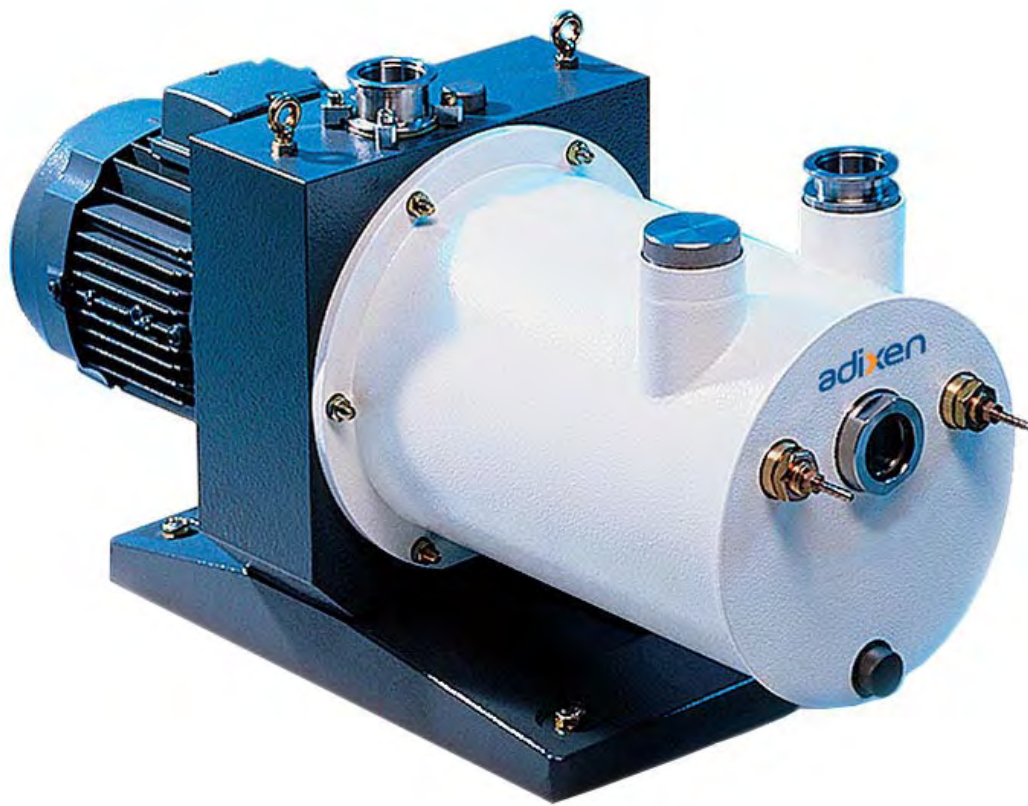


# PASCAL Series 2033 - 2063 m<sup>3</sup>/h H1 series

LES POMPES PRIMAIRES À PALETTES  
ROTARY VANE PUMPS



Manuel Utilisateur  
User's Manual

**adixen**  
by Alcatel Vacuum Technology





Alcatel Vacuum Technology, filiale du groupe Alcatel-Lucent fournit à travers le monde des pompes à vide, des détecteurs de fuites à hélium et hydrogène, des plasma sensors et des composants de mesure. Grâce à une gamme complète de produits, nous sommes présents dans différents domaines comme l'instrumentation, la recherche et développement, l'industrie et le semi conducteur. Alcatel Vacuum Technology, leader international dans le domaine du vide, a créé sa marque de produits Adixen.

La compagnie française, certifiée ISO 9001 et 14001, experte dans le support et le service, développe ses produits Adixen d'un haut niveau de qualité en conformité avec les exigences environnementales.



Avec 45 ans d'expérience, aujourd'hui AVT garantit une présence internationale auprès de ses clients et distributeurs expérimentés.

Aux Etats-Unis, Alcatel Vacuum Products (Hingham-MA) fondé il y a trente ans, a été la première étape. Deux autres filiales à Fremont (CA) et Tempe (AZ) renforcent notre présence sur ce territoire.

En Europe, la maison mère AVT-France et ses filiales, Alcatel Hochvakuumtechnik (Allemagne), Alcatel Vacuum Technology U.K. (Grande-Bretagne), Alcatel Vacuum Technology Benelux (Pays-Bas), Alcatel Vacuum Systems (Italie), Adixen Sensistor AB en Suède (2007) sont le point d'ancrage de réseaux de partenaires couvrant toute l'Europe.

En Asie, notre présence a démarré en 1993 avec Alcatel Vacuum Technology au Japon, puis a été renforcée avec Alcatel Vacuum Technology Korea (1995), Alcatel Vacuum Technology Taiwan (2001), Alcatel Vacuum Technology Singapore, et plus récemment Alcatel Vacuum Technology Shanghai en Chine (2004).

Plus de quarante agents viennent compléter cette organisation sur différents continents.

Les utilisateurs de nos produits peuvent donc, en toutes circonstances et dans un délai rapide, compter sur nos experts en Technologie du Vide.



## Welcome

### Rotary vane pumps 2033 H1 et 2063 H1



Dear customer,

You have just bought an Adixen rotary vane pump. We would like to thank you and are proud to count you among our customers.

This product is a result of experience acquired over many years by Alcatel Vacuum Technology in the design of rotary vane pumps.

#### APPLICATIONS:

- CLOSED LOOP CRYOGENIC SYSTEMS
- CFC RECOVERY
- REACTIVES GASES
- PRECIOUS GASES

**We suggest that you read this manual, particularly the chapter on installation and operation, before you start to use this pump so that you can obtain optimum levels of performance and complete satisfaction from this equipment.**

This product complies with the requirements of European Directives, listed in the Declaration of Conformity contained in page 55 of this manual. These Directives are amended by Directive 93/68/E.E.C (E.C. Marking).

**Copyright/Intellectual property:**

The use of Adixen products are subject to copyright and intellectual property rights in force in any jurisdiction.

All rights reserved, including copying this document in whole or any part without prior written authorization from Alcatel Vacuum Technology France. Specifications and information are subject to change without notice by Alcatel Vacuum Technology France.

**CAUTION**

Indicates a potentially hazardous situation which, if not avoided, could result in property damage.

 **CAUTION**

Indicates a potentially hazardous situation which, if not avoided, could result in moderate or minor injury. It may also be used to alert against unsafe practices.

 **WARNING**

Indicates a potentially hazardous situation which, if not avoided, could result in death or severe injury.

 **DANGER**

Indicates an imminently hazardous situation that, if not avoided, will result in death or severe injury (extreme situations).

# Contents

## The PASCAL series 2033 - 2063 m<sup>3</sup>/h -H1 Series

Presentation of the product range .....	4
Operating principle of a rotary vane pump .....	6
Oil - Noise liliter - Antisudback.....	8
Technical characteristics .....	9
Pump dimensions .....	12
Accessories .....	13

## Installation and connections

Safety instructions .....	15
Table of recommended oils .....	17
Filling with oil .....	18
Mechanical connections.....	20
Electrical connections.....	22
Motor protection .....	23

## Operation

Precautions .....	27
Operating temperature .....	27
Before starting up the pump.....	27
Start-up .....	28
Particular uses.....	28
Oxygen pumping .....	29
High pressure pumping and cycling .....	30

## Maintenance

Precautions .....	31
Troubleshooting and corrective actions .....	32
Maintenance frequency .....	35
Draining the oil.....	36
Flushing the pump.....	36
Change of type of oil.....	37
Tools and consumable products .....	38
Disassembling the pump.....	40
Cleaning components.....	42
Replacement of all shaft seals .....	43
Reassembling the pump.....	44

<b>Safety questionnaire .....</b>	<b>47</b>
-----------------------------------	-----------

<b>Declaration of Conformity .....</b>	<b>49</b>
--	-----------

## Nomenclature

Spare parts lists.....	N – 1
------------------------	-------

# Presentation of the product range

**A wide range**  
**Specific solutions adapted to**  
**various applications**

Oil seal rotary vane pumps are used in all vacuum technology applications.

They can be used on their own to achieve a maximum vacuum of  $10^{-3}$  Torr ( $10^{-3}$  mbar), or in pumping assemblies. e.g. at the exhaust of a diffusion pump or turbomolecular pump.

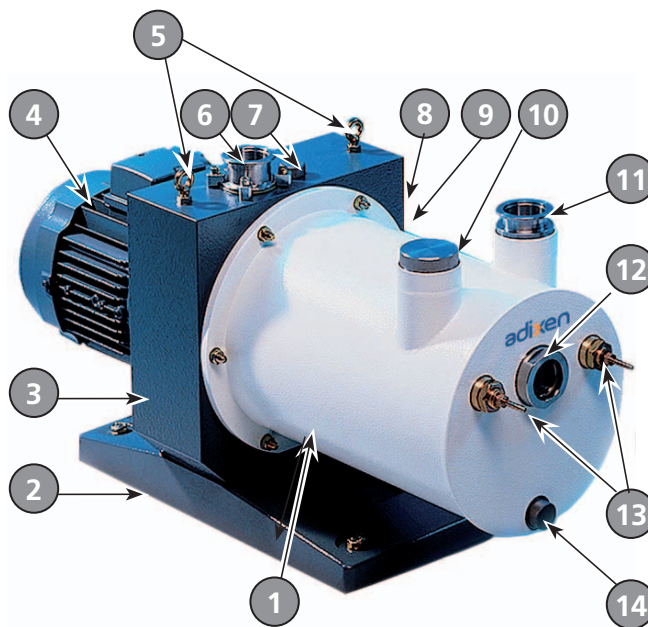
- SD series**    **Standard pumps for several purposes (non-corrosive applications).**  
 Manufacture of light bulbs. production of TV tubes. manufacture of electronic tubes. metallurgy. centrifuges. etc.
- I series**    **Pumps designed to meet the requirements of analytical instrumentation and R&D.**  
 Mass spectrometer. electronic microscopes. GC/MS. LC/MS. gas analyzers. leak detectors. sterilizers. etc.
- C1 series**    **Pumps suited to the pumping of corrosive gases.**  
 R&D. laboratories. freeze-drying. pumping of solvents. etc.
- C2 series**    **Pumps with increased resistance to meet the requirements of the more aggressive processes of the semiconductor industry.**  
 Ion implantation. sputtering. etc.
- H1 series**    **Sealed pumps offering maximum tightness.**  
 Pumping of pure or precious gases.

Nominal flow rate	m <sup>3</sup> /h	30	60
SD Series	1 stages	1033SD	1063SD
	2 stages	2033SD	2063SD
C1 Series	1 stages	1033C1	1063C1
	2 stages	2033C1	2063C1
C2 Series	2 stages	2033C2	2063C2
H1 Series	2 stages	2033H1	2063H1

## 2033 - 2063 m<sup>3</sup>/h rotary vane pumps. H1 Pascal series

The 33 to 63m<sup>3</sup>/h pump models, H series are following main characteristics:

- A **direct drive motor**, making them very compact.
- An **anti-suckback system** ensures the tightness of the pump during accidental or voluntary shutdowns.
- The universal three-phase **motor** can be **disassembled independently** of the rest of the pump, without the need to drain the oil case.
- On the oil case and on the central housing 2 **sight glasses** can be used to inspect the oil level easily when filling the tank and during the operation of the pump.
- A rotary seal near the motor works with two other seals. The two additional seals form a sealed compartment immersed in oil. If one of these seals deteriorates, it will become apparent from the change in oil level through the sight glass. The operator can then intervene before the second seal is destroyed.
- The oil casing is made of stainless steel sheet and all welds are checked with the helium leak detector.
- The static O-ring ensure a tightness with respect to the surrounding environment:
  - $\leq 1.10^{-7}$  mbar.l.s<sup>-1</sup> when the oil casing is at a pressure below atmospheric pressure,
  - $\leq 2.10^{-6}$  mbar.l.s<sup>-1</sup> when the oil casing is at overpressure.



- |                                |   |
|--------------------------------|---|
| 1. Oil case                    | 8. Sealed housing draining plug         |
| 2. Base                        | 9. Sealed housing oil level sight glass |
| 3. Frame                       | 10. Oil case filling plug               |
| 4. Electric motor              | 11. Exhaust end fitting                 |
| 5. Lifting rings               | 12. Oil case level sight glass          |
| 6. Inlet end fitting           | 13. Water fittings                      |
| 7. Sealed housing filling plug | 14. Oil case draining plug              |

The inlet and exhaust end fittings are PNEUROP ISO-KF standardized. They are fitted vertically on the pump at delivery but can be positioned on the horizontal openings if required by operating conditions. They can also be used to connect many of our accessories (**see page 13**).

The main replacement parts are interchangeable: This enables easier disassembly-assembly operations and replacement without changing the pump's performance.

Various accessories can be used to adapt the pump to meet the requirements of your application.

The moulded aluminium pump frame supports the pumping module and the motor. All the parts of the pumping module in contact with gases are free of zinc, copper and cadmium.

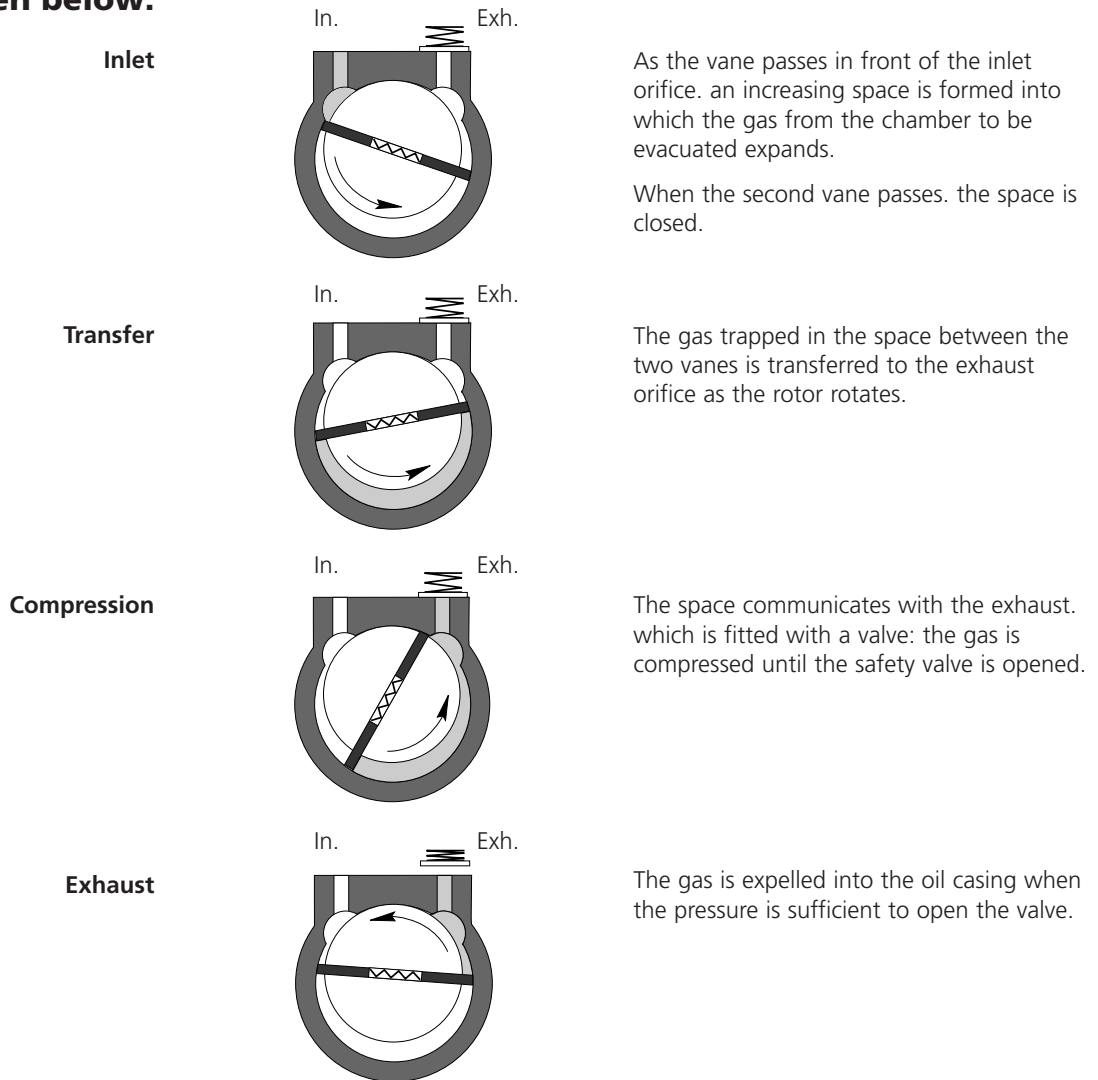
The other construction materials include cast iron, aluminium alloy, stainless steel, fluorocarbons (FPM), nitril (NBR) and chemically resistant polymers.

# Operating principle of the rotary vane pump

## Single-stage rotary vane pump

- This is a volumetric pump. with a functional part composed of:
- A hollow cylindrical stator with inlet and exhaust valves.
  - A rotor mounted eccentrically inside the stator for pumping.
  - Two vanes sliding in the rotor. forced against the stator by centrifugal force and springs.

### The pumping cycle is given below:



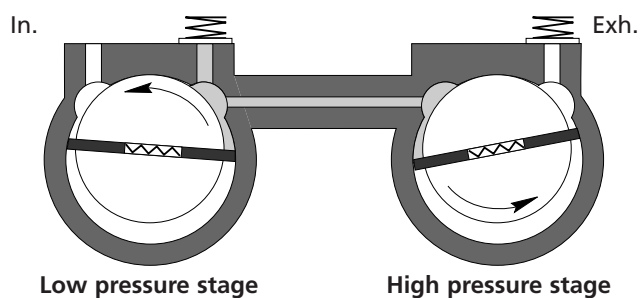
### Applications

Single stage rotary vane pumps are the best choice for continuous pressures above 1.0 Torr (1.3 mbar), as well as applications where large amounts of condensable gases are present.



## Two-stage rotary vane pump

To improve the backing pressure and flowrate at low pressure, two stages are connected in series. The second is similar to the first both structurally and operationally. The gases pulled in by the first (low pressure) stage are transferred to the second (high pressure) stage and discharged through the high pressure (HP) valve.



**Applications** Two stage rotary vane pumps are the best choice for application requiring an ultimate vacuum as low as  $10^{-3}$  Torr ( $1.33 \times 10^{-3}$  mbar).

