Des pompes au process

INSTRUCTION MANUAL

TO BE KEPT FOR FUTURE REFERENCE

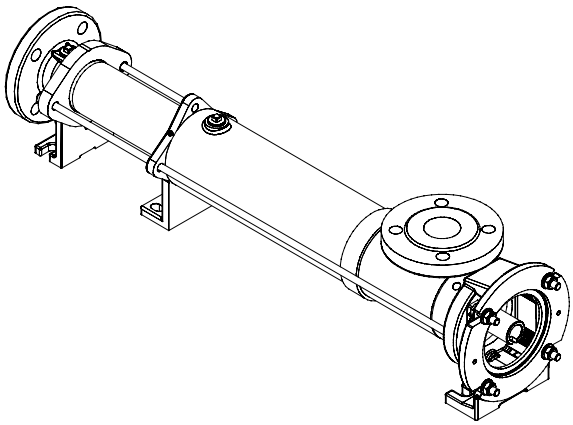
PCM - MOINEAU

Series **I – ID**

Type 0.03 – 0.4 – 1 – 1.6 - 2.6 – 4 - 6 – 13 – 20 – 25 – 30 –35 - 40
45 – 50 - 60 - 62 – 90 – 100 – 120 – 150 - 180 - 240
4, 5, 10, 15, 16, 45 et 52 bars

Serial no.

Year of manufacture



Reference:	***NIPMI01A***	*Date approved: May 2001*

Date issued: May 2001

PCM POMPES-17 RUE ERNEST LAVAL-BP 35-92173 VANVES CEDEX FRANCE
TEL: (33) 01 41 08 15 15 – FAX: (33) 01 41 08 15 00 – TELEX : 634129 F - Internet: http:/www.pcmpompes.com - E-mail: pcm@pcmpompes.com

DECLARATION OF INCORPORATION

We declare that the subassembly covered by the technical description may not be put into operation before the machine in which it is to be incorporated has been declared compliant with the conditions of the Council Directive 89/392/CEE, modified machine directive 91/368/CEE (93/44/CEE and 93/68/CEE), and with the domestic legislation transcribing it.

The subassembly is compliant with harmonised EN 292 standards.

Vanves, 23 April 1996

For the company – NAME and TITLE **Innovations Manager**

B. Lafont

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Thank you for choosing a pump from the PCM range.

6 PRODUCT LINES

PCM MOINEAU
The widest range of progressive-cavity industrial pumps.

PCM PRECI-POMPE
Diaphragm and plunger electro-magnetic dosing pumps.

PCM MOINEAU OILFIELD
Progressive-cavity pumps for oil extraction.

PCM DELASCO
The most complete range of peristaltic pumps.

PCM DOSYS
High-precision dosers and continuous mixers.

PCM EQUIPEMENT
Lobe pumps and pumpliners.

PCM markets its products worldwide via a distribution network comprising, in particular, sales offices and agents. All are approved by PCM and qualified for providing Service and Assistance.

CONTENTS

3. MAINTENANCE 20

4. APPENDICES

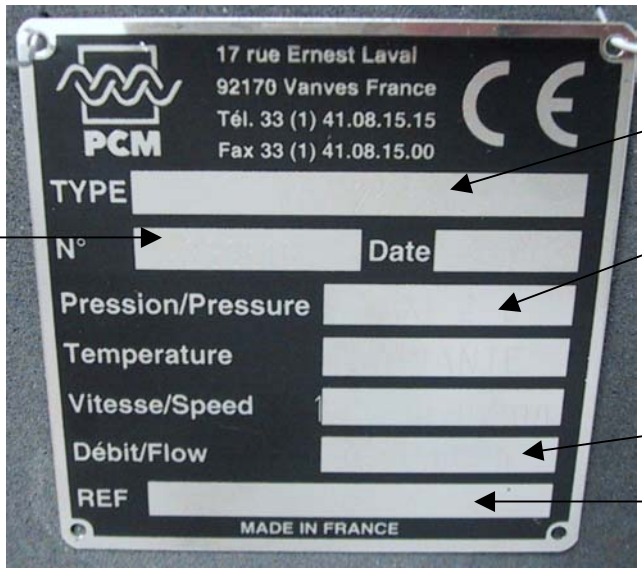
0. INTRODUCTION

0.1 General information

The pump that you have just purchased has been manufactured and checked with the utmost care.

This manual is intended to help you maintain the pump in proper working order.

Rating plate



This plate, which is placed on the pump, provides the following information:

a) Serial no.

b) Pump code, which can be broken down according to the example below

_ Pump model code **01MR25I5**

01MR; specifies mounting type according to drive motor type

25; specifies flow at 0 bar in cubic metres per hour (m³/h) at maximum speed

I; specifies pump type (I: industrial version)

5; specifies the maximum admissible hydraulic pressure in bar

Note: The coding of supplied equipment is clearly explained in this form in the technical description in Section 4 – Appendices

c) Maximum flow of pump at 0 bar.

d) Maximum pressure admissible by pump depending on drive motor.

e) Customer reference
This information is required for all spare parts orders (contact our Customer Services Department).

The pump characteristics (flow, pressure, rotation speed, construction, pump rotation direction, etc.) must not be modified without the written agreement of our Customer Services Department.

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0.2 Limits of guarantee

Before carrying out any work on the pump, check that all precautions have been taken: upstream and downstream valves closed, piping cleaned and purged, power supply disconnected and implementation of all regulatory procedures in force relating to staff safety.

On reception of the pump, immediately inspect it for any obvious signs of damage. If it is visibly damaged, clearly note on the shipper's papers that the merchandise has been received damaged, briefly describing the type of damage observed. Send a letter by registered post with acknowledgement of receipt to inform the shipper within 48 hours and a copy to our Customer Services Department in the event that you accept the damaged equipment.

Storage and handling conditions are explained in Section 3, paragraphs 3.2 and 3.3.
To avoid any damage or accidents (in particular, when the pumped fluids are hazardous), it is essential that this equipment not be used for applications other than those foreseen in our technical description (see Section 4 – Appendices).

To maintain the original qualities of the pump, it is essential that parts from PCM POMPES be used.

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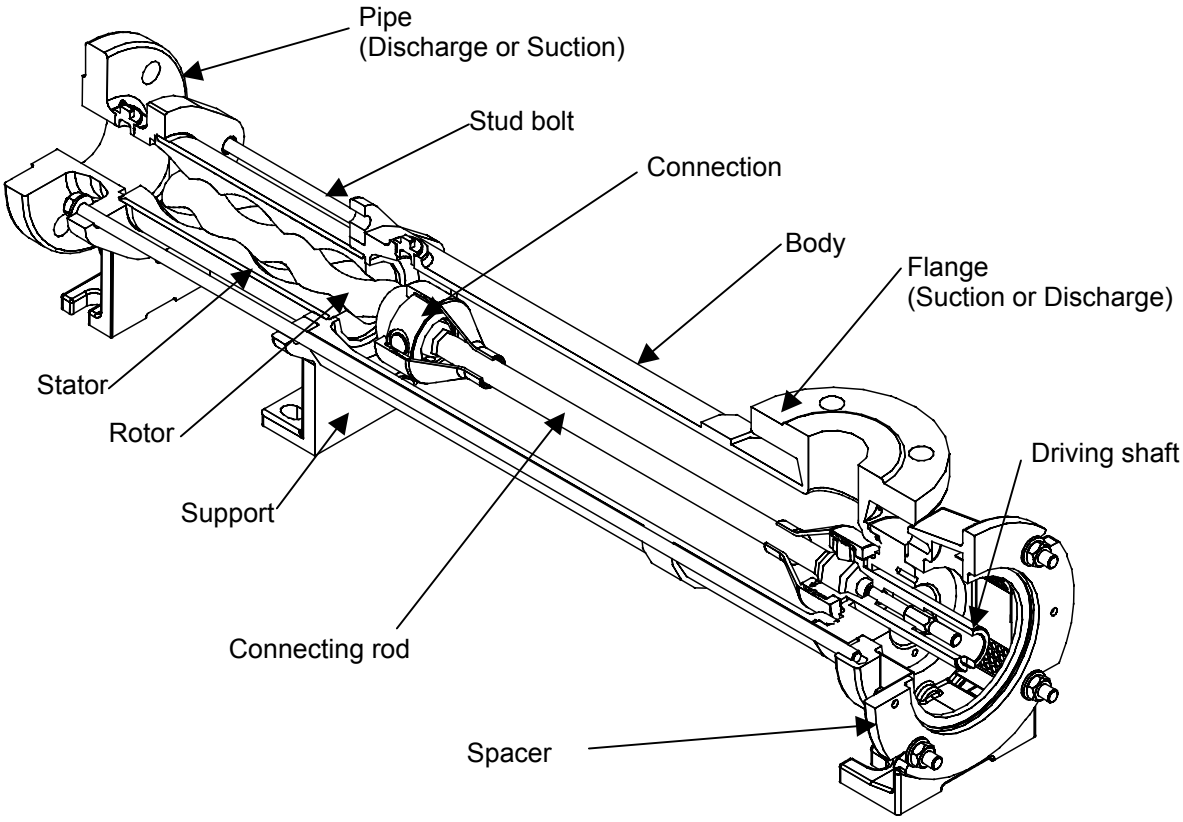
1. SPECIFICATIONS AND INSTALLATION

1.1 Operating principle



The PCM MOINEAU-type progressive-cavity (or eccentric-screw) pump is essentially made up of two internal spiral gears, each of which has the following particular features:
- The stator (external element) has one tooth more than the rotor (internal element).
- For any given cross section, each rotor cross-section is in contact with the stator.
- The helix pitch for both elements depends on the number of teeth.

The rotational movement generates an axial displacement of the closed cells, delimited by the rotor and the stator, from the suction port to the discharge.
The PCM MOINEAU pump is a positive displacement vacuum pump whose cylinder capacity is equal to the cell volume.
The drive system, flanged directly to the pump, turns the driving shaft which itself turns the rotor via a connecting rod.
The bearing option, which enables drive via semi-elastic coupling, is available for our entire range.

Direction of rotation

An arrow on the upper part of the spacer indicates the direction of rotation. The direction of rotation for discharge on the pipe side is counterclockwise for an observer positioned at the end of the drive shaft. The suction port is marked on the pump, the other port being for discharge.

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1.2 Specifications

1.2.1 Build specifications

These are given in the table below

Pump type	
Suction body and pipe	FGL250 Cast Iron or Z3CND17.11.02 Stainless Steel
Stator and sheath	Hypalon, Neoprene, Nitrile or Viton
Rotor	Z30C13 with or without chrome plating Z3CND17.11.02 with or without chrome plating
Connecting rod	Z30C13 Z3CND17.11.02
Seal	Stuffing box assembly lubricated or not Single or double mechanical seal, lubricated or not
Driving shaft	Z30C13 with or without chrome plating Z3CND17.11.02 with or without chrome plating
Spacer	FGL 250 Cast Iron

Use of Stainless Steel and Cast Iron equipment names is in accordance with the AFNOR standard.
The PCM MOINEAU progressive-cavity I-series pumps, in the MONOBLOCK and BEARING versions, are fitted with ISO or ANSI standard flanged unions, and can be installed on a base provided as an optional extra.

There are two build types: monoblock and bearing.
The name of the monoblock pumps, given on the rating plate, begins with two figures followed by one or two letters: M – MR – MV or R (e.g.: 01MR45I5 corresponds to size 45I5 with a 01 type mounting geared motor).
The name of the bearing pumps do not have the same elements as described before. Returning to the previous example, this therefore gives us the following code: 45I5

The space occupied by the pumps will be defined below.

Note: Ft indicates that the equipment is made out of cast iron and In indicates stainless steel

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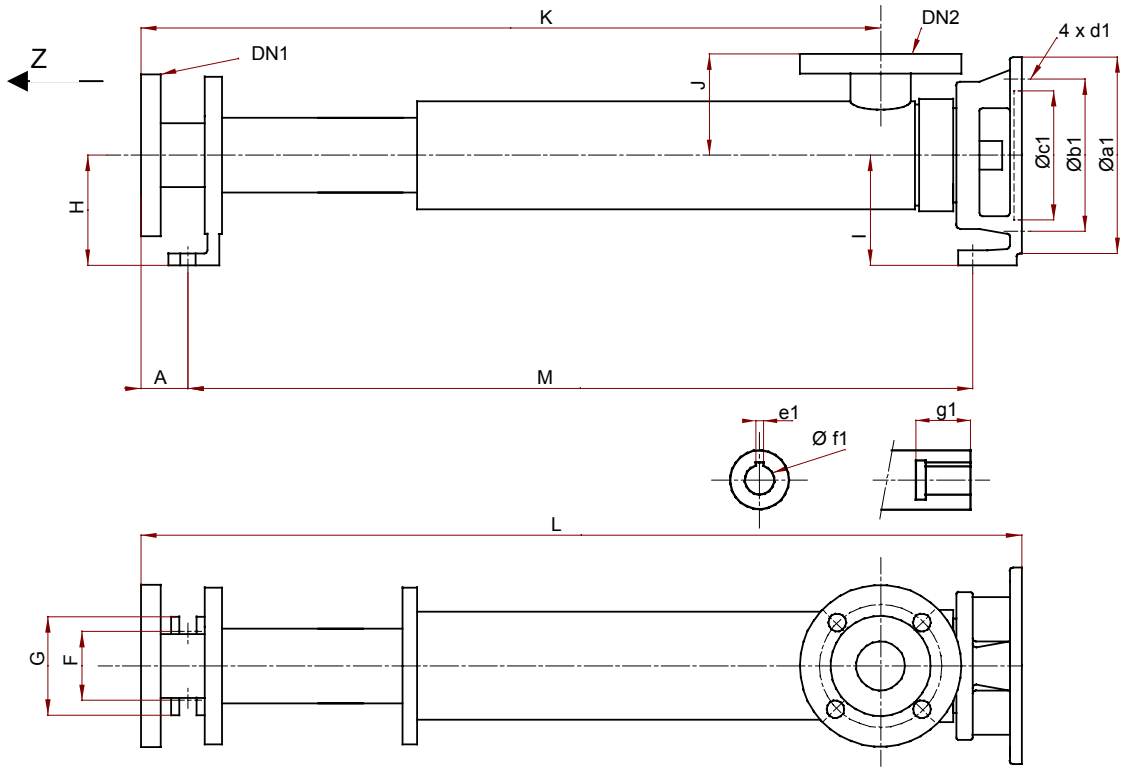
1.2.1.1 00 bearing monoblock pump general dimensions



00 bearing pumps															
TYPE	DN1 DN2	A	F	G max	H	I	J	K (CI)	K (ST)	L (CI)	L (ST)	M (CI)	M (ST)	Mass in Kg	Z
0.03ID10	PN10 DN20	28	72	98	80	90	65	297		414		346	313	18	70
0.4I10			48	116								350	327	17	
0.4ID10								400		512		450	430	18	175
1I10								350		467		403	380		145
1ID10								501		615		553	530	19	300
2.6I10	PN16 DN40	47	60		90		80	513		635		557		24	160
2.6ID10								723		845		767	740	26	370
6I5								432		555		475	450	21	120
6ID5								557		680		600	575	24	250

