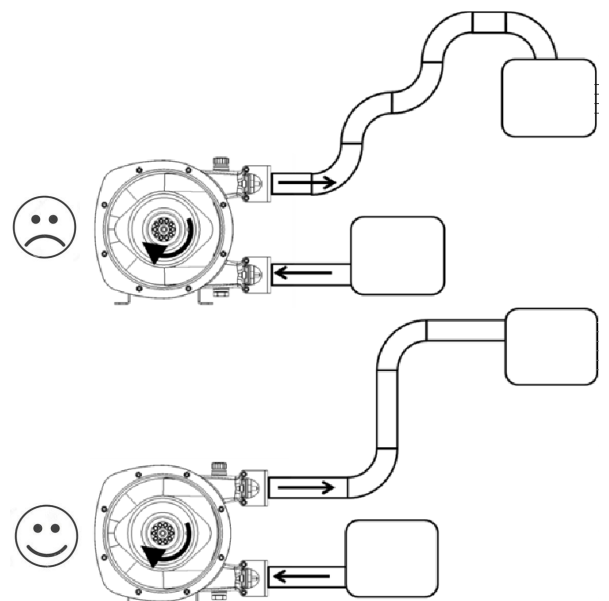
	WARNING	<p>FAILURE TO RELIEVE THE SYSTEM PRESSURE PRIOR TO PERFORMING ANY WORK ON THE PUMP OR THE INSTALLATION CAN CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.</p>
	<p>Hazardous pressure can cause personal injury or property damage.</p>	

- Not recommended
- To be avoided if possible
- Preferable

Make suction line as short and straight as possible.



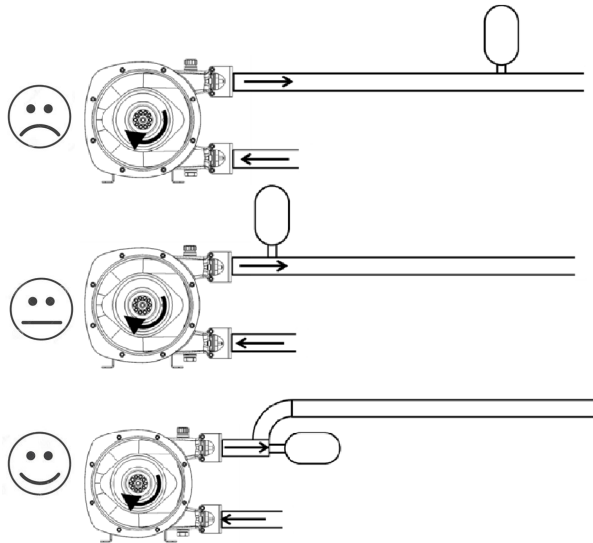
Avoid multiplying pipe bends.



1. INSTALLATION (continued)

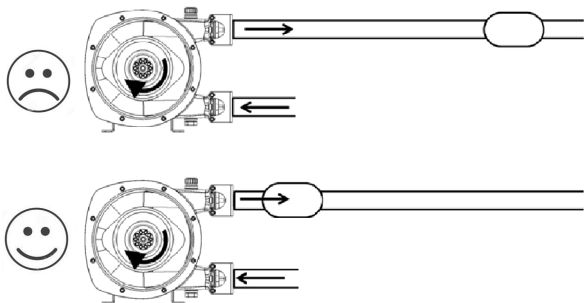
Use of a dead-end pulsation dampener

To obtain a maximum efficiency of the dampener, it should be placed as close as possible to pump port, and with inlet port facing full flow rather than being on a T junction.

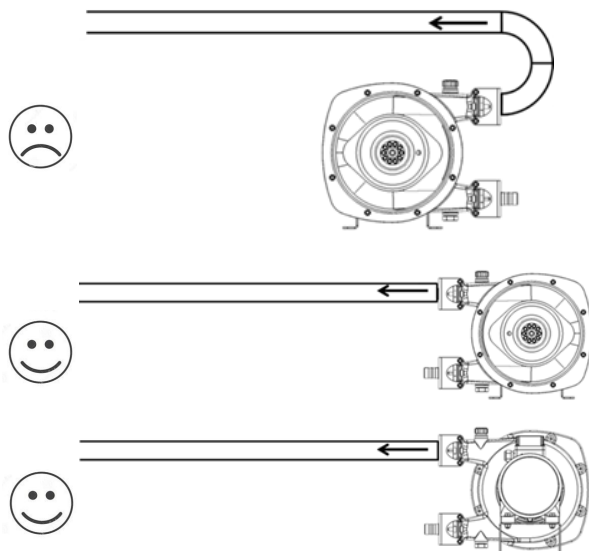


Use of an in-line pulsation dampener

To obtain a maximum efficiency of the dampener, it should be placed as close as possible to pump port.



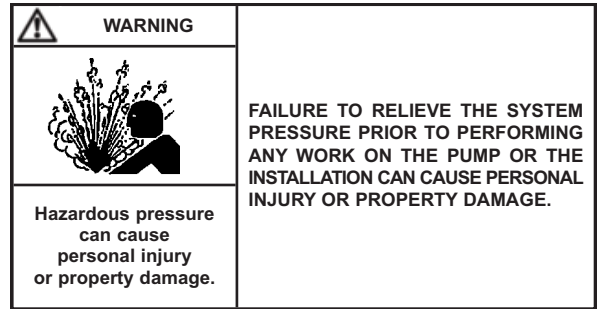
Change pumping set or pump ports position rather than multiplying pipe bends.



For hoses fitting on pump suction or discharge, a hose whip restrain device must be installed to limit the whip or travel of the pressurized hose at start up, or in case the hose breaks free.

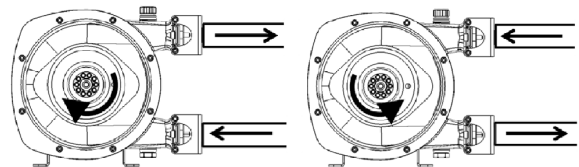


1.5 Rotation direction



The ABAQUE pump is reversible; this allows it to always circulate the liquid in the desired direction by choosing the corresponding direction of rotation.

The intake and discharge sides are determined as follows : When an observer is placed on pump cover side (opposite to the shaft output), if rotation takes place clockwise, the intake is on the bottom, on the contrary if the rotation is anticlockwise, the intake is on the top.



1.6 Highly solid loaded liquids

In the case where the pumped fluid contains particles, use the upper flange as the inlet flange.

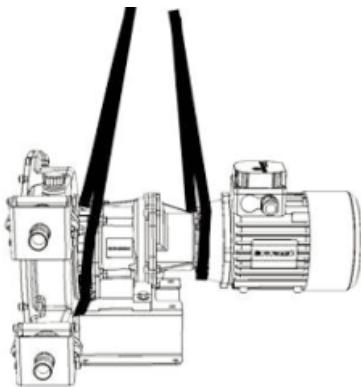
This facilitates discharge of the sediments formed by the build-up of the particles contained in the fluid, so this reduces friction between the hose and the shoes. Therefore, the pump may be re-started more easily.

1.7 Operation with vacuum on suction

Because of the operating principle of the pump, using it with suction pressure lower than the atmospheric pressure will cause a resulting loss of flow more or less in line with the conditions of the application (hose material, rotation speed, temperature, etc.).

1. INSTALLATION (continued)

1.8 Lifting



USE SUITABLE LIFTING DEVICES FOR HANDLING.

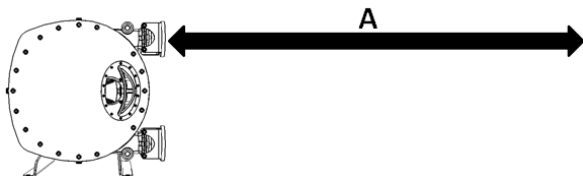
Pass a strap between pump body and gear reducer. Pass another one between gear reducer and motor and put all straps on a common hook.

Maximum pump weight : see § OVERALL DIMENSIONS.

1.9 Pump location

Provide sufficient clearance around the pump for maintenance operations.

Particularly, make sure that there is sufficient clearance for replacing the hose; the distance between the pump flanges and the closest obstacle must allow the hose to be removed, as shown below :



Distance A : 500 mm (19,69 in.)

1.10 Anchoring the pump

The correct seating of the pump is vital for its efficient operation and its longevity.

The surface must be resistant enough to absorb the stresses due to the pump unit without deformation.

In the case where the unit is fastened by anchor lugs or bolts, it must be carefully wedged to prevent any deformation of the chassis when tightening the bolts.

1.11 Electric motors

	<p>DISCONNECT THE ELECTRICITY SUPPLY BEFORE ANY MAINTENANCE OPERATION.</p>
<p>Dangerous voltage. Can cause injury and death.</p>	

Check that the supply voltage matches the indications on the motor rating plate.

Comply with the wiring diagram, make sure the wires are rated for the power and take care with the contacts which must be thoroughly tightened.