Note : when operating a two stage vane pump continuously, greater than half an hour, above 1.0 Torr, the unit should be equipped with an oil mist eliminator and oil return system. see oil draining kit or a single stage pump should be used.

# Oil - Noise limiter - Antisukback

## Oil's function

- Oil has several important functions in the pump:
- It lubricates mechanical components (bearings, seals, rotor, vanes, etc.).
  - It makes moving parts relatively tight by limiting internal leakage.
  - It carries away the heat produced by the compressed gases.

## Choosing the right oil

Not all oils produce the same ultimate pressure in a given pump. Ultimate pressure depends on the saturated vapour pressure of the oil, its viscosity and its ability to dissolve gases.

Good pumping conditions are related to the type of oil used.

The choice depends on:

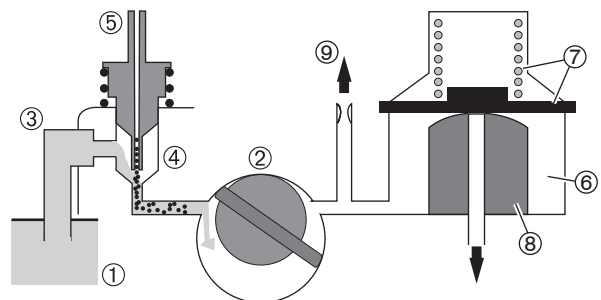
- Expected pump performance.
- Chemical aggression and corrosion of pumped gases.
- Accessories used.
- Desired maintenance intervals and total operating cost.

The manufacturer has selected various types of oil for its pumps (*see page 17*).

## Lubrication and anti-noise device

The pump is equipped with a **lubrication** system which regulates the oil flow rate required in the vacuum pump. In addition this system also ensures the gassing of the lubrication oil and therefore **the low noise level** of the pump.

When the pump begins to operate, the cooled oil (from the bottle of the oil casing) is pulled in by the oil pump (2) and drawn in through the oil inlet tube (3). It is then agitated by a venturi tube (4) and forced into the chamber (6) which is adjusted by the diaphragm spring system (7).



The discharge pressure of the oil pump (2) lifts the diaphragm off its seat (8) allowing oil to reach the functional block via the oil injection line (through seats) (8). An orifice (9) equipped with a jet located in the oil lubrication systems allows trapped gases to be expelled out of the chamber (6).

## Anti-noise

Parallel to the oil flow, there is a small orifice in the venturi tube (5), which reduces the noise level at ultimate pressure. Because of the negative pressure created at the end of the venturi tube (5), gases are entrained into the moving layers of oil dampening pump noise, allowing the fluid to become more compressible. The added gases will affect the ultimate pressure, therefore, a compromise between sound level and ultimate pressure has to be reached as follows:

- Tightening down air intake tube (5) decreases the oil flowrate at the intake of the oil pump (2) and increases the amount of gas mixture in the oil. The sound level decreases but the ultimate pressure increases.
- Unscrewing tube (5) increases the oil flowrate at the intake of the oil pump (2) and decreases the amount of air mixture with the oil. The sound level increases but the ultimate pressure decreases.

This adjustment can be performed via the oil fill port while the pump is in operation at ultimate pressure. (a plug is designed for this purpose on the oil case single stage pump).

## Anti-suckback and tightness at stoppin

When the pump is stopped or the power is turned off, the anti-suckback device (6), (7) and (8) isolates the functional block of the pump against air or oil returning to the chamber being evacuated.

When the pump stops, the discharge pressure of the oil pump (2) drops rapidly through the jet (9). Diaphragm (7) under pressure from spring and the difference of pressure is forced against its seat (8) thus closing off the injection line through the seat (8).

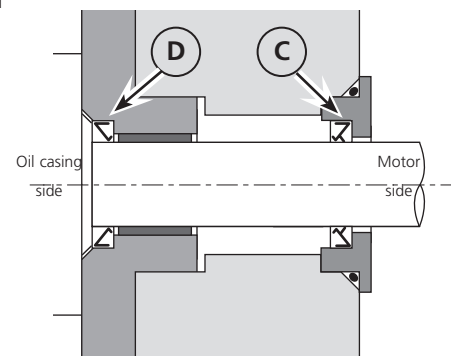
The seal is also ensured by flush-mounted o-rings between the faces of the functional parts (stators, flanges, housing...) and by spring loaded check valves in the discharge ports.

## Tightness

In a conventional pump, when the shaft seal is deteriorated, there is:

- either an oil or gas leakage from oil casing to outside,
- either an oil leakage to outside and an oil casing pollution by ambient air which goes into the pump.

The operator notices when gas has escaped.



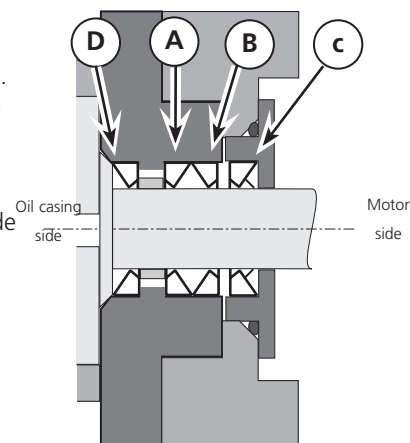
## Role of sealed housing

Role of sealed housing of hermetic pumps is to avoid gas leakage and to warn the operator from seals (A) or (B) deterioration. Generally speaking, when the oil level rises into the sealed housing, it indicates an oil and gas leak from oil casing.

An oil level falling indicates an opposite leakage or an oil outside leakage motor side (C seal).

The operator is advised and can intervene before leakage becomes important.

See page 10 the using conditions of the sealed housing



**Note: whatever the exhaust pressure, the sealed housing can be:**

- pressurized with gas purge at atmospheric pressure or at (150 Torr/0.2 bar) relative pressur,
- charged with neutral gas.

**Discharge exhaust pressure  
above atmospheric pressure  
(from 1 to 2 bars absolute  
750 to 1500 Torr in the oil case)**

Seals (A) and (B) are mounted in the reverse direction, and the pressure in the oil casing is at a pressure above atmospheric pressure, then the **(A)** seal is tightened on the shaft. The sealed housing is initially at atmospheric pressure: oil and pumped gas leakage from casing to intermediate housing is minimal. The oil sight glass watching allows the operator to check the seal tightness as follows:

- as the oil level rises from the sealed housing and the oil case level falls, this indicates that the **(A)** seal has deteriorated.
- as the oil level falls from the sealed housing, this indicates that the **(C)** seal has deteriorated

**Discharge exhaust pressure  
below atmospheric pressure  
(from 0.05 to 1 bar absolute  
38 to 750 Torr in the oil case)**

Oil casing pressure is below atmospheric pressure. Sealed housing is initially at atmospheric pressure, **(B)** seal is tightened on the shaft: oil leakage from the sealed housing to the inside of the pump is minimized.

The oil sight glass allows the operator to check the seal tightness as follows:

- an oil level fall from the sealed housing indicates the **(C)** seal has deteriorated.
- an oil level rise from the oil casing and an oil level fall from the sealed housing indicate the **(B)** seal has deteriorated: gas and oil from sealed housing fly into the casing. To reduce this leak, you can surpress the sealed housing (max. 150 Torr/0.2 bar), with a gas similar to pumped gas (to preserve the purity) only if the pumped gas is pure and not dangerous. But in the case of the pumped gas is dangerous and if the oil level changes slowly, you can add more oil in the sealed housing, keeping 2 cm free under the filling plug to allow oil thermal expansion.
- an oil level rise from the sealed housing can correspond to an oil therma expansion (eventually restore the atmospheric pressure in this compartment).

In all cases, the middle of the oil sight glass level must be considered as the minimum level to warrant the rotor feedthrough.

**Note:** whatever the applications, avoid to depress the sealed housing to not disturb the function of the outside lip seal (C).

In a normal use, this overpressure is due to the oil temperature rise in the sealed housing.

## Technical characteristics

Characteristics	Unit	2033 H1		2063 H1	
		50	60	50	60
Frequency	HZ	50	60	50	60
Number of stages		2		2	
Nominal rotation speed	tr/mn	1500	1800	1500	1800
Nominal flow rate	m <sup>3</sup> /h	35	42	65	78
	CFM		27		50
Flow rate Pneurop method	m <sup>3</sup> /h	4.8	5.7	12.5	15
	CFM		3.4		8.8
Partial ultimate pressure* with A120 oil	mbar	< 1.10 <sup>-4</sup>		< 1.10 <sup>-4</sup>	
	Pa	< 1.10 <sup>-2</sup>		< 1.10 <sup>-2</sup>	
Exhaust pressure (maximum)	bar	2		2	
Internal gas volume	cm <sup>3</sup>	3200		3540	
Helium tightness ** - below atmospheric pressure - up to 1000 mbar	mbar.l.s <sup>-1</sup>	≤ 1.10 <sup>-7</sup>		≤ 1.10 <sup>-7</sup>	
	mbar.l.s <sup>-1</sup>	≤ 2.10 <sup>-6</sup>		≤ 2.10 <sup>-6</sup>	
Oil capacity (case)	l	4.6		7.5	
Oil capacity (sealed housing)	l	0.12		0.27	
Coling water flow rate	l/mn	1		2	
Water pressure	bar	3		3	
Weight (pump + motor)	kg (lb)	74 (163)		107 (236)	

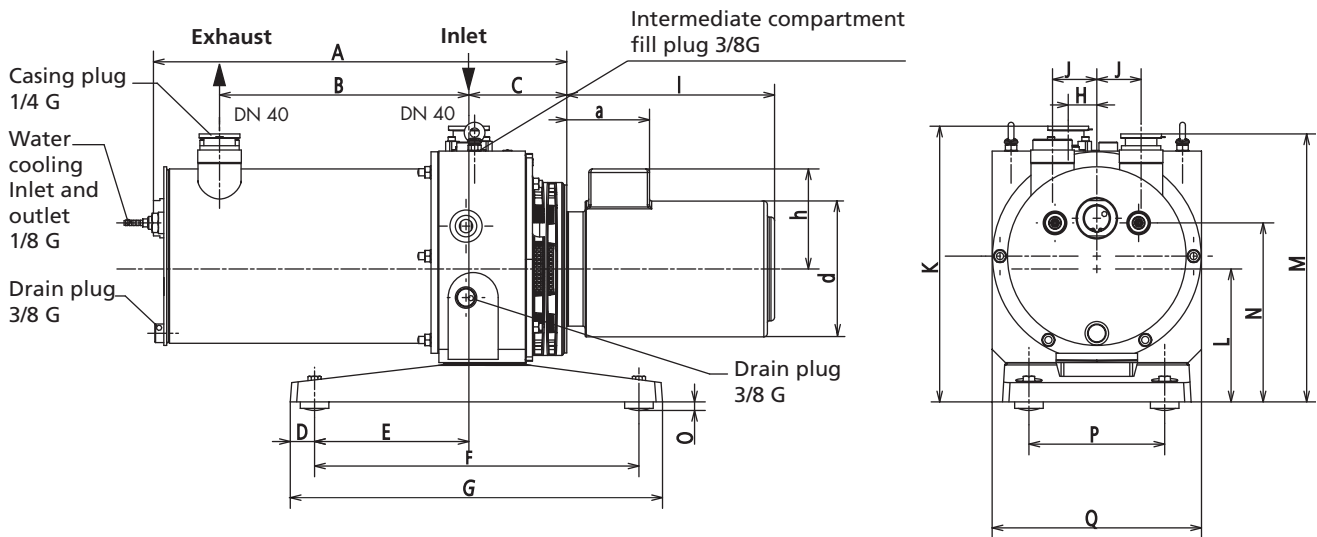
\* Partial ultimate pressure measured according to Pneurop 6602 specifications with A120 oil charge.

It may vary if other oils are used (*see page 17*).

\*\* Helium values for a standard supply . This value depends of the gas permeation rate and of the seal material type.

Note: The pressure measurements were made with a capacitive diaphragm pressure gauge measuring a total pressure in the absence of a cold trap. Measurements using a Pirani type gauge can give different pressure values.

# Pump dimensions



2033H1	Motor dimensions mm (inch)			
P.N. Motor	l	d	h	a
<b>113115</b>	270 (10.6)	170 (6.7)	140 (5.5)	200 (7.9)
<b>114450</b>	270 (10.6)	170 (6.7)	140 (5.5)	150 (5.9)
<b>118060</b>	270 (10.6)	170 (6.7)	140 (5.5)	150 (5.9)

2063H1	Motor dimensions mm (inch)			
P.N. Motor	l	d	h	a
<b>113115</b>	300 (11.8)	190 (7.5)	150 (5.9)	150 (5.9)
<b>114450</b>	300 (11.8)	190 (7.5)	150 (5.9)	230 (9.1)
<b>118060</b>	300 (11.8)	190 (7.5)	150 (5.9)	150 (5.9)

## Dimensions en mm (inch)

	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q
<b>2033</b>	519 (20.4)	295 (11.6)	122 (4.8)	29 (1.1)	198 (7.8)	375 (14.6)	437 (17.2)	35 (1.37)	58.5 (2.3)	364 (14.3)	170 (6.7)	364 (14.3)	233 (9.2)	12 (0.46)	140 (5.5)	269 (10.6)
<b>2063</b>	586 (23.1)	349 (13.7)	137 (5.4)	31 (1.2)	221 (8.7)	459 (18)	521 (20.5)	40 (1.58)	69.5 (27.3)	385 (15.1)	186 (7.3)	385 (15.1)	250 (9.8)	12 (0.46)	190 (7.5)	293 (11.5)

## Accessories

Name	Part number	Location	Fonctions
Oil mist eliminator OME 40H	068744	Exhaust	<ul style="list-style-type: none"> <li>• Separates oil droplets and particles contained in exhaust gases emitted by the pump.</li> </ul>
Liquid nitrogen trap LNT 40	786537	Inlet	<ul style="list-style-type: none"> <li>• Protects the pump against condensable vapours.</li> <li>• Prevents oil from backstreaming into pumped chamber.</li> </ul>
Auxiliary cooling device (only on 2033 H model)	054257	Between frame and motor	<ul style="list-style-type: none"> <li>• When operating at ambient temperatures qbove 40° C, a water cooling ring can be fitted.</li> </ul>
Outside centering ring	066887	At inlet and exhaust port	<ul style="list-style-type: none"> <li>• Secure the use with exhaust pressure above atmospheric pressure</li> </ul>
Shock mount	082691 LAX 100 model D	Between base and machine frame	<ul style="list-style-type: none"> <li>• Helps isolate pump vibration.</li> <li>• Allows pump to be mounted on a frame.</li> </ul>

### CAUTION

In general, use accessories in which the tightness and materials are compatible with the pumped gases and the required safety conditions at both the inlet and the exhaust.

### CAUTION

If the exhaust orifice is connected to an extraction duct or an oil mist eliminator, you must remove the exhaust safety valve mounted in the pump's exhaust orifice.

At the pump exhaust, the discharge circuit must be such that the resulting excess pressure in the oil case is as low as possible. **The maximum excess pressure recommended for correct pump operation is 0.5 bar (6 PSI).** A slight negative pressure in the oil case (0.1 to 0.2 bar / 1.5 PSI), at the exhaust, will prevent gases from accumulating and reduce pump corrosion and pollution.





# Safety instructions concerning the installation and operation of pumping systems

## CAUTION

**Before switching on the equipment, the user must read all of the start-up and operation sections of this manual and observe the safety instructions listed in this manual.**

## Unpacking

When you receive the equipment, unpack it carefully. Do not discard the packaging until you have ensured that the pump has not been damaged during transport. Otherwise, take the necessary measures with the transporting company and, if necessary, notify the manufacturer.

For all handling, only use the devices provided for this purpose (lifting rings, handle, etc.).

**The pump is not supplied filled with oil. The oil is contained in separate bottles. Similarly, it is recommended to drain the pump before redispaching the equipment.**

## Storage

- If the pump is to be stored, we guarantee the reliability of our equipment without particular storage precautions for up to 3 months (ambient temperature between 41°F and 149°F or 5 and 65°C).

- For storage periods of over 3 months, we recommend to fill the pump with oil during storage. For this, fill the pump and run it at ultimate vacuum (inlet orifice blocked) for approximately 1 hour in order to lubricate all the parts of the functional block (*see page 27*).

Then, stop the pump and store it with the inlet and exhaust orifices sealed: clamping ring, centring ring, plug, etc.

The shaft should be rotated by hand or by starting the pump every six months following this storage procedure.

- After 3 months storage without oil, factors such as temperature, degree of humidity, salt air, etc. may cause the deterioration of the pump components, particularly the hardening of O-rings and the "sticking" of lip seals on shafts and the gumming of oil. In this state, a pump may have operational problems, particularly oil leaks. Before any start-up (new pump as well as used), the pump must be disassembled (*see page 40*), and all the seals changed.

### **Pump which have been used:**

If the pump is not new, drain and rinse it (*see page 36*). Fill it with new oil, then pump a dry inert gas through it to remove all traces of dampness in the pumping system and oil casing.

Pump in dry inert gas as follows:

- 10 minutes at above 2.25 Torr (30 mbar)
- 10 minutes at ultimate pressure with gas ballast open
- 10 minutes at ultimate pressure

Stop the pump and seal the inlet and exhaust orifices tightly with quick connect clamps, centering rings, blank-off flanges...

### **Note 1:**

The seal kits must be stored with caution. Keep them away from heat and light (sunlight and ultraviolet light) in order to prevent the elastomers from hardening (AFNOR standard FD T 46.022).

## **Installation and start-up**

- The machines must be connected to an electrical installation including an ground plug type T.T in compliance with decree 88-1056 dated 14th November 1988, as well as any local electrical codes that apply.
- It is important to isolate the machine from the power source before any intervention on the equipment (for maintenance purposes).
- When switching off the power of equipment containing capacitors loaded with over 60 VDC or 25 VAC, take precautions when accessing the connector pins (single-phase motors, equipment with mains filter, frequency converter, monitor, etc.).
- Vane roughing pumps use lubricants, it is recommended to request information from the manufacturer on the safety data sheets concerning the product used.
- Our pumps are tested in the factory with A120 oil or A119 for the USA (A113 oil for the C2 series). It is recommended to use the same oil during operation.  
If changing the type of oil, refer to the chapter concerned for the procedure and the type of lubricant required.
- Our pumps are designed to prevent any thermal risk for user safety. However, specific operating conditions may generate temperatures which may justify particular attention on the part of the user (outer surfaces > 70°C).

