



# Pascal 2033-2063 Series

Rotary vane pumps

## Operating instructions

## Welcome

### Rotary vane pumps 2033 - 2063 SD-C1-C2



#### APPLICATIONS:

- RESEARCH AND DEVELOPMENT
- INDUSTRY:  
FOODSTUFFS (FREEZE-DRYING), PHARMACEUTICALS,  
ELECTRONIC TUBE MANUFACTURE, METALLURGY, DRYING SYSTEMS, REFRIGERATION SYSTEMS,  
CHEMICAL INDUSTRY, ETC.
- VARIOUS SEMICONDUCTOR PROCESSES

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 adixen Vacuum Products in the design of rotary vane pumps.

**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.**

**The performance and operational safety of this product are guaranteed provided it is used normally in the operating conditions defined in this manual.**

**It is the customer's task to:**

- train operators to use the product if they do not speak the language the manual is written in,
- ensure operators know the safe practices to apply when using the product.

This product complies with the requirements of European Directives. listed in the Declaration of Conformity contained in page 56 of this manual.

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Specifications and information are subject to change without notice by adixen Vacuum Products.

**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).

Before switching on the appliance, study the user's manual and make sure you follow the safety instructions it gives. You can recognise these by the 'Caution', 'Warning' and 'Danger' symbols.

Good practice tips and manufacturer's recommendations are in a grey box.

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## Nomenclature

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# 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.
- 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:  
- Helium 3 used by cryogenists,  
- Radioactive gases used in nuclear applications, either for the recycling of CFC or refrigerated gas.

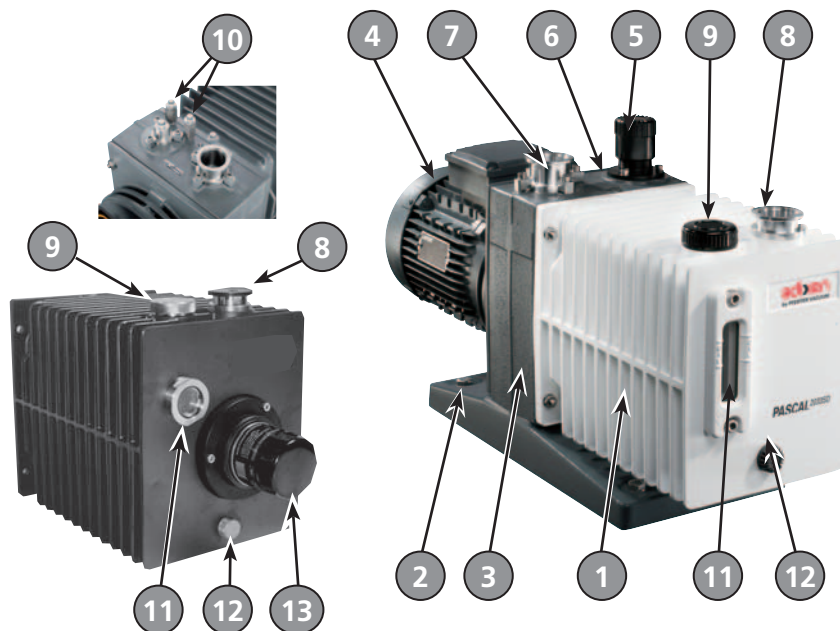
Nominal flow rate m <sup>3</sup> /h	30	60
SD Series	2033SD	2063SD
C1 Series	2033C1	2063C1
C2 Series	2033C2	2063C2
H1 Series *	2033H1	2063H1

\* See 2033-2063 Series H1 User's manual.

## 2033 - 2063 m<sup>3</sup>/h rotary vane pumps. SD, C1, C2 Pascal series

The 33 to 63m<sup>3</sup>/h pump models, have 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.
- A **gas ballast** enables the pumping of condensable vapors.
- 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, a **sight glass** can be used to inspect the oil level easily when filling the oil case and during the operation of the pump.
- A **neutral gas purge** is used to degas oil and dilute pumped gases on C1 and C2 series models.
- An **oil casing purge** is used to dilute the pumped gases on C2 series models.
- Sensor connections for oil pressure or temperature sensors are available on C2 series models.



1. Oil case
2. Base
3. Frame
4. Electric motor
5. Gas ballast control
6. Spring hook (lifting device)
7. Inlet end fitting
8. Exhaust end fitting
9. Oil case filling plug

10. Sensor connections (C2 Series)
11. Oil level sight glass
12. Oil draining plug
13. Oil filter (C1 Series)

The inlet and exhaust end fittings are PNEUROP ISO-KF standardized. They can be used to connect many of our accessories (*see page 14*).

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.

# Operating principle of the rotary vane pump

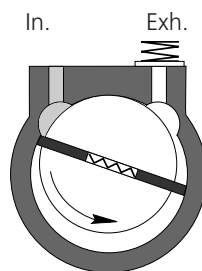
## Single-stage rotary vane pump

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.

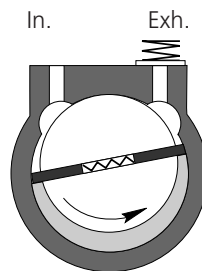
## The pumping cycle is given below:

**Inlet**



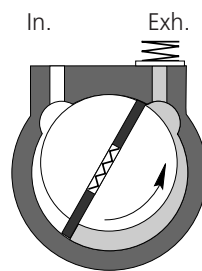
As the vane passes in front of the inlet orifice, an increasing space is formed into which the gas from the chamber to be evacuated expands. When the second vane passes, the space is closed.

**Transfer**



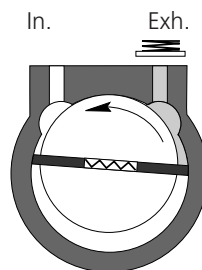
The gas trapped in the space between the two vanes is transferred to the exhaust orifice as the rotor rotates.

**Compression**



The space communicates with the exhaust, which is fitted with a valve: the gas is compressed until the safety valve is opened.

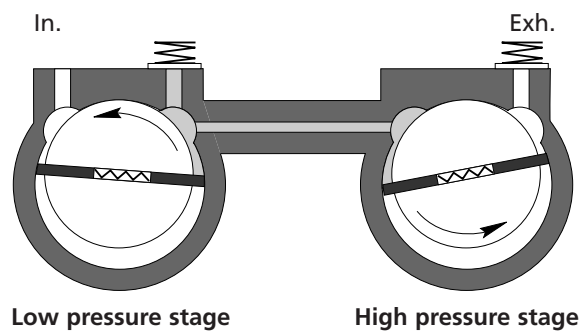
**Exhaust**



The gas is expelled into the oil casing when the pressure is sufficient to open the valve.

## 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 stage (low pressure) are transferred to the second stage (high pressure) 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  $3.75 \cdot 10^{-3}$  Torr ( $5 \times 10^{-3}$  mbar).

Note: when operating a two stage vane pump continuously, greater than half an hour  
- above 1.0 Torr,  
- or with opened gas ballast,  
the unit should be equipped with an oil mist eliminator equipped with an oil return system.