Mounting type	a1	b1	c1	d1	e1	f1	g1
02	200	165	130	12	8	25	49
03	160	130	110	13	6	20	39
04					8	25	49
05	200	165	130	12			
06					6	19	39
07					8	24	49
08	160	130	110	13	8	25	49

The Z dimension is the minimum length required for pump disassembly

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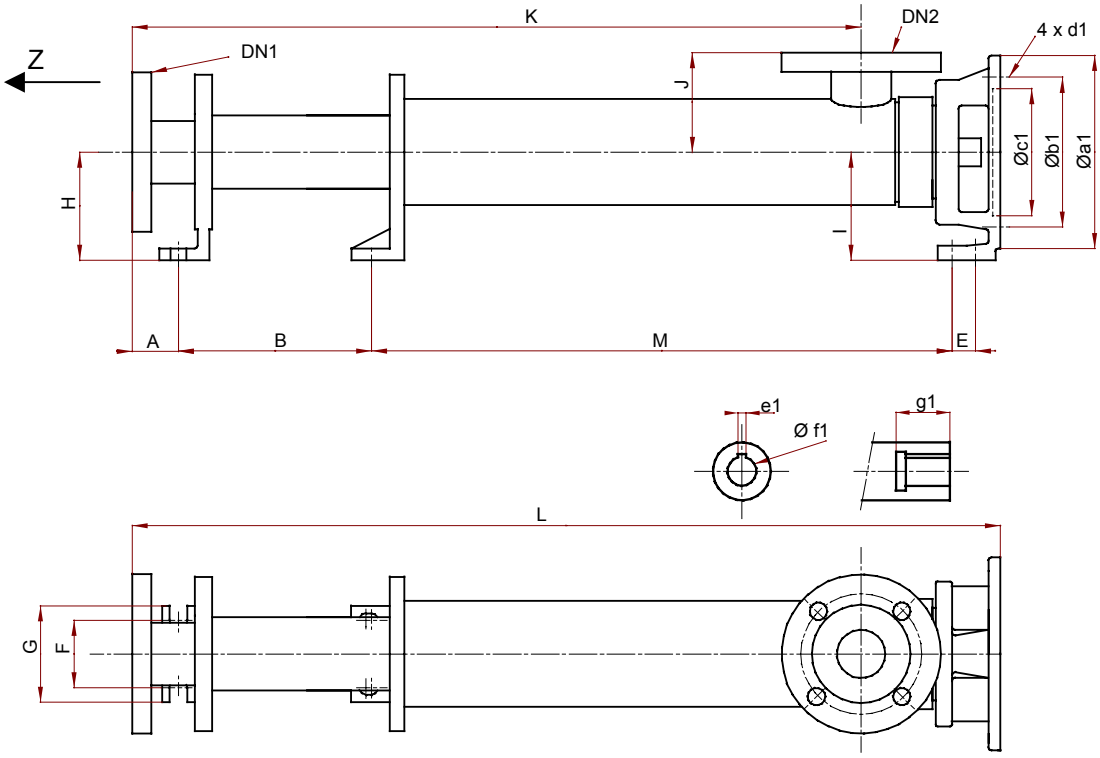
1.2.1.2 0 bearing monoblock pump general dimensions



0 bearing pumps																
TYPE	**DN1 DN2**	**A**	**B**	**F**	**G max**	**H**	**I**	**J**	**K (CI)**	**K (ST)**	**L (CI)**	**L (ST)**	**M (CI)**	**M (ST)**	**Mass in Kg**	**Z**
6I10	(*)	45	288	70	140	112	112	100	814	848	956	994	573	569	30	210
6I20	(**)	43	520						1066		1379		597	597	33	450
13I5	PN16 DN50	45	229						753		897		573	569	28	210
13I10			438						962		1106		597		33	420
13ID10			803						1327		1471		573		55	740
20I4	(***)	46	462					103	985		1160		602		47	405

Mounting type	a1	b1	c1	d1	e1	f1	g1
01	160	130	110	6	8	25	49
02	200	165	130	11			
03							
04	160	130	110	6	6	20	39
08	200	165	130	11	8	24	49
09					6	19	39

(*): Cast Iron pumps DN1=PN16 DN50 and DN2=PN10 DN50
Stainless Steel pumps DN1=PN16 DN40 and DN2=PN10 DN50
(**): Cast Iron pumps DN1=DN2=PN25 DN50
Stainless Steel pumps DN1=PN25 DN40 and DN2=PN25 DN50
(***): Cast Iron pumps DN1=PN16 DN80 and DN2=PN16 DN65

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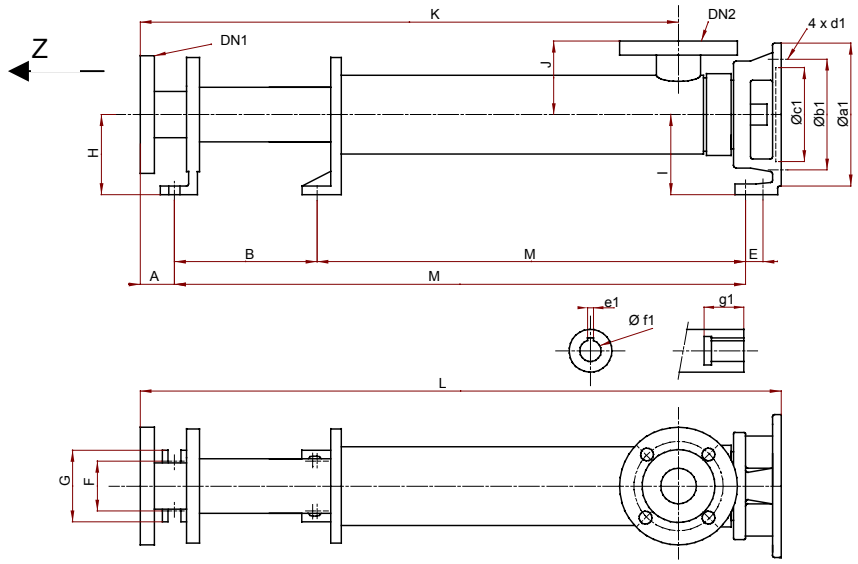
1.2.1.3 II bearing monoblock pump general dimensions



II bearing pumps																	
TYPE	**DN1 DN2**	**A**	**B Ft**	**B In**	**E**	**F**	**G max**	**H CI**	**H ST**	**I**	**J**	**K**	**L**	**M (CI)**	**M (ST)**	**Mass in Kg**	**Z**
1.6I45	Rp3/4	30			80	60	170	77		130	90	1065	1370	1220		59	470
13I20	(*)	50	795			140	180	125			130	1315	1640	671		90	700
20I16	(**)	(***)	1033	1082								1584	1930	722	676	125	980
25I5	PN16 DN100	(****)										764	1085	910	915	71	185
25I10												1058	1379	1200	1209	87	470
30I4		50					170	130				980	1296	1145		180	420
40ID5	PN16 DN125	74	785	831			180	130	125			1360	1701	722	676	127	700
40I10																129	
40ID10			1260	1305								1834	2175			157	1175
45I5								130				948	1289	1096	1069	108	305
62I5		170	386			120	185					1400	1740	1047		188	390
62ID5			746									1760	2100			219	750
90I5			606									1620	1943			153	390

Mounting type	a1	b1	c1	d1	e1	f1	g1
01	200	165	130	11	8	30	59
02	250	215	180	15	12	40	79
03							
04	200	165	130	11	8	25	49
08					10	35	64
09	250	215	180	15	12	40	79
10	200	165	130	11	8	30	59
11						25	49
12	250	215	180	15	10	35	

(*): DN1=PN40 DN65 and DN2=PN16 DN100
(**): DN1=PN16 DN100 and DN2=PN16 DN125
(***): Cast Iron A=50 and Stainless Steel A=47
(****): Cast Iron A=50 and Stainless Steel A=65

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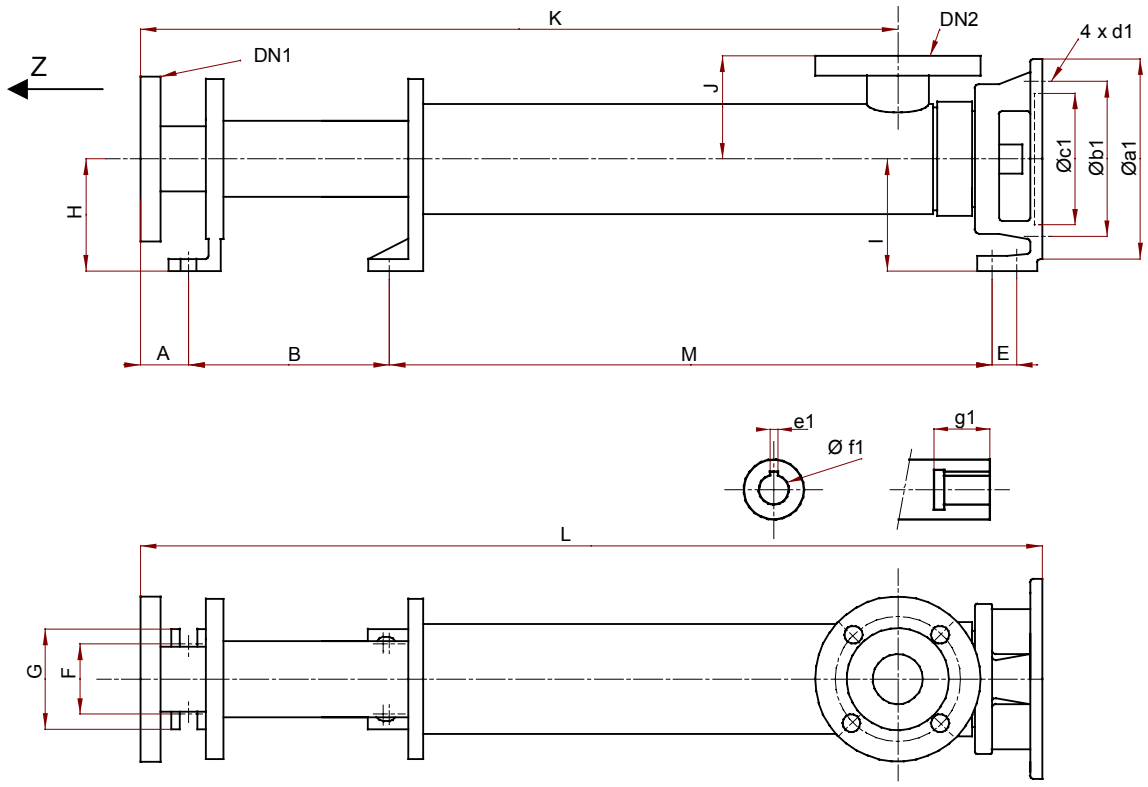
1.2.1.4 III bearing monoblock pump general dimensions



III bearing pumps														
TYPE	**DN1 DN2**	**A**	**B**	**E**	**F**	**G max**	**H**	**I**	**J**	**K**	**L**	**M**	**Mass in Kg**	**Z**
4I52	Rp2	115	733	100	130	250	112	180	120	164	1917	911	106	770
20I20	(*)	180	862		200		140		160	1775	2120	920	191	1050
35I20	(**)	177	1081						180	2093	2480	1064	251	1160
60I10	PN16 DN150	215	830				160			1874	2255	1052	280	890
100I10	PN10 DN200	234	1085		230	280	180		200	2382	2795	1318	370	1150
100ID10			2332			660				3630	4042	1318	525	2380
120I5			462			280			190	1710	2103	1249	270	600
150I10			1605							2902	3315		385	1650
150ID10			3372			660				4670	5082		630	3400
180I5			1085			280				2333	2726		351	1200

Mounting type	a1	b1	c1	d1	e1	f1	g1
01	300	265	230	M12	14	50	99
02					12	40	79
03	350	300	250	M16	14	50	99
04	300	265	230	M12			
05	350	300	250	M16			

(*): DN1=PN40 DN100 and DN2=PN16 DN125
(**): DN1=PN40 DN125 and DN2=PN16 DN150

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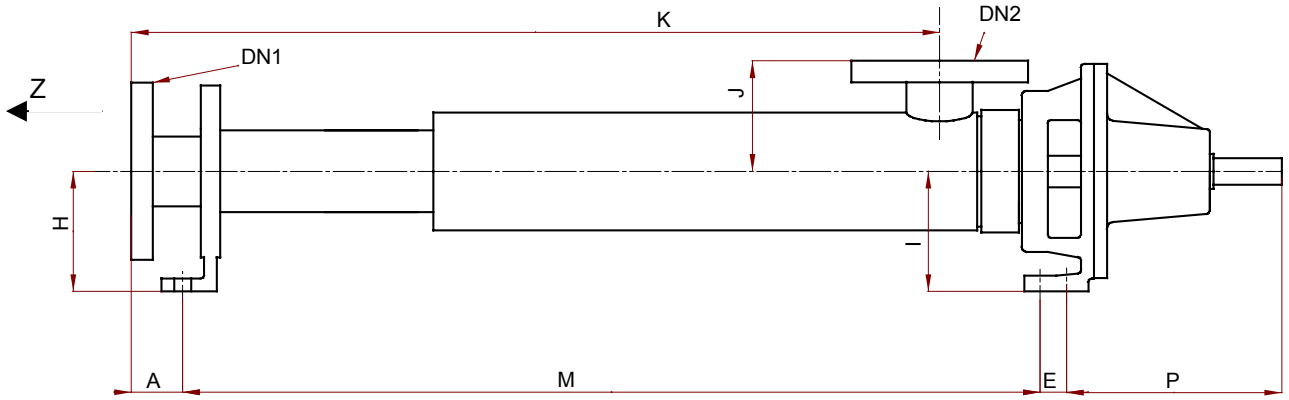
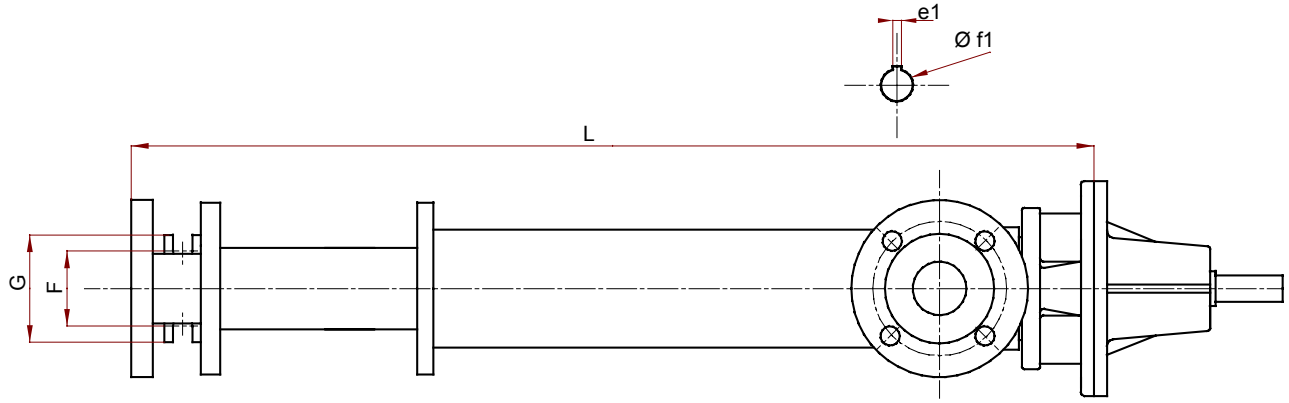
1.2.1.5 00 bearing pump general dimensions