## Table of recommended oils

**Recommended oils** In the vane pumps, we recommend to use only the manufacturer's oils in the table below:

Oil	Characteristics and applications	H	Density	Viscosity mm <sup>2</sup> /s (cst)	Vapor pressure at 25°C (mbar)	Total ultimate pressure* (mbar)	Flash point/ self ignition temperature (°C)
<b>A102</b>	Additivated hydro-carbon anti-emulsion mineral oil - oil and water separation (anti-emulsion) - drying and water vapor pumping - freeze-drying		0.88	98 to 40°C 11.1 to 100°C	<1.10 <sup>-3</sup>	<3.10 <sup>-2</sup>	230°C 260°C
<b>A111</b>	Hydro-carbon based synthetic oil - stable pumping at high temperature - gas circulation in recycling - oxidation sensitive (frequent atmospheric cycle prohibited)		0.87	100 to 40°C 7.8 to 100°C	<1.10 <sup>-3</sup>	<1.10 <sup>-2</sup>	212°C 245°C
<b>A113</b>	Perfluoropolyether (PFPE) synthetic oil - pure Oxygen pumping - highly inert to chemical - highly corrosive gas pumping - plasma etching compatible		1.9	90 to 40°C 11 to 100°C	<3.10 <sup>-5</sup>	<5.10 <sup>-3</sup>	None None
<b>A119</b>	Hydro-carbon mineral oil - general purposes (common use at 60 Hz) - non-corrosive products - low viscosity (low temperature starting)		0.86	54 to 40°C 8.1 to 100°C	<4.10 <sup>-5</sup>	<3.10 <sup>-3</sup>	213°C 244°C
<b>A120</b>	Hydro-carbon mineral oil non additivated - general purposes (common use at 50 Hz) - non-corrosive products - high viscosity		0.886	120 to 40°C 12.5 to 100°C	<4.10 <sup>-5</sup>	<3.10 <sup>-3</sup>	260°C 295°C
<b>A121</b>	Special hydro-carbon double distilled synthetic oil with anti-oxidant additive - atmospheric cycle pumping - high temperature and pressures - acid and organic vapor resistivity - plasma etching prohibited		0.83	64 to 40°C 10 to 100°C	<1.10 <sup>-7</sup>	<3.10 <sup>-3</sup>	268°C 296°C
<b>A155</b>	Synthetic oil organic ester type - compatible with hydro-carbon vapors - compatible with NH <sub>3</sub> , R134a, refrigerating agent fluids - oxidation resistivity - polymerization resistivity (low coating)		0.957	94 to 40°C 9.1 to 100°C	<1.10 <sup>-5</sup>	<3.10 <sup>-3</sup>	240°C 350°C
<b>A200</b>	Double distilled mineral oil non additivated - pumping of corrosive products - ionizer plasma resistivity - low backstreaming		0.86	58 to 40°C 8.5 to 100°C	<1.10 <sup>-5</sup>	<2.10 <sup>-3</sup>	223°C 259°C
<b>A300</b>	Hydro-carbon based mineral oil, double distilled, non additivated. - highly resistant to chemical attacks - highly ionizer plasma resistivity - pumping of Lewis acids, halogens - low backstreaming		0.86	56 to 40°C 8.9 to 100°C	<1.10 <sup>-5</sup>	<5.10 <sup>-3</sup>	243°C 270°C

Requires special preparation of pump (See page 36)

\* Ultimate pressure measured according to Pneurop 6602 specifications on 2015 pump.

These values are given as a rough guide only. They may vary according to the type of pump and the pumping conditions.

However, the following replacement fluids can be used:

**Mineral oil:**

ELF MOVIXA PV 100, TURBELF SA 100,  
BP CS 100 (BP registered trademark)  
SHELL VITREA 100 (SHELL registered trademark)  
TOTAL CORTIS PV 100 (TOTAL registered trademark)  
INLAND 19, INLAND 20 (INLAND registered trademark)  
MR 200 (MATSUMURA registered trademark)

**Mineral-based synthetic oils:**

ELF BARELF F 100, ELF BARELF C 68 (ELF registered trademark)  
INVOIL 20 (INLAND registered trademark)  
INLAND TW (INLAND registered trademark)  
ELITE Z (CAMBRIDGE MILL PRODUCTS, INC. reg. trademark)

**Ester type synthetic oils:**

ANDEROL 555 (ANDEROL-BV registered trademark)  
ANDEROL RCF 96 N (ANDEROL-BV registered trademark)

**Fluorocarbon synthetic oils:**

FOMBLIN YL VAC 25-6 (MONTEDISON registered trademark)  
KRYTOX 15-25 (DU PONT DE NEMOURS registered trademark)  
HALOVAC 100 (HALOCARBON registered trademark)  
AFLUNOX 15.25 (SCM registered trademark)

Note: In this case, pump performances may be slightly different from those given in pages 9, 10, 11.

**Filling with oil**

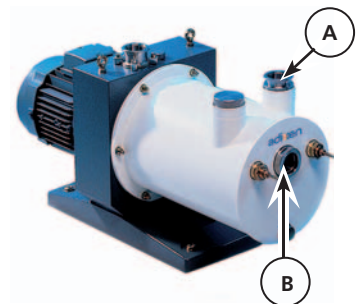
2033 and 2063 series pumps are tested in the factory with **A120** oil (or A119 for USA).  
At delivery, there is some oil remaining in the functional block.



**Our pumps are tested in the factory with manufacturer's oil: it is recommended to use the same oil during operation. To change the type of oil, refer to the Maintenance Chapter, "replacement of type of oil" section. In all cases, follow the recommendations of the pump specifier for the choice of oil to be used.**

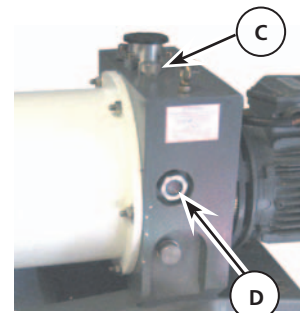
**Filling oil casing with oil**

Remove exhaust part (A) and fill with oil up to the middle of the sight glass (B) on housing. This operation must be performed with the pump switched off.



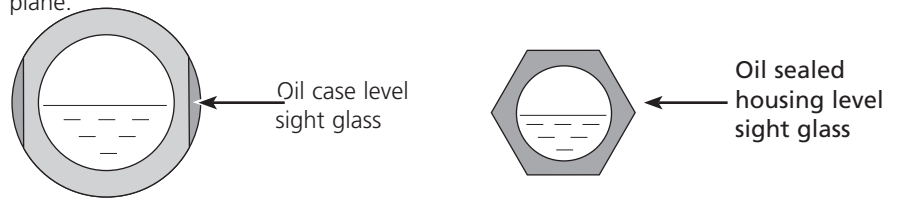
**Filling sealed housing with oil**

Unscrew plug (C) on the frame and fill with oil up to the middle of the sight glass (D) on housing. Tighten plug (C).



## Checking the oil level

To use the pump in optimum conditions, the oil level must be observed and checked regularly. This level is checked with the pump switched off, hot and on a horizontal plane.



**Note:** Optimum pump performance and service life are obtained when the oil level is between the maximum level and the minimum level.

# Mechanical connections

**⚠ CAUTION**

For a given application, pump performance, vacuum characteristics, temperature and reliability depend on the following:

- assembly conditions, accessory filters.
- the oil used.
- mechanical connections: pipes, etc.
- maintenance frequency and quality.

For the assembly of the vacuum circuit, provide the accessories required for maintenance: valves, purges, etc.

## Mounting on a frame

The pump can be mounted on a frame using the 4 attachment holes on the base and the shock mounts supplied.

**Note:** Special shock mounts, effective against the pump's own vibrations, can also be used but they do not ensure correct attachment during the transfer of equipment. In this case, the pump should be clamped onto its support (see page 13).

## Ventilation

The pump and the motor are each equipped with a ventilation system. During pump installation, the pump should be placed in ventilated place. Provide a minimum gap of 25 mm around the pump.

**The vents on the pump and the motor should be checked regularly to ensure that they are not blocked.**

Adixen pumps are designed for operation at an ambient temperature between 53°F and 111°F (12 and 45°C). For temperature > 113 °F (45°C) use a cooling device (see page 13).

## Cooler connections

### Characteristics of water cooling

In order to limit the corrosion and clogging of the cooling pipes, it is recommended to use cooling water with the following characteristics:

Treated soft water or non-corrosive industrial water

- pH between 7.5 and 11
- Hardness <7 milli-equivalent/l  
= 350 mg/l of CaCO<sub>3</sub> calcium carbonate  
= 35° f (French degree) Resistivity > 1500 Ω.cm
- Solid pollution < 100 mg/dm<sup>3</sup>
- Solid particle size (maxi): 0.03 mm<sup>3</sup>
- Pressure range between 2 and 7 bar (relative)
- Temperature: 15°C < T < 25°C
- Flow rate: 60 l/h (minimum)
- Deionized water compatible

Male end connectors (29) 1/08" located on the rear casing must be connected to water line. Flows and pressures indicated **page 11** must be respected.

	Range of working pressure		
	Ultimate pressure	30 mbar	60 mbar High pressure
2033 H1	without water	with water	use the auxiliary cooling device (see page 13)
2063 H1	with water		

## Inlet and exhaust fitting

**⚠ WARNING**

Remove the protective caps on the inlet and exhaust orifices; these components prevent foreign bodies from entering the pump during transport and storage. It is dangerous to leave them on the pump during operation.

**⚠ WARNING**

Make sure that all the components or chamber connected to the pump inlet withstand a negative pressure of 1 bar relative to atmospheric pressure. Also make sure that the maximum excess pressure does not exceed 1 bar relative to atmospheric pressure (for security).

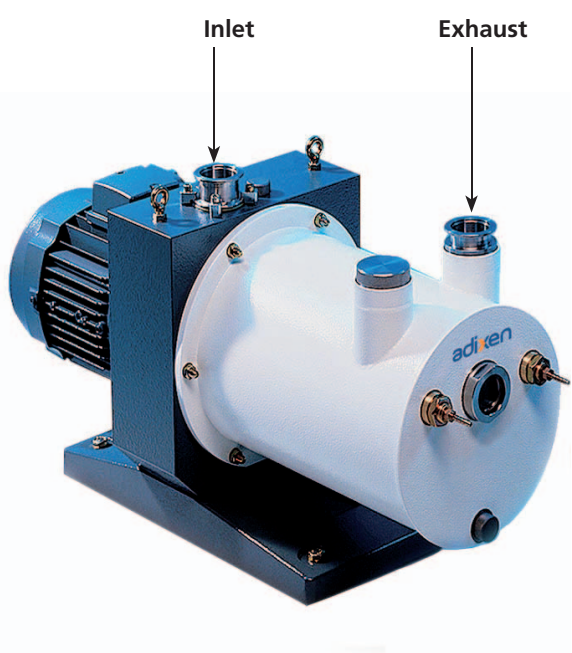
**⚠ WARNING**

It is recommended to connect the pump exhaust to a smoke evacuation duct.

- If the pump exhaust orifice is connected to an extraction duct or an oil mist eliminator, the exhaust stop valve fitted in the pump exhaust orifice must be removed.
- At the pump exhaust, the evacuation circuit must be such that the resulting excess pressure in the oil case is as low as possible: for correct pump operation the max. exhaust pressure recommended should be 1.125 Torr (1.5 bar) absolute pressure.

The pump inlet and exhaust orifices are equipped with DN 40 ISO-KF end fittings which can be used to fit various line components made of stainless steel, plastic, etc. (see the **Adixen catalog**).

**Note:** in case of using with exhaust pressure above atmospheric pressure (see page 10), it is necessary to install outside centering ring at the exhaust port (see page 13).



# Electrical connections

## WARNING

The pumps must be connected to an electrical installation including a ground plug type T.T in compliance with the decree 88-1056 dated 14 November 1988, as well as any local electrical codes that apply.

- Our products are designed to meet current EEC regulations. Any modification on the part of the user is liable to cause non-compliance with regulations or even affect the EMC (Electromagnetic compatibility) performance and safety of the product. The manufacturer cannot be held responsible for consequences resulting from such an intervention.
- Before any maintenance is performed on a product by a maintenance operator who has not been trained on safety regulations (EMC, electrical safety, chemical pollution, etc.), isolate the product from its various energy sources (electricity, compressed air, etc.).
- As a general rule, it is recommended to protect the motor for 120% of its nominal current (see page 25).
- Check that the electrical wiring and the voltage selector position of the motor correspond to the line voltage, before starting up the pump.
- Ensure that the electrical installation conforms with your local safety requirements. It must include the appropriate fuse and reliable earthground.

## Three-phase version

Electrical motor is in accordance with major international standards (UL, CSA, CE).

**All three phase motors (protection level IP 43. TEFC type) must be protected by a customer supplied starter consisting of a suitably rated contactor and thermal overload.**

Wire the motor according to the line voltage. The connections to be made are shown on a diagram inside the terminal box or on its lid (see page 24).

Check the direction of rotation of the motor (direction of arrow located on the motor cover). For this:

- Remove the protective caps on the inlet and exhaust orifices.
- Vent the pump to atmospheric pressure.
- Switch on the pump for 2 to 3 seconds, with your hand on the inlet orifice if suction is felt, the wiring is correct.

Otherwise, invert 2 consecutive phases.

The earth terminal must be connected correctly.

## Motor characteristics, connection, protection

The information below is given as a recommendation.

The user must comply with the electrical standards or recommendations (IEC, VDE, UL, CSA, etc.) applicable in the country in which the pump is used.

The use of electrical protection for the pump motor makes it possible to protect:

- The motor: in the event of excess voltage or rotor blocking, the resulting excess current may destroy the coil and possibly the start-up system (for a single-phase motor).
- The pump: in the event of a lubrication fault (contaminated oil, presence of particles), increased resistance will draw excessive motor current.

Differential thermal circuit-breakers should be used, in which the mechanism contains an instantaneous disconnection controlled by a bi-metal blade.

**Never protect a three-phase motor with fuses not equipped with a differential system:** if three phase motors are powered on 2 phases without a differential system, the motor could burn..



# External motor protection, electrical protection

Different types of motors are available in accordance to the major international standards The three phase motors are compatible with the following voltages:

Limites des plages tensions moteur						
	Motor P/N	Country	Fr.	Voltage		
2033	118059	Europe	50 HZ	220	240	380 415
			60 HZ	220	280	380 480
	114449	Asia & Row	50 HZ	180	240	360 415
			60 HZ	180	240	380 480
	113114	USA Japan	50 HZ	180	220	380 440
			60 HZ	190	230	380 460
2063	118060	Europe	50 HZ	220	240	380 415
			60 HZ	220	280	380 480
	114450	Asia & Row	50 HZ	180	240	360 415
			60 HZ	180	240	380 480
	113115	USA Japon	50 HZ	180	220	380 440
			60 HZ	190	280	380 460

The characteristics and ratings of fuses and circuit breaker associated with standard pump three-phase motors.

Circuit breaker rate for the following motors						
	Motor P/N	Country	Frequency	Power	Voltage	Rate
2033 H1	118059	Europe	50 / 60 HZ	1,1 kW	220 V	6 A
					400 V	4 A
	114449	Asia & Row	50 HZ	1,5 kW	200 V	8 A
					400 V	4 A
			60 HZ	1,8 kW	230 V	8 A
					460 V	4 A
113114	USA Japan	50 HZ	1,5 kW	200 V	8 A	
				400 V	4 A	
		60 HZ	1,8 kW	230 V	8 A	
				460 V	4 A	
2063 H1	118060	Europe	50 HZ	2,2 kW	230 V	10 A
					400 V	6 A
	114450	Asia & Row	60 HZ	2,64 kW	265 V	10 A
					460 V	6 A
			50 HZ	2,2 kW	200 V	8 A
					400 V	4 A
113115	USA Japan	60 HZ	2,2 kW	230 V	8 A	
				460 V	4 A	
		50 HZ	2,2 kW	200 V	12 A	
				400 V	6 A	
60 HZ	2,64 kW	230 V	8 A			
		460 V	4 A			

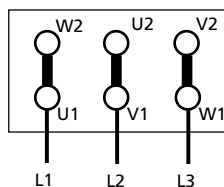
## Three-phase motors

### Electrical connections

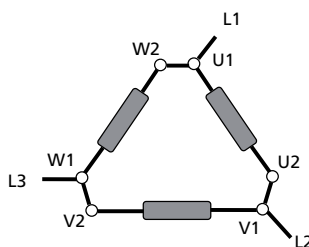
The pumps are equipped with 6, 9 or 12 wire terminal box motors, the wiring diagram of the terminals is given as a rough guide only. In the event of doubt, only the plate in the terminal box should be used as a reference.