# Oil - Noise limiter - Antisuckback

- Oil** 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 vapor pressure of the oil, its viscosity and its ability to dissolve gases.

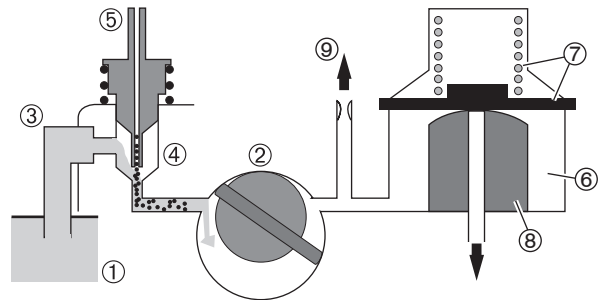
- Good pumping conditions are related to the type of oil used. The choice depends on:
- Expected pump performance.
  - Chemical aggression and corrosion of pumped gases.
  - Accessories used.
  - Desired maintenance intervals and total operating cost.

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

## Lubrication

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 bottom 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).

### C1 series

C1 series pumps are equipped with an automobile type oil filter, which traps particles from the oil pumps exhaust. Due to its construction, its life time is reduced when pumping on corrosive products in large quantities. In this case, an auxiliary oil filtering system is recommended and the filter is replaced by a stainless steel short-circuit stopper (*see accessories page 14*).

## 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.

## Anti-suckback and tightness at stopping

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.

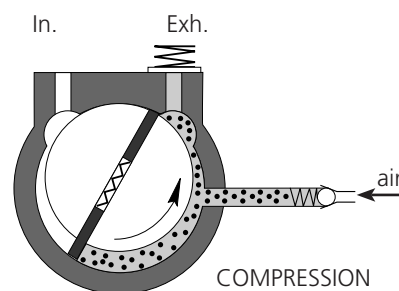
## Gas ballast

When condensable vapors are being pumped, gas is compressed beyond its saturated vapor pressure in the «compression» phase and can condense, impairing pump performance and life.

The gas ballast can be used to inject a certain quantity of air (inert or dry gas) into the last stage of the pump during the «compression» phase so that the partial pressure of the pumped gas is less than its saturated vapor pressure at the temperature of the pump. Condensation is therefore impossible if this limit is not reached. The maximum admissible vapor pressure is obtained at pump inlet for this value.

At the end of «compression», the pressure in the exhaust chamber is greater than atmospheric pressure. An anti-suckback device (valve + spring) prevents the gases and oil from being draw back into the inlet.

The saturated vapor pressure of a body is higher when the system is hot than when it is cold; therefore, the pump must reach operating temperature before pumping condensable vapors.



## Gas ballast (cont'd)

### CAUTION

- Using the gas ballast increases the ultimate pressure of the pump as well as the temperature.
- The gas ballast control, located on the frame cannot be used to set the gas injection flow rate.
- When the gas ballast control is open, the pump is not tight when stopped. To guarantee this tightness, install an automatic gas ballast.
- The functioning in permanent regime with opened gas ballast draws away important oil losses (mist) by exhaust: use an accessory OME 40 HP + ODK (see *page 14*) or control the oil level very often.
- C1 and C2 pump series:  
Because of the danger present if the gas ballast (C1 series) or purge gas ballast (C2 series) was to be opened to atmosphere, remove the plug and connect the port to a neutral gas supply line (see *page 31*).

## Technical characteristics

### For industry: SD Series

Characteristics	Unit	2033 SD		2063 SD	
		50	60	50	60
Frequency	HZ	50	60	50	60
Number of stages		2		2	
Nominal rotation speed	rpm	1500	1800	1500	1800
Nominal flow rate	m <sup>3</sup> /h	30		60	
	cfm		23.3		42.4
Flow rate Pneurop method	m <sup>3</sup> /h	27		55	
	cfm		18.8		38
Partial ultimate pressure <sup>(1)</sup> with A120 oil	Torr/mbar Pa	3.75.10 <sup>-4</sup> / < 5.10 <sup>-4</sup>		3.75.10 <sup>-4</sup> / < 5.10 <sup>-4</sup>	
Ultimate pressure with gas ballast closed	Torr/mbar/Pa	2.25.10 <sup>-3</sup> / 3.10 <sup>-3</sup> / 3.10 <sup>-1</sup>			
Ultimate pressure with gas ballast open <sup>(3)</sup>	Torr/mbar/Pa	1.5.10 <sup>-2</sup> / 2.10 <sup>-2</sup> / 2			
Maximum pressure in continuous operation	Torr/mbar/Pa	7.5 / < 10 / 1.10 <sup>3</sup> 75 / > 100 / 1.10 <sup>4</sup>			
• without oil recovery					
• with oil recovery					
Maximum exhaust relative overpressure	bar	0.5			
Oil capacity (case)	l	3.6		7	
Maximum water vapor pumping capacity <sup>(3)(1)</sup>	Torr/mbar	30		25	
	Pa	3.10 <sup>3</sup>		25.10 <sup>2</sup>	
Water vapor pumping capacity	g/h	700		1200	
Weight (pump + motor) <sup>(2)</sup>	kg (lb)	65.5 (144.4)		102 (224.9)	
Inlet and exhaust end fittings		DN 40 ISO-KF			
Ambient operating temperature	°C	min 12 / max 45			
Ambient storage temperature	°C	min 5 / max 65			

### Corrosive applications: C1 Series

Characteristics	Unit	2033 C1		2063 C1	
		50	60	50	60
Frequency	HZ	50	60	50	60
Number of stages		2		2	
Nominal rotation speed	rpm	1500	1800	1500	1800
Nominal flow rate	m <sup>3</sup> /h CFM	30		60	
			23.3		42.4
Flow rate Pneurop method	m <sup>3</sup> /h CFM	27		55	
			18.8		38
Partial ultimate pressure <sup>(1)</sup> with A120 oil	Torr/mbar/Pa	3.75.10 <sup>-4</sup> / 5.10 <sup>-4</sup> / 5.10 <sup>-2</sup>			
Ultimate pressure with gas ballast closed	Torr/mbar/Pa	2.25.10 <sup>-3</sup> / 3.10 <sup>-3</sup> / 3.10 <sup>-1</sup>			
Ultimate pressure with gas ballast open <sup>(3)</sup>	Torr/mbar/Pa	1.5.10 <sup>-2</sup> / 2.10 <sup>-2</sup> / 2			
Maximum pressure in continuous operation	Torr/mbar/Pa	7.5 / < 10 / 1.10 <sup>3</sup> 75 / > 100 / 1.10 <sup>4</sup>			
• without oil recovery					
• with oil recovery					
Maximum exhaust relative overpressure	bar	0.5			
Oil capacity	l	3.6		7	
Maximum water vapor pumping capacity <sup>(3)(1)</sup>	Torr/mbar	30		25	
	Pa	3.10 <sup>3</sup>		25.10 <sup>2</sup>	
Water vapor pumping capacity	g/h	700		1200	
Weight (pump + motor) <sup>(2)</sup>	kg (lb)	68.5(150)		105.5 (232.6)	
Inlet and exhaust end fittings		DN 40 ISO-KF			
Ambient operating temperature	°C	min 12 / max 45			
Ambient storage temperature	°C	min 5 / max 65			

<sup>(1)</sup> Partial ultimate pressure and vapor pressure measured according to Pneurop 6602 specifications with A120 oil charge. It may vary if other oils are used (**see page 17**).