00 bearing pumps																		
TYPE	**DN1 DN2**	**A**	**F**	**G max**	**H**	**I**	**J**	**K (Cl)**	**K (ST)**	**L (Cl)**	**L (ST)**	**M (Cl)**	**M (ST)**	**P**	**e1**	**f1**	**Mass in Kg**	**Z**
0.03ID10	PN10 DN20	28	72	98	80	90	65	297		414		346	313	177	6	20	19	70
0.4I10			48	116								350	327				18	
0.4ID10								400		512		450	430				19	175
1I10								350		467		403	380					145
1ID10								501		615		553	530				20	300
2.6I10	PN16 DN40	47	60		90		80	513		635		557					25	160
2.6ID10								723		845		767	740				27	370
6I5								432		555		475	450				22	120
6ID5								557		680		600	575				25	250

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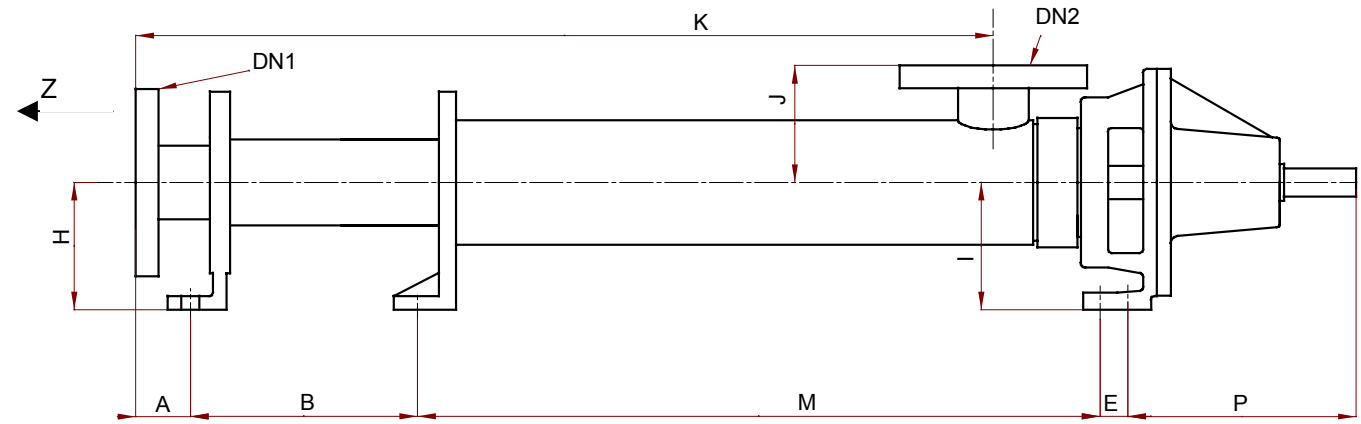
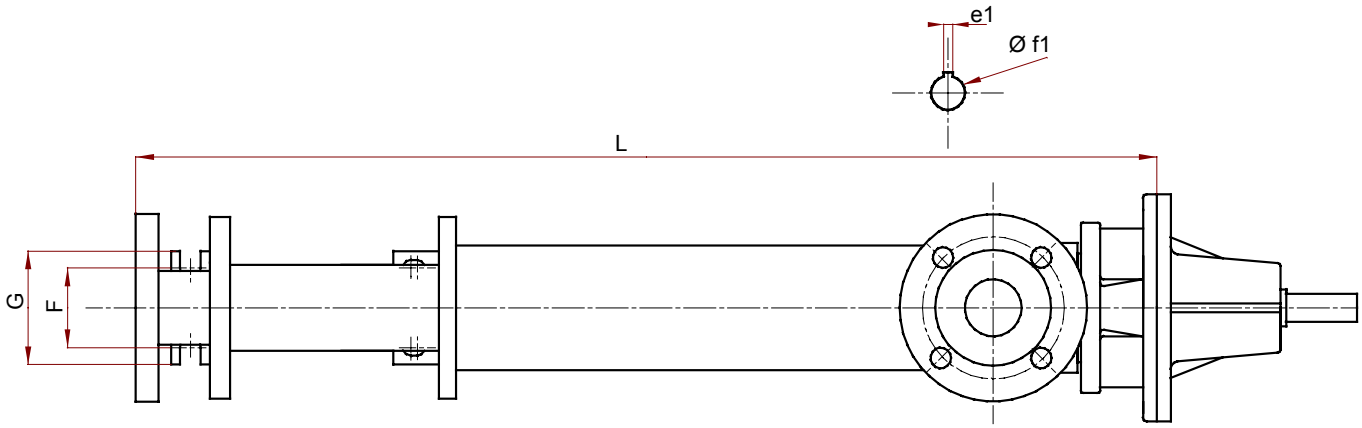
1.2.1.6 0 bearing pump general dimensions





0 bearing pumps																		
TYPE	**DN1 DN2**	**A**	**B**	**F**	**G max**	**H**	**I**	**J**	**K (Cl)**	**K (ST)**	**L (Cl)**	**L (ST)**	**M (Cl)**	**M (ST)**	**P**	**e1**	**f1**	**Mass in Kg**	**Z**
6I10	(*)	45	288	70	140	112	112	100	814	848	956	994	573	569	220	8	28	31	210
6I20	PN25 DN50	43	520						1066		1379		597	597				38	450
13I5	PN16 DN50	45	229						753		897		573	569				30	210
13I10			438						962		1106		597					35	420
13ID10			803						1327		1471		573					56	740
20I4	(**)	46	462					103	985		1160		602					49	405

(*): Cast Iron pumps DN1=PN16 DN50 and DN2=PN10 DN50
Stainless Steel pumps DN1=PN16 DN40 and DN2=PN10 DN50
(**): Cast Iron pumps DN1=DN2=PN25 DN50
Stainless Steel pumps DN1=PN25 DN40 and DN2=PN25 DN50
(***): Cast Iron pumps DN1=PN16 DN80 and DN2=PN16 DN65

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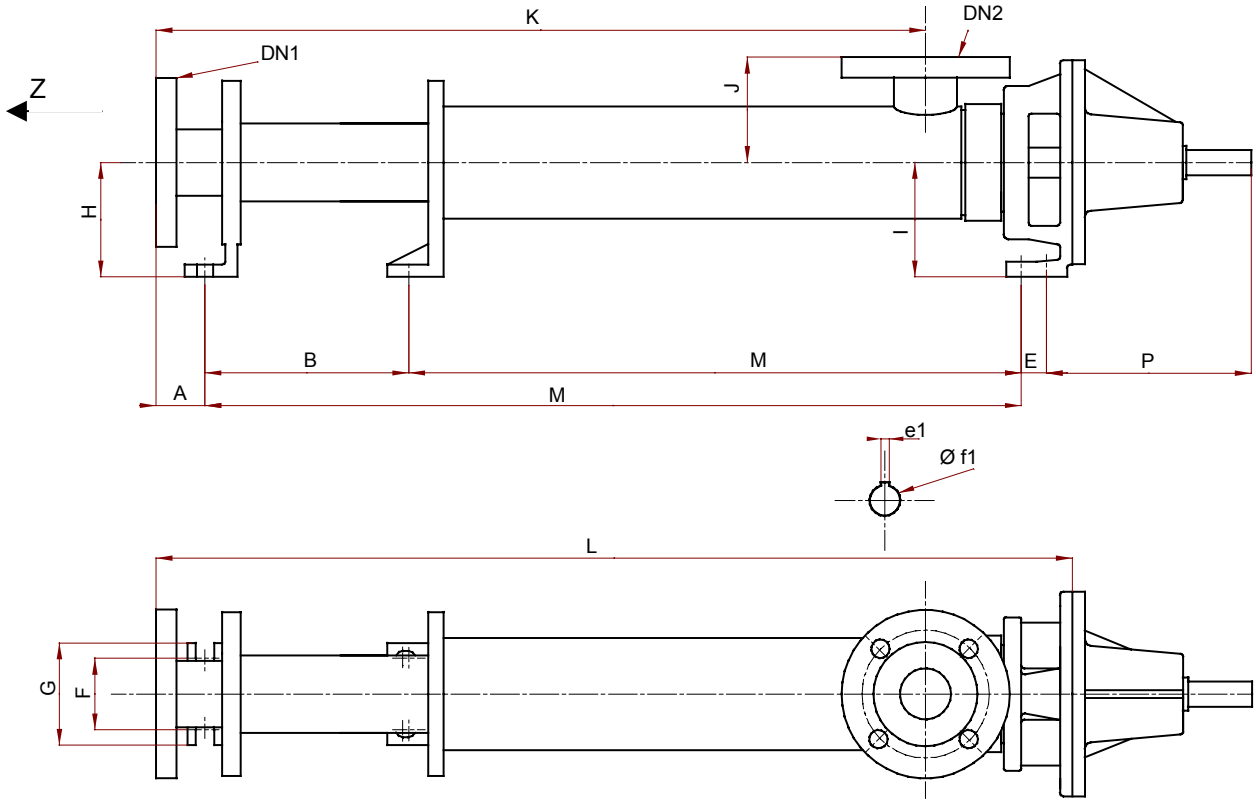
1.2.1.7 II bearing pump general dimensions



II bearing pumps																				
TYPE	**DN1 DN2**	**A**	**B Ft**	**B In**	**E**	**F**	**G max**	**H CI**	**H ST**	**I**	**J**	**K**	**L**	**M (CI)**	**M (ST)**	**P**	**e1**	**f1**	**Mass in Kg**	**Z**
1.6I45	Rp3/4	30			224	60	170	77		130	90	1065	1370	1220		129	10	38	65	470
13I20	(*)	50	795			140	180	125			130	1315	1640	671					95	700
20I16	(**)	(***)	1033	1082								1584	1930	722	676				140	980
25I5	PN16 DN100	(****)										764	1085	910	915				77	185
25I10												1058	1379	1200	1209				95	470
30I4		50					170	130				980	1296	1145					92	420
40ID5	PN16 DN125	74	785	831			180	130	125			1360	1701	722	676				135	700
40I10																			135	
40ID10			1260	1305								1834	2175						165	1175
45I5								130				948	1289	1096	1069				115	305
62I5		170	386			120	185					1400	1740	1047					195	390
62ID5			746									1760	2100						245	750
90I5			606									1620	1943						230	390

(*): DN1=PN40 DN65 and DN2=PN16 DN100
(**): DN1=PN16 DN100 and DN2=PN16 DN125
(***): Cast Iron A=50 and Stainless Steel A=47
(****): Cast Iron A=50 and Stainless Steel A=65

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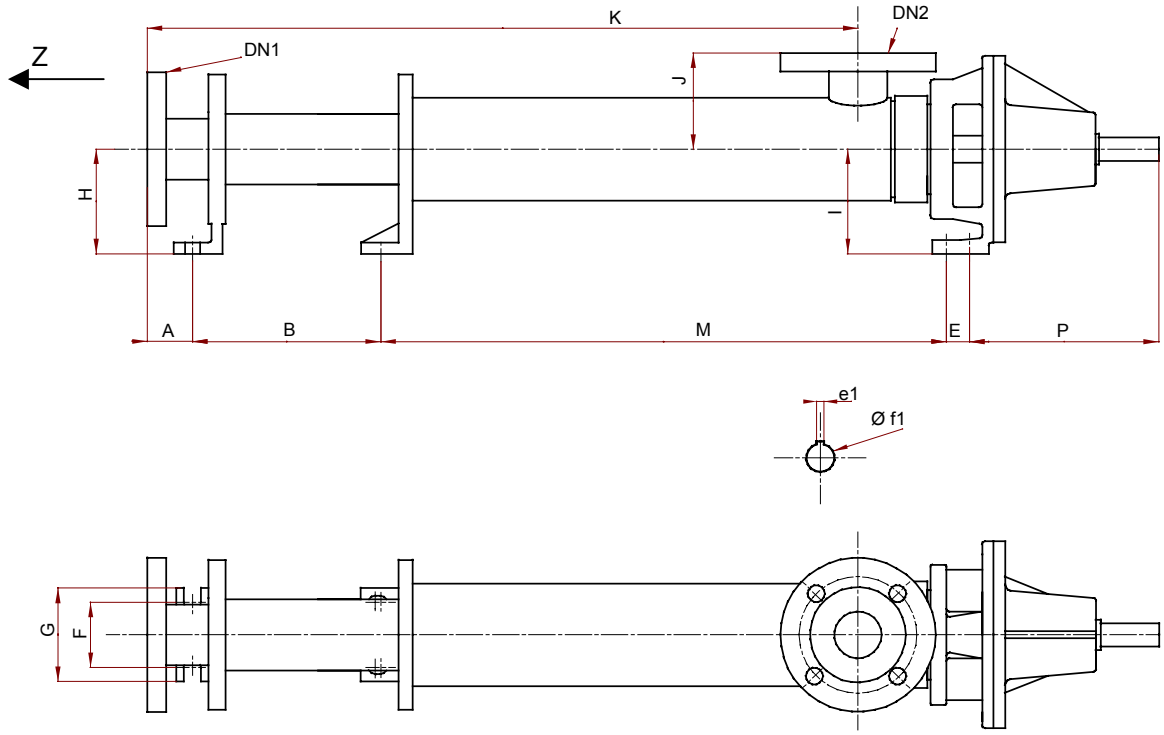
1.2.1.8 III bearing pump general dimensions



III bearing pumps																
TYPE	**DN1 DN2**	**A**	**B**	**E**	**F**	**G max**	**H CI**	**I**	**J**	**K**	**M**	**P**	**e1**	**f1**	**Mass in Kg**	**Z**
4I52	Rp2	115	733	295	130	250	112	180	120	164	911	168	16	55	140	770
20I20	(*)	180	862		200		140		160	1775	920				225	1050
20I40										2790					312	1850
35I20	(**)	177	1081						180	2093	1064				285	1160
35ID20			2307							3319					365	2390
35I40	(***)		2304							3568	1342				380	2320
50I15	(****)	213	1268				160			2562	1336				387	1400
50ID15			2724				180			4000					525	2800
60I10	PN16 DN150	215	830				160			1874	1052				315	890
100I10	PN10 DN200	234	1085		230	280	180		200	2382	1318				405	1150
100ID10			2332			660				3630	1318				580	2380
120I5			462			280			190	1710	1249				305	600
150I10			1605							2902					440	1650
150ID10			3372			660				4670					685	3400
180I5			1085			280				2333					385	1200
240I5	PN10 DN250	102	1268			320	250		200	2435	1360				440	
240ID5			2416			660				3582					695	2350

(*): DN1=PN40 DN100 and DN2=PN16 DN125
(**): DN1=PN40 DN125 and DN2=PN16 DN150
(***): DN1=PN40 DN125 and DN2=PN10 DN200
(****): DN1=PN16 DN150 and DN2=PN10 DN200

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1.2.2 Operating specifications

Pump specifications (flow, pressure, rotation speed, construction, etc.) must not be modified without the written agreement of our Customer Services Department.