The motors must be protected by appropriate circuit breakers and fuses. Connect the regulatory ground connections.

Check the direction of rotation :

	<p>OPERATION WITHOUT THE SHAFT PROTECTOR CAN CAUSE SERIOUS PERSONAL INJURY, MAJOR PROPERTY DAMAGE OR DEATH.</p>
<p>Do not operate without guard in place.</p>	

This fundamental checking of the pump must be done without any product, with the inlet and outlet circuit open to the air, for example, to avoid any risk of an unexpected pressure rise. Start the pump empty to check the correct operation of the connections and check that the direction of rotation corresponds to installation's inlet and outlet direction.

Follow the instructions below if necessary to change the direction of rotation :

- **Three phase motor** : switch any two wires of the current supply.
- **Two phase motor** : switch the two wires of the same phase.
- **Single phase motor** : comply with the instructions of the manual supplied with the motor.

2. OPERATION

2.1 Pump storage

If the pump remains unused for more than 3 months, remove the hose or the shoes. If you do not wish to remove the hose or the shoes, operate the pump for 5 minutes once a week.



For storage at temperatures below 0 °C (32 °F), specific precautions must be taken. See § LUBRICANT REPLACEMENT.

2.2 Hose storage

Hose shelf life is limited to two years from the date of purchase.

The hoses must be stored in a cool place protected from light. Exposure to ultraviolet rays accelerates deterioration of the material, thus reducing shelf life.

2.3 Hot liquids pumping



 CAUTION	<p>THE SURFACES OF THE PUMP CAN BE AT A TEMPERATURE LIABLE TO CAUSE INJURY OR SEVERE DAMAGE.</p>
	
<p>Excessive temperature- can cause injury or severe damage.</p>	



When pumping products at high temperatures, take care when starting the pump for the first time, tighten the bolts to compensate for expansion effects.

2.4 Pump stopped with liquid inside

In the case where the pumping circuit is situated between isolating valves and/or has a check valve, you must bear in mind the variations in temperature that can occur, leading in particular to the expansion of the product in the circuit. In this case, provide a means of releasing the expansion volume. The use of a relief valve can suffice for this function. The opening pressure of this valve must be compatible with the pressure allowed by the parts composing the circuit. With products including particles that settle at shutdown, it is necessary to ensure that the consistency of the deposited products will not affect the start-up of the pump.

2.5 Starting the pump

 WARNING	<p>FAILURE TO RELIEVE THE SYSTEM PRESSURE PRIOR TO PERFORMING ANY WORK ON THE PUMP OR THE INSTALLATION CAN CAUSE PERSONAL INJURY OR PROPERTY DAMAGE.</p>
	
<p>Hazardous pressure can cause personal injury or property damage.</p>	

 WARNING	<p>OPERATION WITHOUT THE SHAFT PROTECTOR CAN CAUSE SERIOUS PERSONAL INJURY, MAJOR PROPERTY DAMAGE OR DEATH.</p>
	
<p>Do not operate without guard in place.</p>	

Before starting up the pump, always ensure that :



- Pump lubricant level is correct.
- The breathers on the rear of the pump and on the gearbox are free from any obstruction.
- The gearbox has been filled with oil and that the oil level is correct.
- All valves open on both suction and discharge lines.
- No other item is obstructing suction and discharge lines.

For use at temperatures below 0 °C (32 °F), specific precautions must be taken. See § LUBRICANT REPLACEMENT.

2.6 Stopping the pump

When stopping the pump, we recommend waiting for the pump to stop completely before closing any valve on both suction and discharge lines.

2.7 Hose burst



 WARNING	<ul style="list-style-type: none"> • THE CASING MAY BE FILLED WITH THE PUMPED FLUID. • IF THE PUMP IS LOADED AT INTAKE OR DISCHARGE, ALL THE FLUID MAY BE EVACUATED THROUGH A HOLE IN THE HOSE IN THE PUMP BODY.
	
<p>Hazardous pressure can cause personal injury or property damage.</p>	



When the hose breaks, there is a risk that the lubricant may be contaminated by the pumped liquid.



2.8 Scrapping



The pump must be scrapped in compliance with applicable regulations. During this operation, particular care must be paid to the drainage stages of the pump (pumped product).

3. MAINTENANCE

 WARNING	DISCONNECT THE ELECTRICITY SUPPLY BEFORE ANY MAINTENANCE OPERATION.
	
Dangerous voltage. Can cause injury and death.	

 WARNING	IF PUMPING HAZARDOUS OR TOXIC FLUIDS, THE SYSTEM MUST BE FLUSHED PRIOR TO PERFORMING ANY SERVICE OPERATION.
	
Hazardous or toxic fluids can cause serious injury.	

 WARNING	HANDLING THE PUMP WITHOUT THE COVER IN PLACE MAY CAUSE BODILY HARM, SERIOUS INJURY OR EVEN DEATH.
	
Do not operate without guard in place.	

 WARNING	HYDRAULIC PRESSURE MUST BE FULLY RELEASED BEFORE MAINTENANCE OPERATIONS IN ORDER TO PREVENT PERSONAL INJURY OR PROPERTY DAMAGE.
	
Hazardous pressure can cause personal injury or property damage.	

Before proceeding to any maintenance operation, carefully check that :

- Pump has been drained from pumped liquid.
- There is no inside residual pressure left.
- Isolation valves are closed.
- Power supply is switched off and disconnected.

Suggested parts to order for each operation

Table below lists the minimum part list to have before each maintenance operation. Depending on their conditions, some other parts may also need replacement.

Lubricant replacement:

- Lubricant can

Hose replacement :

- Lubricant can
- 1 hose 16
- 2 gaskets 1105

Rotor assembly removal :

- Lubricant can
- 1 hose 16
- 2 gaskets 1105
- 1 cover gasket 10

Shaft seal replacement :

- Lubricant can
- 1 hose 16
- 2 gaskets 1105
- 1 cover gasket 10
- 1 shaft seal 26
- 1 friction ring 27

Tightening torques

Part No	Designation	Torque (N.m)
19	Rotor hub	17
33	Cover screw	1 ± 0,2
42	Gear reducer / pump body nut	19
48	Bracket screw	8
61	Gear reducer / baseplate nut	19
1106	Pressing gland screw	15 ± 2

3. MAINTENANCE (continued)

3.1 Lubricant replacement

The hose is lubricated with a special mixture. ABAQUE lubricant is recommended to lengthen the service life of the hose.

It is recommended to change the lubricant when :

- Replacing the hose.
- After 2000 hours of operation.

The minimum working or storage temperature for the pump lubricant is 0°C (32°F).

For use / storage at lower ambient temperatures, it is necessary to add ethylene glycol to the ABAQUE lubricant. To maintain optimum lubrication, the volume of ethylene glycol should remain between 4% and 6% of the total volume of lubricant, and the total quantity of lubricant present in the pump must be in compliance with the value specified above. In any case, the ambient temperature should never be lower than -20°C (-4°F).

DO NOT USE ANY VEGETAL, MINERAL OR SYNTHETIC OIL AS IT WOULD RAPIDLY DESTROY THE HOSE.

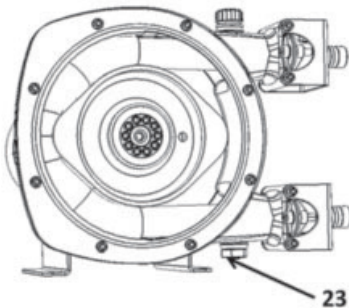
Draining

Put a drain tray below plug 23.

Unscrew plug 23 and wait for complete lubricant draining.
Clean and degrease plug 23.

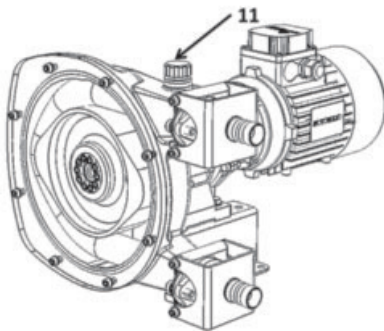
Wrap it with PTFE tape.

Screw plug 23 in the pump body.



Lubricant filling

Remove breather 11.



Fill the pump with corresponding volume of lubricant :

- HD10 0,2 l. (0,052 gal.)
- HD15 - HD20 0,6 l. (0,185 gal.)

Put back breather 11.

3.2 Hose replacement

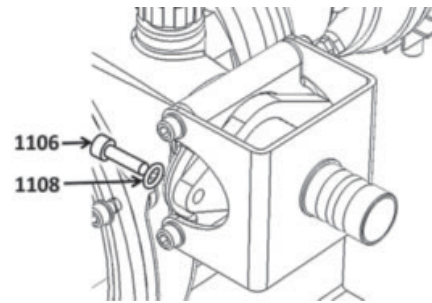
Hose removal

Drain lubricant (see § LUBRICANT REPLACEMENT).
Disconnect suction and discharge ports.