<sup>(2)</sup> These values are for pumps equipped with IE2 European three-phase motors.

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.

<sup>(3)</sup> Vapor pressure measured with an automatic gas ballast.

## Technical characteristics (cont'd)

### Corrosive applications: C2 Series

Characteristics	Unit	2033 C2		2063 C2	
		50	60	50	60
Frequency	HZ	50	60	50	60
Number of stages		2		2	
Nominal rotation speed	rpm	1500	1800	1500	1800
Nominal flow rate	m <sup>3</sup> /h	30		60	
	cfm		23.3		42.4
Flow rate Pneurop method	m <sup>3</sup> /h	27		55	
	cfm		18.8		38
Partial ultimate pressure <sup>(1)</sup> with A120 oil	Torr/mbar/Pa	<b>3.75.10<sup>-4</sup> / 5.10<sup>-4</sup> / 5.10<sup>-2</sup></b>			
Ultimate pressure with gas ballast closed	Torr/mbar/Pa	<b>2.25.10<sup>-3</sup> / 3.10<sup>-3</sup> / 3.10<sup>-1</sup></b>			
Maximum pressure in continuous operation	Torr/mbar/Pa	7.5 / < 10 / 1.10 <sup>3</sup>			
<ul style="list-style-type: none"> <li>• without oil recovery</li> <li>• with oil recovery</li> </ul>		75 / > 100 / 1.10 <sup>4</sup>			
Maximum exhaust relative overpressure	bar	0.5			
Oil capacity (case)	l	3.6		7	
Weight (pump + motor) <sup>(2)</sup>	kg (lb)	66.5(145.5)		102.5 (226)	
Inlet and exhaust end fittings		DN 40 ISO-KF			
Ambient operating temperature	°C	min 15 / max 45			
Ambient storage temperature	°C	min 5 / max 65			

<sup>(1)</sup> Partial ultimate pressure measured according to Pneurop 6602 specifications with A113 oil charge. It may vary if other oils are used (**see page 17**).

<sup>(2)</sup> These values are for pumps equipped with IE2 European three-phase motors.

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.

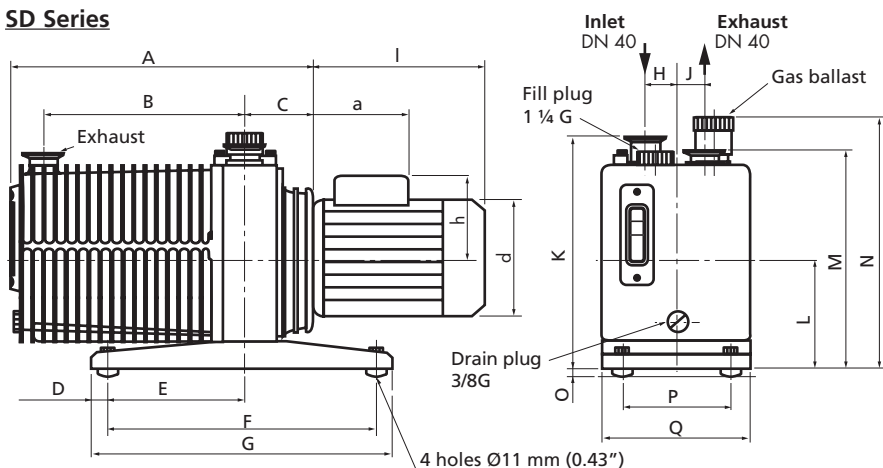
### Materials

The pumps are made in different materials to address the requirements of all major vacuum applications.

Materials	SD Series	C1 Series	C2 Series
Valves	FPM		
Optional valves	PAI		
Oil sight glass	Glass	Glass	PA
O-rings, lip seals	FPM		
Rotors	Carbon steel		
HP, LP valves	Abestos free plastic		
Stators, central housing, plates	Cast iron (without Cu, Zn, Cad)		
Oil casing	Aluminium		
Friction rings	Alloy of zinc	Graphite	

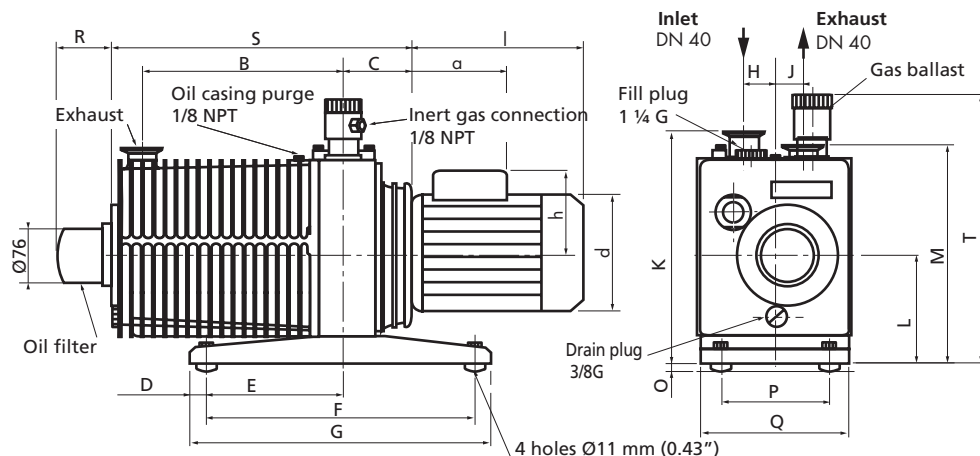
# Pump dimensions

## SD Series

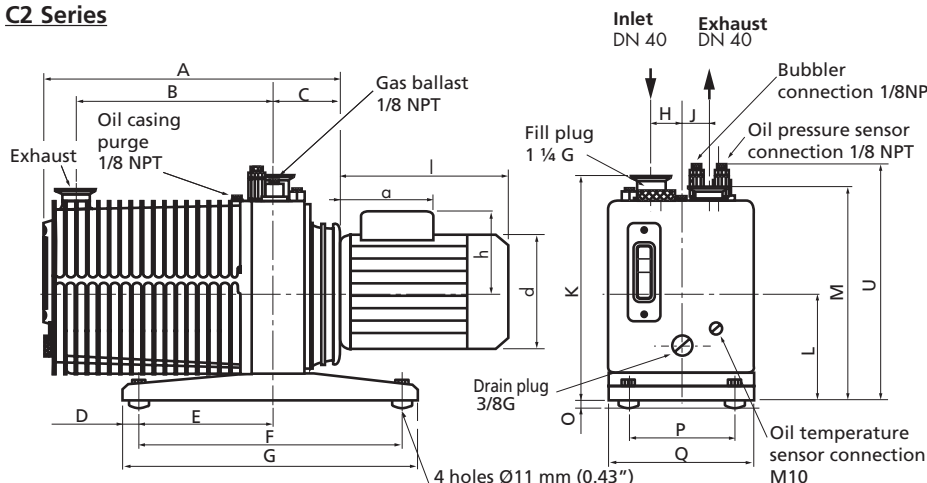


P/N	Dimensions (mm/inch)				Weight (kg/lb)
	l	d	h	a	
114449	270	170	140	200	21.7
	10.6	6.7	5.5	7.9	47.8
119997	267	177	137	143	18.2
	10.5	7	5.4	5.6	40.1
119998	267	177	137	143	16.4
	10.5	7	5.4	5.6	36.2