Operating specifications are given in the Technical Description for the supplied equipment. The equivalent continuous A-weighted sound pressure level for PCM pumps is less than 70 dB(A).

I-series MOINEAU pumps are used in the following industries: Starch, Building and public works, Ceramics, Chemistry, Purification and environment, Oil mills, Mining, Paper, Petrochemicals, Oil, Soap and Sugar, etc.

With their strong design, I-series MOINEAU pumps are used for clear, viscous, abrasive, heterogeneous, slurry, fragile and emulsifying liquids.

IMPORTANT

The operating temperature range is defined according to the stator material and the specifications indicated in the Technical Description provided in the Appendix. Do not use the pump in conditions other than those stipulated in this document, without obtaining prior authorisation from our Customer Services Department.

Pump performance curves

The rotation speeds and the pressures indicated on the curves correspond to typical performance levels for water at 20°C. In the event of operating conditions that differ from this standard, it is necessary to limit performance according to:

- Fluid properties (viscosity, fragility, abrasiveness).
- Characteristics of the application (operating conditions, discharge pressure, available NPSH)

The curves that appear below were achieved in the following conditions:

- Water base at 20°C
- Maximum discharge pressure = 4 bar or 6 bar per increment

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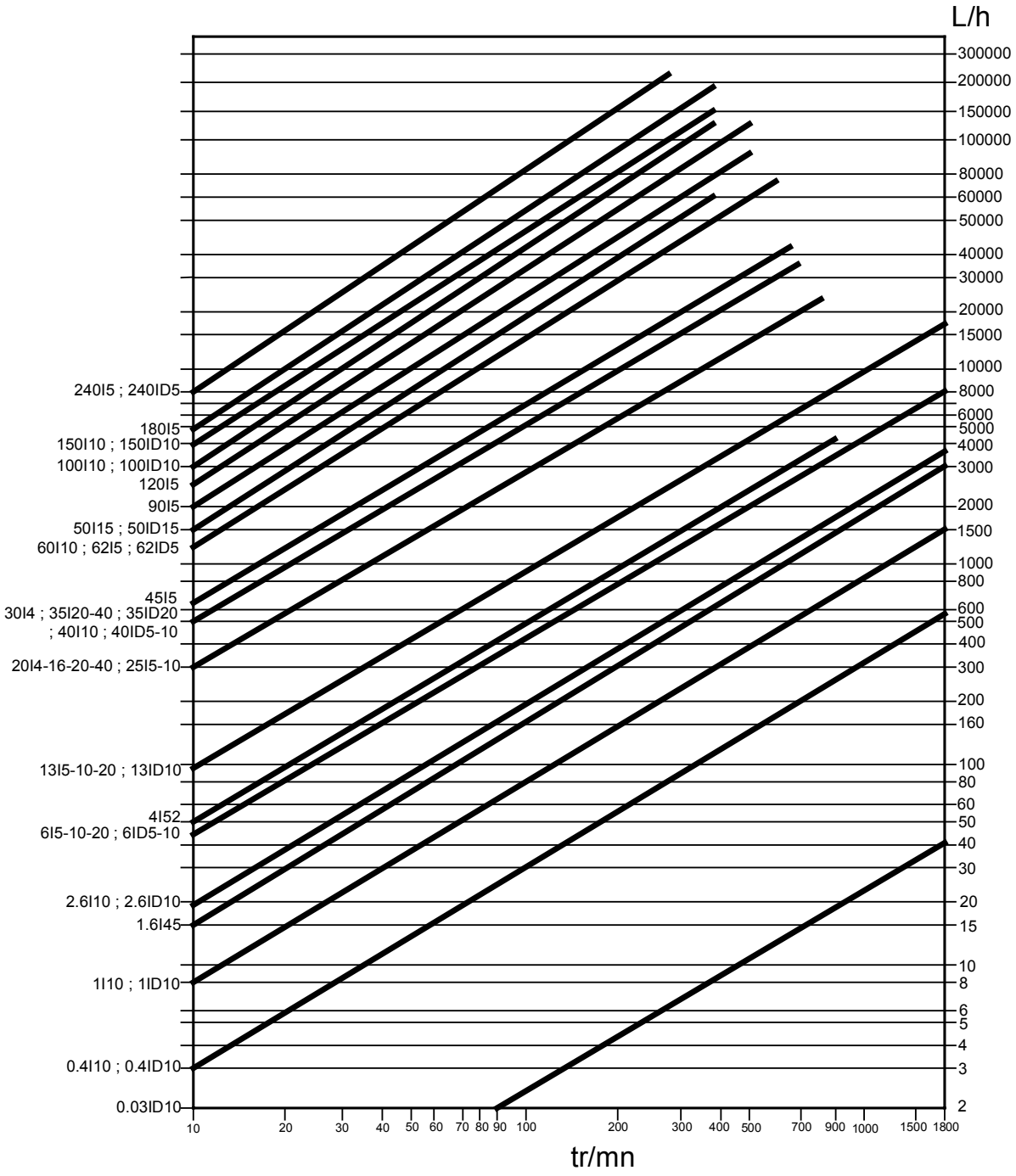

For further information, refer to the curve for your pump or ask our Customer Services Department for a copy.

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1.3 Equipment installation

1.3.1 Installation precautions

It is important to leave enough space around the pump to allow for maintenance and adjustments. Avoid mounting the pump in places where the ambient temperature is not within the pump operating temperature limits (see Technical Description in the Appendix). If installed outside, protection above the equipment and anti-frost protection are both recommended.
We also recommend the installation of a removable connection component to allow easy maintenance of the motor-pump unit. (see dimension Z on the floor space requirement diagrams in paragraph 1.2.1). A discharge pressure relief valve will protect the pump and installation. PCM has a wide selection of accessories; contact our Customer Services Department for all your needs.

Some recommendations for optimum pump operation

a) The pump should preferably be placed under load with suction below the fluid to be pumped.
b) If there is a valve on the downstream circuit, it is **IMPERATIVE** that a pressure relief valve and/or break contact be installed for authorising pump operation.

Note: A discharge valve, in the absence of circuit interlock, is often the cause of improper operations resulting in the deterioration of the pump or piping.

1.3.2 Connecting the piping

An easily removable element will be installed on the end of the stator. This will enable both the stator and the rotor to be disassembled easily (see dimension Z on the floor space requirement diagrams in paragraph 1.2.1), without having to dismantle the whole pump from its support. The pump does not have to support the weight of the piping.

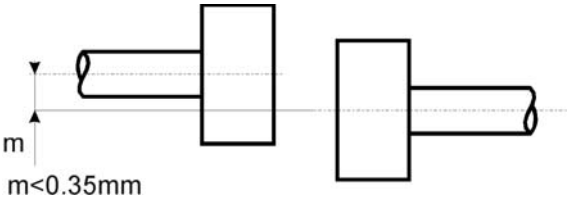
1.3.3 Fixing to the ground

The pump and its driving device must be aligned with the base, which can be provided by PCM Pompes. It must be fixed in place by screws and pegs or foundation bolts in an sufficiently large concrete block.

1.3.4 Alignment

Pumps that we at PCM mount onto a base with the drive are aligned in the workshop.
Alignment must nevertheless be checked once the pump has been installed definitively (foundation, etc.). However, in some cases, the following steps should be taken:

- _ Remove the protective casing and the coupling sleeve fixing screws.
- _ Separate these items.
- _ Using a ruler, check that the alignment specifications are compliant with the diagrams below:
  - ✓ Maximum radial misalignment



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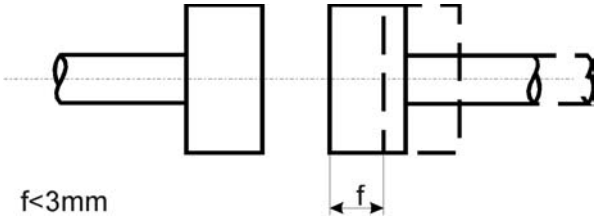
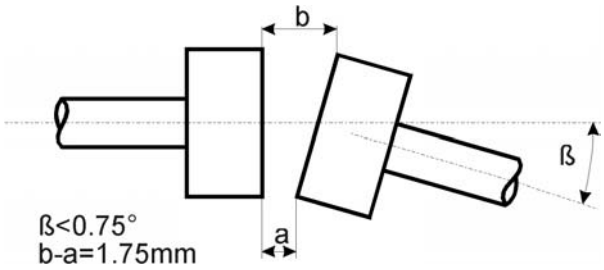
✓ Maximum axial misalignment



✓ Maximum angular misalignment



_ In the event of an unacceptable alignment, change the motor-pump unit ground setting and possibly the motorisation and/or pump setting.

_ Put back the protective casing and fix it in place.

1.3.5 Lubricating the sealing system

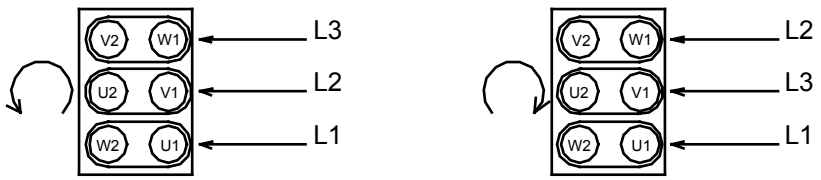
If the sealing system is fitted with a lubrication system, connect the barrage fluid inlet and outlet ports. Refer to the specific instructions about sealing provided in the appendix.

1.3.6 Connecting the motor

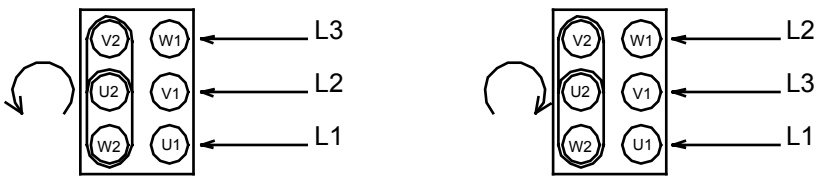
Warning! Prior to any connection, ensure that the electrical supply corresponds to the specifications that appear on the motor plate. However, the connection diagram is located in the motor terminal box.

Three-phase motor

Connection of 220V to 240V in "triangle" position



Connection of 380V to 460V in "star" position



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Warning! All our pumps are delivered with a "star" connection. Do not forget to connect the pump earthing.

In terms of thermal protection, the operating value is the current specified on the motor plate.

Once all connections have been made (three-phase), start the pump (at minimum speed if possible using the frequency mechanical or hydraulic variable speed drive) and check the rotation direction of the motor according to the arrow on it.

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2. OPERATION

2.1 First commissioning

2.1.1 Before start-up

Ensure that the:
_ Electric connections are compliant
_ Reducing gear lubricant has been refilled or is at correct level
_ Vent plug on reducing gear is present and protection has been removed
_ Rotation direction of shaft complies with desired circulation direction of product
_ Product to be pumped is present in tank and in pump body
_ Seal is lubricated if pump is fitted with a sprayed seal
_ Valves installed upstream and downstream of pump are open
_ Maximum setting of variable speed drive thrust bearings is correct

2.1.2 Start-up

NEVER OPERATE THE PUMP DRY!

If the pump is not under a load, the pump body should be filled manually. If the pump is temporarily drained, the small amount of fluid remaining in the pump will be sufficient for stator lubrication until the next priming. During the first few minutes of operation, check the following points:
_ Pumped fluid exits from the delivery piping
_ Pump does not vibrate
_ No abnormal noises
_ No leaks from sealing system (see specific documentation in appendix)
_ If a pressure gauge is installed, check the pressure stabilisation
_ No abnormal heating at the:
- stator
- sealing system

Check that the following operating parameters:
_ Speed
_ Flow
_ Pressure
_ Fluid viscosity
_ Temperature
correspond to the parameters for which the pump was designed.

For any values other than those indicated, the PCM Customer Services Department must be contacted.

2.2 Normal operating procedure

2.2.1 Start-up procedure

Before each start-up, check the following points:
_ Presence of fluid to be pumped
_ Valves on the suction and delivery pipes open
_ Temperature of fluid to be pumped is correct.

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2.2.2 General operating requirements

Ensure that the following conditions are met:
_ Pump is constantly supplied with fluid to be pumped and power.
_ Discharge pressure remains stable and lower than maximum pump capacity.
_ Pumped fluid temperature remains within the operating limits described in the technical description in Section 4 - Appendices.
_ Compliance with the process operating requirements in force on the production site.

2.2.3 Cleaning

External cleaning

Remove any dirt which may damage paint or corrode the pump.

Internal cleaning

The cleaning procedures and frequency depend on specific pump use and the fluid pumped. However, the minimum procedure is described below.
When the pump is in operation, use the suction to supply it with a cleaning product that is compatible with the pumped fluid and the materials from which the pump is made. The pump process determines cleaning time. When this time is up, stop the pump in accordance with Section 2.2.4.

2.2.4 Shut-down procedure

The shut-down procedure depends on the type of fluid pumped. Refer to specific characteristics given in the technical description given in Section 4 - Appendices.
The shut-down procedure is therefore defined by the process.
However, stopping the pump and then closing the suction and discharge valves constitutes the minimum procedure.

Warning! In the case of a fluid that decants, the pump must be cleaned to allow a start-up without damage.

2.3 Operating procedure in the event of an incident

In the event of operating anomalies, such as:
_ Pump does not start.
_ Pump does not prime.
_ Flow too low or irregular.
_ Pump stops.
_ Pump produces no flow.
_ Pump abnormally noisy.
Proceed as follows:
_ Stop the pump in accordance with the shut-down procedure in Section 2.2.4.
_ Hydraulically isolate the pump (suction, discharge).
_ Refer to Section 3.5.1 - Troubleshooting.

2.4 Automatic control

The use of devices which automatically authorise or prohibit pump operation is recommended.
For example, valves with electrical contacts for position, dry running protection probe (capacitance probe).