#### Terminal box with 6 wires and 6 terminals

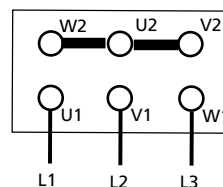
Low voltage



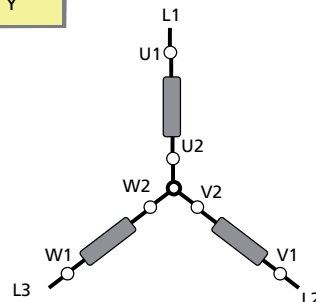
Delta :  $\Delta$



High voltage

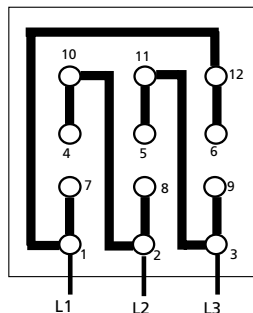


Star : Y

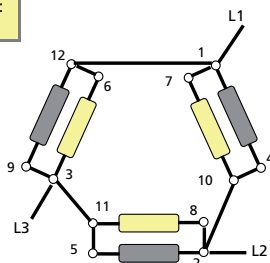


#### Terminal box with 12 wires and 12 terminals

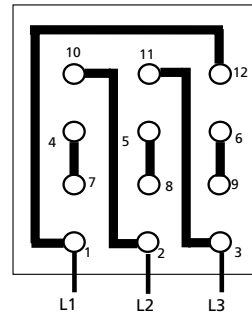
Low voltage



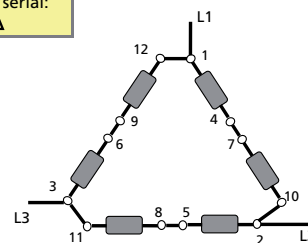
Delta parallel:  $\Delta\Delta$



High voltage

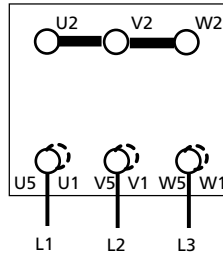


Delta serial:  $\Delta$

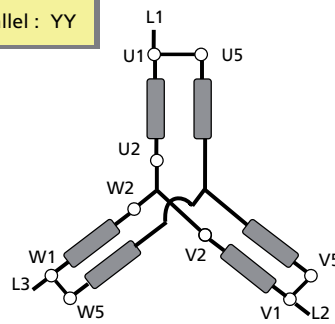


Terminal box with 9 wires and 6 terminals

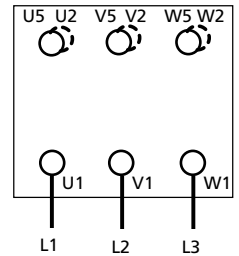
Low voltage



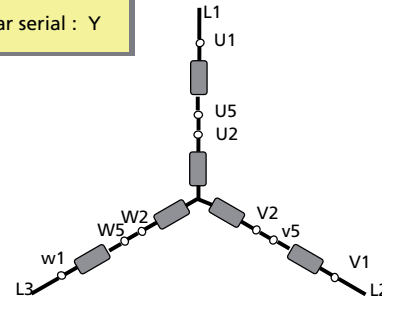
Star parallel : YY



High voltage

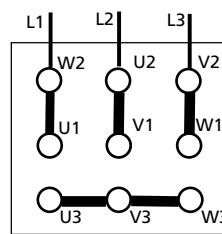


Star serial : Y

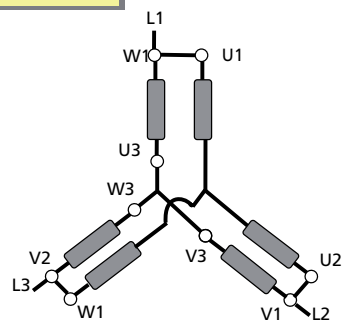


Terminal box with 9 wires and 9 terminals

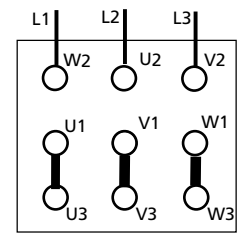
Low voltage



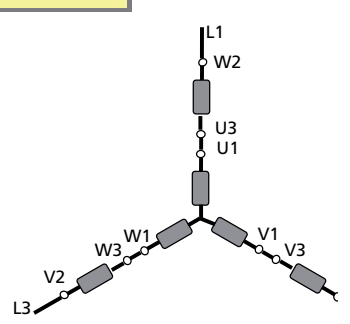
Star parallel : YY



High voltage



Star serial : Y





# Operation

## Preliminary precautions

### WARNING

- The performance and operating safety of this product can only be guaranteed if it is operated according to normal conditions of use.
- The vacuum pump is also a compressor: incorrect operation may be dangerous. Study the user manual before starting up the pump.
- The pumps are designed to prevent any thermal risk for user safety. However, specific operating conditions may generate temperatures which may justify particular attention on the part of the user > 70°C).
- Product tightness is guaranteed for normal operating conditions when the product leaves the factory. It is the user's responsibility to maintain the level of tightness particularly when pumping dangerous products (on C series pumps).

## Operating temperature

**At start-up**, before switching on the motor, check that the oil bath temperature is greater than 53°F (12°C).

**The ambient operating temperature** for the pump must be between 53°F (12°C) and 113°F (45°C).

Under these conditions, **the stabilized pump temperature** (at the front of the oil case) will be between 140°F and 158°F (60 and 70°C) (depending on operating conditions).

### Special case - Synthetic oils

Synthetic oils are much more viscous when cold than mineral oils.

Do not start up the pump at ambient temperatures below 59°F (15°C).

For the same reason and to facilitate lubrication of the pump, pour a few drops of oil (1 to 2 cm<sup>3</sup>) through the inlet orifice before starting.

## Before starting-up the pump

### CAUTION

**Check that the exhaust orifice is not blocked.**

In certain cases, when the pump is started up in cold ambient conditions, or with slightly contaminated oil, the current after start-up may remain high until the oil in the pump is heated up. These conditions are sufficient for the internal thermal protection to be activated, making start-up impossible (*see pages 23, 24 and 25*).

## Start-up

- When using a three phase motor, **check the direction of rotation of the motor** (see electrical connections *start-up chap. page 22*).
- **Check the oil level** (see *page 19*).
- **Start-up the pump.**
- **Allow the pump to run for one hour with the inlet blocked at ultimate vacuum**

During this operation, make sure that the oil circuit is operating: remove the oil fill plug to listen to the pump.

**During this operation, make sure that the oil circuit is operating. Remove one of the oil fill plugs to listen to the pump.**

**At start-up, the oil enters the lubrication circuit of the vacuum pump. As a result, noises will be heard (first irregularly, then regularly) which will reduce as the oil heats up. These noises will no longer be heard when the fill plug has been replaced.**

**Under normal temperature conditions, the oil circuit should start less than 1 minute after start-up (this time may vary with the type of oil and its degree of contamination)..**

**It is normal for the oil level to rise (as can be seen through the oil sight glass) when the pump is hot due to expansion of the oil and starting of the oil circuit.**

## Using noise limiter

**The principle of this system is described page 8. It is adjusted at the factory when the pump is checked and need only be readjusted after :**

- **pump disassembly-reassembly operations;**
- **changing the oil type (not all are miscible in the same proportions with pumped gases).**

- Set pump to normal operating condition (temperature, ambient sound level, etc.);
- Connect a liquid nitrogen trap and a Penning gauge to pump inlet
- Remove fill exhaust port **(20)** (see *page N-2*) and unscrew gas inlet tube **(11)** (see *page N-12*) with a screwdriver all the way out,
- Run pump for about one hour at ultimate pressure,.
- Screw in tube **(11)**, half a turn at a time, monitoring partial pressure and sound level (wait 3 to 4 minutes after each half turn). Then set to desired point (to evaluate sound level, replace exhaust port **(20)**).

## Starting after disassembly and reassembly

**After maintenance or a change in oil type, the functional parts of the pump will be under-lubricated. Before running pump under hard conditions (continuous or high-pressure operation), proceed as follows:**

- Check motor rotation direction
- Remove exhaust port **(20)**. Use a screwdriver to unscrew air inlet tube **(11)** completely to facilitate the initial startup of pump oil circuit
- Perform operations (see above the informations)
- When the pump is hot, adjust noise level.

## Special cases

**When a pump must start cold (ambient temperature about 10 °C) or when it has to start cold after pumping contaminating products or condensables , proceed as follows:**

- Unscrew air inlet tube **(11)** to the maximum extent to help oil circuit to start.
- Readjust antinoise system when the pump is hot.

**CAUTION**

**Note : When you have pumped on dangerous products (corrosive, toxic...), you must reheat the pump to reach the pump starting temperature.**

# Oxygen pumping

In certain applications, mixtures containing oxygen at different concentrations, or even pure oxygen, are used.

Oils of mineral origin are combustible. Exposure to pure oxygen at high temperatures may cause them to self-ignite. In addition, they are highly oxidized during pumping and quickly lose their lubricating properties. Mineral oils must not be used for oxygen levels of over 21 % in pumped gases. In this case, perfluorinated synthetic oils must be used, see list on **page 17**.

The use of these oils requires a special pump preparation (**see page 37**). The pump must be completely disassembled and all traces of mineral oil removed. Flushing the oil case is not adequate.

## **WARNING**

**In addition, it is strongly recommended not to use fluids such as tri-aryl-phosphate-ester which are known to cause accidents.**

Any accumulation of oxygen in the installation should be avoided and the oxygen or combustible mixture should be diluted with a neutral gas at the exhaust: the gas flow rate should be 4 times the oxygen flow rate.

**Certain combustible or explosive gases require a higher degree of dilution. Our Support Services and Customer Services can advise you to help solve problems of this kind.**

## Recovery of oil (high pressure and cycling)

When the pump operates at high pressure, the oil heats up, becomes more fluid and is flushed out of the functional block by the gas stream.

Oil losses at the exhaust are increased.

### For intermittent pumping

If the pump only operates for a very short time at high pressure, the lubricating oil is replaced when the pump returns to low pressure. The use of an oil mist eliminator prevents losses due to intermittent high pressure operation.

### For cyclical pumping

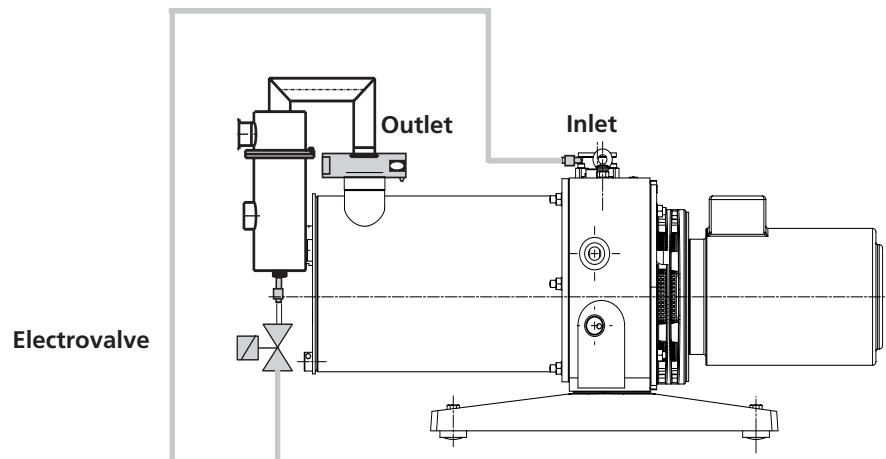
If the pump operates at high pressure in a cyclical fashion, oil consumption may reach sufficiently high levels (according to the pumped volume and pumping cycle rates) causing the level to drop in the oil case.

There is then a risk of seizure due to a lack of oil. In addition, the high flow of gas passing through the eliminator prevents oil from returning to the oil case.

In order to pump in these conditions, the pump must be equipped with an oil mist eliminator and an oil draining kit, which enables oil recovery via the gas ballast.

**Please consult us directly.**

### OME 40 H oil mist eliminator with ODK oil recovery device An electrovalve ensure the tightness when the pump is stopped



### For continuous pumping at high pressure

In this case, or when very large volumes (requiring several hours of pumping) are being pumped, it is recommended to recover the oil via the pump inlet.

In this case, please consult us directly.



# Maintenance

## General precautions

For normal operation, the maintenance of 2033-2063 m<sup>3</sup>/h series pumps only require regular oil changes (*see page 35*).

Before any draining or maintenance operation, check the pumping conditions of the installation: potential toxicity, corrosion or radioactivity of pumped gases.

Depending on the case, we recommend:

- to purge the pumping installation with dry nitrogen before maintenance;
- wear gloves, protective goggles and, if necessary, a breathing apparatus;
- ventilate the premises well and disassemble the equipment under a suction hood;
- not to dispose of used oils and residues using the standard system and, if necessary, have them destroyed by a specialized company.

### DANGER

Certain gases can become corrosives and toxic when trapped in oil. Always wear protective gloves when handling used and dirty pump oil, drain it into a closable container, and do not breathe the fumes of the oil. Always use fully self-contained breathing apparatus.

### WARNING

Always dispose of used dirty oil, or sub-products properly and in compliance with all local, state and federal environmental laws and regulations.

### CAUTION

After a complete maintenance operation, it is recommended to perform a helium leak tightness test.

The manufacturer can provide specific training to know the tightness test methods and supply helium leak detectors. Contact us.

#### Decontamination – product dismantling

According to the regulations 2002/96/CE about Waste of electrical and electronical equipments, and 2002/95/CE about Restriction of Hazardous substances, the manufacturer provides a recycling paid service for the end-of-life of waste electrical and electronic equipment.

Any obligation of the manufacturer to take back such equipment shall apply only to complete not amended or modified equipment, using Alcatel Vacuum Technology original spare parts, delivered by Alcatel Vacuum Technology, containing i.e. all its components and sub-assemblies.

This obligation will not cover the shipping cost to an Alcatel take back facility.

Before returning the product, fill in the safety form, attach it to the product before shipping to the service-repair office closest to you.

Safety form available on this manual or can be downloaded on: [www.adixen.com](http://www.adixen.com)

## Troubleshooting and corrective actions

Incidents	Causes	Corrective actions
<b>The pump is not running</b>	▶ Incorrect motor power supply.	Check the power supply.
	▶ Temperature too low.	Reheat the pump and its oil.
	▶ Gumming of seals after prolonged storage.	Disassemble the motor and try to turn the fan manually. Disassemble, clean the pump, replace seals, reassemble.
	▶ Oil contaminated after pumping.	Drain, flush and refill with clean oil.
	▶ Motor coupling damaged.	Replace by disassembling the motor.
	▶ Pump seized, due to a stopping after pumping in difficult conditions (no draining or flushing).	Disassemble, clean, hone the scratched metal parts (replace them if necessary) and reassemble.
<b>The pump does not start</b>	▶ Oil cold.	Warm pump.
	▶ Insufficient oil in the oil case.	Fill up to the level.
	▶ Oil contaminated.	Drain, flush and refill with clean oil.
	▶ Oil pump inlet partially blocked.	Drain, and clean the oil pump inlet duct.
	▶ Lubrication holes blocked.	Disassemble and clean.
	▶ Vane or spinner-cam (SD models) damaged.	Replace them.
	▶ Incorrect anti-suckback system assembly.	Repeat the assembly and the setting.
<b>The vacuum pump does not produce a vacuum</b>	<b>Ultimate pressure obtained: a few mbar, Torr</b>	
	▶ Direction of motor rotation incorrect (three phase).	Rewire.
	▶ Insufficient motor power.	Check the power supply.
	▶ Inlet filter blocked.	Clean it.
	▶ Insufficient oil in the oil case.	Add oil.
	▶ Oil cold, oil pump inlet blocked.	Warm, disassemble, clean.
	▶ Oil contaminated.	Drain, flush and start again with clean oil.
	▶ Oil pump inlet partially blocked.	Drain and clean the oil pump inlet duct.
	▶ One of the LP safety valves is damaged.	Replace.
	▶ Part forgotten in reassembly.	Repeat the reassembly.

Incidents	Causes	Corrective actions
<b>The vacuum pump does not produce a vacuum (<i>continued</i>)</b>	<b>Ultimate pressure obtained: a few <math>10^{-2}</math> Torr (<math>10^{-2}</math> mbar)</b>	
	▶ O-ring pinched.	Replace.
	▶ One of the seals is damaged.	Replace.
	▶ One of the HP safety valves is damaged.	Replace.
	▶ Lubrication holes blocked.	Disassemble and clean.
	▶ Incorrect anti-suckback assembly.	Repeat the assembly and setting.
	▶ Part forgotten in reassembly.	Repeat the reassembly.
	<b>Accessories</b>	
	▶ At the pump exhaust, the installation produces an exhaust pressure of 1,125 Torr (1.5 bar).	Check the installation.
▶ Oil mist eliminator cartridge clogged.	Replace.	
<b>Noisy pump</b>	▶ Oil level too high.	Drain and fill with a new oil.
	▶ Oil contaminated (presence of particles).	Drain, flush and refill with clean oil.
	▶ Pump not prepared for the oil used.	Check the pump configuration or the type of oil.
	▶ Incorrect motor power supply.	Check the power supply.
	▶ Motor bearings damaged.	Replace the motor after inspection.
	▶ Motor coupling incorrectly set or damaged.	Check the setting.
	▶ Incorrect fan assembly.	Check the assembly.
	▶ Incorrect anti-suckback device assembly.	Repeat the assembly.
	▶ Vanes damaged or stuck.	Replace.
<b>Pump too hot</b>	▶ Ambient temperature too high.	
	▶ Pump placed in a poorly ventilated place or vents blocked.	Check the installation.
	▶ Operation at high pressure $P > 22$ Torr (30 mbar).	Check for system leaks.
	▶ Excess pressure at exhaust.	Check the exhaust line.
	▶ Motor in over-voltage or motor in short-circuit.	Check the voltage, replace the motor.
	▶ Oil contaminated.	Drain, flush and refill with clean oil.
	▶ Pump not prepared for the oil used or oil unsuitable.	Check pump configuration or type of oil.

Incidents	Causes	Corrective actions
Considerable oil losses	▶ Oil level too high.	Drain and fill with new oil.
	▶ Operation at high pressure.	Use an HP type oil mist eliminator with oil recovery.
	▶ Leak at oil case seal or at front seal.	Check the assembly and replace the seals if necessary.
	▶ Safety valve damaged.	Replace.
	▶ Incorrect anti-suckback assembly.	Repeat the assembly.
	▶ O-ring pinched.	Replace.
	▶ Seals damaged.	Replace.
	▶ Oil contaminated.	Drain, flush and refill with clean oil.
Oil in plate	▶ Oil case and frame cleaned poorly during reassembly.	Remove the base and clean.
	▶ Oil case seal pinched.	Disassemble the oil case, clean the faces and refit a new seal.
	▶ Front seal damaged or felt saturated.	Replace.
Oil level variation	▶ External shaft seal deterioration	Replace shaft seal
	▶ Discharge at surpressure: oil level from sealed housing rises, casing oil level falls	Replace shaft seals <b>14, 15</b> and <b>18</b> .
	▶ Discharge at low pressure: casing oil level rises, sealed housing level falls	Replace shaft seals <b>14, 15</b> and <b>18</b> .

# Maintenance

## Maintenance frequency

	Frequency	Operating conditions
Oil	6 months	"normal", 24 / 24h
	1 year	"normal", < 12h / day
Pump	1 year	"normal", 24 / 24h
	2 years	"normal", < 12h / day

The frequency values are minimum values for «normal» operating conditions: pressure < 1 mbar (0.75 Torr), clean gas and non-corrosive gas.