## C1 Series



## C2 Series



P/N	Dimensions (mm/inch)				Weight (kg/lb)
	l	d	h	a	
114450	300	190	150	230	29.8
	11.8	7.5	5.9	9.1	65.7
119979	321	196	144	149	26
	12.6	7.7	5.7	5.9	57.3
119980	321	196	144	149	26
	12.6	7.7	5.7	5.9	57.3

## Dimensions en mm (inch)

	A	B	C	D	E	F	G	H	J	K	L	M	N	O	P	Q	R	S	T	U
2033	455	288	103	31	206	375	437	53	42	336	164	323	362 to 385	12	140	213	91	452	389 to 398	353
	17.7	11.2	4	1.2	8	14.6	17	2	1.6	13.1	6.3	12.5	14.1 to 15	0.46	5.4	8.3	3.5	17.6	15 to 5.5	13.7
2063	529	342	118	29	229	459	521	56	45	385	186	371	410 to 422	12	190	264	91	526	438 to 447	402
	20.6	13.3	4.6	1.13	8.9	17.9	20.3	2.1	1.7	15	7.2	14.4	16 to 6.4	0.46	7.4	10.2	3.5	20.5	17 to 17.4	15.6

# Accessories

Name	SD	C1	C2	Part number	Location	Fonctions
Oil mist eliminator	OME 40 S	●		104887	Exhaust	• Separates oil droplets and particles contained in exhaust gases emitted by the pump.
	OME 40 C1	○	●	068785		
	OME 40 C2	○	○	068492		
High pressure oil mist eliminator OME 40 HP+	●			200024	Exhaust	• Separates oil droplets and particles contained in exhaust gases emitted by the pump when pump operate in high pressure and/or in frequent cycles. Can be fitted to <b>ODK 136</b> and <b>ODK 236</b> .
Oil level switch OLS 36	●			104377	On oil casing	Provide information about oil level inside oil casing of RVP, whenever the pump is located in an unaccessible area.
Oil draining kit ODK 136	●			118773	Gas ballast	• Connect to the OME 40 HP+, it is used to recover oil via the gas ballast. Note : the pump is not sealed when switched off.
Oil draining kit ODK 236	●			118776: 220/240V 50/60 Hz 118777: 115V 60 HZ	Inlet	Connect to the OME 40 HP+, it is used to recover oil. Equipped with an electrovalve which seals the pump when switched off.
Sorption trap ST 40	●			104731 -115V 053380 220 V	Inlet	• Prevents oil backstreaming when pumping in a "clean" vacuum.
Automatic gas ballast AGB 36	●		○	068391: 230V 50/60Hz 104367 115V 60Hz	Gas ballast	• Remote control for gas ballast. • Allows the gas ballast to be closed when the pump is off, ensuring that the pump is tight.
Oil filter DE1	●	●	●	068990 220V 50/60Hz 068991 115V 50/60Hz	External device	• Filters and/or neutralizes oil when pumping gases which are corrosive and could rapidly degrade oil quality.
Oil filter DE2	●	●	●	104374 220V 50/60Hz 104375 115V 50/60Hz		
Shock mount	●	●	●	082691 LAX 100 model D	Between base and machine frame	• Allows pump to be mounted on a frame.
Oil short-circuit adaptor		●		054273	On the vessel pipe fitting	• On C1 model, allows to remove the oil filter cartridge and replace it by an oil filtration system type DE1 or DE2.

Possible without restrictions

Possible with restrictions

Out of question

## WARNING

- When pumping on corrosive, aggressives or flammable gases, the gas can cause injury or death. In these cases,
  - connect the exhaust of the pump to an exhaust stack or an evacuation duct.
  - connect a relief valve or rupture disc directly on the pump. Contact your closest service center (see addresses at the back of the manual).
 When the exhaust 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.
- For safety reasons, use accessories on the inlet and exhaust lines whose materials and sealing properties are compatible with the gases being used.

# Safety instructions concerning the installation and operation

## 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

- We took care to provide you with a clean appliance. To keep it in this condition, unpack it only in its final place of use.
- Make sure the equipment shows no sign of transport damage. If it has been damaged, take the necessary steps to record this with the carrier and inform the manufacturer. In all cases, we recommend keeping the packaging (reusable materials) for further transport of the equipment or for prolonged storage.

## ⚠ WARNING

## Handling

- Vane roughing pumps use lubricants, it is recommended to request information from the manufacturer on the safety data sheets concerning the lubricant. These can be downloaded from [www.adixen.com](http://www.adixen.com).
- The pumps are delivered without an oil charge: the oil is delivered in separate containers.  
Wear gloves, protective glasses to fill in or drain the oil in the pumps. In the same way, it is recommended to drain the pump before returning the equipment.
- For all handling of the equipment, it is highly recommended to only use the devices provided for this purpose (handle, hoisting rings, spring hook..).  
The spring hook and square support must not be used to tip up the pump from horizontal to vertical position and vice versa.  
The maker can not be held liable for the consequences of using other handling devices.

## CAUTION

- The product is supplied with the inlet and exhaust sealed. These are to prevent foreign bodies entering the pump during transport and storage.
- C2 Series: In order to prevent moisture from entering the pump before installation, it has been pressurized before hand with nitrogen and sealed with blanking plates.
- Do not remove these blanking plates until you are ready to install the product on the vacuum line.

## Storage

### C2 series

#### New pump:

If the pump is new and has not been unpacked, store it as received since it has been pressurized with neutral gas at factory.

### Other series

- 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°C 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 29**).

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

The shaft must be rotated by hand (be means of the fan) or by starting the pump every six months following this storage procedure.



## Storage (cont'd)

- 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 46**), and all the seals changed.

### All series Pump which have been used:

If the pump is not new, drain and rinse it (**see page 42**). 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:

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

### CAUTION

- **The pump must be operated in the horizontal position with the pumping axis vertical and the inlet operating upwards.**
- **Ensure that the product is connected to an electrical installation:**
  - in compliance with the local and national safety requirements,
  - equipped with electrical protection (fuses, circuit breaker, ...) which has a suitable earth (ground) point, properly connected.

### WARNING

- **Do not expose any part of the human body to vacuum.**  
The product is supplied with the inlet and exhaust sealed. Remove these blanking plates when you are ready to connect the product on your vacuum system.  
As well as, don't operate the product unless the inlet and exhaust are connected to a vacuum and exhaust pumping line.
- **The products are designed to avoid subjecting users to heat hazards.**  
Specific operating conditions can nevertheless exist that require extra caution from users due to the high temperatures generated (outer surfaces > 70° C):  
Wear protective gloves to work on the appliance, especially during maintenance.