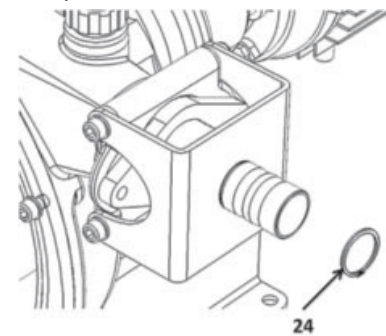
Disconnect power supply.

Make sure there is enough space beside pump to let hose coming out. See § PUMP LOCATION.

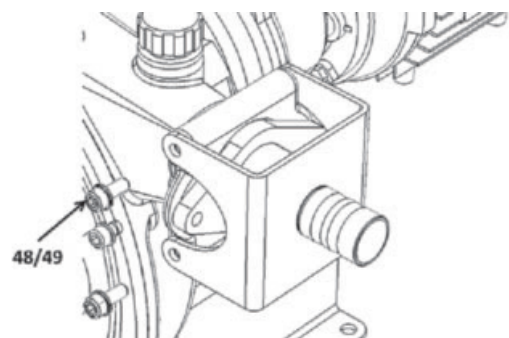
Unscrew and remove pressing gland screws 1106 and their washers 1108.



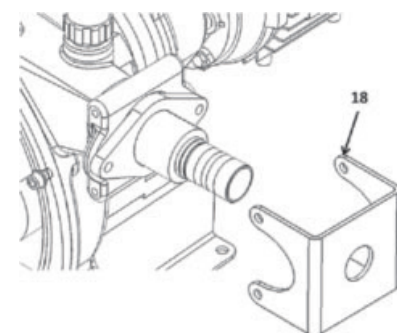
Remove circlips 24.



Remove the four screws 48 and washers 49.

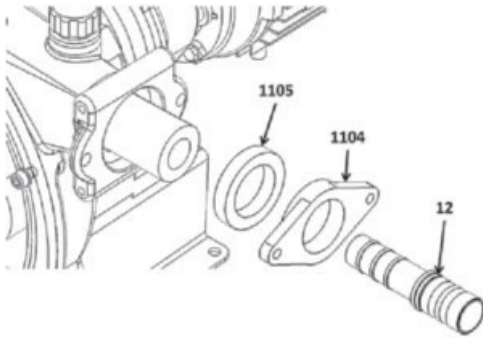


Remove bracket 18.



3. MAINTENANCE (continued)

Remove insert 12, pressing gland 1104 and gasket 1105.

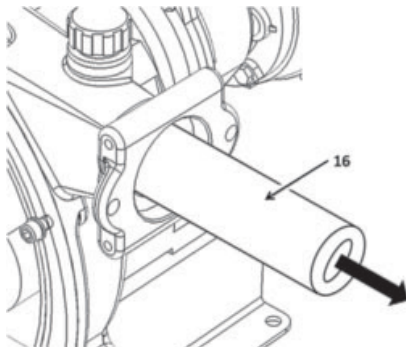


Put a drain tray under bottom port and repeat the same operations on bottom port.

	WARNING
	<p>THE HOSE CAN COME OUT OF PUMP VIOLENTLY. BE SURE NO ONE IS IN FRONT OF PUMP PORTS.</p>
<p>Hazardous machinery can cause severe personal injury or property damage.</p>	

Connect power supply.

Rotate the pump intermittently until the hose 16 is completely outside pump body.



	WARNING
	<p>DISCONNECT THE ELECTRICITY SUPPLY BEFORE ANY MAINTENANCE OPERATION.</p>
<p>Dangerous voltage. Can cause injury and death.</p>	

Disconnect power supply.

Hose refitting

	WARNING
	<p>NEVER INSERT THE HOSE OR RUN THE PUMP WITHOUT ITS COVER AND ITS WINDOW IN PLACE.</p>
<p>Do not operate without guard in place.</p>	

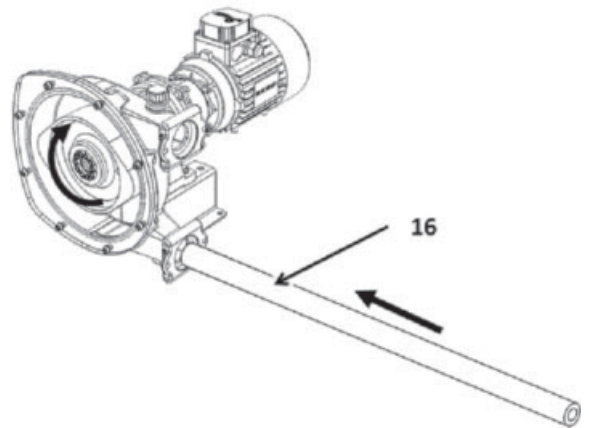
Clean the hose 16 to eliminate any particles that may have adhered to it (gravel, etc.).

Generously coat the hose with lubricant.

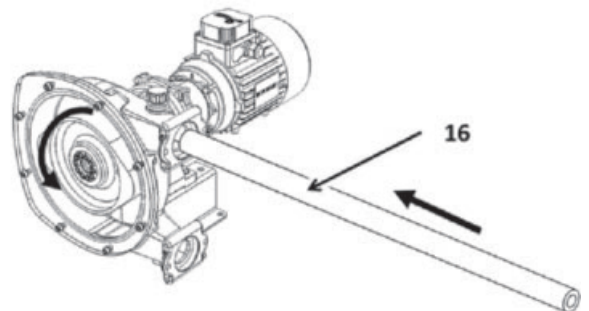
Connect power supply.

Insert one end of the hose 16 in the suction port.

If pump rotates clockwise, suction is on the bottom port :

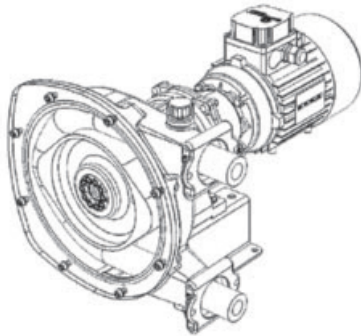




If pump rotates anti-clockwise, suction is on the top port :



3. MAINTENANCE (continued)

Rotate the pump intermittently until the hose 16 is completely inserted in the body and show equal lengths outside the body on both ports :

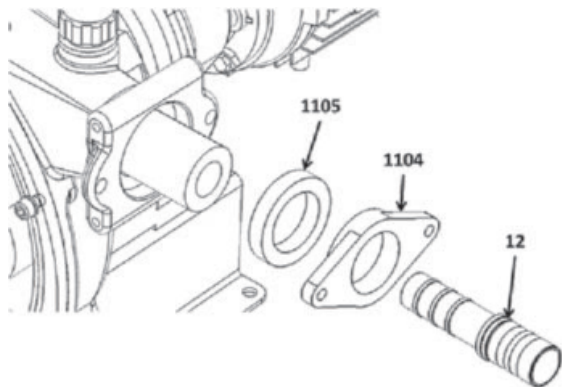


	WARNING
	DISCONNECT THE ELECTRICITY SUPPLY BEFORE ANY MAINTENANCE OPERATION.
Dangerous voltage. Can cause injury and death.	

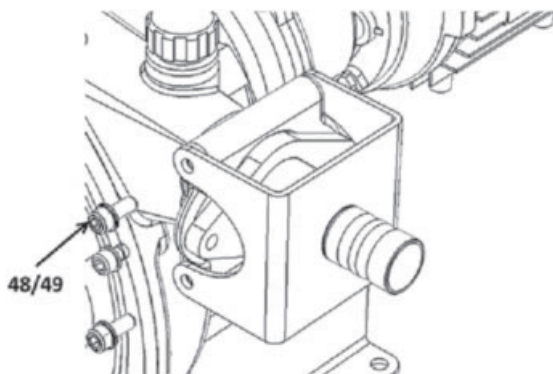
Disconnect power supply.

On one port :

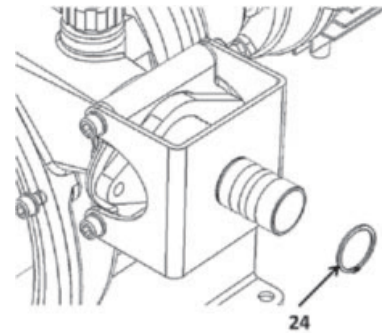
1. Place gasket 1105, pressing gland 1104 and insert 12 after coating its outside with pump lubricant.



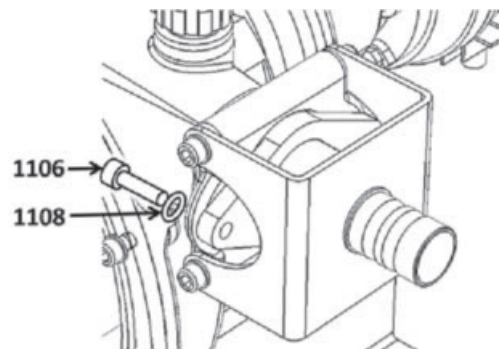
2. Place brackets. Screw and tighten the four screws 48 with their washers 49. **Tightening torque 8 N.m.**



3. Place circlips 24.



4. Fit screws 1106 with their washers and tighten them. **Tightening torque 15 ± 2 N.m.**



Repeat operations 1 to 4 on the other port.