### **An incorrect ultimate vacuum or a reduction in pumping speed are signs that the oil has deteriorated.**

The periodic inspection of the state of the oil is performed by comparison with a sample of new oil in order to check the level of contamination or deterioration of the lubricant.

The frequency at which oil is renewed is adapted to the type of operation:

- if the oil is cloudy, this indicates that condensables have been absorbed during pumping.
- a thickening of the oil, together with a blackish color and a "burnt" smell indicate that the oil has deteriorated.

Drain the pump and flush it.

### **The oil should be changed every 6 months. This value is given as a guide only.**

It may be extended to 1 year if the ultimate vacuum required is sufficient (for primary vacuum pumps). Similarly, **if the pump is stopped frequently for long periods, the oil should be changed at intervals of 6 months to a maximum of 1 year** (oil may become sticky).

**Note:** Every pumping operation is different. This oil must therefore be changed at intervals adapted to each specific application. The use of certain accessories (**see page 13**) can reduce the frequency of these maintenance operations.

## Draining

### **WARNING**

The draining operation places the contaminated pumping circuit in communication with the outside atmosphere. Take all necessary steps to ensure personal safety.

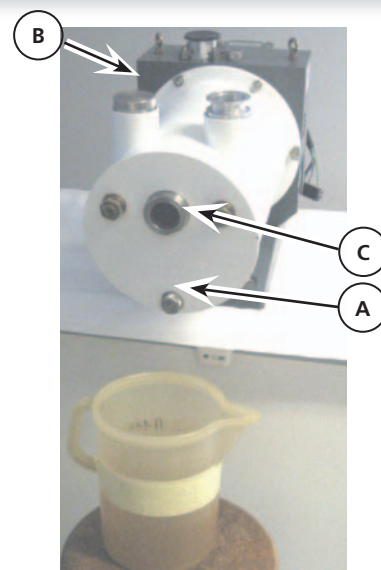
### Oil case draining

The pump must be drained when hot and after the oil case has been vented to atmospheric pressure. For this:

- switch off the pump;
- isolate the pump or disconnect from the installation;
- tilt the pump;
- unscrew the draining plug **(A)** on the side of the oil case and the filling plug **(B)** on the top of the oil case.

When all the oil has drained, replace the two plugs temporarily and run the pump for about 10 seconds leaving the intake open. Take care with the oil mist which may appear at the exhaust. This operation removes the oil from the functional block;

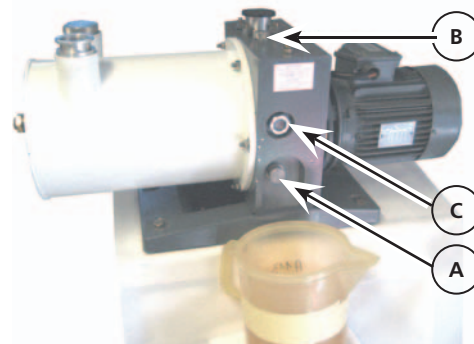
- drain this oil by removing the draining plug;
- replace the draining plug and fill with fresh oil to the appropriate maximum level of the oil case oil sight glass through the filling orifice **(C)** (see page 19).



### Sealed housing draining

Unscrew the filling plug **(B)** on the top of the sealed housing and the draining plug **(A)** on the side of the sealed housing.

When all the oil has drained, replace the draining plug **(A)** and fill with fresh oil to the appropriate maximum level of sealed housing oil sight glass **(C)** through the filling orifice. Replace the filling plug **(B)**



### Flushing

The draining operation can be followed by a flushing operation if the oil is particularly dirty. This operation requires a volume of oil equal to the capacity of the pump.

After draining the sealed housing, replace the draining plug. Remove the intake filter, clean it and replace it. Run the pump at atmospheric pressure, pour the flushing oil very slowly through the inlet orifice. Take care with oil mist which may develop at the exhaust. Stop the pump and drain the flushing oil via the draining plug. Replace the plug and fill with fresh oil (see page 18)

## Change of type of oil

2033 H1 and 2063 H1 pumps are tested in the factory with A120 oil or A119 for USA unless specified otherwise in the order. When the pump is delivered, a certain quantity of oil remains in the functional block.

Thus, if you wish to use another type of oil, proceed as follows:

### Compatible oils

Mineral oil can be replaced by another type of mineral oil. Simply flush the pump (**see page 36**) using the new oil and fill the pump (**see page 18**).

Mineral oils are also compatible with mineral-based synthetic oils (**see page 17**).

### Incompatible oils

This is the case when, for example, a mineral oil is replaced by a synthetic oil (e.g. A120 by A113).

Synthetic oils are considered to be incompatible with each other for practical reasons: they are expensive. A mixture may cause slight cloudiness of the resulting mixture, which could be interpreted mistakenly as a sign of contamination or deterioration. For the same reasons, clear synthetic and mineral oils (A300), which are also expensive, are treated as synthetic oils.

These remarks apply to ester or fluorocarbon type synthetic oils and the oils A111, A113 and A300 (**see page 17**).

#### Proceed as follows:

- Disassemble the pump completely and clean it (**see page 40**).
- Reassemble it.
- Connect an oil mist eliminator to the pump exhaust.
- Fill the pump (oil case and sealed housing) with the new oil (**see page 18**).

**NOTE:** to replace a synthetic oil by a mineral oil, proceed as for compatible oils.

**In all cases, follow the recommendations of the pump integrators for the choice of the oil to be used.**

# Tools and consumable products

## Special precautions

Read the warning at the beginning of the maintenance chapter.  
 Before disassembling the pump, drain it (see page 34).  
 All the seals and faulty parts should be replaced, provided in a seal kit or a maintenance kit.

## Spare parts

For fasted service, specify the following when ordering:

- pump type
- serialnumber (on label)
- part number (see list at end of book)

Maintenance kits containing the most frequently used parts are always available at our sales outlets. Be sure to use these kits so you will have all the parts necessary.

**Minor kit** This kit contains all the seals on the pump which must be replaced at each complete disassembly.

Keep this kit in a dry place, away from heat and light (sunlight and ultraviolet light), in order to prevent any hardening of the elastomers (see AFNOR standards: "storage conditions for vulcanized elastomer based products" - FD T.46 022).

Pump	2033 H1	2063 H1
P/N	054282	054483

**Major kit** In addition to the seal kit, this kit contains a set of spare parts to perform maintenance operations on the pump for a two year period, under normal operating conditions.

Pump	2033 H1	2063 H1
P/N	054283	054484

**Screw kit** This kit contains all screws and washers for the pump.

Pump models	P/N
2033 H1 / 2063 H1	105347



## Specific tools

**Tools kit** This kit contains the usefull tools to disassemble and reassemble the shaft seals in the different flanges and flanged stators (see table bellow).

Pump models	P/N
All pumps	065192

Description	P/N
Mounting mandrel	065089
Protective sleeve	065088
Washer	073331
Coupling adjustment tool	065087
Extraction tool	065186

EN

## Recommended tools

The tools required for disassembling and reassembling the motor pump assembly are listed below:

- N° 3 and N° 9 screwdrivers
- Thin spanner: 13-17 mm on face
- Allen wrenches: - 4 - 5 - 6 - 8 mm
- 6 mm and 8mm extraction screws
- Slip-joint pliers



Protective sleeve

Maintenance

# Disassembling the pump

**Follow the chronological order of disassembling instructions.  
See the drawings and their part lists in pages N – 1 to N – 15**

## Disassembling the motor block

(see page N-2)

### Disassembling moving parts

(see page N-2)

### Removing the oil case

(see page N – 2)

### Disassembling the oil sight glass

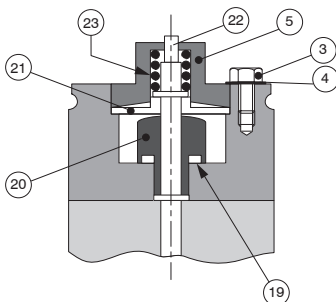
(see page N – 2)

### Disassembling the exhaust valve cover

(see page N – 8)

### Disassembling the pump oil system

(see page N – 12)



### Disassembling the rear flange

(see page N-12)

Unscrew 4 nuts (59)

Remove motor assembly (49) and motor mounting plate (53). The coupling separates into two halves, one (51) on the motor side, the other (52) on the pump side.

Prevent fan (64) from rotating by wedging a wooden chock against the side of the frame and two blades of the fan.

Remove elastomere coupling (52).

Unscrew self-locking screw (62) not (reusable) and remove washer (63)

Using two 8 mm extraction screws, remove fan (64) and shock

Remove screws (65) and using two 6 mm extraction screws, remove cover (67) with seal (48).

Unscrew the nuts (29) and remove the oil casing (25) and its gasket (28).

**Gasket may cause case (25) and frame (34) to stick together due to aging: insert lever between base and bottom of case, and pry off case. Do not use a hammer or screwdriver, which could damage the parts and sealing surfaces.**

Unscrew the sight glass (14). Remove the the O-rings (13) (15), the ring (11), the sight glass (12).

Remove the screws (7) (10) and the cover(s) (5) (11), the exhaust valves (2) (13) and their springs (4) (12).

Remove screws (1) (2) and body (18).

Remove screws (3) (4) and cylinder (5), spring (23), the piston (22) and diaphragm (21). Remove seat (20) and O-ring (19).

Remove screw (8) (9) and remove the air retening retainer (10).

Remove oil inlet tube (6).

Unscrew air inlet tube (11) and remove spring (12).

(If necessary, note setting of air inlet tube (11): **number of turns** until tube stops moving turning clockwise).

Remove vane (38) (see page N – 8).

Remove 4 nuts (17).

Insert two screwdrivers into the two notches and twist to remove palte off pins. Pull flange (14) straight out, holding HP rotor (35) in place.

Remove O-ring (43) (see page N – 8).

## Disassembling the pumping module

### Removing HP rotor (35) and HP stator (40) (see N – 8)

Remove the **HP rotor (35)** by skiding it out of the **HP stator (40)**.  
Remove vanes (37) and their springs (36).  
Insert two screwdrivers in the two notches of the HP stator (40) and twist to remove plate off pins. Remove **HP stator (40)** straight out. Remove the O-ring (34).

### Removing flange (33) (see N – 8)

Insert two screwdrivers in the notches of the **flange (33)** and release the **flange (33)**.  
Remove the O-ring (31).  
Oil jet (32) lubricates the first stage. Do not remove it for cleaning. When reassembling, spray with compressed air to remove any obstructions.  
Remove tube (29) and O-ring. (28).

### Removing LP rotor (23) and LP stator (27) (see N – 8)

Remove the **LP rotor (23)** by sliding it out of the **LP stator (27)**.  
Remove vanes (25) and their springs (24).  
Insert two screwdrivers in the notches of the LP stator (27) and twist to remove the LP stator (27) straight out. Remove the O-ring (26).

### Removing front flange (21) (see N – 8)

Remove 4 nuts (32) (see N – 2).  
Insert two screwdrivers in the notches of the flange (21) and twist to remove the **front flange (21)** straight out. Remove the O-ring (19), Shaft seal (15) (18) and the gib rings (16) (17).

### Disassembling inlet nipple (40) on frame (34) (see N – 2)

Remove 4 screws (41) and remove clamps (44).  
Remove nipple (40), the inlet filter (38) and its O-ring (39).

### Disassembling inlet nipple (20) on oil case (see N – 2)

To remove **exhaust nipple (20)**, the nipple must be connected to a line with a NW 40 centering ring with O-ring and quick connect clam. Use the quick connect clam to unscrew the nipple (20).  
Remove O-ring (24).  
Remove pin (17) filter (18), shaft (19), valve (22) and circlip (23).

# Cleaning components

## Cleaning metal components

Solvents are required to clean components.

Standard precautions should be taken in compliance with the manufacturer's instructions.

**After use in mineral or synthetic oil**, clean the metal components with a mineral products based solvent such as **AXAREL**<sup>(1)</sup>, **CARECLEAN**<sup>(2)</sup>, **PREMACLEAN**<sup>(3)</sup>, **NAPHTESOL**<sup>(4)</sup>. Proceed as follows:

- Clean when cold or hot (max. 45°C) by dipping or using a cloth
- Vacuum dry in a ventilated oven
- **The component must be cleaned a second time with alcohol.**

**After use in (perfluorinate) synthetic oil**, clean the metal components in a solvent such as **GALDEN S 90**<sup>TM(5)</sup> and proceed as follows:

- Clean when cold by dipping or using a cloth
- Dry the components in the air or with compressed air

**After use in (non-perfluorinate) synthetic or mineral oil**, clean the metal components with a solvent such as alcohol and proceed as follows:

- Clean when cold by dipping or using a cloth
- Dry the components in the air
- Industrial washing solutions can also be used. The cleaning operation should be followed by vacuum drying.

## Cleaning the oil level sight glass

The sight glass of these pumps is made of glass: it can be cleaned with common used solvents.

(1) DUPONT DE NEMOURS registered trademark

(2) CASTROL registered trademark

(3) DOW registered trademark

(4) Nippon Oil Corporation registered trademark


(5) MONTEDISON registered trademark

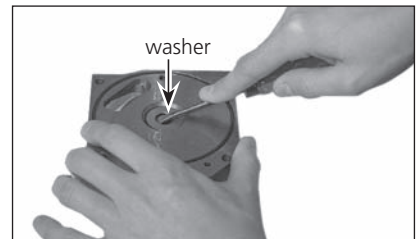
# Replacement of shaft seals

## Specific tools

- Specific extraction tool.
- Specific assembly mandrel.
- A support plate (or washer).

## Recommended tools

- A flat screwdriver .
- A hammer.



## Extracting a shaft seal from its housing

- Flange : the seal is extracted using a screwdriver, resting on the plate (or washer) so as not to damage the seal housing.

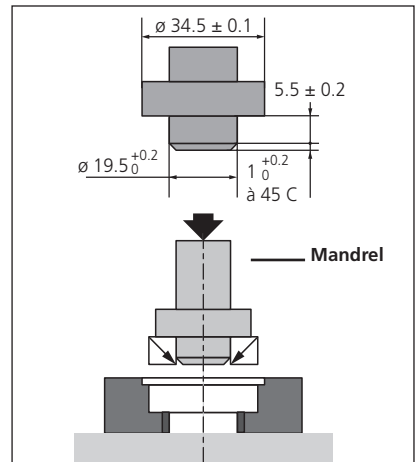
## Assembling the shaft seal

The seal housing and the seal lip are lubricated with the lubricant used in the pump. The flange is resting on a flat surface.

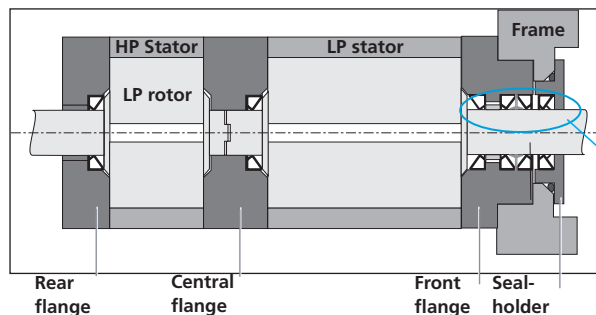
**According to the direction of assembly specific to each pump**, the seal is fitted on the assembly mandrel.

Using a press or a hammer, the seal is inserted in its housing.

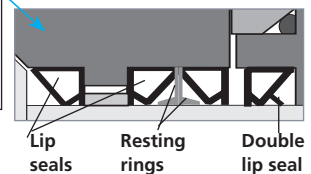
Check the position of the seal: it must lean against its bearing.



## Direction of assembly of shaft seals

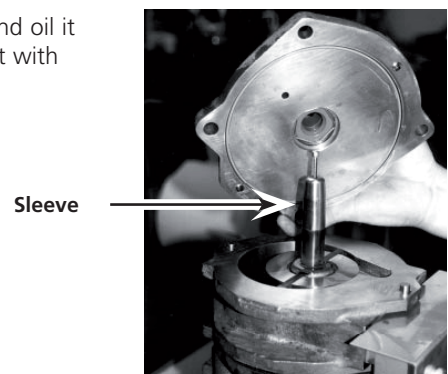


They are fitted using the assembly mandrel according to the direction of assembly below: (seals and resting rings).



## Assembly the protective sleeve

To install the flanges, use protective sleeve and oil it before mounting lange (or wrap end of shaft with adhesive tape).



# Reassembling the pump

## Component preparation

- All parts must be dry so that no solvent remains, particularly in blind holes
- Check that the lubrication holes are not blocked.
- Oil used for lubricate pump parts must be the same as oil used for pump operation.

## Before reassembly

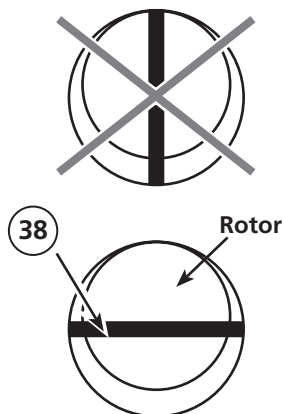
- Coat all pump parts and lips of shaft seals with clean oil. Make sure seals are correctly installed (**see page 43**).
- Fill lubrication holes of bearings and seal seats with oil.
- Do not put too much oil in the bottoms of the holes for the plate/stator alignments pins.
- Tighten nuts without forcing maximum torque (**see chapter «Nomenclature»**)
- Rest the frame (**34**) on a flat surface in order to raise the pump..

## Assembling moving parts

The bushings in the frame and plates can be replaced, but special machining is required whenever a bushing is changed. Consult service center for assistance.

- Reassemble moving parts in reverse order of disassembly.
- Before replacing valves, for a little oil into the stators through the valve holes.
- Before reassembling oil pump, assemble fan (**64**) using a new self-locking screw to tighten it (Maintenance kit page **38**).

## Assembling oil pump



Mount all necessary parts on oil pump body proceeding in reverse order as described page **40**. Place slot of oil pump rotor in horizontal position (parallel to pump base).