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, because the oils are not mixable (refer to table page 17 and replacement fluids page 18).**

- If changing the type of oil, refer to the chapter concerned for the procedure and the type of lubricant required (**see page 42**).

# Table of recommended oils

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

Oils	Characteristics and applications	SD	C1	C2	Density	Viscosity mm <sup>2</sup> /s (cst)	Vapor pressure at 25°C (mbar)	Total ultimate pressure* (mbar)	Flash point/self ignition temperature (°C)
A102	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
A111	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
A113	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
A119	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
A120	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
A121	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
A155	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
A200	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
A300	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

● Possible without restrictions

○ Possible with restrictions

□ Not recommended

■ Requires special preparation of pump (see page 42).

\* Ultimate pressure measured according to Pneurop 6602 specifications on 2033 pump.

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

## Recommended oils (cont'd)

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 **11** and **12**.

## Filling with oil

**2033 and 2063 m<sup>3</sup>/h SD, C1 series** pumps are tested in the factory with **A120** oil (**A119** for the US).

**2033 and 2063 m<sup>3</sup>/h C2 series** pumps are tested in the factory with **A113** oil.

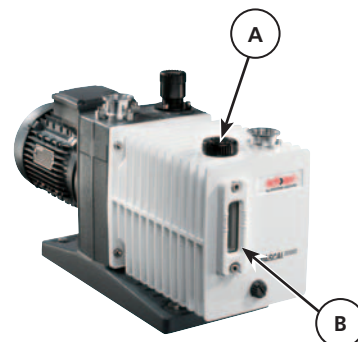
At delivery, there is some oil remaining in the functional block.

### CAUTION

- **Our pumps are tested in the factory with adixen'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 oil type" section. In all cases, follow the recommendations of the pump specifier for the choice of oil to be used.**
- **The pumps are delivered without an oil charge: the oil is delivered in separate containers. Wear a mask, gloves, protective glasses to fill in or drain the oil in the pumps. In the same way, it is recommended to drain the pump before returning the equipment.**

If necessary, carry out the special preparation procedure for the pump (see page 41), then:

- remove the filling cap (A).
- fill with oil until:
  - the oil is between the maximum and minimum levels (SD, C2 Series),
  - the oil reaches the middle of the sight glass (C1 Series).



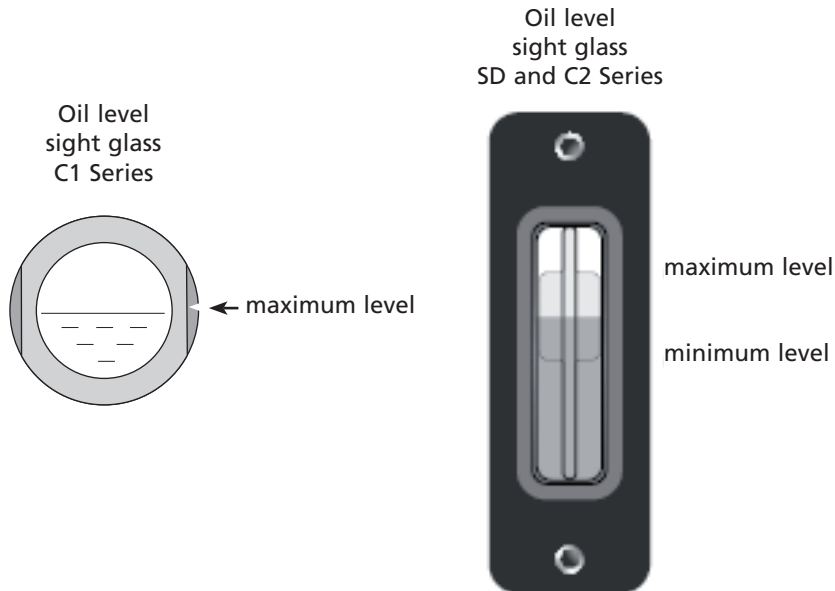
**This operation must be performed with the pump switched off.**

At the first start-up, to facilitate lubrication of the pump, pour a few drops of oil (1 to 2 cm<sup>3</sup>) through the inlet orifice.

**C2 series:** if the pump is equipped with an oil temperature sensor, the installation must be made with the pump drained of oil.

## 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, filter...) and mechanical connections,
- used oil,
- maintenance frequency and quality.

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

For safety reasons, use accessories on the inlet and exhaust lines whose materials and sealing properties are compatible with the gases being used. Several fitting accessories are available in the adixen products' catalog.

## Mounting on a frame

The pump can be mounted on a frame using the 4 attachment holes on the base and the special shock mounts (*refer to accessories page 14*).

**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 113°F (12 and 45°C) (with A120 oil).

## Inlet and exhaust fitting

## WARNING

- Do not expose any part of the human body to vacuum. The product is supplied with the inlet and exhaust sealed. Remove these blanking plates when you are ready to connect the product on your vacuum system.

As well as, don't operate the product unless the inlet and exhaust are connected to a vacuum and exhaust pumping line.

### At inlet:

- Make sure that the parts or chambers connected to the inlet of our pumps products withstand a negative pressure of 1 bar in relation to the atmospheric pressure.
- The inlet pressure must be no higher than atmospheric pressure. Too high pressure can damage the product.

## Inlet and exhaust fitting (cont'd)

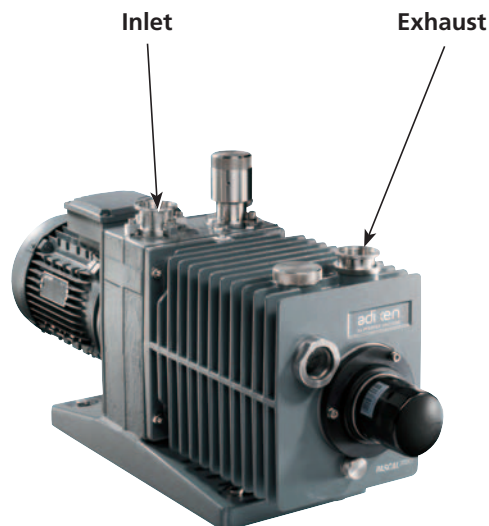
### **WARNING**

#### At exhaust:

- When pumping on corrosive, aggressives or flammable gases, the gas can cause injury or death. In these cases,
  - connect the exhaust of the pump to an exhaust stack or an evacuation duct.
  - connect a relief valve or rupture disc directly on the pump. Contact your closest service center (see addresses at the back of the manual).  
When the exhaust 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.
- Make sure the exhaust pressure does not exceed 1500 mbar (absolute). Too high a pressure can damage the appliance.  
Check periodically that the pipes and accessories connected at exhaust are not clogged and that the purge is running (Series C1, C2).

After connecting the appliance to the pump ing line, check for leaks along the whole of the line to ensure proper connections have been made (pump, pipes, valves, etc.).