Fill the pump with lubricant (see § LUBRICANT REPLACEMENT).

Connect power supply.

Rotate pump and check that there is no visible axial movement of the hose or lubricant leakage.

3. MAINTENANCE (continued)

3.3 Rotor assembly removal

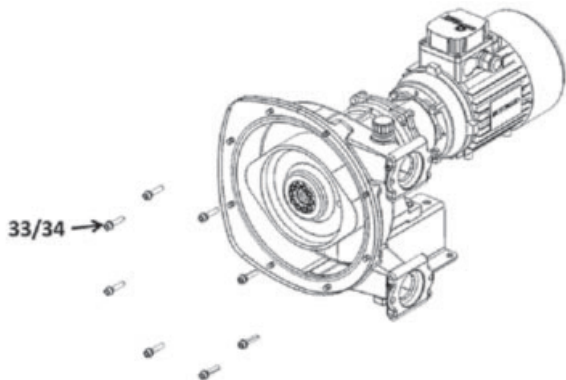
Disassembly and reassembly of the rotor 3 are required when :

- replacing the shaft seal 26.
- performing a complete overhaul.
- disassembling or replacing the gear reducer.

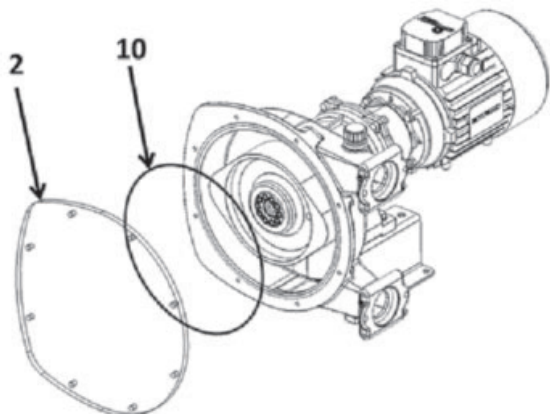
Rotor assembly removal

Drain lubricant (see § LUBRICANT REPLACEMENT) and remove hose (see § HOSE REPLACEMENT).

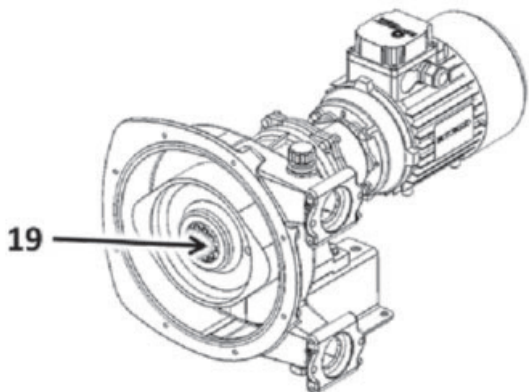
Loosen screws 33 with their washers 34.



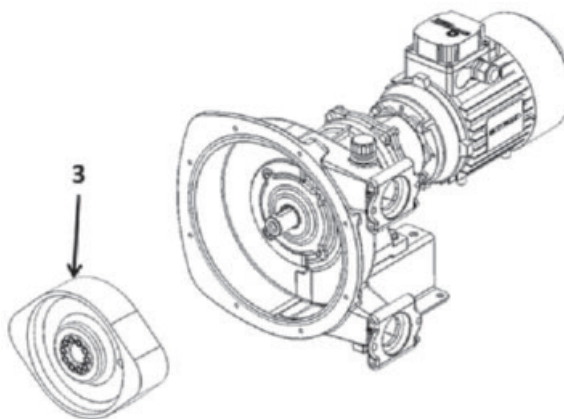
Remove cover 2 with its gasket 10.



On rotor hub 19, loosen all screws without removing them. Put 5 screws in the extraction threading to loosen the hub.

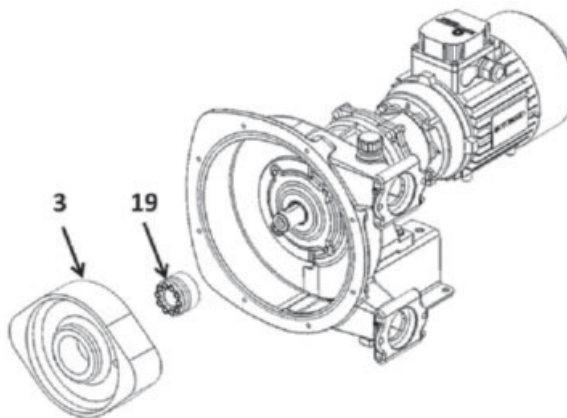


Pull out the rotor 3.

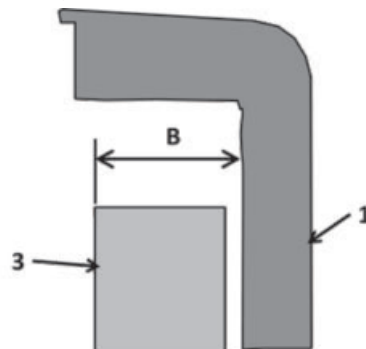


Rotor assembly refitting

Place hub 19 and rotor 3 on gear reducer shaft.



Position rotor 3 to have distance B between rotor outer edge and casing 1 back wall.



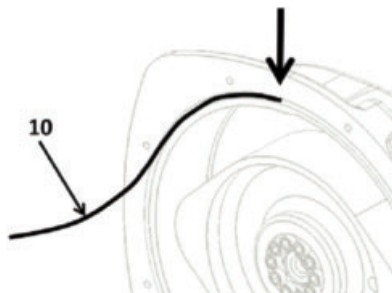
Distance B :

- HD10..... 39 ± 1 mm ($1,535 \pm 0,039$ in.)
- HD15 - HD20 51 ± 1 mm ($2,008 \pm 0,079$ in.)

Progressively tighten screws on hub 19, keeping distance B constant. **Tightening torque 17 N.m.**

3. MAINTENANCE (continued)

Put cover gasket 10 in pump body, starting at the top. Make sure that the two ends of gasket are firmly in contact.



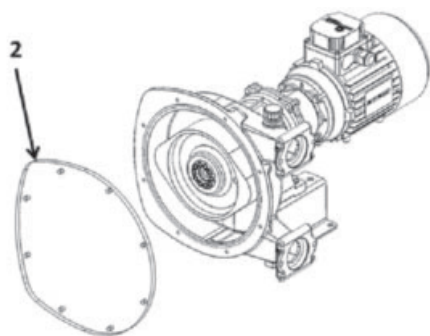
Incorrect mounting : risk of leak.



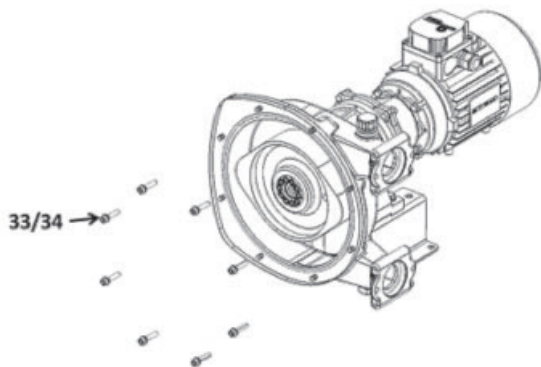
Correct mounting :



Place cover 2 on pump body.



Screw and tighten screws 33 and their washers 34, starting by top ones to secure cover assembly. **Tightening torque 1 + 0,2 N.m.**

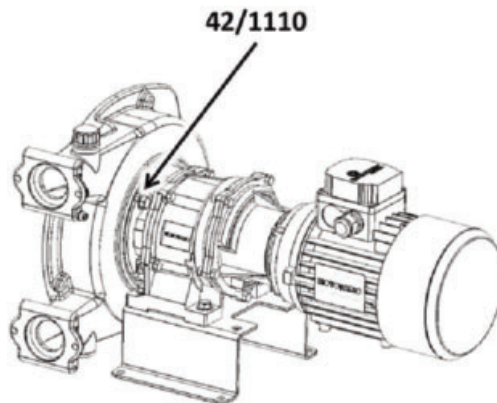




Fit hose in (see § HOSE REPLACEMENT) and fill the pump with lubricant (see § LUBRICANT REPLACEMENT).

3.4 Shaft seal replacement

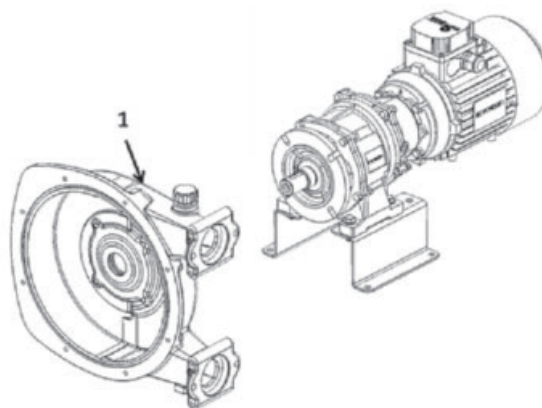
Drain lubricant (see § LUBRICANT REPLACEMENT), remove hose (see § HOSE REPLACEMENT) and remove rotor (see § ROTOR ASSEMBLY REMOVAL).