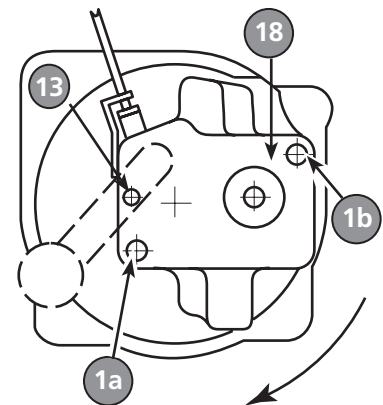
Fan can be used to turn rotor, **but never insert a screwdriver in the rotor slot as this may cause damage.**

Place vane (**38**) in its slot. With pump horizontal, let pump body drop by gravity on to rotor.

With pump vertical, turn pump body (**18**) clockwise around alignment pin (**13**), to bring it into contact with the rotor without forcing.

**Never rest pump body on rotor; this will eliminate bearing play.**

Fit two screws (**1a**) and (**1b**): must be tightened first (**1a**), and (**1b**) second (maximum torque: **10 N.m.**)



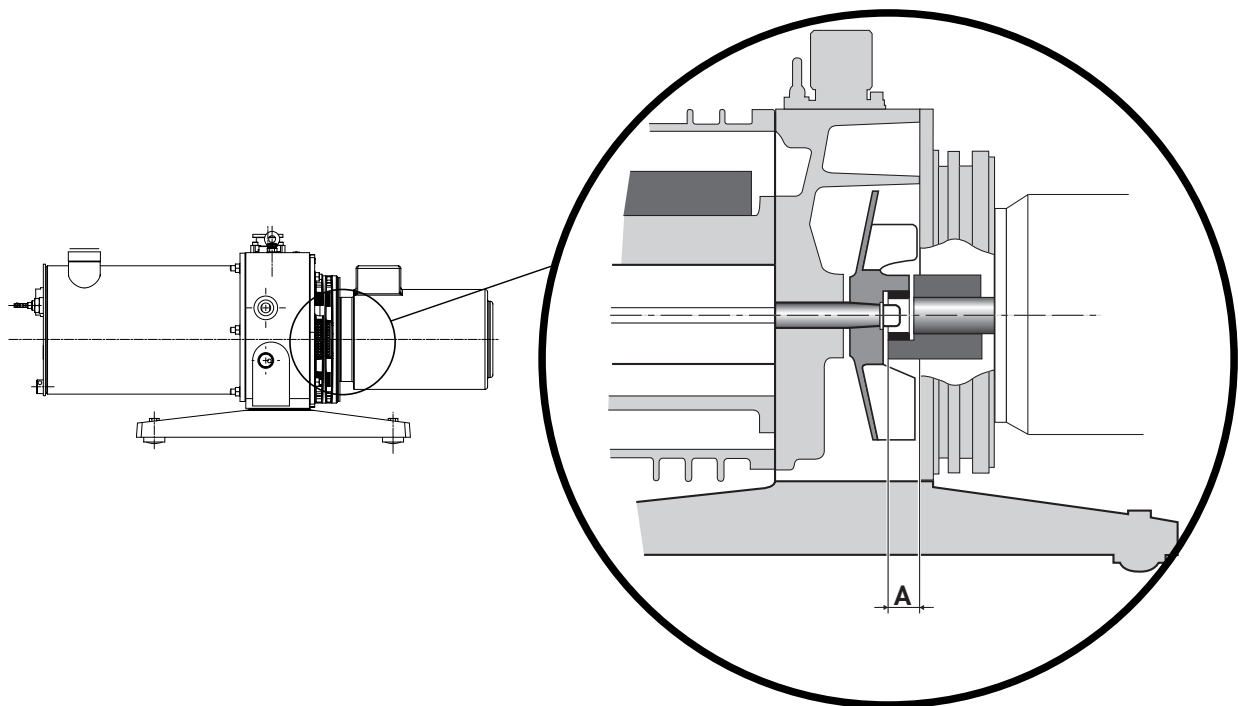
**Air inlet tube**

Screw the air tube home (11) and unscrew it of the number of turns given, when disassembling (usually 3 or 4 turns) (see page 40).

**Motor coupling**

To make sure motor coupling does not touch fan, adjust distance from motor plate (dimension A on the drawing) :  
To perform this adjustment, use adjusting tool in tool kit (see page 39).

pump	Dimension «A»
2033 H1	16,6 ± 0.5 mm
2063 H1	23,3 ± 0.5 mm



**Fill with oil**

After reassembling, fill the oil casing and the sealed housing with oil (see page 18) before start-up the pump (see page 26).





# Safety questionnaire

## Procedure for returning ADIXEN products

You wish to return an Adixen product for maintenance. The equipment will be dismantled and possibly cleaned by a technician from our Service Centre.

In compliance with European Community's L360 directives, French labor code L231 - R231 and Federal OSHA Safety Standard 1910-1200, Alcatel Vacuum Technology requires this form to be completed to preclude the potential health risk to its service personnel that can occur when receiving, disassembling, or repairing potentially contaminated products.

**Equipment returned without this form completed and secured to outside of package will be returned to customer unprocessed.**

Equipment must be drained of fluids and residue, securely packaged and shipped prepaid.

Concerning the closing of the ports (inlet & outlets of the product), metallic airtight blank flanges should be used if toxic or copper gases have been pumped.

We wish to draw your attention to the following points:

- **The risk may be of the following nature:**

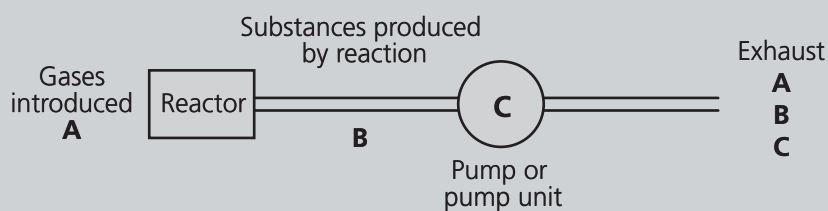
- **Chemical:** Danger to health, risks of explosion, fire, risks for the environment. Please indicate the chemical formula and name of the gases or substances that have been in contact with the equipment (pump or detector).
- **Biological:** in case of contamination (such as pathogenic germs, micro-organisms (bacteria, viruses, etc.) classes 1 to 4 and group E), our Service Center is currently unable to decontaminate and recycle such material without risk to the safety of our staff. Please contact us **before sending** the product to the Service center.
- **Radioactive:** In case of contamination, our Service Center is currently unable to decontaminate and recycle such material without risk to the safety of our staff. Please contact us **before sending** the product to the Service center.
- **Copper contamination:** Copper based by products formed in sputtering or etching processes are considered as a poison in some semi-conductor processes.

**If following inspection and quotation, customer elects to not proceed with repair, he will be subject to service fee to cover product decontamination, disassembly, cleaning and evaluation costs.**

**Please to fill in the following form, print it and attach it to the product before shipping to the service-repair office closest to you.**

### **WARNING**

In the event of chemical contamination, please indicate the following gases or substances:



- Gases (or substances) introduced into the reactor and which may be found at the exhaust (A).
  - Gases (or substances) resulting from the reaction or process (B).
  - Gases (or substances) that may possibly be formed inside the pump (due to a thermodynamic or chemical reaction, condensation, deposition, precipitation, etc.) (C).
- **Precautions need to be taken before transferring contaminated pumps.**  
Please contact Service Center for recommendations.



## DECLARATION OF CONFORMITY

We, Alcatel Vacuum Technology France,  
98, Avenue de Brogny, BP 2069  
74009 ANNECY FRANCE

### ISO 9001 CERTIFIED

declare under our sole responsibility that the listed below products

2002 I / 2002 C1  
1015 / 1015 SD / 1015 C1 / 1021 / 1021 SD / 1021 C1  
2005 I / 2005 SD / 2005 C1 / 2005 H1  
2010 I / 2010 SD / 2010 C1 / 2010 C2  
2015 I / 2015 SD / 2015 C1 / 2015 C2 / 2015 H1  
2021 I / 2021 SD / 2021 C1 / 2021 C2  
2033 SD / 2033 C1 / 2033 C2 / 2033 H1  
2063 SD / 2063 C1 / 2063 C2 / 2063 H1  
1033 SD / 1033 C1 / 1063 SD / 1063 C1  
2100 SD / 2100 C1

to which this declaration relates are in conformity with the following European Directives

73 / 23 / EEC	Low voltage Directive
98 / 37 / EEC	Machinery Directive
89 / 336 / EEC	Electromagnetic Compatibility Directive
93 / 68 / EEC	Council directive (E.C Marking)

The standards, normative documents, and/or specifications to which the products comply are :

NF EN 60204-1	Safety of Machinery / Electrical Equipment of Machinery
NF EN 292-1	Safety of Machinery / Basics
NF EN 292-2	Safety of Machinery / General Principles for Design
IEC 34 parts 1, 5, 11	General Requirements for Rotating Electrical Machines
NF EN 55011 cl B	EMC / Limits for Electromagnetical Conducted and Radiated Interferences
NF EN 61000-6-4	EMC / Generic emission standard / Light industry
NF EN 61000-6-2	EMC / Generic immunity standard / Industrial environment
NF EN 61000-4-2	EMC / Immunity to Electrostatic Discharges
NF EN 61000-4-4	EMC / Immunity to Transient Burst
NF EN 61000-4-3	EMC / Immunity to Radiated electromagnetic Field
NF EN 61000-4-6	EMC / Conducted disturbances induced by radio-frequency Fields

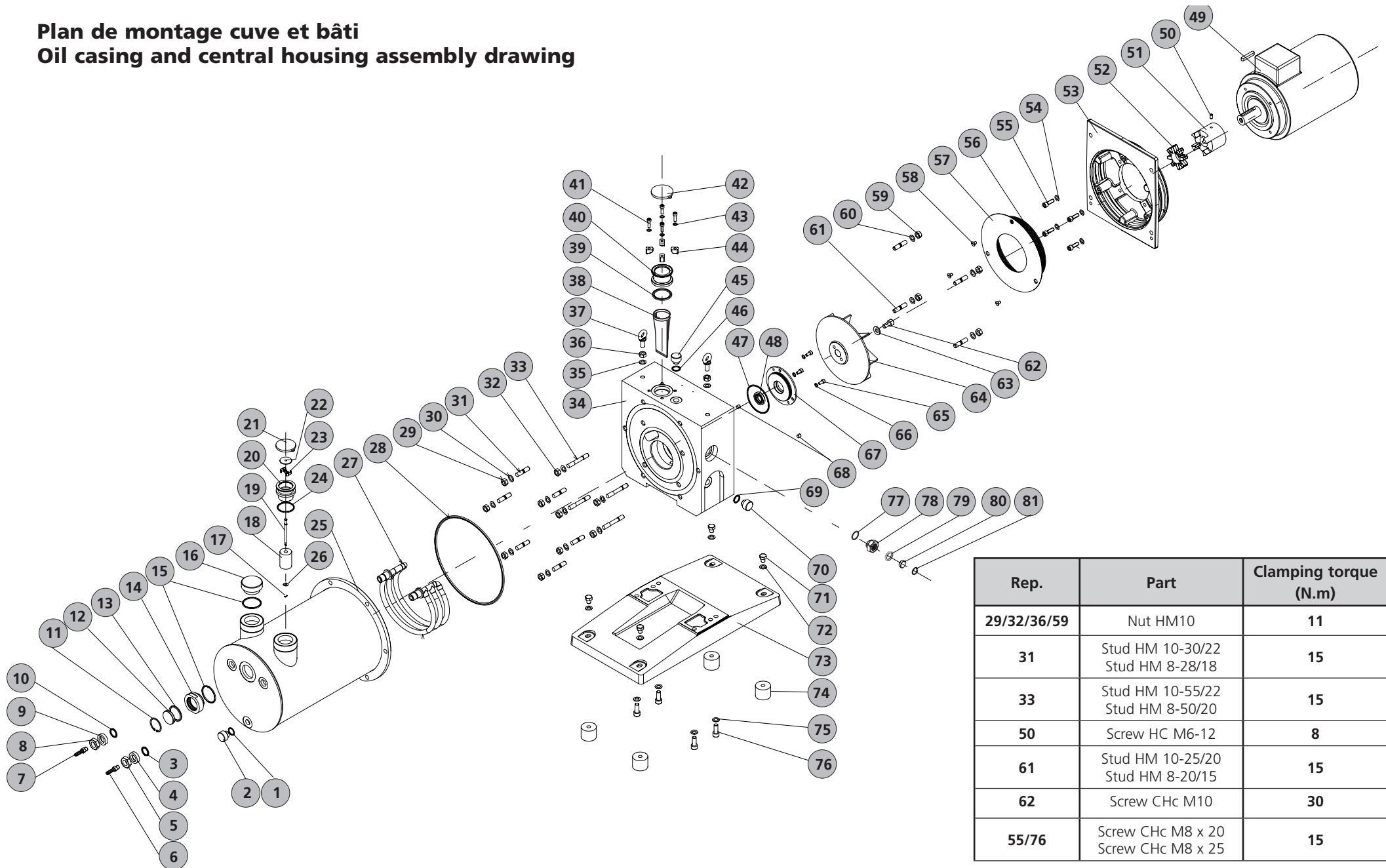
Mr J.Y. GUEGAN, Président Directeur Général

Made in Annecy, 03/11/03

# Composants de maintenance / Maintenance components 2033 H1 - 2063 H1

Plan de montage cuve et bâti .....	Oil casing and central housing assembly drawing .....	2 / 6
Nomenclature cuve et bâti.....	Oil casing and central housing part list .....	3 / 5 / 7
Plan du bloc fonctionnel .....	Pumping module drawing .....	8 / 10
Nomenclature du bloc fonctionnel.....	Pumping module part list .....	9 / 11
Plan du système de lubrification pompe à huile (A).....	Oil pump system drawing (A) .....	12
Nomenclature du système de lubrification pompe à huile (A) .....	Oil pump system part list (A).....	13
Plan ensemble motorisation (M).....	Motor assembly drawing (M).....	14
Nomenclature ensemble motorisation (M).....	Motor assembly part list (M) .....	14

**Plan de montage cuve et bâti**  
**Oil casing and central housing assembly drawing**



Rep.	Part	Clamping torque (N.m)
29/32/36/59	Nut HM10	11
31	Stud HM 10-30/22 Stud HM 8-28/18	15
33	Stud HM 10-55/22 Stud HM 8-50/20	15
50	Screw HC M6-12	8
61	Stud HM 10-25/20 Stud HM 8-20/15	15
62	Screw CHc M10	30
55/76	Screw CHc M8 x 20 Screw CHc M8 x 25	15

## Nomenclature cuve et bâti / Oil casing and central housing part list

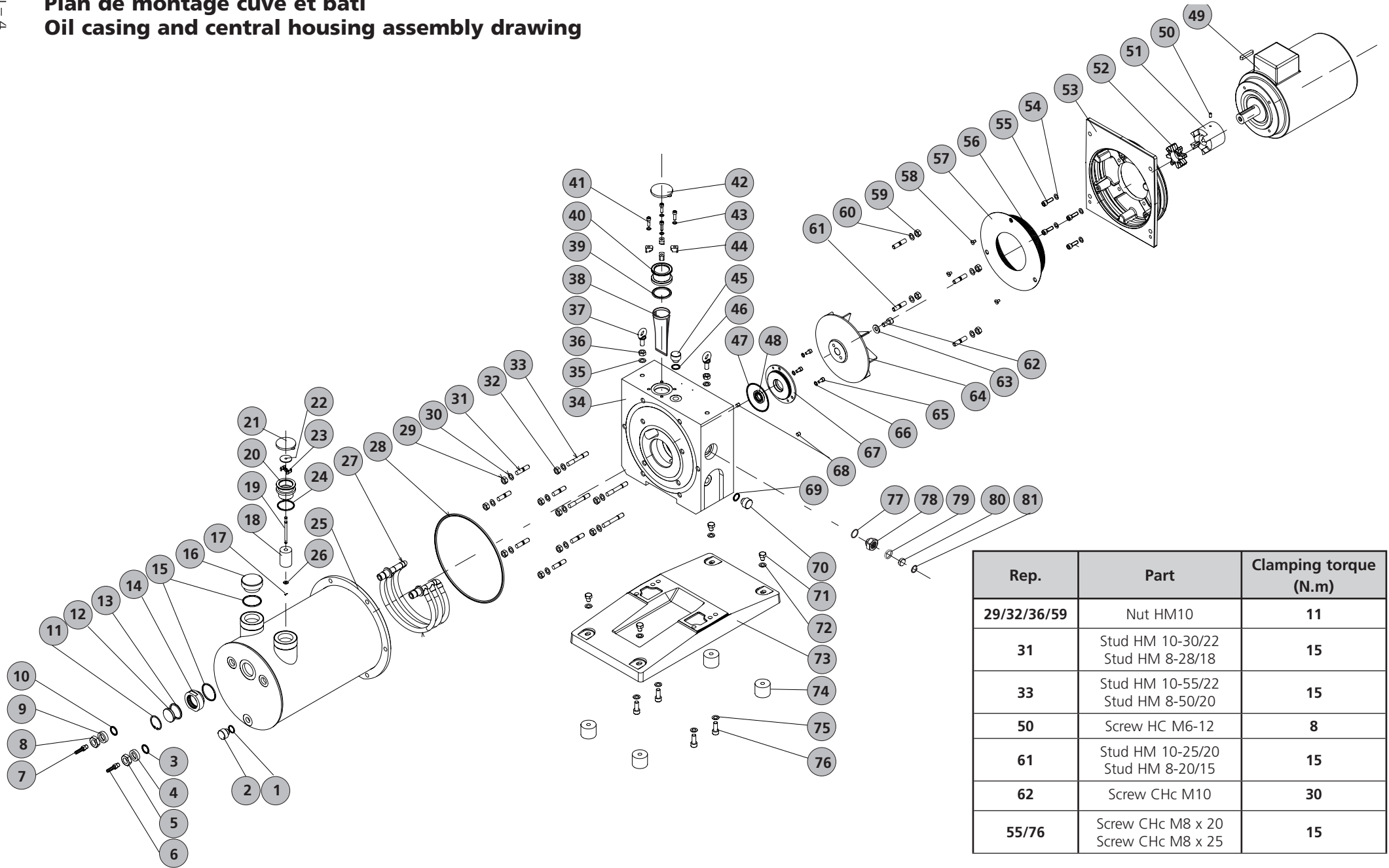
REP	DÉSIGNATION	SPECIFICATION	Types/model		REF. P/N
			2033 H1	2063 H1	
1	Joint torique 2.7*16.9	O-ring 2.70*16.9	1/3	1/3	●
2	Bouchon 3/8 G	Drain plug 3/8	1/3	1/3	052752
3	Joint torique 2.70 * 18.4	O-ring 2.70 *18.4	1/2	1/2	●
4	Douille d'étanchéité	Tightness spacer	1/2	1/2	065528
5	Ecrou HM 18	Nut HM 18	1/2	1/2	-
6	Rac. embout male 1/8G	1/8G male fitting	1/2	1/2	-
7	Idem 6	Idem 6	1/2	1/2	-
8	Ecrou HM 18	Nut HM 18	1/2	1/2	-
9	Idem 4	Idem 4	1/2	1/2	065528
10	Idem 3	Idem 3	1/2	1/2	●
11	Circlips D38	Circlips D38	1	1	●
12	Disque verre	Glass disc	1	1	054199
13	Joint torique 3.6*37.3	O-ring 3.6 *37.3	1	1	●
14	Corps voyant huile	Oil sight glass body	1	1	-
15	Joint torique 3*44	O-ring 3*44	2/3	2/3	●
16	Bouchon mâle	Fill plug	1	1	054213
17	Goupille V1.6 -10	Pin V1.6 -10	1	1	-
18	Filtre de refoulement équipé	Equipped exhaust filter	1	1	100116
19	Axe refoulement	Exhaust valve shaft	1	1	054223
20	Embout de refoulement DN 40 ISO KF	Exhaust nipple DN 40 ISOKF	1	1	054205
21	Protecteur	Protective cap	1/2	1/2	-
22	Soupape	Valve	1	1	●
23	Clips	Circlips	1	1	054133
24	Idem 15	Idem 15	1/3	1/3	●
25	Cuve	Oil case	1		-
25	Cuve	Oil case		1	-
26	Rondelle M6	Washer M6	1	1	-
27	Refroidisseur	Cooler	1		054274
27	Refroidisseur	Cooler		1	065526
28	Joint torique 5*220	O-ring 5*220	1		●
28	Joint torique 5*241	O-ring 5*241		1	●
29	Ecrou HM10	Nut HM10	6/20	6/20	⊕
30	Rondelle Ond.8	Washer D8	4/28	6/28	⊕
31	Goujon M8-28/18	Stud M8-28/18	6/6		054209
31	Goujon M10-30/22	Stud M10-30/22		6/6	054441
32	Idem 29	Idem 29	4/20	4/20	⊕
33	Goujon M8-50/20	Stud M8 -50/20	4/4		054266
33	Goujon M10-55/22	Stud M10-55/22		4/4	065515
34	Bâti	Central housing	1		-
34	Bâti	Central housing		1	-
35	Idem 30	Idem 30	2/28	2/28	⊕
36	Idem 29	Idem 29	2/20	2/20	⊕