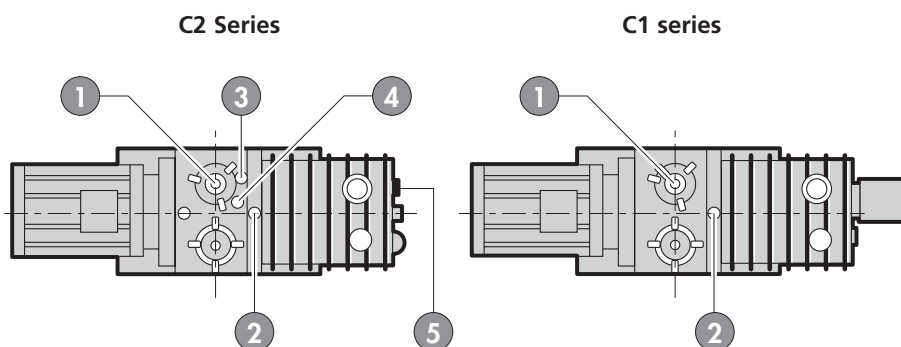
The pump inlet and exhaust orifices are equipped with **DN 40 ISO-KF end fittings** which can be used to fit various line components made of stainless steel, plastic, etc. (see the adixen catalog).



## Purge and indicator connections

Serie	Item	Description	Connection	
C2	C1	1	Gas ballast purge	1/8' NPT
		2	Oil casing purge	1/8' NPT
		3	Oil pressure sensor connection *	M 10 X 1
		4	Purge - Bubbler	1/8' NPT
		5	Oil casing temperature sensor connection *	M 12 X 1

\* Sensors are customer supplied.



### Specific equipment: HP valve (C2 Series)

The C2 pumps are equipped with HP and LP elastomer valves (FPM™ according to standard NPT 40-002). In certain applications with fluorinated gases, HP valve may harden and become brittle and compromise pump performances. Alternatively, the pump may be equipped with a plastic, corrosion-resistant HP valve on request. On request we can supply these specific components depending on your needs.

Equipment	HP Valve material	Tightness	Part Number
Standard	Elastomer	Installation tight	053443
On request	Plastic *	Installation not tight	065057
	Plastic + special o-ring	Installation tight	065160

### WARNING

\* If a plastic valve is used, the pump's anti-suckback operation cannot be guaranteed and an anti-suckback device must be installed in the pumping line to ensure tightness when the pump is not operating.



# Electrical connections

## WARNING

- Ensure that the product is connected to an electrical installation:
  - in compliance with the local and national safety requirements,
  - equipped with electrical protection (fuses, circuit breaker, ...) which has a suitable earth (ground) point, properly connected.
- Our products are designed to comply with current EEC regulations. Users making their own modifications to the product are liable to break its compliance with these regulations, degrade its EMC (electromagnetic compatibility) rating, and make it unsafe to use. The manufacturer declines all liability for the consequences of such operations.
- Electric shock hazard.  
The voltages and currents in use can induce electric shock.  
Isolate and lock out power line to the appliance before maintaining it /or removing the cover.  
Only skilled, authorized people may carry out maintenance work.  
If a main isolator is installed by the customer, it must be in compliance with local regulations, with a minimum amp. interrupting current of 10KAIC.
- Check that the electrical wiring of the motor corresponds to the line voltage, before starting up the pump.

## Three-phase version

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

**All three phase motors (protection level IP 54 - TEFC type) must be protected by a customer supplied starter consisting of a suitably rated contactor and thermal overload (see page 27).**

**In all the cases, the pumps are delivered with its motor connected to the maximum voltage (see page 26).**

### Direction of rotation

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 25).

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.
- Fit a pressure gauge at the pump inlet
- Switch on the pump for 2 to 3 seconds, than stop the pump
- if the pressure indicated is less than 5.10-1mbar, the direction of rotation is correct.
- if the pressure increases, invert two phases.

### Motor characteristics, connection, protection

The information below is given as a recommendation.

The user must comply with the electrical standards or recommendations (UL, CSA, VDE) 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.

### Motor Thermal protection

It is necessary to protect the pump against increase of temperature. The motors are equipped with a dry contact which gives motor temperature information.

To manage the motor thermic protection, It is the user's responsibility to wire this dry contact by connecting the 2 wires available in the terminal box (wiring diagram in the terminal box – NC dry contact - 250V max. - 0.5 A max.).

## CAUTION

### Differential circuit breaker.

In case of insulation defect, for personnel protection you must install on the main power supply a type B differential circuit breaker GFI (or RCD) of 30 mA minimum.

This equipment protection device is compatible with type T.T electrical network.

For other network type T.N or I.T, apply the right protection device. Contact adixen product manufacturer for advice.

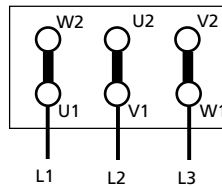
In all cases, comply with current local regulations.

## Electrical connections of three-phase motors

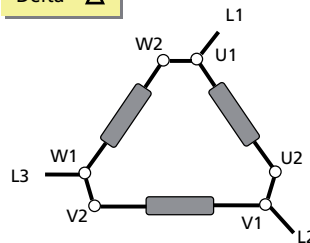
The pumps are equipped with 6 or 9 wire terminal box motors, the wiring diagram of the terminals is given as a rough guide only. In the event of doubt, only the plate in the terminal box should be used as a reference.

### Terminal box with 6 wires and 6 terminals

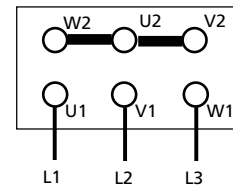
#### Low voltage



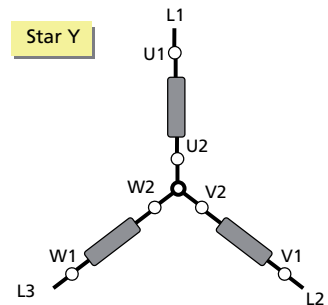
#### Delta $\Delta$



#### High voltage

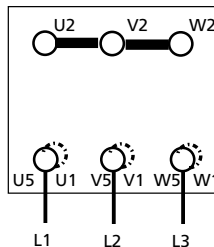


#### Star Y

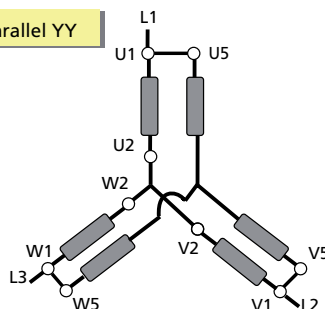


### Terminal box with 9 wires and 6 terminals

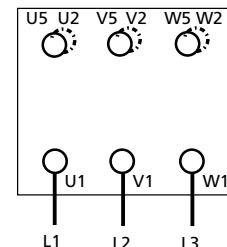
#### Low voltage



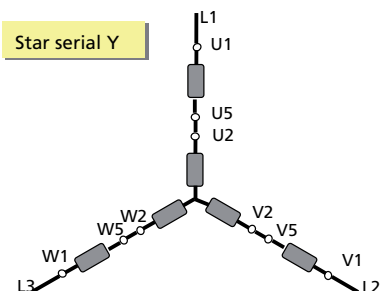
#### Star parallel YY



#### High voltage



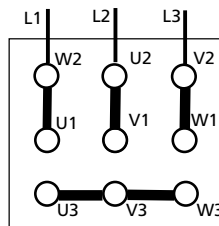
#### Star serial Y



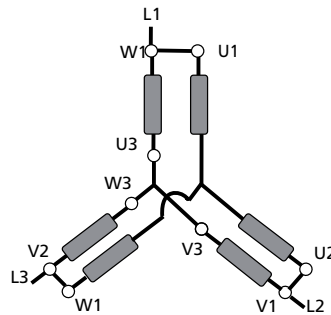
## Electrical connections of three-phase motors (cont'd)