Loosen nuts 42 and their washers 1110.

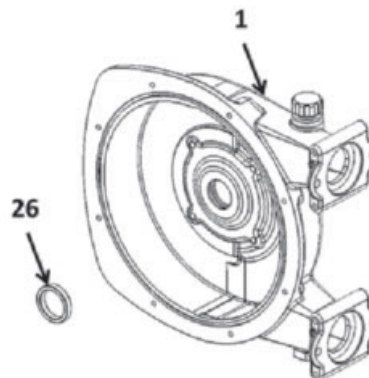


	WARNING
	BE CAREFUL WITH THE WEIGHT OF THE PUMP BODY.
<p>The weight of the parts can be dangerous and may provoke bodily injuries or material damages.</p>	

Remove pump body.

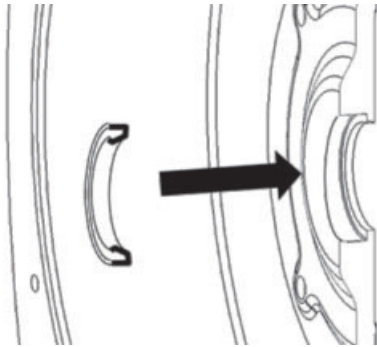


Remove shaft seal 26 from pump body. Put new shaft seal 26 in pump body.

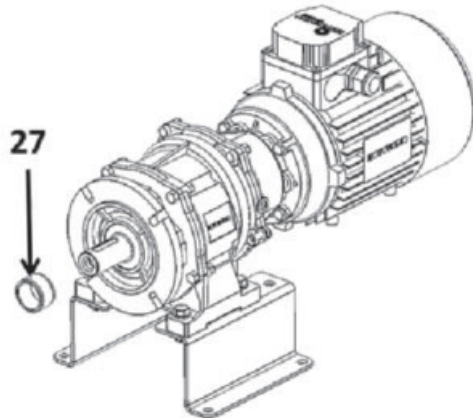


3. MAINTENANCE (continued)

Make sure the shaft seal is in the right direction :



If necessary to replace friction ring 27, use a mallet and a chisel, to break and remove friction ring 27.

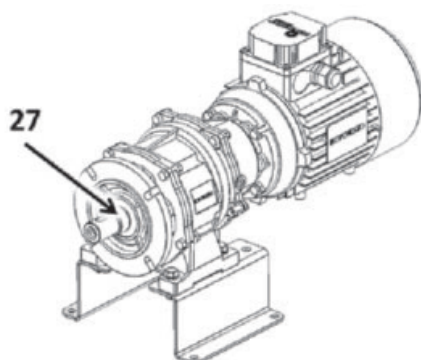


Heat new friction ring at $110 \pm 10^\circ\text{C}$ / $230 \pm 50^\circ\text{F}$.

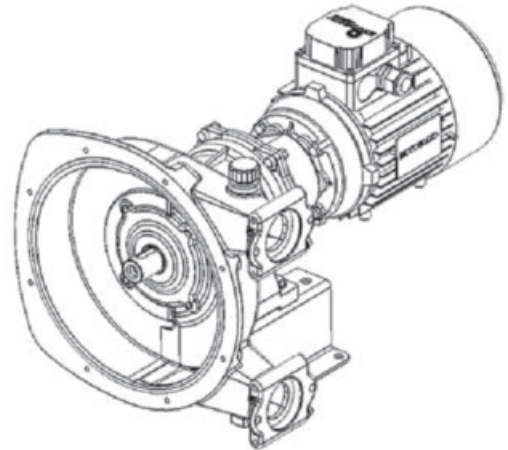
	CAUTION
	BE CAREFUL WITH THE VERY HIGH TEMPERATURE OF FRICTION RING. USE APPROPRIATE HANDLING DEVICES.
Excessive temperature- can cause injury or severe damage.	

Put high temperature sealant Loctite* 648® or equivalent on reducer shaft from shaft shoulder and on a length corresponding to friction ring width.

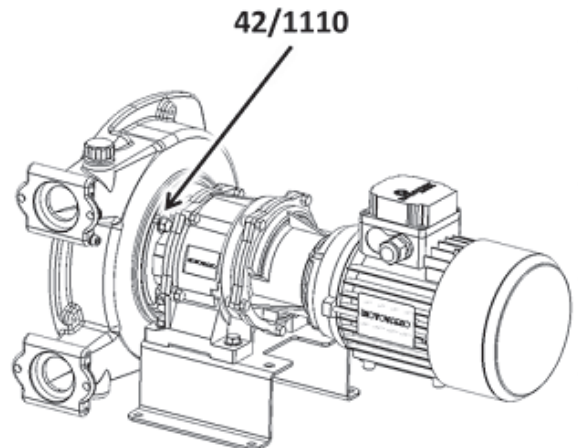
Put new friction ring on shaft, pushing it against shaft shoulder.



Let friction ring cool down before carrying on reassembly.
Put back the pump body.



Put back nuts 42 and their washers 1110 and tighten them.
Tightening torque 19 N.m.

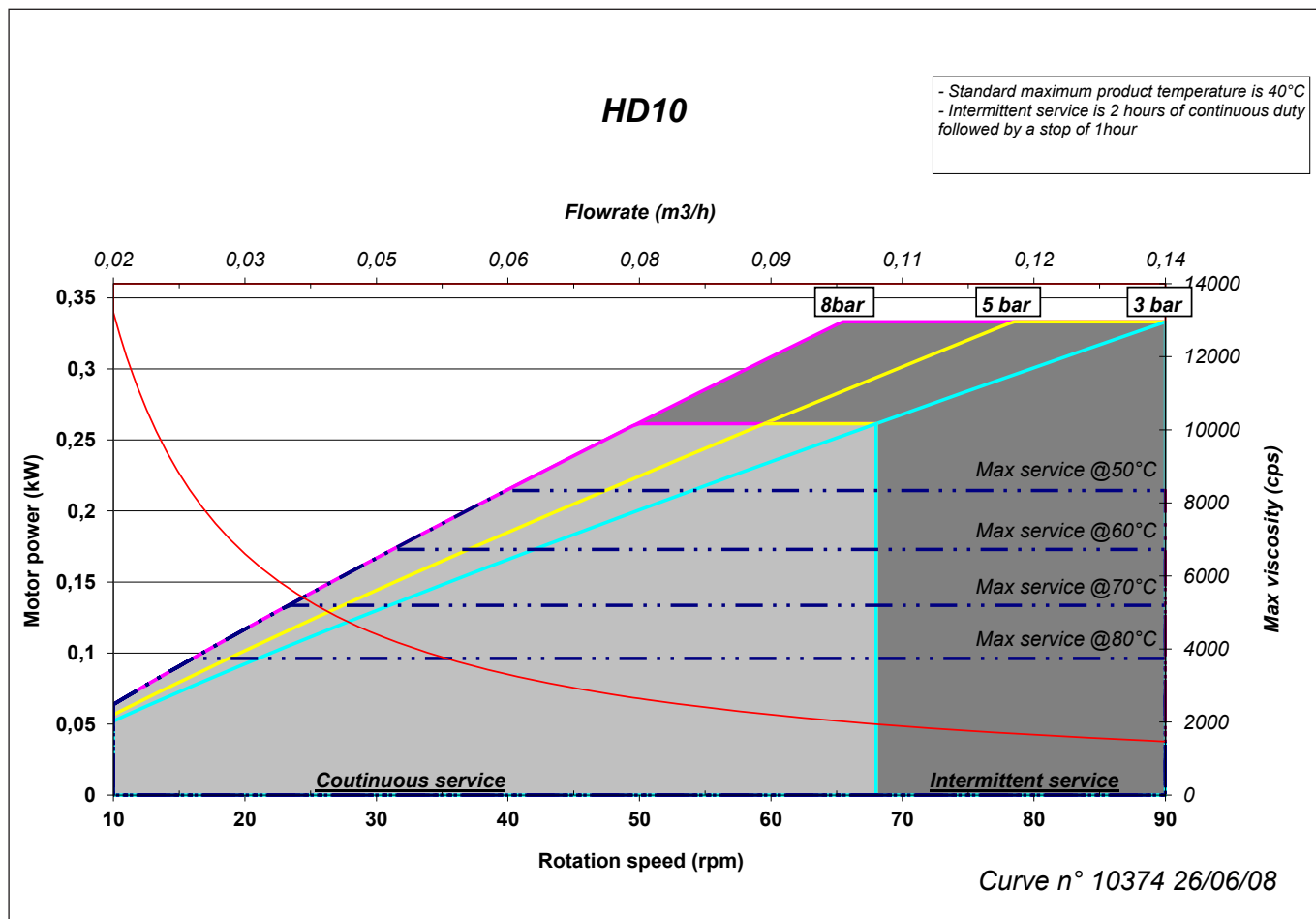


Refit rotor in the pump (see § ROTOR REMOVAL), refit hose (see § HOSE REPLACEMENT) and fill the pump with lubricant (see § LUBRICANT REPLACEMENT).