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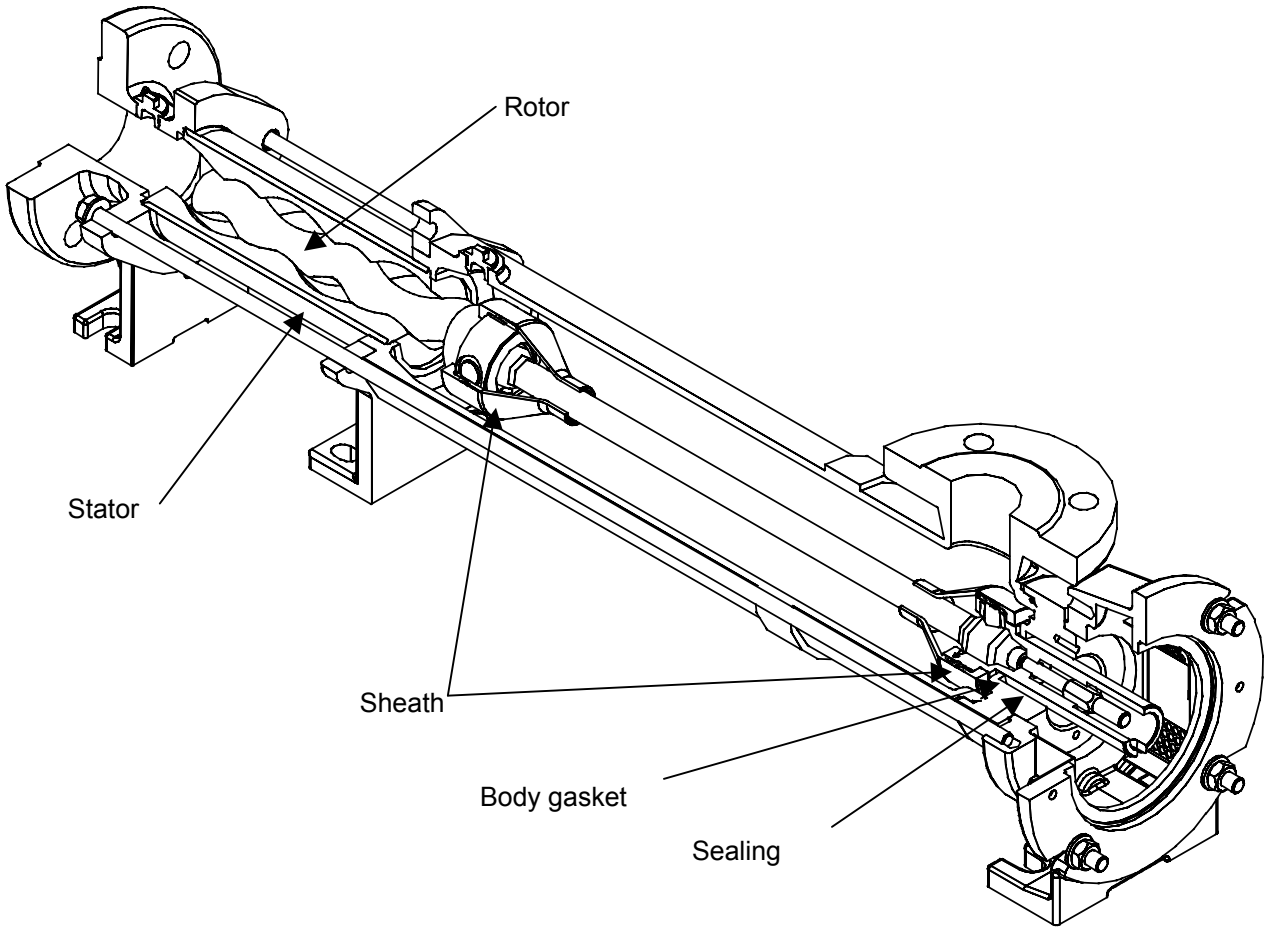
3. MAINTENANCE

3.1 List of spare parts

The list of spare parts for your pump can be obtained by contacting your Customer Services Department and providing the serial number of your equipment, which can be found on the manufacturer's plate, (see paragraph 0.1).



Quantity	Name
1	Stator
1	Rotor
1	Sealing (see specific note in appendix)
2	Sheath
1	Body gasket assembly

3.2 Handling equipment and procedure

Pump parts that cannot be handled manually can be lifted using a hoist and sling (or other similar lifting equipment).
Metallic slings (chain, cable, etc.) are not recommended.
Fragile parts, such as the rotor, drive shaft, etc., must be handled with particular care to avoid any impact.

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Following disassembly, they should be placed on wooden blocks, in a stable manner and protected against impact.

For handling the whole pump, refer to the applicable procedure and comply with legislation relating to the safety of nearby personnel.

3.3 Storage conditions

A) In standard PCM packing
Pumps and pump parts must be stored in their original packing, in a stable manner, protected from impacts and in a dry room.

B) After unpacking
. Protect equipment against impacts and dust

C) When packed according to S.E.I. 4c
Every six months,
. Change the desiccator bags
. Check machined surfaces and grease as necessary
. Close the cover hermetically

NOTE: Every month, turn the pump four to five turns using the ventilator or bearing shaft.

3.4 Preventive maintenance

All maintenance operations must be performed by personnel trained and qualified in accordance with the instructions of this manual.
Any breach of this rule releases PCM of all responsibility.
Before carrying out any work on the pump, check that all precautions have been taken: upstream and downstream valves closed, piping cleaned and purged, power supply disconnected and blocked. All usual methods must be implemented in accordance with regulations in force relating to personnel safety.

3.4.1 Periodic inspection

If the pump is operated intermittently or for less than five hours per day, monthly testing is sufficient.
If the pump is operated for more than five hours per day, check the following points on a weekly basis:
_ Sealing at suction and discharge pump connections
_ Sealing between body and drive
_ Tightness of assembly fixing screws {pipe, stator, body, spacer, drive}
_ Drive lubricant level, if applicable
_ Anchoring to floor, if applicable
_ Motor output and cleanliness of drive ventilation grilles
_ Condition of power cable sheaths

3.4.2 Lubrication

The pump drive is supplied with oil (except for a single motor). Check lubricant level in drive before operating.
The precautions to be taken for drive lubrication, if any, must be applied according to the manufacturer's documentation given in the Appendix.
However, the table below indicates the recommended lubricants to be used when working on the pump:

Lubricated element	Recommended lubricants	Supplier

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Sheathed connections	ANTISEEZE 76772 TOTAL FM	LOCTITE TOTAL
Roller bearings	AVIATION N°10 UPTON 400	ELF LABO
Stator (for mounting)	GLYCERINE	

3.4.3 Tightening torque

The general tightening torque value for the fixing screws is defined in the table below:

Screw diameter	Max. torque
M 8	7.4 N.m
M 10	15 N.m
M 14	40 N.m
M 16	61 N.m

3.5 Corrective maintenance

3.5.1 Troubleshooting

FINDING	POSSIBLE CAUSES & SOLUTIONS
- Pump does not start	1, 2, 7, 8, 13, 14, 16, 17, 18, 22, 23, 30
- Pump does not prime	3, 4, 5, 9, 10, 11, 14, 15, 16, 17, 20, 21, 24, 26, 27, 29
- Flow is too low	3, 4, 5, 9, 10, 15, 16, 19, 20, 21, 22, 23, 24, 26, 29
- Discharge pressure too low	3, 4, 5, 9, 10, 15, 20, 21, 22, 23, 24, 26
- Pump stops	2, 7, 8, 13, 14, 16, 17, 18, 19, 22, 23, 29, 30
- Pump no longer produces any flow	3, 4, 5, 7, 9, 10, 13, 15, 16, 17, 18, 20, 21, 23, 24, 26, 27, 29
- Drive overload	1, 2, 3, 8, 12, 13, 14, 16, 17, 18, 19, 22, 25, 26, 29
- Pump is noisy or vibrates abnormally	3, 4, 5, 6, 12, 13, 14, 17, 20, 23, 25, 26, 27, 28
- Drive sealing leaks	9, 10, 11, 28
- Stator prematurely worn	2, 3, 5, 14, 16, 17, 18, 19, 20, 21, 25, 26, 27, 30
- Rotor prematurely worn	3, 14, 16, 17, 18, 19, 20, 25, 30
- Flow not constant	9, 10, 20, 21, 22, 23, 26
- Connections deteriorate quickly	2, 3, 14, 16, 17, 18, 19, 20, 25, 26, 30

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N°	POSSIBLE CAUSES	SOLUTIONS
1	- For a new pump or new stator, static tightening torque is too high.	- Fill the pump and turn the motor fan about ten times by hand.
2	- Stator has expanded.	- The stator material expands when in contact with the pumped fluid. Check that the fluid is the one provided on the order. Otherwise, contact our Customer Services Department to determine a new elastomer grade.
3	- Stator has become hard and brittle.	- Check that the temperature of the pumped fluid is below the maximum admissible temperature for the stator.
4	- Stator is worn.	- Replace the stator and check the condition of the rotor.
5	- Rotor is worn.	- Determine the cause of this wear: abrasion, corrosion, cavitation. Contact our Customer Services Department to determine a new grade. Install a new rotor.
6	- Connections are worn	- Check the condition of the sheaths and, as for the stators, contact our Customer Services Department to determine a new elastomer grade. Repair the connection.
7	- Rotor drive system is broken.	- Determine the cause of this incident by checking points 1, 2, 14, 20 and 30. Replace the damaged parts.
8	- Stuffing box assembly has seized or stuck.	- First of all, unscrew the nuts in the gland and turn the pump allowing the pumped fluid to escape. Re-tighten gently in order to curb the leak. If this is not enough, disassemble and then reassemble using new parts.
9	- Leak from mechanical seal.	- Replace mechanical seal (see specific note in Section 4 - Appendices).
10	- Shaft damaged	- Change shaft and recondition seal
11	- Incorrect rotation direction.	- Change the motorisation rotation direction by inverting the two motor phases.
12	- Misalignment between pump and motor.	- Re-align group.
13	- Coupling worn or broken.	- Replace the coupling and redo the alignment. Diagnose the reasons for the breakage.
14	- Temperature of pumped fluid too high.	- Check acceptable temperature range for stator and replace if necessary.
15	- Temperature of pumped fluid is lower than expected.	- Replace stator with tighter stator.
16	- Percentage of dry content too high.	- Decrease fluid dryness ratio.
17	- Fluid sedimentation or precipitation in pump.	- Clean and rinse pump after each use.
18	- Solids contained in fluid too thick.	- Remove these solids by sieving or use another pump with larger cells.
19	- Discharge pressure too high.	- Measure the pressure using a pressure gauge and compare the reading with that in the technical description.
20	- Net positive suction head too low (NPSHd < NPSHr).	- Reduce head losses in the suction piping, lower the temperature, increase the intake level and reduce pump speed.
21	- Air suction at the pump intake.	- Check for leaks in the piping, re-tighten the stuffing box assembly if the pump is sucking in air on this side (apply lubrication if there is none).

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22	- Electrical installation is non-compliant.	- Check the mains voltage, motor coupling and fuse rating.
23	- Equipment that drives the pump is worn or broken.	- Change the defective parts and check motor load.
24	- Rotation speed too low.	- Replace the motor or change reduction ratio.
25	- Rotation speed too high.	- Replace the motor or change reduction ratio.
26	- Installation, piping and accessories must be checked.	- Check that piping is not blocked by foreign bodies or a faulty valve, and that there are no permanent accidental leaks: poorly sealed valve, leaking safety valve, etc.
27	- Pump operates dry.	- Review pump installation conditions or install a safety system that prohibits dry operation.
28	- Roller bearings worn.	- Disassemble the bearing, change roller bearings and gaskets.
29	- Viscosity of pumped fluid is higher than expected.	- Ensure that viscosity is not higher than that expected.
30	- Pump blocked by foreign body.	- Disassemble pump, clean it, change any damaged components.

3.5.2 Pump disassembly (see sectional drawings in appendix)

To maintain the pump in its original condition, it is essential that PCM spare parts be used.
Pump maintenance must be performed by qualified personnel only, in accordance with the regulations in force.

The reference number of the drawing corresponding to your model is given in the table below:

Pump model	Sectional drawing reference
0.03ID10 – 0.4I10 – 0.4ID10 – 1I10 – 1ID10 – 2.6I10 – 2.6ID10 – 6I5 – 6ID5 – 6I10 – 6I20 – 13I5 – 13I10 – 13ID10 – 20I4	TPC0056
1.6I45 – 13I20 – 20I16 – 25I5 – 25I10 – 30I4 – 40ID5 – 40I10 – 40ID10 – 45I5 – 62I5 – 62ID5 – 90I5	TPC0057
4I52 – 20I20 – 35I20 – 35ID20 – 35I40 – 50I15 – 50ID15 - 60I10 – 100I10 – 100ID10 – 120I5 – 150I10 – 150ID10 – 180I5 – 240I5 – 240ID5	TPC0058

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ORDER OF PUMP DISASSMBLY		SECTIONS TO BE REFERRED TO
Disassemble pump from site	→	§ 3.5.2.1
↓		
Disassemble stator	→	§ 3.5.2.2
↓		
Disassemble body	→	§ 3.5.2.3
↓		
Disassemble rotor	→	§ 3.5.2.4
↓		
Disassemble connecting rod	→	§ 3.5.2.5
↓		
Disassemble sheaths	→	§ 3.5.2.6
↓		
Disassemble driver on motor side	→	§ 3.5.2.7
↓		
Disassemble connection gaskets (depending on model)	→	§ 3.5.2.8
↓		
Disassemble seal	→	§ 3.8
↓		
Disassemble spacer and bearing	→	§ 3.5.2.9
↓		
Disassemble drive	→	See documentation in Section 4 - Appendices

Before disassembly

- Ensure that the pump has stopped and that it has been disconnected both electrically and hydraulically to prevent the pump from accidentally starting.
- Remove all pressure at discharge and suction ports, isolate the pump from the rest of the installation and purge the pump body and piping.
- Empty the pump body.
- Prepare the tools required for the corresponding disassembly phase, referring to the tables given in the appendix of this document.

3.5.2.1 <u>On-site pump disassembly</u>

- Isolate the pump from the electrical circuit and secure it.
- Close the suction and discharge valves.
- Obtain information about the pumped fluid so as to implement any precautions required for personal safety.
- Empty the pump.
- Remove the pump from the installation and mark the motor connection (for rotation direction when reassembling).

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3.5.2.2 Removal of stator (Ref. 1)

- Take out the removable element from the discharge pipe.
- Immobilise the pump body to prevent it from falling.
- Remove the nuts, washers, stud bolts (Ref. 80) or fixing screws, and the pipe (Ref. 54) and possibly the supports (Ref. 48 and 384) depending on the case.
- Remove the stator (Ref. 1) from the rotor (Ref. 20) by rotating the pump drive shaft if necessary. Depending on the model, remove the adaptor rings between the body and stator and then mark them.
- Check the condition of the rotor and stator

3.5.2.3 Removal of body (Ref. 50)

- Remove the fixing screws from the body (Ref. 50) on the spacer (Ref. 88).
- Slide the body along the shafting (rotor Ref. 20 and connecting rod Ref. 22).
- Isolate the body thereby protecting it from impact.

Note: Mark the adaptor washer between the body and seal (depending on model) so as to facilitate reassembly.

3.5.2.4 Removal of rotor (Ref. 20)

According to the model and size of the bearing, the connections are protected by sheaths (Ref. 3) or pins (Ref. 11). The unit is therefore identified by the contents of the list of parts provided in Section 4 - Appendices.

Pump with sheath (Ref. 3)	Pump with pins (Ref. 11)
- Turn the sheath (Ref. 3) on the rotor side back on itself. - Remove the screw (Ref. 100) and the driver gasket (Ref. 23). - Drive out the pin (Ref. 21) to disengage the rotor (Ref. 20) from the connecting rod (Ref. 22).	- Unscrew the fixing screws (Ref. 100) and disengage the set collar (Ref. 31) (or depending on the model 23). - Drive out the pin (Ref. 21) to disengage the rotor (Ref. 20) from the connecting rod (Ref. 22).

3.5.2.5 Removal of connecting rod (Ref. 22)

According to the model and size of the bearing, the connections are protected by sheaths (Ref. 3) or pins (Ref. 11). The unit is therefore identified by the contents of the list of parts provided in Section 4 - Appendices.