Terminal box with 9 wires and 9 terminals

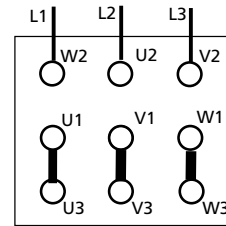
Low voltage



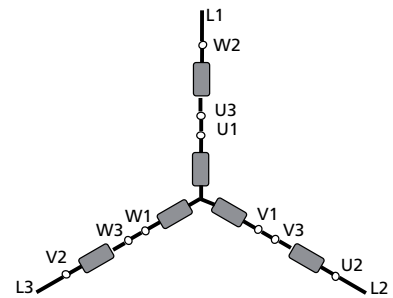
Star parallel YY



High voltage



Star serial Y



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

Motor voltage range - Capacity limits								
	Motor P/N	Country	Fr.	Voltage				
2033	119978*	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
	119977*	USA Japon	50 HZ	180	220		380	440
			60 HZ		190	230	380	460
2063	119979*	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
	119980*	USA Japon	50 HZ	180	220		380	440
			60 HZ		190	280	380	460

IE2 high efficiency class according to IEC 60034-30 standard.

# External motor protection, electrical protection

## CAUTION

Installation protection with circuit breaker.  
The user must supply the pump from facilities equipped with a main circuit breaker, curve D (IEC 60947-2), in accordance with local regulations and with a minimum amp. interrupting current of 10 KAIC.  
This protection device should be in close proximity to the pump (no further than 7m (25 ft) within line of sight of the pump).

## Electrical protections

The characteristics and ratings of fuses and recommended circuit breaker with standard pump three-phase motors:

Circuit breaker rate for the following motors						
	Motor P/N	Country	Frequency	Motor power	Voltage	Rate
2033	119978	Europe	50 / 60 HZ	1,1 kW	220 V 400 V	6 A 4 A
			60 HZ	1,3 kW	265 V 460 V	6 A 4 A
	114449	Asia & Row	50 HZ	1,5 kW	200 V 400 V	8 A 4 A
			60 HZ	1,8 kW	230 V 460 V	8 A 4 A
	119977	USA Japon	50 HZ	1,5 kW	200 V 400 V	8 A 4 A
			60 HZ	1,8 kW	230 V 460 V	8 A 4 A
2063	119979	Europe	50 HZ	2,2 kW	230 V 400 V	10 A 6 A
			60 HZ	2,64 kW	265 V 460 V	12 A 6 A
	114450	Asia & Row	50 HZ	2,2 kW	200 V 400 V	8 A 4 A
			60 HZ	2,2 kW	230 V 460 V	8 A 4 A
	119980	USA Japon	50 HZ	2,2 kW	200 V 400 V	14 A 6 A
			60 HZ	2,64 kW	230 V 460 V	12 A 6 A



# Operation

## Preliminary precautions

### WARNING

- The performance and operational safety of this product are guaranteed provided it is used normally in the operating conditions defined in this manual.  
It is the customer's task to:
  - train operators to use the product if they do not speak the language the manual is written in,
  - ensure operators know the safe practices to apply when using the product.
- Fire protection.  
The roughing pump is not intended to be installed on process containing flammable materials or in hazardous atmosphere.
- Fire hazard due to the presence of electrical components.  
The fire hazard is low due to the use of appropriated components and the containment in the pump cover.
- The vacuum pump is also a compressor: incorrect use may be dangerous. Study the user's manual before starting up the pump.
- The products are designed to avoid subjecting users to heat hazards. Specific operating conditions can nevertheless exist that require extra caution from users due to the high temperatures generated (outer surfaces > 70° C):  
Wear protective gloves to work on the appliance, especially during maintenance.
- The products are factory tested to ensure they will not leak in normal operating conditions. It is the user's responsibility to ensure this level of leak tightness is maintained.»
- For emergencies and breakdowns, contact the manager of your local service center (see addresses at back of manual).

## 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) (with A120 oil, 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).

The stabilized temperature is higher than with a pump used with mineral oil.

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.

## Operation (cont'd)

### Before starting-up the pump

#### CAUTION

Check periodically that the pipes and accessories (i.e. oil mist eliminator) connected at exhaust are not clogged and that the purge is running.

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 electrical connections page 24*).

### Start-up

- When using a three phase motor, **check the direction of rotation of the motor** (*see electrical connections page 24*).
- **Check the oil level** (*see page 20*).
- **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 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.

### Start-up after pump disassembly or oil change

See specific cases *page 43*.

### Cold start-up

**When a pump must start cold (ambient temperature about 12 °C) or when it has to start cold after pumping contaminating products or condensables, proceed as follows:**

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

#### WARNING

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

# Operation of gas ballast

## Regeneration of pump oil

In a pump stored with the same oil for a long time, condensed vapors may contaminate the oil bath and affect performance. This is also the case after pumping vapors and when the oil appears cloudy or discolored through the sight glass.

- Run the pump, shutting it off from the system at the inlet by a valve or a plug.
- Open the gas ballast and allow the pump to operate for 1/2 hour to 1 hour, or longer if the oil remains cloudy. This operation accelerates the temperature rise of the pump while eliminating residual vapors present in the oil bath.

## Pumping condensable vapors

To pump with condensable products, it is necessary to operate with a hot pump. For this, isolate the pump from the system and allow it to operate for 1/2 hour with the gas ballast open, or 1 hour (if possible) with the gas ballast closed. When the oil bath is hot, the condensation of vapors in the pump is reduced or prevented.

## Choice of pump and system

The pump's capacity to eliminate condensable vapors is related to their type, the pump temperature and the quantity of air introduced by the gas ballast.

Care should be taken to limit the inlet pressure of the pump to its maximum admissible water vapor pressure with the pumped product. This is obtained by reading the pump characteristic table for water vapor (*see pages 11 and 12*).

The use of cold traps or condensers are recommended when large quantities of vapors are to be extracted.

**Caution : don't forget to regenerate the traps. Excessively intense or prolonged pumping may cause the products condensed in the trap to be evaporated a second time.**

## Choice of oil

Choose an oil which facilitates the separation of pumped products which may be condensed in the oil bath (anti-emulsion oil for water-based compounds, etc.) (*see page 17*).