4. TROUBLESHOOTING

PROBLEM	POSSIBLE CAUSE	SOLUTION
THE PUMP DOES NOT START	Electric power supply failure.	<p>Check the connections :</p> <ul style="list-style-type: none"> • There must be 3 phases. • The connections are suitable for the voltage (delta-star). • If possible, check the parameters for the different motor frequencies (starting torque, power input...).
	<p>When the pump has not been used for a long period of time, one shoe can have been kept outside the lubricant.</p> <p>As it has not been lubricated, it causes a lot of resistance on start up.</p>	<p>Operate the pump intermittently to try to free the rotor but do not be too insistent to prevent the reduction gear from being damaged.</p> <p>If the rotor remains stuck, contact your local dealer for instructions.</p>
	Sediments or other substances have built up inside the hose and are blocking the pump.	<p>Reverse the pump rotation direction or disassemble the hose.</p> <p>If the rotor remains stuck, contact your local dealer for instructions.</p>
ABNORMALLY LOW FLOW	The inlet or discharge valve is partially closed.	Open the inlet or discharge valve.
	Air is entering the inlet piping.	Check the inlet line.
	The pumped liquid is too viscous. Significant pressure drop at inlet.	Check the inlet line.
	The pump hose is damaged.	Replace the hose.
ABNORMALLY HIGH TEMPERATURE	The lubricant is not suitable.	Empty the pump body and replace the lubricant with one that is recommended by ABAQUE.
	The lubricant is dirty or too old.	Empty the pump body and replace the lubricant with a new ABAQUE lubricant.
	Temperature of the pumped fluid is too high.	Check the maximum fluid temperature allowed for the hose material.
	Pump speed too high.	Reduce speed.
ABNORMALLY SHORT HOSE LIFE SPAN	Lubricant is not suitable.	Empty the pump body and replace the lubricant with one that is recommended by ABAQUE.
	Chemical incompatibility between the hose and the pumped fluid.	Check the compatibility of the hose with the fluid and replace the hose with another one made of suitable material.
	Temperature of pumped fluid too high.	Check the maximum temperature permitted for the hose.
	The discharge pressure is too high.	Check the maximum pressure allowed for the pump. Reduce pressure drop at discharge.
	Pump speed is too high.	Reduce speed.
THE HOSE IS PULLED INTO THE PUMP BODY AT INLET	The pumped fluid contains impurities or sediments.	Reverse the pump rotation direction and use the upper port for inlet.
	Pressing gland is not sufficiently tightened.	Retighten the pressing gland.

5. TECHNICAL SPECIFICATIONS



Light grey area : Continuous service (24h/24).

Dark grey area : Intermittent service (continually for 2 hours then stopped for 1 hour).

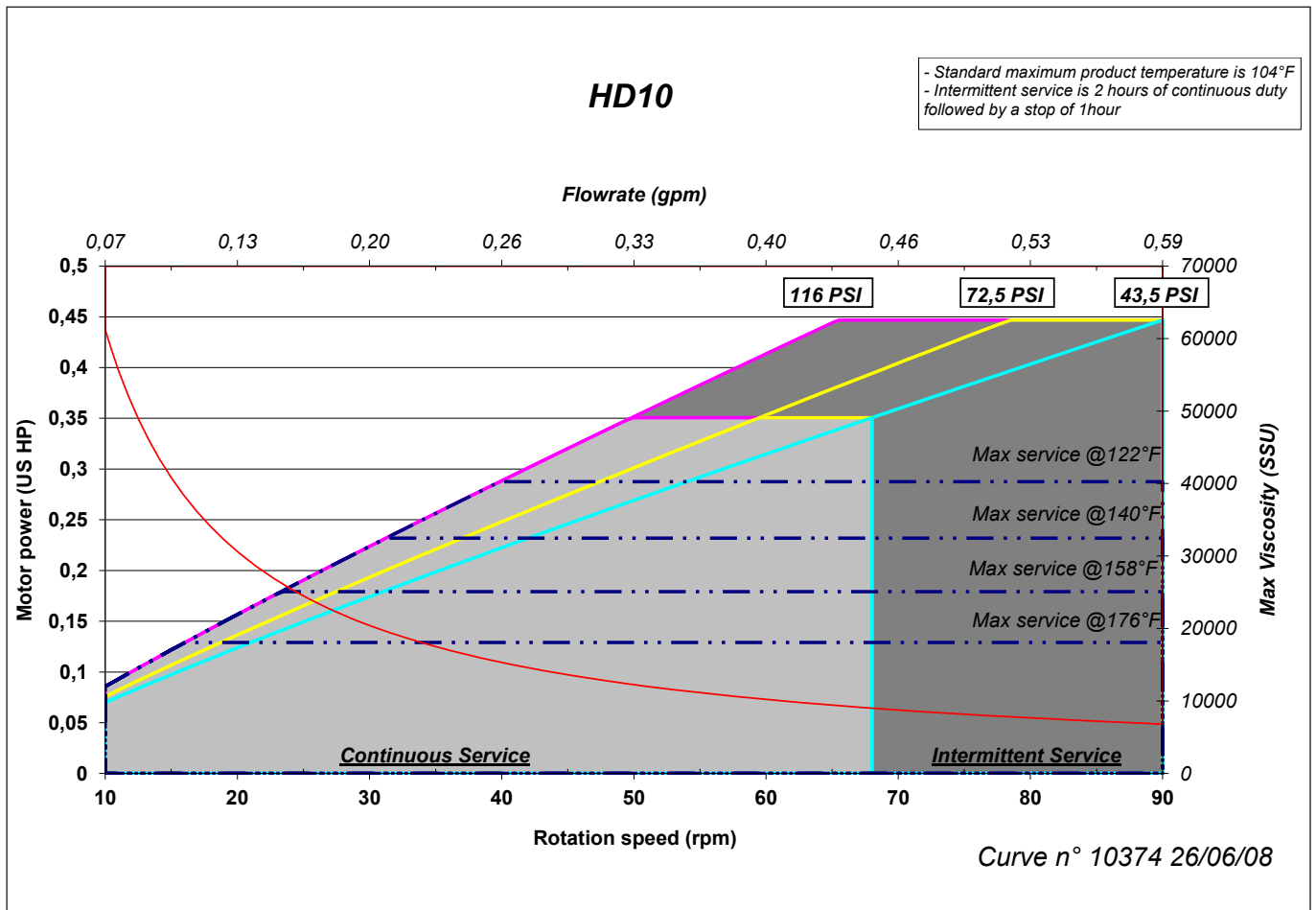
The flow rates shown have been obtained by pumping water at ambient temperature.

Above the limit of Max service at 50°C (122°F), the maximum temperature of liquid is 40°C (104°F).

ATEX pumps :

ATEX certified ABAQUE pumps have specific limits for use.
 Intermittent operation is forbidden.
 Refer to corresponding Instructions Manual for more informations.

5. TECHNICAL SPECIFICATIONS (continued)



Light grey area : Continuous service (24h/24).