Pump with sheath (Ref. 3)	Pump with pins (Ref. 11)
- Turn the sleeve (Ref. 3) on the drive side back on itself. - Remove the screw (Ref. 100) and the driver gasket (Ref. 23). - Drive out the pin (Ref. 21) to disengage the connecting rod (Ref. 22) from the driver (Ref. 26).	- Unscrew the fixing screws (Ref. 100) and disengage the set collar (Ref. 31). - Drive out the pin (Ref. 21) to disengage the connecting rod (Ref. 22) from the driver (Ref. 26).

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3.5.2.6 Removal of sheaths (Ref. 3) or pins (Ref. 11)

According to the model and size of the bearing, the connections are protected by sheaths (Ref. 3) or pins (Ref. 11). The unit is therefore identified by the contents of the list of parts provided in Section 4 - Appendices.

Pump with sheath (Ref. 3)	Pump with pins (Ref. 11)
- Cut the sheaths (Ref. 3) to disengage them from the ends of the connecting rod (Ref. 22).	- Take out the pins (Ref. 11) from the ends of the connecting rod (Ref. 22). - Disengage the set collar (Ref. 23) (or 31 depending on model).

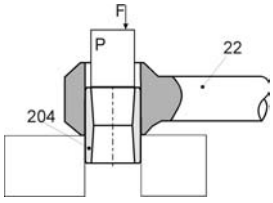
3.5.2.7 Removal of driver (Ref. 26) (or 36) on motor side

According to the model and size of the bearing, the driver is fixed onto the drive shaft either by axial pins, keys or tangential pins. The unit is therefore identified by the contents of the list of parts provided in Section 4 - Appendices.

Pump with axial pins (Ref. 108)	Pump with key (Ref. 142) (or 141)	With tangential pins (Ref. 108)
- Unscrew the fixing screw (Ref. 139). - Disengage the driver (Ref. 26) of the drive shaft (Ref. 33).	- Unscrew the fixing screw (Ref. 139). - Disengage the driver (Ref. 26) of the drive shaft (Ref. 33).	- Remove the circlips (Ref. 97). - Slide the 1st gasket (Ref. 69) towards the drive shaft (Ref. 33). - Drive out the 1st pin (Ref. 108). - Slide the 2nd gasket (Ref. 69) towards the drive shaft (Ref. 33). - Drive out the 2nd pin (Ref. 108). - Disengage the driver (Ref. 26), gaskets (Ref. 69) and circlips (Ref. 97) of the drive shaft (Ref. 33).

3.5.2.8 Removal of connection gaskets (Ref. 204 and 206)

- Drive out the gaskets (Ref. 206) of the driver (Ref. 26) and/or of the rotor (Ref. 20) with the clamp.
- Drive out the gaskets (Ref. 204) of the connecting rod (Ref. 22) with the clamp following the diagram below.



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3.5.2.9 Removal of spacer or bearing

3.5.2.9.1 Removal of spacer (Ref. 88)

- Unscrew the drive fixing screws on the spacer (Ref. 88).
- Disengage and isolate the pump drive.
- Separate the spacer (Ref. 88) from the pump base.

3.5.2.9.2 Removal of bearing

3.5.2.9.2.1 Removal of protective casing

- Unscrew the fixing screws of the pump base.
- Disengage the protective casing from below.

3.5.2.9.2.2 Removal of transmission system

- Unscrew the fixing screws from the drive on the pump base.
- Isolate the pump drive.
- Disassemble the coupling half of the drive output shaft.

3.5.2.9.2.3 Bearing 0 and 00

- Unscrew the spacer fixing screws (Ref. 88).
- Separate the bearing-holder (Ref. 60) from the spacer (Ref. 88).
- Remove the key (Ref. 87) once its coupling half has been removed.
- Unscrew the locknut (Ref. 70) and remove the thrust washer (Ref. 34).
- Disassemble the gasket (Ref. 5) and then drive out the shaft (Ref. 33).
- Remove the inner gasket of the roller bearing (Ref. 65) of the shaft (Ref. 33) and then remove the outer gaskets of the roller bearing (Ref. 65) of the bearing-holder (Ref. 60).

3.5.2.9.2.4 Bearing II

- Remove the gasket (Ref. 7).
- Unscrew the spacer fixing screw (Ref. 88).
- Separate the bearing-holder (Ref. 60) from the spacer (Ref. 88).
- Remove the key (Ref. 87) once its coupling half has been removed.
- Unscrew the locknut (Ref. 70) and remove the thrust washer (Ref. 34)
- Disassemble the gaskets (Ref. 5A and 5B) and then drive out the shaft (Ref. 33).
- Remove the inner gasket of the roller bearing (Ref. 65) of the shaft (Ref. 33) and then remove the outer gaskets of the roller bearing (Ref. 65 and 66) of the bearing-holder (Ref. 60).

3.5.2.9.2.5 Bearing III and IV

- Remove the flap (Ref. 72) that may be present depending on the model.
- Remove the key (Ref. 87) once its coupling half has been removed.
- Unscrew the locknut (Ref. 70) and remove the thrust washer (Ref. 34)
- Disassemble the gaskets (Ref. 5A and 5B) and then drive out the shaft (Ref. 33).
- Remove the inner gasket of the roller bearing (Ref. 65) of the shaft (Ref. 33) and then remove the outer gaskets of the roller bearing (Ref. 65 and 66) of the bearing-holder (Ref. 60).

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3.5.3 Pump reassembly (see sectional drawings in appendix)

To maintain the pump in its original condition, it is essential that PCM spare parts be used.
Pump maintenance must be performed by qualified personnel only, in accordance with the regulations in force.

The reference number of the drawing corresponding to your model is given in the table below:

Pump model	Sectional drawing reference
0.03ID10 – 0.4I10 – 0.4ID10 – 1I10 – 1ID10 – 2.6I10 – 2.6ID10 – 6I5 – 6ID5 – 6I10 – 6I20 – 13I5 – 13I10 – 13ID10 – 20I4	TPC0056
1.6I45 – 13I20 – 20I16 – 25I5 – 25I10 – 30I4 – 40ID5 – 40I10 – 40ID10 – 45I5 – 62I5 – 62ID5 – 90I5	TPC0057
4I52 – 20I20 – 35I20 – 35ID20 – 35I40 – 50I15 – 50ID15 - 60I10 – 100I10 – 100ID10 – 120I5 – 150I10 – 150ID10 – 180I5 – 240I5 – 240ID5	TPC0058

ORDER OF PUMP REASSEMBLY		SECTIONS TO BE REFERRED TO
Reassemble drive	→	See documentation in Section 4 - Appendices
↓		
Reassemble spacer or bearing	→	§ 3.5.3.1
↓		
Reassemble seal	→	§ 3.8
↓		
Reassemble connection gaskets (depending on model)	→	§ 3.5.3.2
↓		
Reassemble driver on motor side	→	§ 3.5.3.3
↓		
Reassemble sheaths	→	§ 3.5.3.4
↓		
Reassemble connecting rod	→	§ 3.5.3.5
↓		
Reassemble rotor	→	§ 3.5.3.6
↓		
Reassemble body	→	§ 3.5.3.7
↓		
Reassemble stator	→	§ 3.5.3.8
↓		
Reassemble pump on site	→	3.5.3.9

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3.5.3.1 Reinstallation of spacer and bearing

3.5.3.1.1 Reinstallation of spacer (Ref. 88)

- Secure the spacer (Ref. 88) onto the drive using its fixing screws.
- Secure the spacer (Ref. 88) (and the drive) onto the pump base.

3.5.3.1.2 Reinstallation of bearing

3.5.3.1.2.1 Bearing 0 and 00

- Clean the bearing-holder (Ref. 60).
- Install the outer gaskets of the roller bearing (Ref. 65) in the bearing-holder (Ref. 60) with the clamp.
- Grease the outer gaskets of the roller bearing (Ref. 65) with grease (see section 3.4.2).
- Install the first inner gasket of the roller bearing (Ref. 65) when hot onto the shaft (Ref. 33) (stoving of gasket at 100°C for 45 mins) or use an induction instrument.
- Install the shaft (Ref. 33) thus fitted in the bearing-holder (Ref. 60) and then install the other inner gasket of the roller bearing (Ref. 65) when hot.
- Insert the gasket (Ref. 5) and the washer (Ref. 34).
- Install the locknut (Ref. 70) with LOCTITE 577 thread locking liquid (yellow) to ensure a backlash-free assembly, a shaft that is not free to move and manual rotation without coupling.
- Mount the obtained assembly onto the spacer (Ref. 88) and secure it using the screws.
- Mount the key (Ref. 87) and then the coupling half.

3.5.3.1.2.2 Bearing II

- Clean the bearing-holder (Ref. 60).
- Install the outer gaskets of the roller bearing (Ref. 65 and 66) in the bearing-holder (Ref. 60) with the clamp.
- Grease the outer gaskets of the roller bearing (Ref. 65 and 66) with grease (see section 3.4.2).
- Install the inner gasket of the roller bearing (Ref. 65) when hot onto the shaft (Ref. 33) (stoving of gasket at 100°C for 45 mins) or use an induction instrument.
- Install the shaft (Ref. 33) thus fitted in the bearing-holder (Ref. 60) and then install the other inner gasket of the roller bearing (Ref. 66) when hot.
- Insert the gaskets (Ref. 5A and 5B) and the washer (Ref. 34).
- Install the locknut (Ref. 70) with LOCTITE 577 thread locking liquid (yellow) to ensure a backlash-free assembly, a shaft that is not free to move and manual rotation without coupling.
- Install the obtained assembly onto the spacer (Ref. 88) and secure it using the screws.
- Install the key (Ref. 87) and then the coupling half.
- Install the gasket (Ref. 7) in its housing.

3.5.3.1.2.3 Bearing III and IV

- Clean the bearing-holder (Ref. 60).
- Install the outer gaskets of the roller bearing (Ref. 65 and 66) in the bearing-holder (Ref. 60) with the clamp.
- Grease the outer gaskets of the roller bearing (Ref. 65 and 66) with grease (see section 3.4.2).
- Install the inner gasket of the roller bearing (Ref. 65) when hot onto the shaft (Ref. 33) (stoving of gasket at 100°C for 45 mins) or use an induction instrument.

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- Install the shaft (Ref. 33) thus fitted in the bearing-holder (Ref. 60) and then install the other inner gasket of the roller bearing (Ref. 66) when hot.
- Insert the gaskets (Ref. 5A and 5B) and the washer (Ref. 34).
- Install the locknut (Ref. 70) with LOCTITE 577 thread locking liquid (yellow) to ensure a backlash-free assembly, a shaft that is not free to move and manual rotation without coupling.
- Install the key (Ref. 87) and then the coupling half.
- Install the flap (Ref. 72) which may be present depending on the model.
- Install the gasket (Ref. 7) in its housing.

3.5.3.1.2.4 Reinstallation of transmission system

- Install the coupling half of the drive output shaft.
- Put the drive onto the pump and attach it to the latter using its coupling assembly.

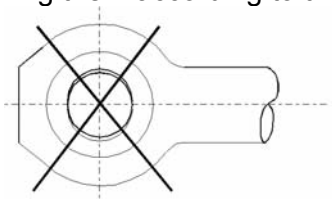
3.5.3.1.2.5 Reinstallation of protective casing

- Replace the protective casing from above.
- Put the protective casing fixing screws into position on the pump base.
- Check that there is no friction when the protective casing is moved.

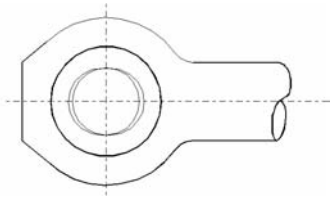
Since this component is vital for personnel safety, PCM disclaims all responsibility for any breach of this section.

3.5.3.2 Reinstallation of connection gaskets (Ref. 204 and 206)

- Apply LOCTITE 638 to the gaskets (Ref. 206) of the driver (Ref. 26) and/or the rotor (Ref. 20).
- Preheat the drivers and fix the gaskets (Ref. 206), thus prepared with the clamp level with the external diameter of the drivers.
- Apply LOCTITE 638 to the gaskets (Ref. 204) of the connecting rod (Ref. 22).
- Preheat the ends of the connecting rod (Ref. 22) and then fix the gaskets (Ref. 204) with the clamp positioning them according to the diagram below.



Incorrect installation



Correct installation

3.5.3.3 Reinstallation of driver (Ref. 26 or 36) on motor side

According to the model and size of the bearing, the driver is fixed onto the drive shaft either by axial pins, keys or tangential pins. The unit is therefore identified by the contents of the list of parts provided in Section 4 - Appendices.

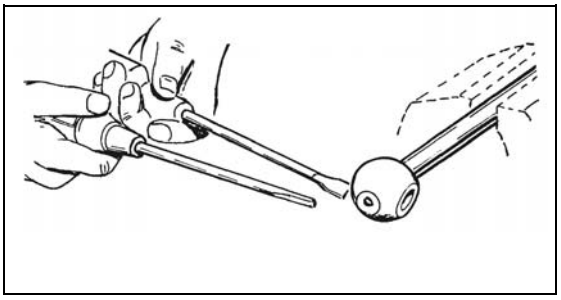
☎: (33) 1 41 08 15 15 🖷: (33) 01 41 08 15 00 💻: http:/www.pcmpompes.com

Pump with axial pins (Ref. 108)	Pump with key (Ref. 142) (or 141)	With tangential pins (Ref. 108)
- Replace the driver (Ref. 26) fitted with its pins (Ref. 108) and the gasket (Ref. 27) (depending on model) on the drive or roller bearing shaft. - Once engaged, tighten the screw (Ref. 139) with the tightening torque indicated in section 3.4.3.	- Check that the key is in good condition (Ref. 142) (or 141) and that it is correctly positioned on the drive or roller bearing shaft (Ref. 33). - Install the gasket (Ref. 27) (depending on model) and replace the driver (Ref. 26) on the drive or roller bearing shaft (Ref. 33) fitted with its key (Ref. 142) (or 141). - Once engaged, tighten the fixing screw (Ref. 139) with the tightening torque indicated in section 3.4.3.	- Replace the circlip (Ref. 97) onto the drive shaft (Ref. 33). - Return the driver (Ref. 26) fitted with its rings (Ref. 69) and gaskets (Ref. 27 and 351) on the drive shaft (Ref. 33). - Slide the two gaskets (Ref. 69) onto the drive shaft (Ref. 33) and engage the first pin (Ref. 108). - Slide the first ring (Ref. 69) towards the driver (Ref. 26) and engage the second pin (Ref. 108). - Slide the second ring (Ref. 69) towards the driver (Ref. 26) and install the circlip (Ref. 97) onto this.

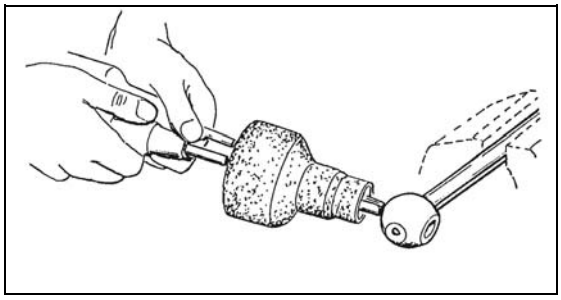
3.5.3.4 Reinstallation of Sleeves (Ref. 3) or Pins (Ref. 11)

According to the model and size of the bearing, the connections are protected by sleeves (Ref. 3) or pins (Ref. 11). The unit is therefore identified by the contents of the list of parts provided in Section 4 - Appendices.