● Lot joints / Minor kit

■ Lot maintenance / Major kit

⊕ Lot visserie / Screw kit

# Plan de montage cuve et bâti Oil casing and central housing assembly drawing



## Nomenclature cuve et bâti / Oil casing and central housing part list

REP	DÉSIGNATION	SPECIFICATION	Types/model		REF. P/N
			2033 H1	2063 H1	
37	Anneau levage	Eye hook	2/2		083004
37	Anneau levage	Eye hook		2/2	082697
38	Filtre aspiration	Inlet filter	1/1		054202
38	Filtre aspiration	Inlet filter		1/1	054426
39	Joint torique 5.33*40.64	O-ring 5.33*40.64	1/1	1/1	●
40	Embout d'aspiration DN 40 ISO KF	Inlet nipple DN 40 ISO KF	1	1	054232
41	Vis CHc M6-20	Screw Chc M6-20	1/4	1/4	✚
42	Protecteur	Protective cap	1/2	1/2	-
43	Rondelle D6	Washer D6	1/13	1/13	✚
44	Taquet	Intake clamp	4	4	068504
45	Idem 2	Idem 2	1/3	1/3	052752
46	Idem 1	Idem 1	1/3	1/3	●
47	Joint torique 2.5*74	O-ring 2.5*74	1/1	1/1	●
48	Joint double lèvres 20*35*7	Double lip seal 20*35*7	1/1	1/1	●
49	Moteur	Motor	1/1	1/1	page 12-13
50	Vis HC M6-12	Screw HC M6-12	1/1	1/1	-
51	Manchon moteur	Motor coupling	1/1		054116
51	Manchon moteur	Motor coupling		1/1	054436
52	Anneau élastique denté	Elastic coupling	1/1	1/1	■
53	Flasque moteur	Motor flange	1/1		054118
53	Flasque moteur	Motor flange		1/1	054419
54	Rondelle	Washer	4/4	4/4	●
55	Vis Chc M8-20	Screw CHc M8-20	4/4		-
55	Vis Chc M8-25	Screw CHc M8-25		4/4	-
56	Grille de protection	Motor flange screen	1/1		054264
56	Grille de protection	Motor flange screen		1/1	065511
57	Défecteur air	Deflector	1/1		054147
57	Défecteur air	Deflector		1/1	054432
58	Vis FS M6-10	Screw FS M6-10	3/3	3/3	✚
59	Idem 29	Idem 29	4/20	4/20	✚
60	Idem 30	Idem 30	4/28	4/28	✚
61	Goujon M8-20/15	Stud M8-20/15	4/4		075837
61	Goujon M10-25/20	Stud M10-25/20		4/4	075838
62	Vis CHc M10*20	Screw CHc M10*20	1/1	1/1	●
63	Rondelle Schnorr D10.5*23	Washer Schnorr D10.5 *23	1/1	1/1	●
64	Ventilateur	Fan	1/1		054115
64	Ventilateur	Fan		1/1	054435
65	Vis CHc M6-12	Screw CHc M6-12	3/3	3/3	✚
66	Rondelle OND D6	Washer D6	3/13	3/13	✚
67	Couvercle porte joint	Cover	1/1		054245
67	Couvercle porte joint	Cover		1/1	065222
68	Aiguille D6-12	Cotter D6-12	2/2		071041
68	Aiguille D8-12	Cotter D8-12		2/2	071046

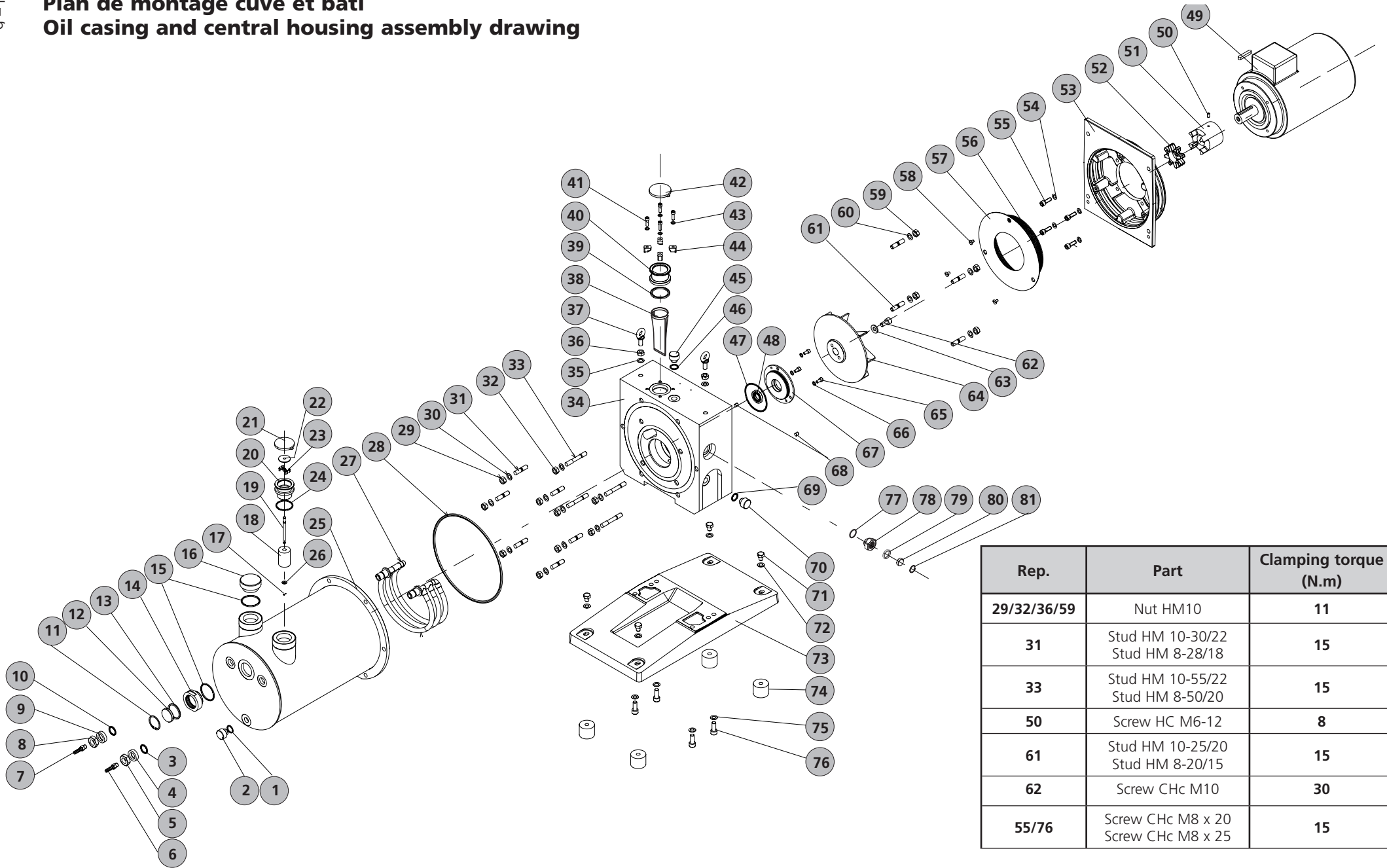
● Lot joints / Minor kit

■ Lot maintenance / Major kit

✚ Lot visserie / Screw kit



# Plan de montage cuve et bâti Oil casing and central housing assembly drawing



Rep.	Part	Clamping torque (N.m)
29/32/36/59	Nut HM10	11
31	Stud HM 10-30/22 Stud HM 8-28/18	15
33	Stud HM 10-55/22 Stud HM 8-50/20	15
50	Screw HC M6-12	8
61	Stud HM 10-25/20 Stud HM 8-20/15	15
62	Screw CHc M10	30
55/76	Screw CHc M8 x 20 Screw CHc M8 x 25	15

## Nomenclature cuve et bâti / Oil casing and central housing part list

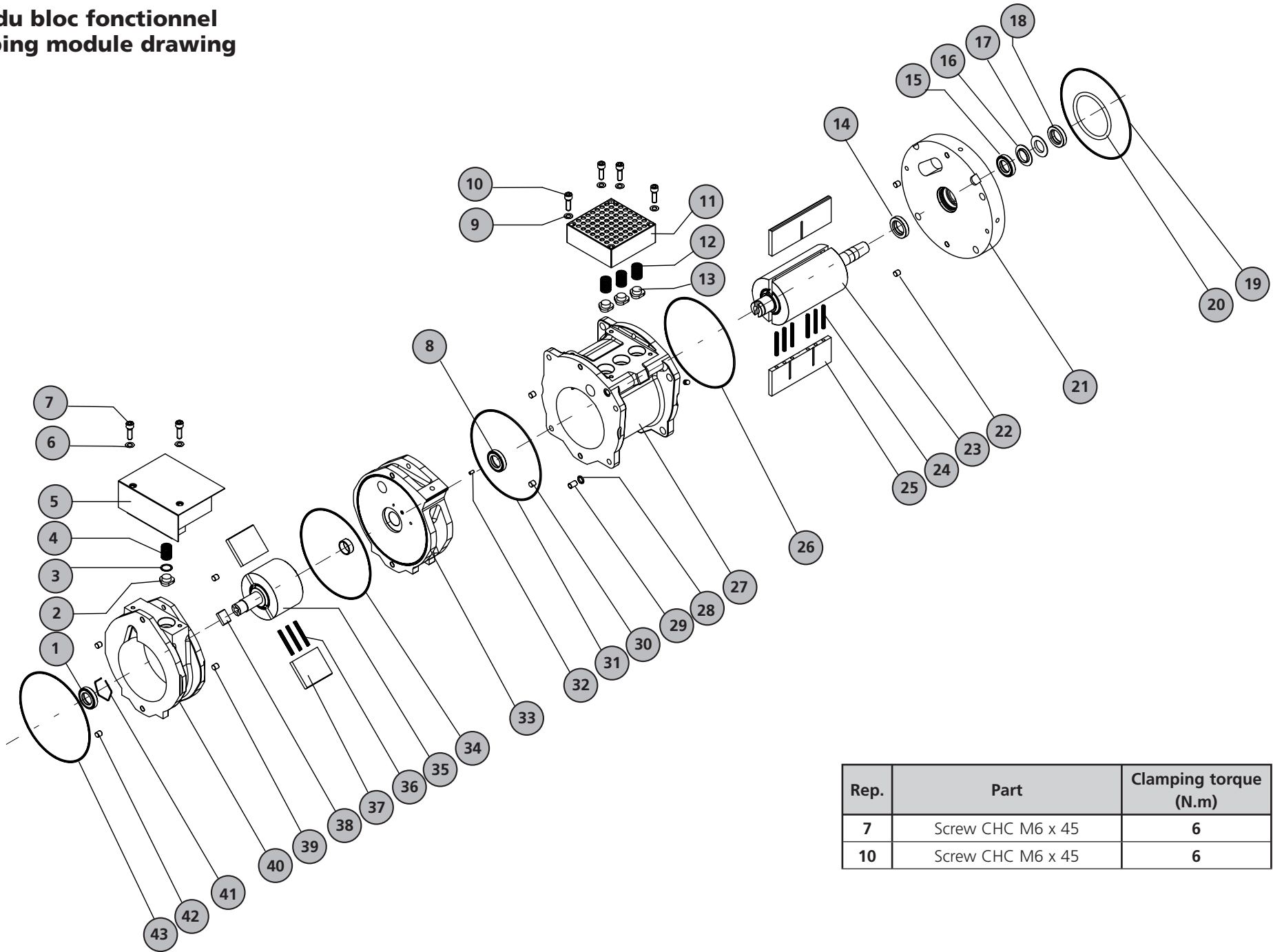
REP	DÉSIGNATION	SPECIFICATION	Types/model		REF. P/N
			2033 H1	2063 H1	
69	Joint torique 2.70*16.9	O-ring 2.70*16.9	1/3	1/3	●
70	Idem 2	Idem 2	1/3	1/3	052752
71	Vis HM 10-12	Screw HM 10-12	4/4	4/4	-
72	Rondelle Ond D10	Washer D10	4/28	4/28	✚
73	Socle	Base	1/1		054102
73	Socle	Base		1/1	054408
74	Butée	Shock mount	4/4	4/4	053323
75	Idem 30	Idem 30	4/28	4/28	✚
76	Vis CHc M8-20	Screw CHc M8-20	4/10		✚
76	Vis CHc M8-25	Screw CHc M8-25		8	✚
77	Joint torique 2*21	O-ring 2*21	1	1	●
78	Corps voyant huile	Oil sight glass body	1	1	●
79	Joint torique 3.6*19.8	O-ring 3.6*19.8	1	1	●
80	Disque pyrex	Pyrex disc	1	1	●
81	Circlips	Clips	1	1	●