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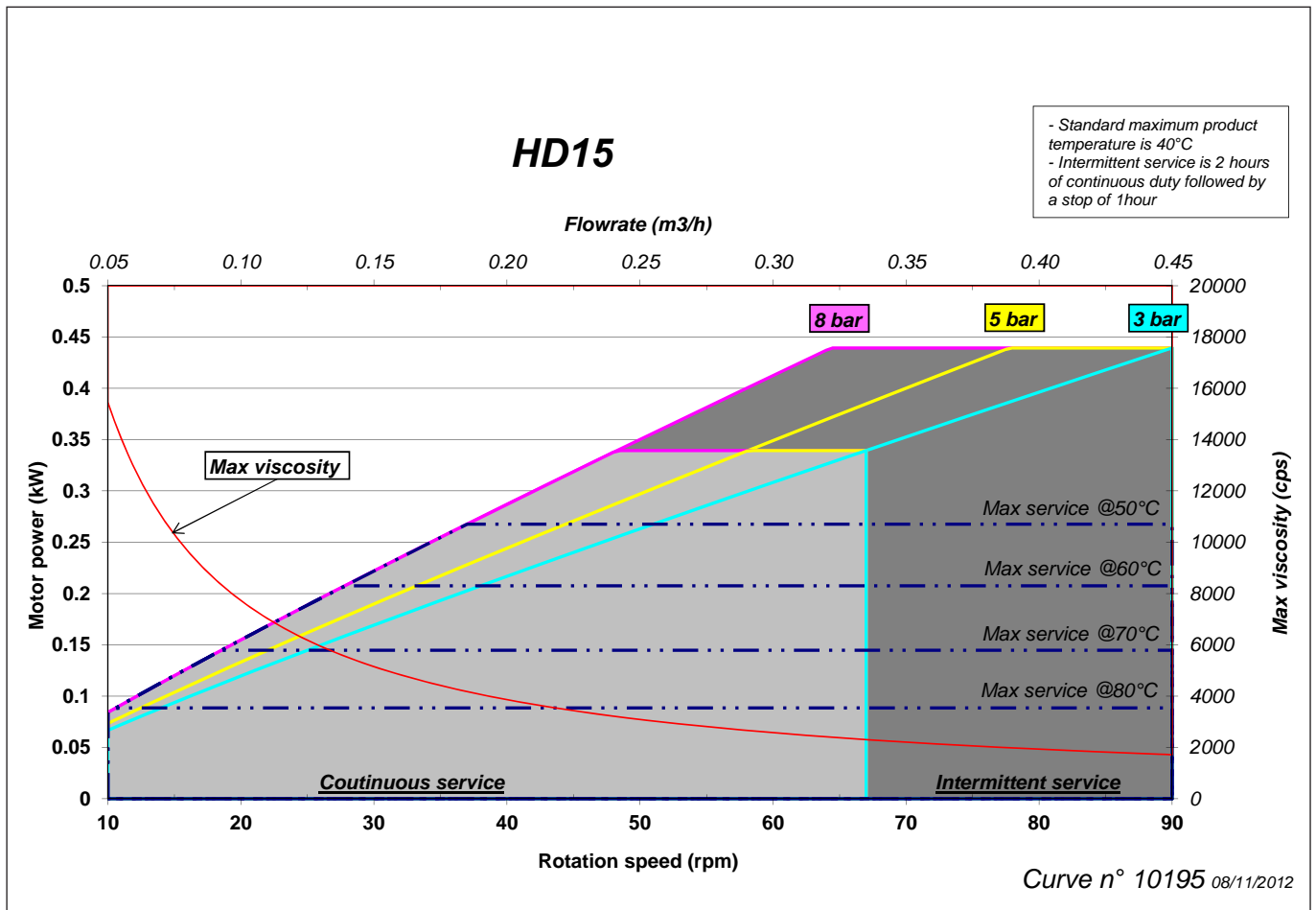
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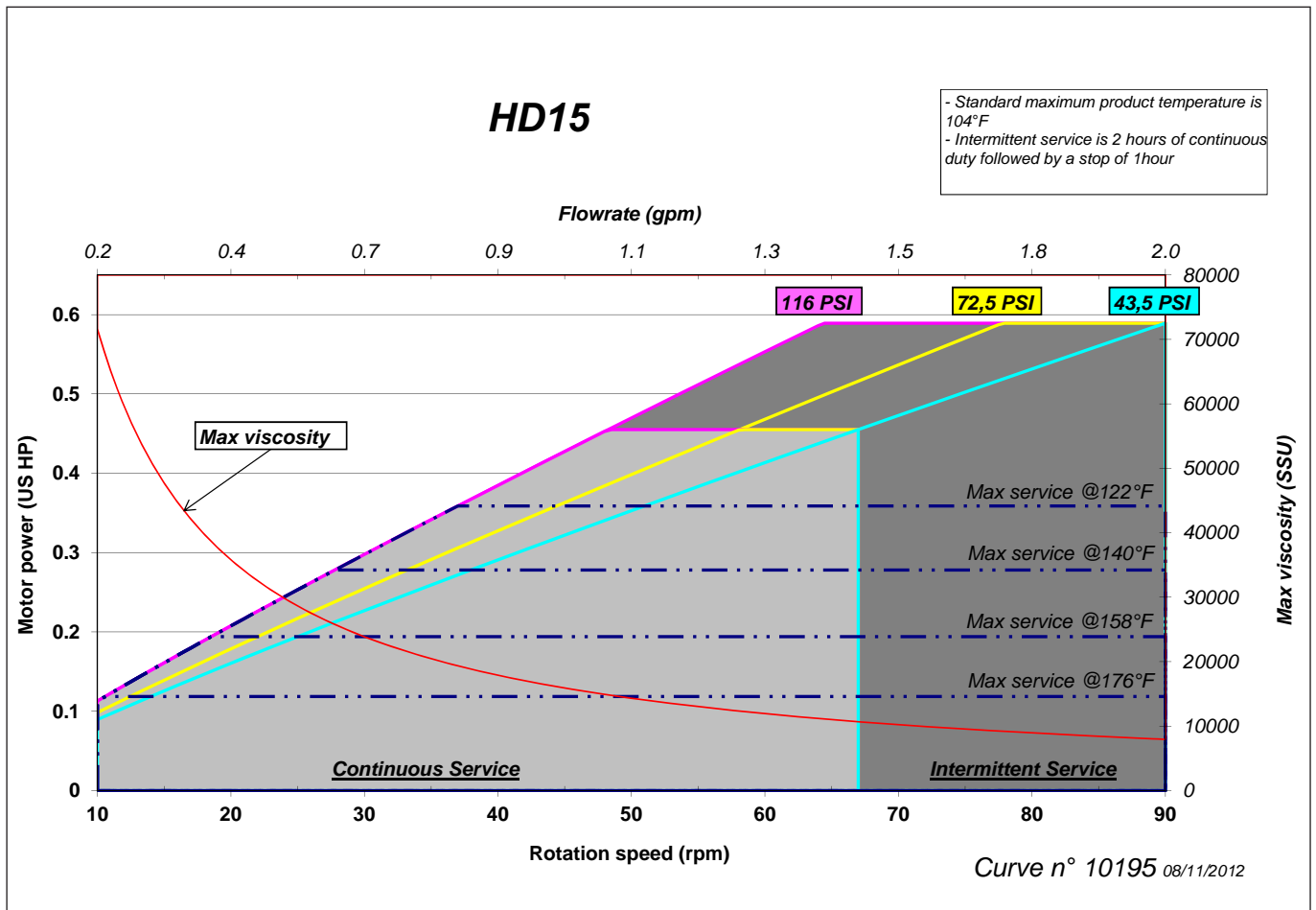
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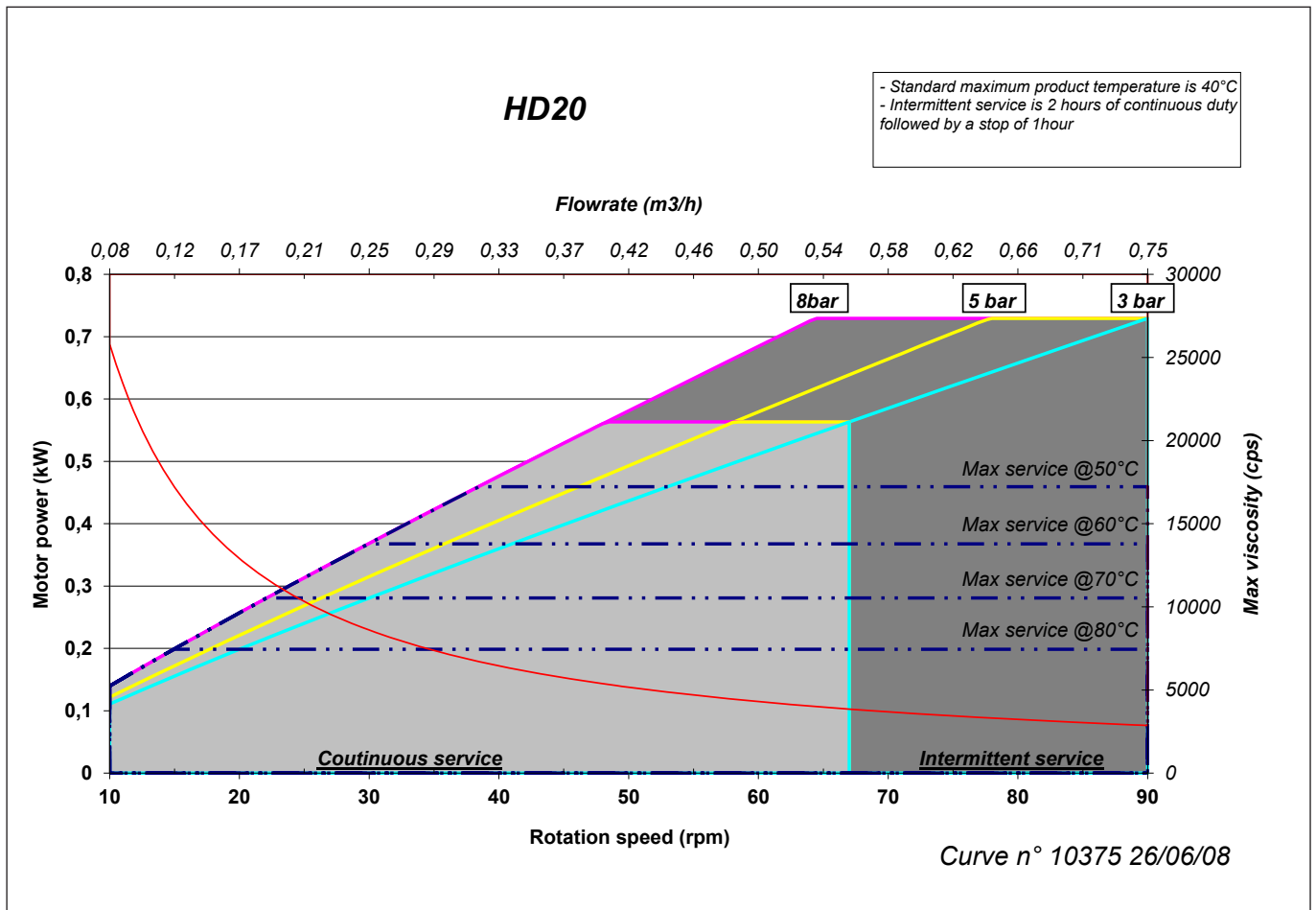
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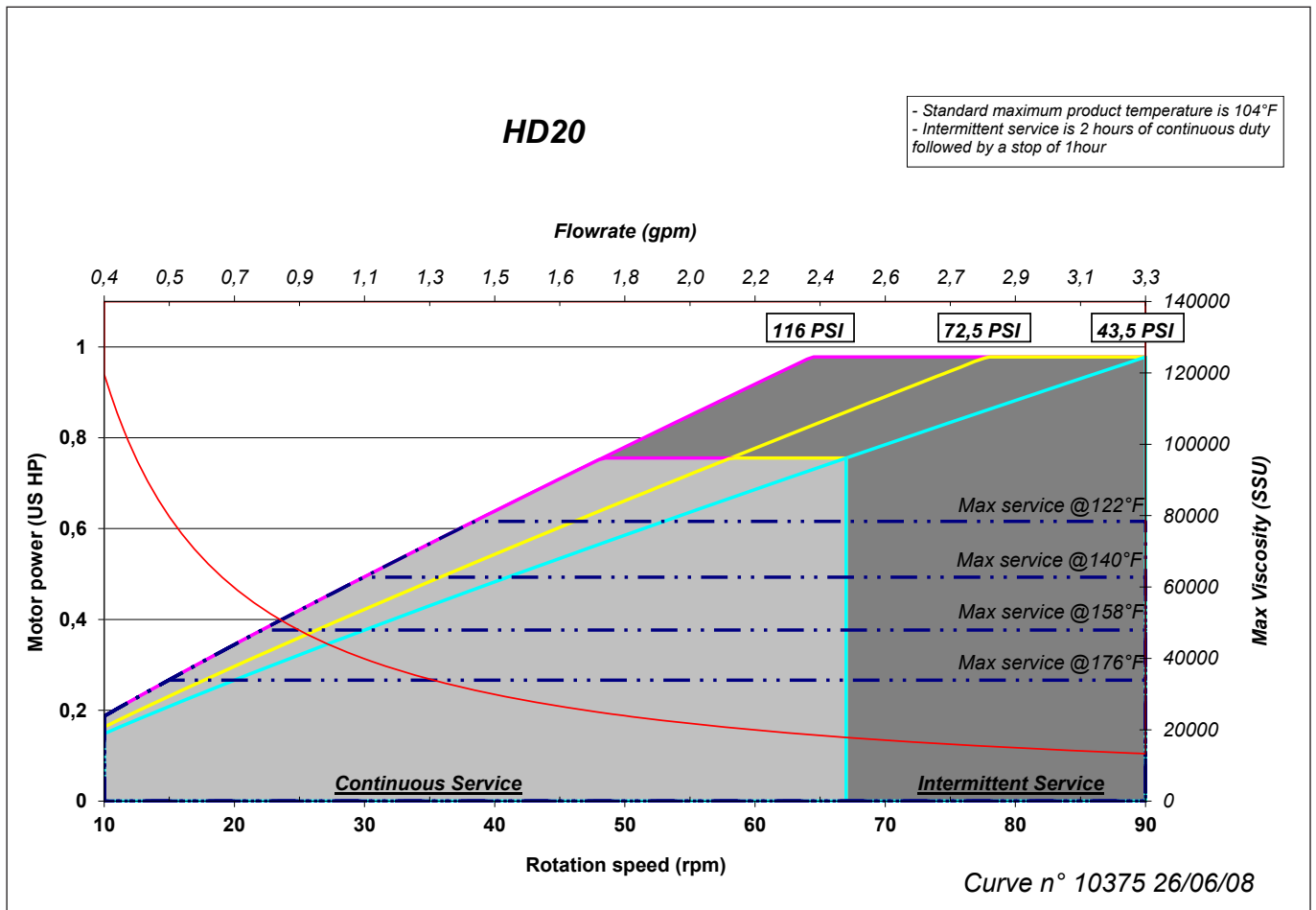
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5. TECHNICAL SPECIFICATIONS (continued)