3.5.3.4.1 Mounting with sleeves (Ref. 3)



1) Use two long handle screwdrivers with no protruding edges. Grease the end of the connecting rod and the inside of the sleeve well.



2) Perpendiculaire position to the connecting rod.

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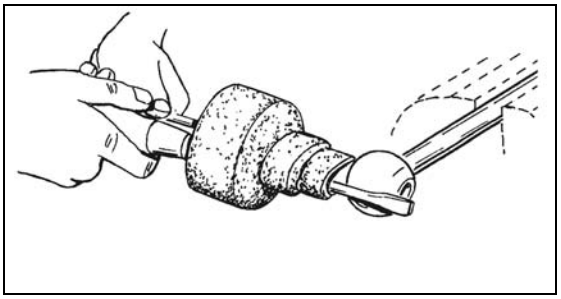
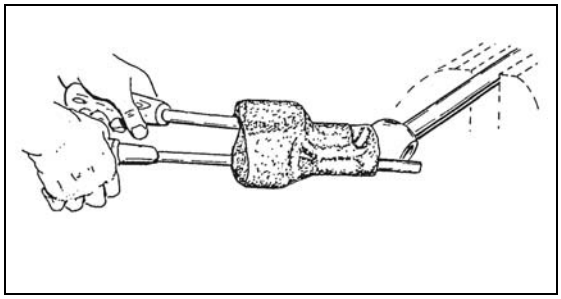
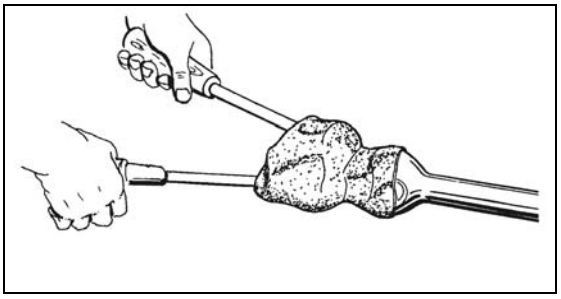


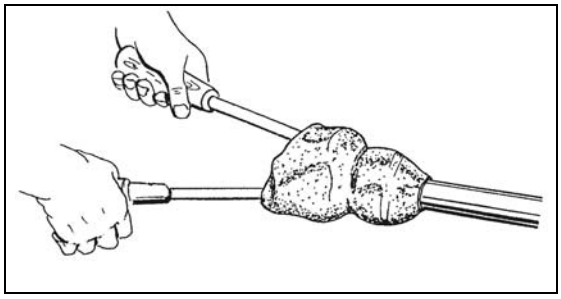
3) Engage the screwdrivers on the inside and the outside of the connection rod end.



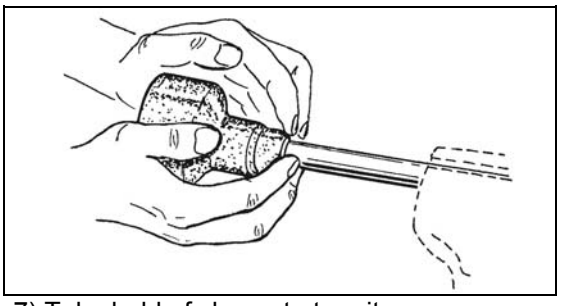
4) Pivot towards the connecting rod axis.



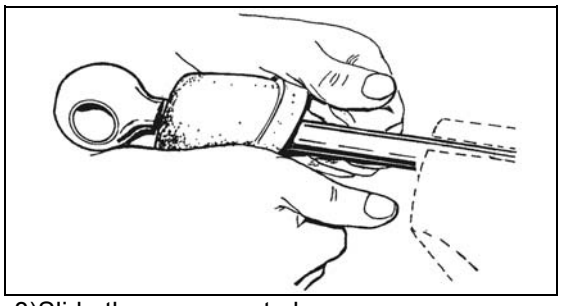
5) In the connecting rod axis, oull the screwdrivers apart.



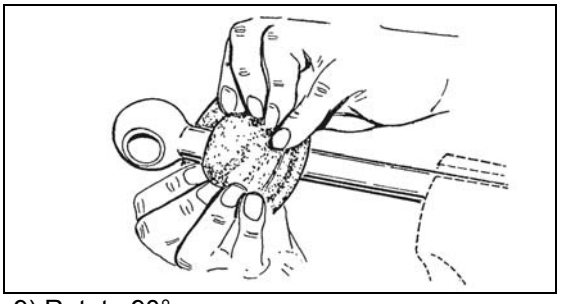
6) Changeover onto end of connecting rod.



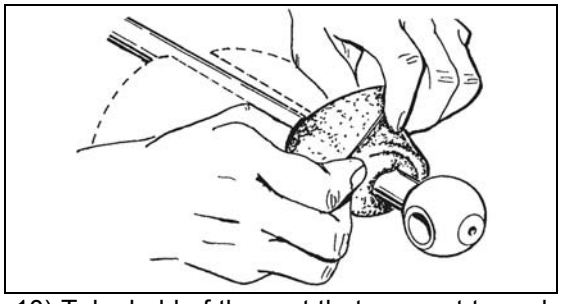
7) Take hold of sleeve to turn it over.



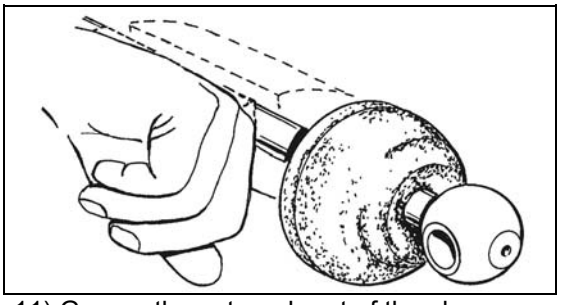
8)Slide the upper part along.



9) Rotate 90°.



10) Take hold of the part that was not turned over.



11) Grease the external part of the sleeve

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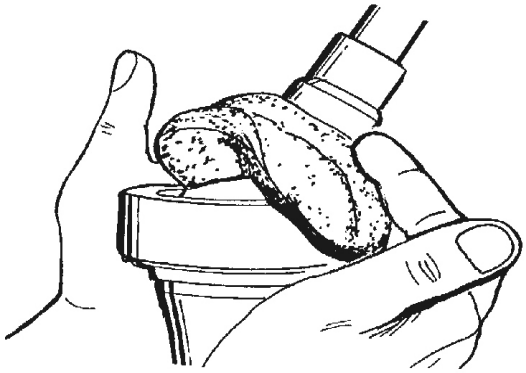
3.5.3.4.2 Installation with pins (Ref. 11)

- Engage the set collar (Ref. 23 or 31) on each connecting rod end (Ref. 22).
- Put the pins into place (Ref. 11) on each connecting rod end (Ref. 22).

3.5.3.5 Reinstallation of Connecting Rod (Ref. 22)

According to the model and size of the bearing, the connections are protected by sleeves (Ref. 3) or pins (Ref. 11). The unit is therefore identified by the contents of the list of parts provided in Section 4 - Appendices.

Pump with sleeves (Ref. 3)	Pump with pins (Ref. 11)
- Grease the inside of the connection with grease (see section 3.4.2). - First mount the set collars (Ref. 23) on each connecting rod end (Ref. 22). - Mount the connecting rod (Ref. 22) in the driver. - Insert the pin (Ref. 21) and put the set collar (Ref. 23) in its final position. - Put the screws in (Ref. 100) and tighten them until it is secure in the driver. - Turn the sleeve over (Ref. 3) to cover the assembly (see diagram below). 	- Grease the inside of the connection with grease (see section 3.4.2). - Mount the connecting rod (Ref. 22) in the driver. - Inser the pin (Ref. 21) and put the set collar (Ref. 23) in its final position. - Put the screws in (Ref. 100) and tighten them until it is secure in the driver.

3.5.3.6 Reinstallation of Rotor (Ref. 20)

According to the model and size of the bearing, the connections are protected by sleeves (Ref. 3) or pins (Ref. 11). The unit is therefore identified by the contents of the list of parts provided in Section 4 - Appendices.

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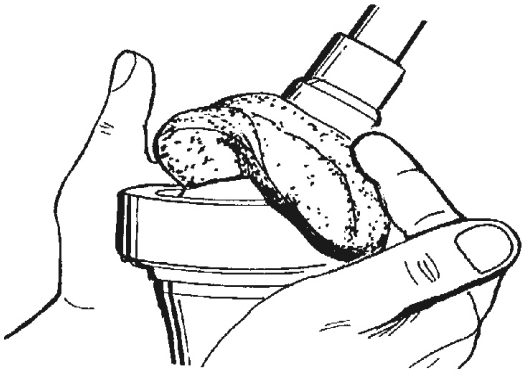
Pump with sleeve (Ref. 3)	Pump with pin (Ref. 11)
- First mount the set collar (Ref. 23) on the connecting rod (Ref. 22) - Mount the rotor (Ref. 20) on the connecting rod end (Ref. 22) - Insert the pin (Ref. 21) and place the set collar (Ref. 23) in its final position. - Put the screws in place (Ref. 100) and tighten them until it is secure in the driver. - Grease the inside of the connection with grease (see section 3.4.2) and turn the sleeve over (Ref. 3) to cover the assembly (see diagram below). 	- Grease the inside of the connection with grease (see section 3.4.2). - Mount the rotor (Ref. 20) on the connecting rod end (Ref. 22). - Insert the pin (Ref. 21) and place the set collar (Ref. 23 or 31) in its final position. - Put the screws in place (Ref. 100) and tighten them until it is secure in the driver.

3.5.3.7 Reinstallation of Body (Ref. 50)

Comment: Prior to any operation and at this stage of reinstallation, protect the rotor and the connections from any possible impact.

- Place the body gaskets and the centring ring(s) (depending on model) on the seal body.
- Slide the body (Ref. 50) along the shafting and move it to the desired position.
- Wedge the body (Ref. 50) to prevent it from falling.

3.5.3.8 Reinstallation of Stator (Ref. 1)

- Attach the stator (Ref. 1) onto the rotor (Ref. 20), which has already been lubricated (see section 3.4.2), turning the drive or roller bearing shaft (Ref. 33) if required.

Comment: In some versions, an intermediary support (Ref. 48 and 384) (depending on model) is to be positioned before this stage.

- Mount the pipe (Ref. 54) and then the stud bolts (Ref. 80), the washers and the nuts or fixing screws depending on the case, and tighten with the torque given in section 3.4.3.
- Fix the pump supports to the base or ground.

3.5.3.9 Reinstallation of Pump on Operating Site

- Put the pump into place and connect the motor (See the whole of section 1.3).
- Familiarise yourself with the product specifications so as to implement all the necessary precautions relating to personnel safety.
- Follow the start-up instructions (see section 2.11, then 2.1.2 and 2.2.1).

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3.6 Equipment storage when not in use

- Release pressure at the suction and discharge.
- Clean the pipes and the pump using a product that is compatible with the pumped product and the materials from which the pump is made.
- Run the pump for a few seconds to drain the body and the pipes.
- Stop the pump.
- Isolate the pump from the rest of the circuit.

3.6.1 Storage of rubber components

- For rubber parts, we recommend storing them in a cool area, out of the light to protect them from UV rays.

3.7 Accessories

See special notes in Section 4 - Appendices.

3.8 Seals

See special notes in Section 4 - Appendices.

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4. APPENDICES

- Standard painting procedure
- Sectional drawings
- Description of Training option
- Special seal notes
- Technical Description
- Accessories (optional)
- Automatic control (optional)

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PCM	PAINTING SPECIFICATION	I121F/d *(21/03/96)*

Drafted on: **05/01/2000**	by: **FAVREAU**	Folio: **1/1**
PROCESS: ***Standard 1 (a)***		
Application Field: **PCM standard procedure for protection of pumps.**		

PRELIMINARY OPERATIONS:

SHOT BLASTING and SOLVENT DEGREASING.

1 COAT: **PRIMER (Protection of components before storage, cast-iron parts, chassis, stators, etc.).**

COLOUR: **grey** RAL: THICKNESS: **20 microns**

REMARKS: **PRODUCT APPLIED: Single-component vinyl: Primer wash ref. PCM; 42911 902G.**

1 COAT: **PRIMER (Protection of unpainted components after assembly).**

COLOUR: **grey** RAL: THICKNESS: **20 microns**

REMARKS: **PRODUCT APPLIED: Single-component vinyl: Primer wash ref. PCM; 42911 902G.**

2 COAT: **TOP.**

COLOUR: **Specification to order** RAL: **5019 or 9010** THICKENESS: **35 microns**

REMARKS **PRODUCT APPLIED: Two-component Acrylic Vinyl Polyester ref PCM 42930 5019 or 9010.**
7 parts of HY for 1 part HYA340 Min. drying time at 23°C: 5h

TOTAL THICKNESS APPLIED: 55 Microns.

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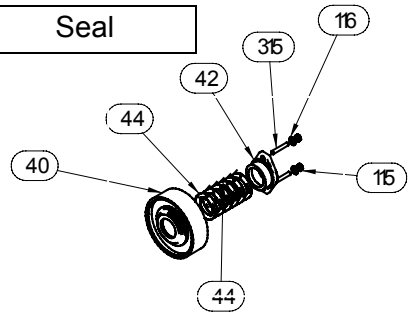
Drawing TPC0056

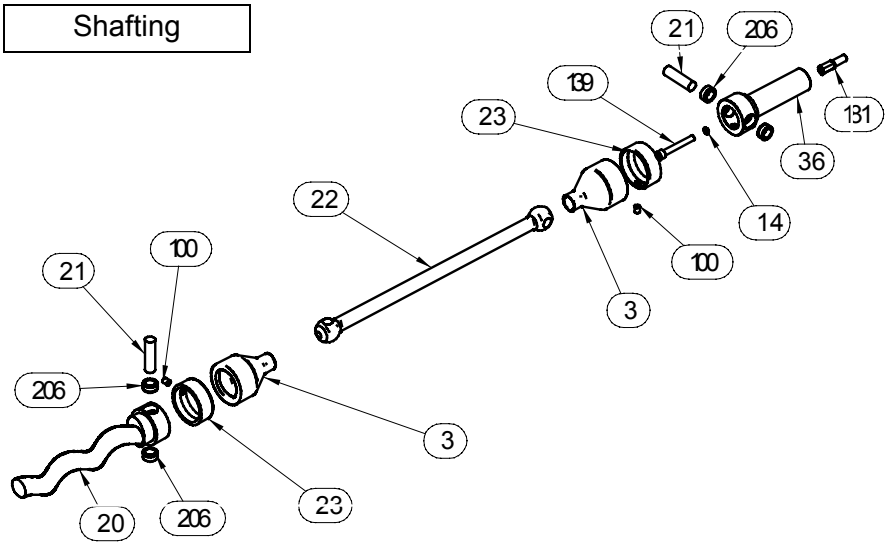
For pumps 0.03ID10-0.4I10-0.4ID10-1I10-1ID10-2.6I10-2.6ID10-6I5-6ID5-6I10-6I20-13I5-13I10-13ID10-20I4

Representation with seal by non-lubricated stuffing box assembly.