● Lot joints / Minor kit

■ Lot maintenance / Major kit

✚ Lot visserie / Screw kit

# Plan du bloc fonctionnel Pumping module drawing



Rep.	Part	Clamping torque (N.m)
7	Screw CHC M6 x 45	6
10	Screw CHC M6 x 45	6

## Nomenclature du bloc fonctionnel / Pumping module list

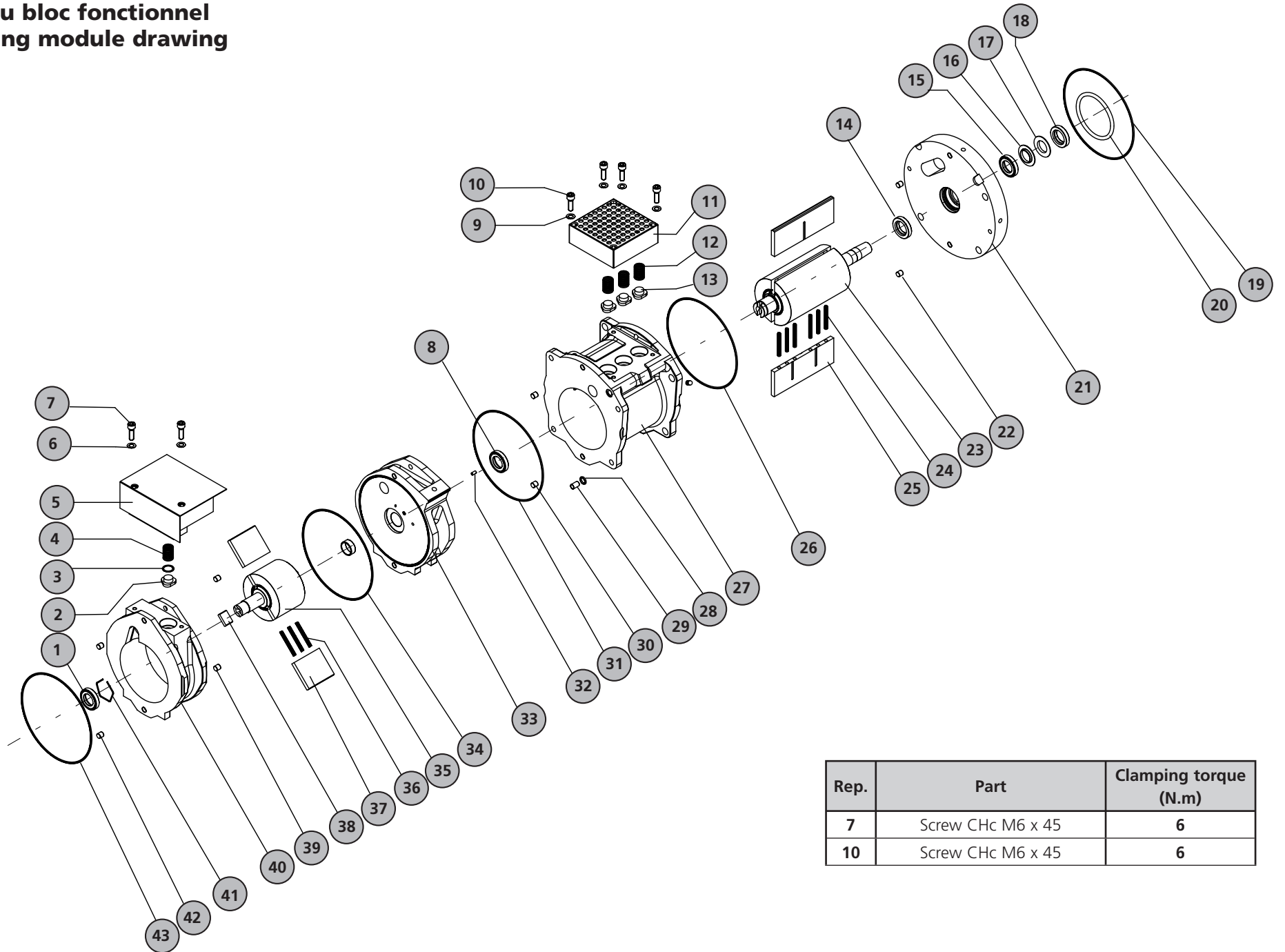
REP	DÉSIGNATION	SPECIFICATION	Types/model		REF. P/N
			2033 H1	2063 H1	
1	Joint à lèvres 20*35*7	Lip seal 20*35*7	1/5	1/4	●
2	Soupape	Valve	1/4	1/4	●
3	Rondelle soupape HP	Valve washer HP	1/1	1/1	●
4	Ressort soupape	Valve spring	1/4	1/4	■
5	Capot de soupape HP	Valve cover HP	1	1	054159
6	Rondelle D6	Washer D6	2/13	2/13	⊕
7	Vis Chc M6-45	Screw Chc M6-45	2/6	2/6	⊕
8	Joint à lèvres 20*35*7	Lip seal 20*35*7	1/5	1/1	●
8	Joint à lèvres 25*35*7	Lip seal 25*35*7		1/1	●
9	Idem 6	Idem 6	4/13	4/13	⊕
10	Idem 7	Idem 7	4/6	4/6	⊕
11	Capot de soupape BP	Valve cover LP	1		054129
11	Capot de soupape BP	Valve cover LP		1	054428
12	Idem 4	Idem 4	3/4	3/4	■
13	Idem 2	Idem 2	3/4	3/4	●
14	Idem 1	Idem 1	1/5	1/4	●
15	Joint à lèvres 20*35*7	Lip seal 20*35*7	1/5	1/4	●
16	Bague d'appui du joint à lèvres	Resting ring	1/2	1/2	100582
17	Idem 16	Idem 16	1/2	1/2	100582
18	Idem 1	Idem 1	1/5	1/4	●
19	Joint torique 2*127.5	O-ring 2*127.5	1/5		●
19	Joint torique 2*148	O-ring 2*148		1/5	●
20	Joint torique 5.33 *56.52	O-ring 5.33*56.52	1		●
20	Joint torique 5.33 *69.22	O-ring 5.33*69.22		1	●
21	Flasque avant	Front plate	1		A110627S
21	Flasque avant	Front plate		1	A111320S
22	Goupille D6 L8	Pin D6 L8	2/8		071042
22	Goupille D8 L8	Pin D8 L8		2/8	071040
23	Rotor BP	Rotor LP	1		054247S
23	Rotor BP diam. 20	Rotor LP diam. 20		1	065524S
23	Rotor BP diam. 25	Rotor LP diam. 25		1	A214806S
24	Ressort de palette	Spring vane	6/9	6/9	■
25	Palette BP	Vane LP	2	2	■
26	Idem 19	Idem 19	1/5	1/5	●
27	Stator BP	Stator LP	1		054120S
27	Stator BP	Stator LP		1	054411S
28	Joint torique 2*18	O-ring 2*18	1	1	●
29	Tube	Tube	1	1	054246
30	Idem 22	Idem 22	2/8	2/8	-
31	Idem 19	Idem 19	1/5	1/5	●

● Lot joints / Minor kit

■ Lot maintenance / Major kit

⊕ Lot visserie / Screw kit

**Plan du bloc fonctionnel**  
**Pumping module drawing**



Rep.	Part	Clamping torque (N.m)
7	Screw CHc M6 x 45	6
10	Screw CHc M6 x 45	6

## Nomenclature du bloc fonctionnel / Pumping module list

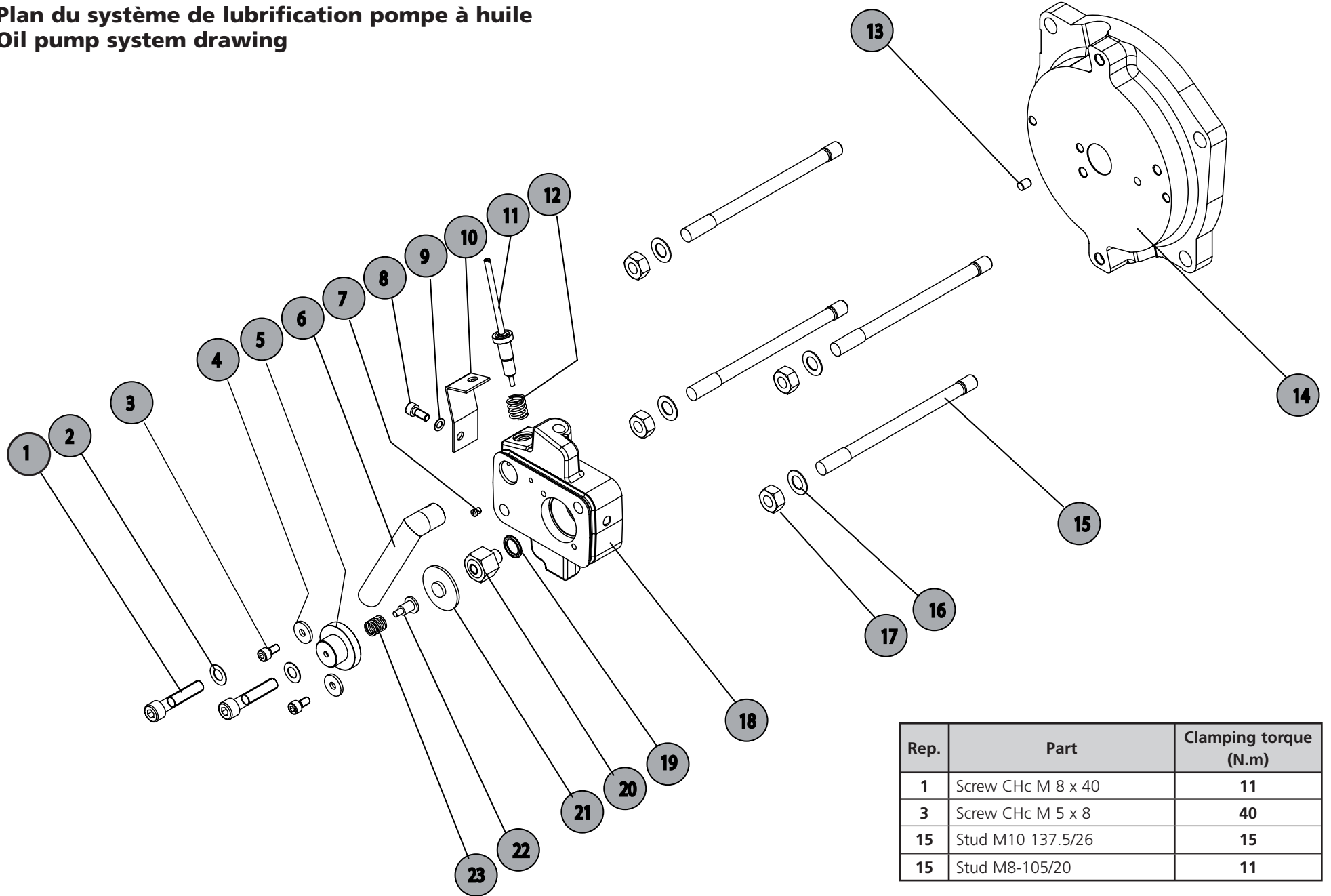
REP	DÉSIGNATION	SPECIFICATION	Types/model		REF. P/N
			2033 H1	2063 H1	
32	Gicleur médian	Jet int. plate	1		087997
32	Gicleur médian	Jet int. plate		1	065001
33	Flasque médian diam. 20	Intermediate flange diam. 20	1		054121S
33	Flasque médian diam. 20	Intermediate flange diam. 20		1	054413S
33	Flasque median diam. 25	Intermediate flange diam. 25		1	A110543S
34	Idem 19	Idem 19	1/5	1/5	●
35	Rotor HP	Rotor HP	1		054125S
35	Rotor HP diam. 20	Rotor HP diam. 20		1	054433S
35	Rotor HP diam. 25	Rotor HP diam. 25		1	A214808S
36	Ressort de palette	Vane spring	3/9	3/9	■
37	Palette	Vane	2	2	■
38	Palette de pompe à huile	Oil pump vane	1	1	■
39	Idem 22	Idem 22	2/8	2/8	-
40	Stator HP	Stator HP	1		054122S
40	Stator HP	Stator HP		1	054415S
41	Frein d'axe	Circlip	1	1	●
42	Idem 22	Idem 22	2/8	2/8	-
43	Idem 19	Idem 19	1/5	1/5	●

● Lot joints / Minor kit

■ Lot maintenance / Major kit

⊕ Lot visserie / Screw kit

**Plan du système de lubrification pompe à huile**  
**Oil pump system drawing**



Rep.	Part	Clamping torque (N.m)
1	Screw CHc M 8 x 40	11
3	Screw CHc M 5 x 8	40
15	Stud M10 137.5/26	15
15	Stud M8-105/20	11

## Nomenclature du système de lubrification pompe à huile / Oil pump system part list

REP	DÉSIGNATION	SPECIFICATION	Types/model		REF. P/N
			2033 H1	2063 H1	
1	Vis CHc M 8-40	Screw CHc M 8-40	2/2	2/2	✚
2	Rondelle Ond D8	Washer D8	2/2	2/2	✚
3	Vis CHc M 5-8	Screw CHc M 5-8	2/2	2/2	✚
4	Rondelle D5	Washer D5	2/2	2/2	✚
5	Cylindre	Cylinder	1/1	1/1	083077
6	Tube prise d'huile	Oil admission tube	1/1		-
6	Tube prise d'huile	Oil admission tube		1/1	-
7	Gliceur	Jet	1/1	1/1	054241
8	Vis CHc M 5-12	Screw CHc M 5-12	1/1	1/1	✚
9	Rondelle Ond D5	Wavy washer D5	1/1	1/1	✚
10	Butée tube entrée d'air	Stop for air admission tube	1/1	1/1	065510
11	Tube de prise d'air	Air admission tube	1/1	1/1	054212
12	Ressort	Spring	1/1	1/1	■
13	Goupille D6 L8	Pin D6 L8	1/1	1/1	071040
14	Flasque arrière	Rear flange	1/1		054250S
14	Flasque arrière	Rear flange		1/1	065505S
15	Goujon M8-105/20	Stud M8-105/20	4/4		054208
15	Goujon M10-137.5/26	Stud M10-137.5/26		4/4	054443
16	Rondelle Ond D8	Washer D8	4/4		✚
16	Rondelle Ond D10	Washer D10		4/4	✚
17	Ecrou HM 8	Nut HM 8	4/20		✚
17	Ecrou HM10	Nut HM 10		4/20	✚
18	Corps de pompe à huile	Oil pump body	1/1		054253
18	Corps de pompe à huile	Oil pump body		1/1	065513
19	Joint torique 2.7*10.5	O-ring 2.7*10.5	1/1	1/1	●
20	Siège	Seat	1/1	1/1	054144
21	Membrane	Membrane	1/1	1/1	●
22	Piston	Piston	1/1	1/1	083331
23	Ressort	Spring	1/1	1/1	■

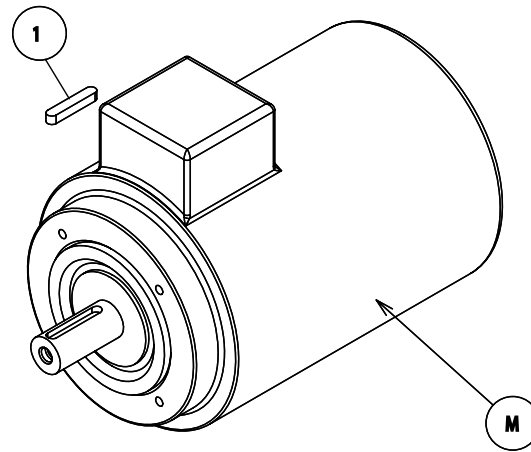
● Lot joints / Minor kit

■ Lot maintenance / Major kit

✚ Lot visserie / Screw kit



## Plan ensemble motorisation (M) Motor assembly drawing (M)



### Nomenclature ensemble motorisation (M) / Motor assembly part list (M)

REP	DÉSIGNATION	SPECIFICATION	Types/model		REF. P/N
			2033 H1	2063 H1	
1	Clavette	Shaft key	1/1	1/1	-
M1	Moteur triphasé EUROPE 1.1/1.3 kW - 190/480V - 50/60Hz - 1500/1800 tr/mn	Tree-phase motor EUROPE 1.1/1.3 kW - 190/480V - 50/60Hz - 1500/1800 tr/mn	1/1		<b>118059</b>
M2	Moteur triphasé EUROPE 2.2/2.6 kW - 190/480V - 50/60Hz - 1500/1800 tr/mn	Tree-phase motor EUROPE 2.2/2.6 kW - 190/480V - 50/60Hz - 1500/1800 tr/mn		1/1	<b>118060</b>
M3	Moteur triphasé USA/JAPAN 1.1/1.3 kW - 175/460V - 50/60Hz - 1500/1800 tr/mn	Tree-phase motor USA/JAPAN 1.1/1.3 kW - 175/460V - 50/60Hz - 1500/1800 tr/mn	1/1		<b>113114</b>
M4	Moteur triphasé USA/JAPAN 2.2/2.6 kW - 175/460V - 50/60Hz - 1500/1800 tr/mn	Tree-phase motor USA/JAPAN 2.2/2.6 kW - 175/460V - 50/60Hz - 1500/1800 tr/mn		1/1	<b>113115</b>
M5	Moteur triphasé ASIA/ROW 1.1/1.3 kW - 180/480V - 50/60Hz - 1500/1800 tr/mn	Tree-phase motor ASIA/ROW 1.1/1.3 kW - 180/480V - 50/60Hz - 1500/1800 tr/mn	1/1		<b>114449</b>
M6	Moteur triphasé ASIA/ROW 2.2/2.6 kW - 180/480V - 50/60Hz - 1500/1800 tr/mn	Tree-phase motor ASIA/ROW 2.2/2.6 kW - 180/480V - 50/60Hz - 1500/1800 tr/mn		1/1	<b>114450</b>

**CHINA**

Alcatel Vacuum Technology, Shanghai  
N°82 Lane 887 Zuchongzhi Road  
Zhangjiang High-Tech Park,  
Shanghai 201203  
China  
Tel. (86) 21 5027 0628  
Fax. (86) 21 3895 3815

**JAPAN**

Alcatel-Lucent Japan Ltd.  
1-9-4 Kita Shin-Yokohama  
Kohoku-ku  
Yokohama, Kanagawa 223-0059  
Japan  
Tel. (81) 3 6431 7130  
Fax. (81) 45 544 0049

**SWEDEN**

Adixen Sensistor AB.  
Box 76  
SE-581 02 Linköping  
Sweden  
Tel. 46 (0)13 35 59 00  
Fax. 46 (0)13 35 59 01

**FRANCE**

Alcatel Vacuum Technology France  
98, avenue de Brogny - BP 2069  
74009 Annecy cedex  
France  
Tel. (33) 4 50 65 77 77  
Fax. (33) 4 50 65 77 89

**KOREA**

Alcatel Vacuum Technology Korea  
447 Banwol-dong, Hawsung-si,  
445-330 Kyungki-do,  
South Korea  
Tel. (82) 031-206-6277  
Fax. (82) 031-204-6279

**TAIWAN**

Alcatel Vacuum Technology Taiwan  
No. 169-3, Sec.1, Kang-Leh Rd  
Song-Lin Village, Hsin-Feng 304  
Hsin-Chu County  
Taiwan - R.O.C.  
Tel. (886) 3 559 9230  
Fax.(886) 3559 9231

**GERMANY**

Alcatel Hochvakuumtechnik GmbH  
Am Kreuzeck 10 - Postfach 1151  
97877 Wertheim  
Germany  
Tel. (49) 9342 9610 0  
Fax. (49) 9342 9610 30

**NETHERLANDS**

ALCATEL Vacuum Technology Benelux  
Landzichtweg 60  
NL 4105 DP Culemborg  
The Netherlands  
Tel. (31) 345 478 400  
Fax. (31) 345 531 076

**UNITED KINGDOM**

Alcatel Vacuum Technology UK Ltd  
8 Bain Square - Kirkton Campus  
Livingston - West Lothian  
EH54 7DQ - Scotland  
United Kingdom  
Tel. (44) 1 506 418 000  
Fax. (44) 1 506 418 002

**ITALY**

Alcatel Vacuum Systems  
Via Trento, 30  
20059 Vimercate (Mi)  
Italy  
Tel. (39) 0396 86 38 55  
Fax. (39) 039 66 71 25

**SINGAPORE**

Alcatel-Lucent Singapore  
49 Jalan Pemimpin  
#01-02 APS Industrial Building  
577203  
Singapore  
Tel. (65) 6254 0828  
Fax. (65) 6254 7018

**USA**

Alcatel Vacuum Products  
67, Sharp Street  
Hingham - MA 02043  
USA  
Tel. (1) 781 331 4200  
Fax. (1) 781 331 4230

Alcatel Vacuum Technology France - 98, avenue de Brogny - BP 2069 - 74009 Annecy cedex - FRANCE  
Tel. (33) 4 50 65 77 77 - Fax. (33) 4 50 65 77 89  
Web site: [www.adixen.com](http://www.adixen.com)

**An Alcatel-Lucent Company**