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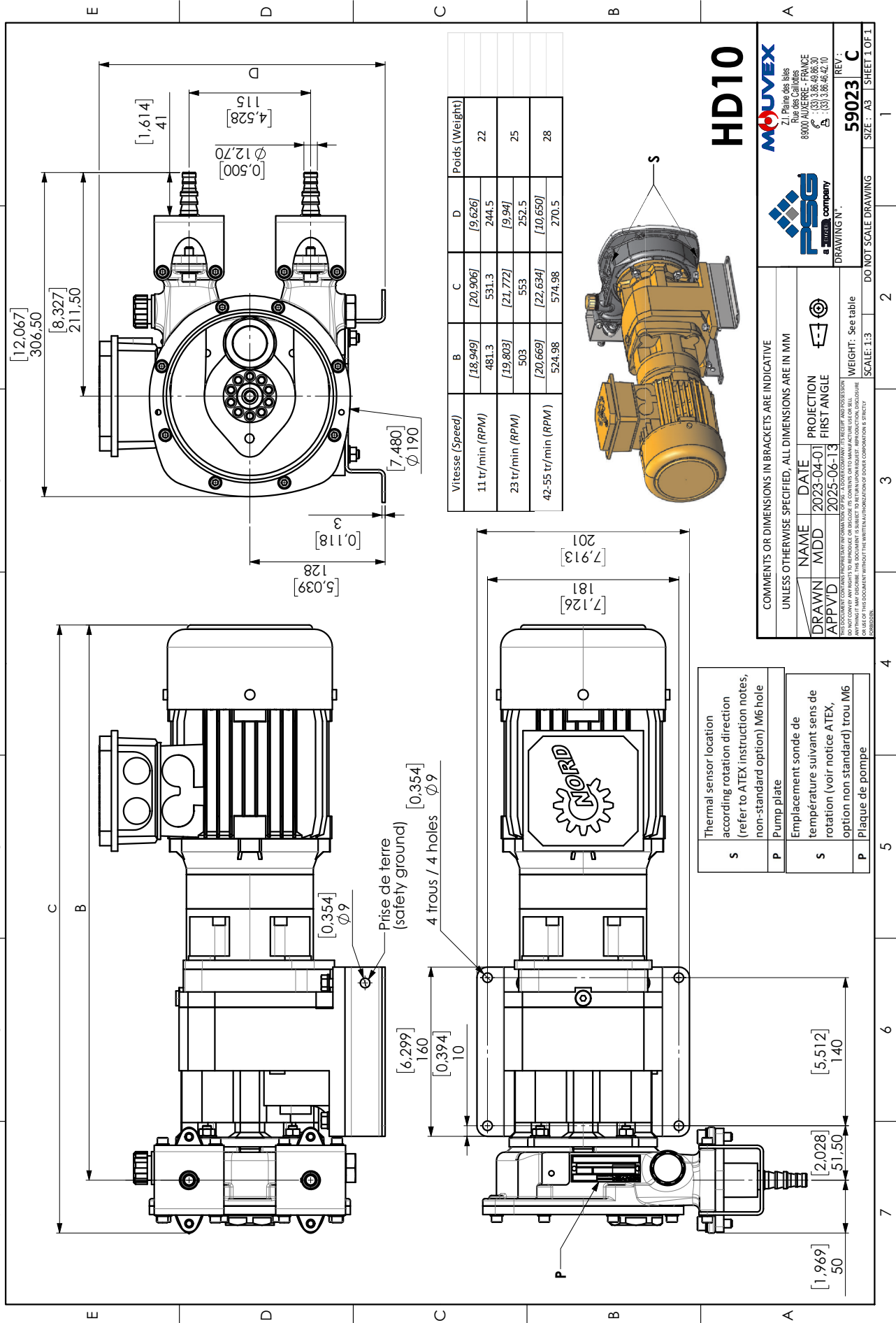
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6. OVERALL DIMENSIONS

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6. OVERALL DIMENSIONS (16)

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