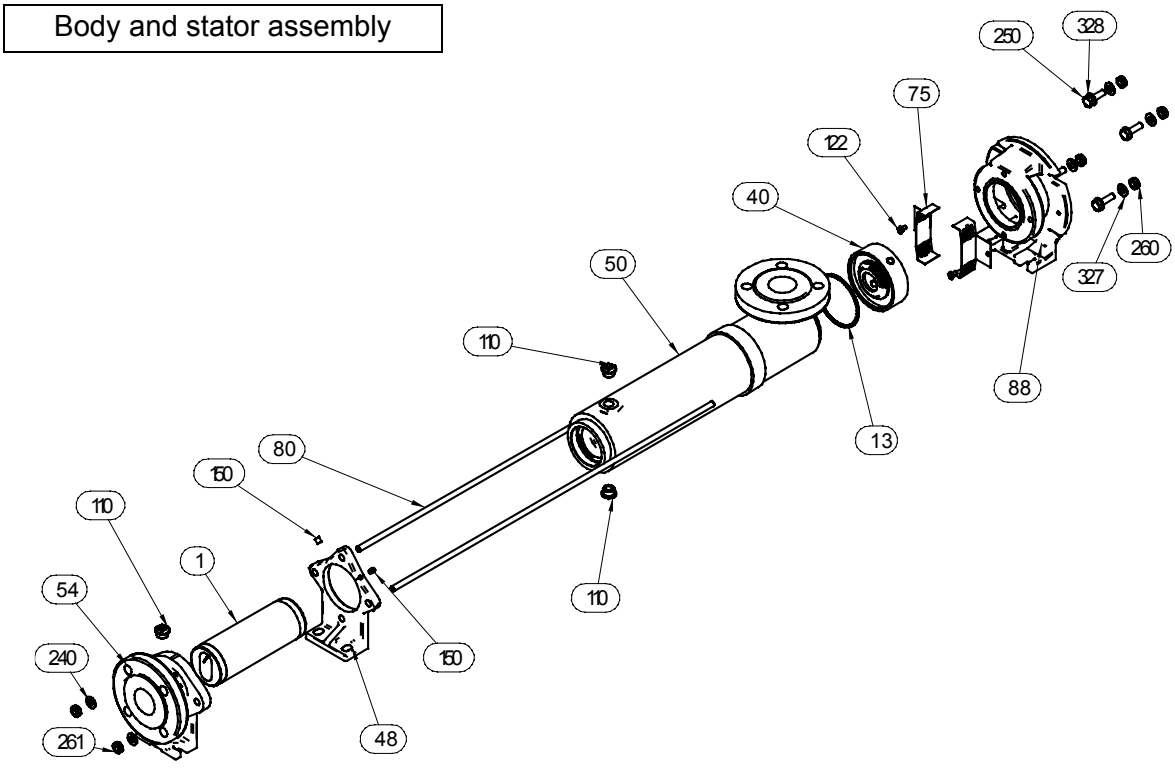
Seal



Shafting



Body and stator assembly

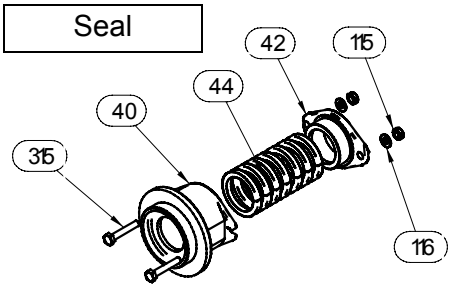


☎: (33) 1 41 08 15 15 🖷: (33) 01 41 08 15 00 🖳: http:/www.pcmpompes.com

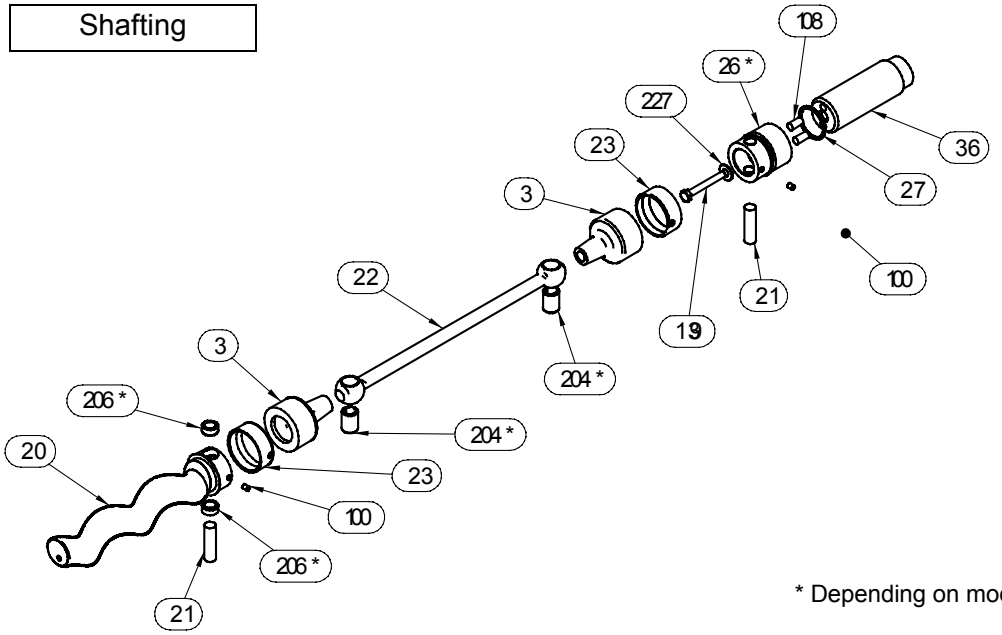
Drawing TPC0057

For pumps 1.6I45-13I20-20I16-25I5-25I10-30I4-40ID5-40I10-40ID10-45I5-62I5-62ID5-90I5
Representation with seal by non-lubricated stuffing box assembly.

Seal

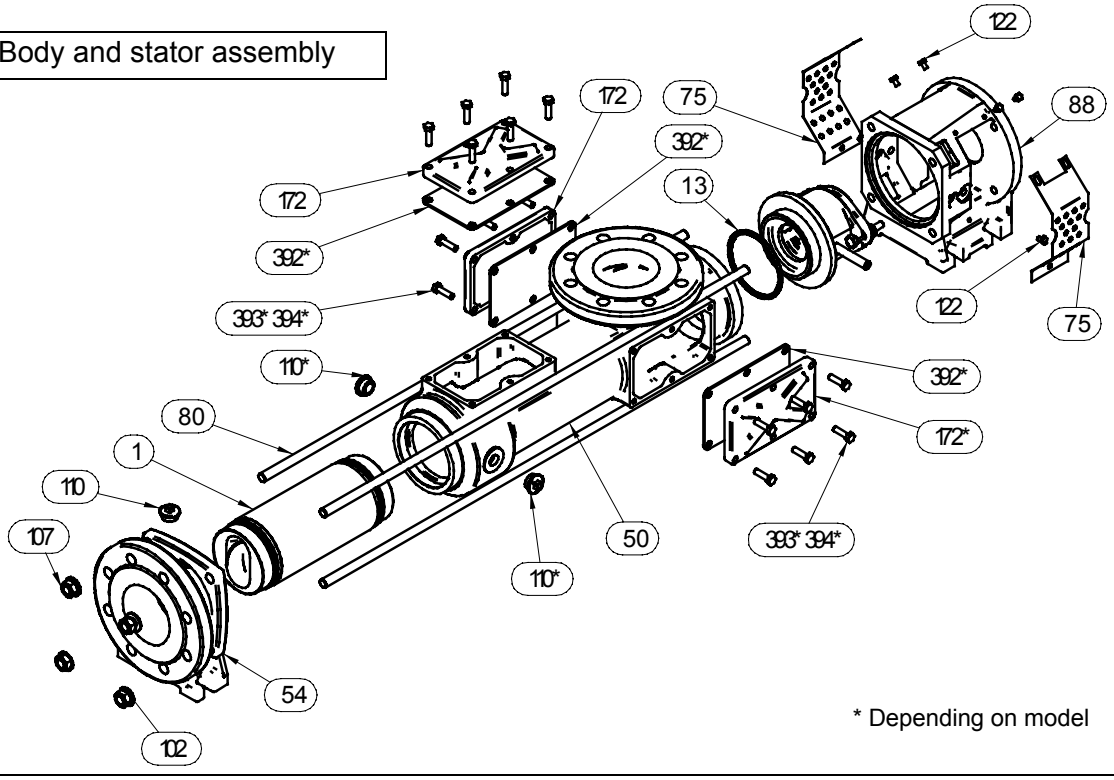


Shafting



* Depending on model

Body and stator assembly



* Depending on model

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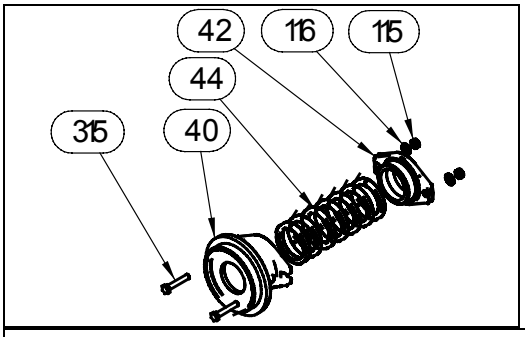
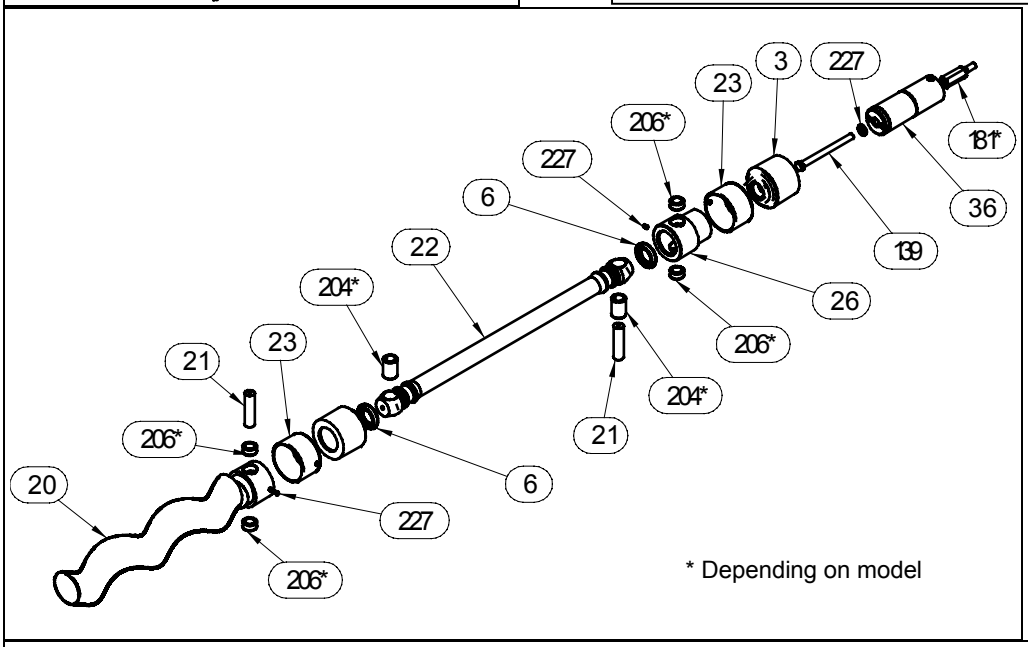
Drawing TPC0058

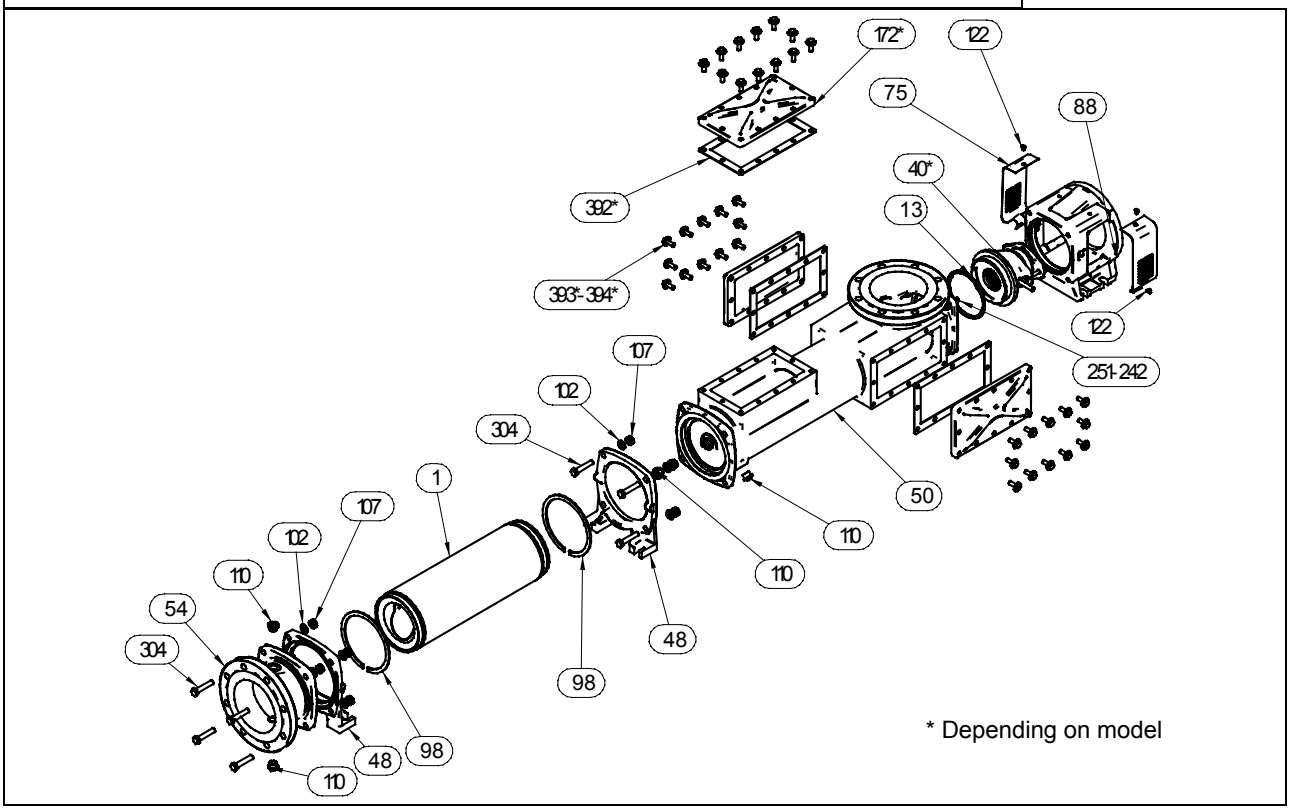
For pumps 4I52-20I20-35I20-35ID20-35I40-50I15-50ID15-60I10-100I10-100ID10-120I5-150I10-150ID10-180I5-240I5-240ID5

Representation with seal by non-lubricated stuffing box assembly.





* Depending on model



* Depending on model

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