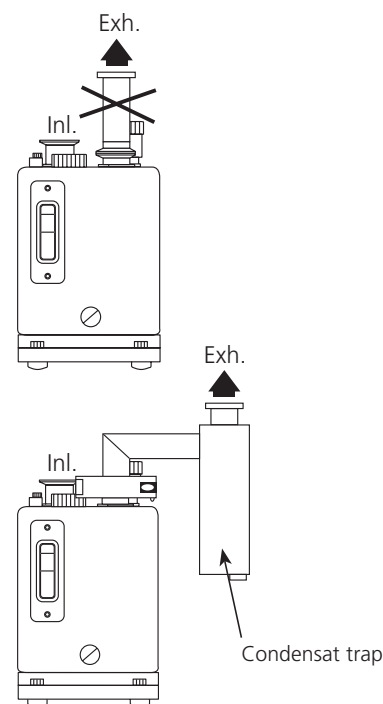
## Assembly

The condensation of vapors at the pump exhaust is reduced if:

- The pump and oil temperature are high.
- The pressure at the exhaust is as low as possible (removal of the oil mist eliminator, connection to an evacuation duct...).
- The condensates are collected separately from the oil bath and do not block the exhaust duct.

For this:

- Avoid using any vertical ducting which promotes the condensation of products and the return of these products to the pump.
- Use a condensate collector.
- We do not recommend an oil mist eliminator when pumping condensable vapors: if it is essential, do not connect it directly to the pump exhaust but place it outside the condensation zone.
- Remove the stop valve from the pump exhaust (*SD series*).
- Connect the exhaust to a mechanical device creating a negative pressure from 0.75 Torr to 1.5 Torr (0.1 to 0.2 bar).





## **Pumping condensable vapors (cont'd)**

### **Vapor pumping procedure**

- Isolate the pump from the system and increase the pump temperature, 30 minutes with gas ballast (**see page 31**).
- Start pumping and check the oil level:
  - The oil level drops, oil is being lost, add oil in the pump.
  - The oil level rises; condensates have been added into the oil.
- After pumping, let the pump running at ultimate pressure and condensates will be separate from the oil.
  - If the oil is cloudy or discoloured, change the oil.
  - If the condensates are heavier than the oil, drain them by the oil drain port.
  - If the condensates are lighter than the oil, drain the pump, flush the pump with clean oil. Let the mixture to clarify, than recover the oil.

# Purges for pumping condensable, corrosive, and hazardous gases

## C1 and C2 Series

**Purges** The use of vane pumps may result in pumping gases or vapors which are flammable or that could contaminate the oil. In this case, these products must be diluted using purges supplied with dry gases, such as nitrogen to avoid undesirable reactions.

For this purpose, a filtered dry nitrogen supply or other inert gas with the same characteristics is required:

- condensation point < 72°F/22°C,
- dust < 1µm,
- minimum absolute pressure 2 bar,
- H<sub>2</sub>O concentration < 10 ppb,
- O<sub>2</sub> concentration < 5 ppb.

**Oil case purge** The purge dilutes pumped gases with a inert gas. It makes it possible to limit corrosion in the oil case, condensation and accumulation of gases in dead spaces of the pump. Furthermore, the purge allows to flush with gas the pipes and accessories connected at the exhaust of the pump.

Connect the dry nitrogen supply on the specific connector (1/8 NPT).

Set the nitrogen pressure to approximately 15.4 PSIG (1.1 absolute bar) (*see table page 34*), and the flowrate so as to satisfy the dilution conditions.

(Caution: do not generate an excess pressure > 7 PSIG (0.5 relative bar).

**Purge with gas ballast** Because of the danger present if the gas ballast was to be opened to atmosphere (C2 series), the manual gas ballast doesn't operate. Connect the dry nitrogen on the specific connector (1/8 NPT). The nitrogen flowrate should be adjusted according to the values from table **34**.

## C2 Series

**Use of the bubbler** The bubble device is composed of an air tube with several holes, located at the bottom of the oil case, which releases bubbles of inert gas in the oil. In this way, the oil is saturated with neutral gas, which reduces its capacity to dissolve pumped gases. The bubbles of inert gas released make it possible to eliminate the volatile vapours or acids condensed in the oil. The bubbler flow also lowers the pumps temperature which slows corrosion.

Connect the dry nitrogen supply on the specific connector (1/8 NPT).

**Setting** The gas flow rate is adapted according to the application and the installation, taking the following criteria into account (flow 60 to 300 l/h) (*see table page 34*):

- When pumping high quantities of gas, a highly corrosive gas or an easily condensable gas, it is recommended to use a high nitrogen flow rate.  
**Caution ! It is assumed that a sufficient quantity of nitrogen is available.**
- The pump exhaust circuit must be such that, for discharged flow rates, pressure drops do not cause an abnormal excess pressure in the oil case.
- The nitrogen flow rate must be such that oil losses have no effect on the operation of the pump throughout the pumping cycle (the oil level must be above the lower limit of the sight glass at the end of pumping).

Run the pump at ultimate vacuum for one hour and set the nitrogen flow rate as follows (at atmospheric pressure and at 60°F/20°C).

# Purges for pumping condensable, corrosive, and hazardous gases (cont'd)

**Purge and sensor setting table**

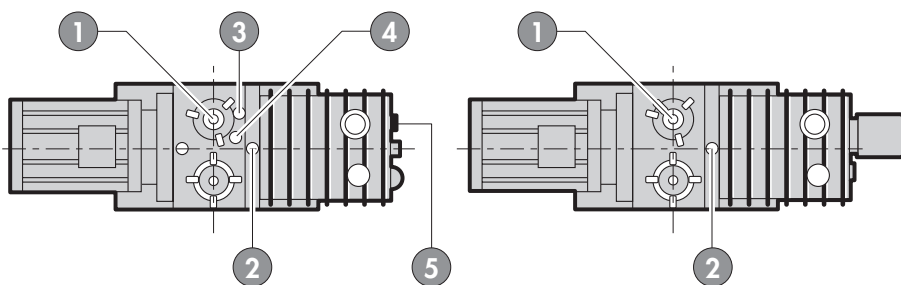
Setting											
Model	Item	Description	Neutral gas flow (l/h)			Pressure (bars)			T (°C)	Corresponding absolute pressure (bar) (indicative value)	
			mini	average	maxi	Starting	Operating	Problem			
2033 2063	C1/C2	1	Gas ballast purge	1200 1500	1500 1700	2000 2500	-			-	1.1 to 1.25
2033 2063	C1/C2	2	Oil casing purge	60 70	300 300	700 900	-			-	1.1 to 1.25 1.15 to 1.25
2033 2063	C2	3	Oil pressure sensor connection *	-			0.9	1.2 ± 0.1	< 0.8	-	-
2033 2063	C2	4	Purge - Bubbler	60 70	300 300	700 900	-			-	1.1 to 1.25 1.15 to 1.25
2033 2063	C2	5	Oil temperature sensor connection *	-			-			< 95 °C	-

\* Sensors are customer supplied.

**Note: these characteristics apply for pumps operating at a constant inlet pressure (1 to 5 mbar): they are adapted for each case of pumping.**

C2 Series

C1 series



## Operation principle

### Start-up

Isolate the pump from the pumping line (*close the isolation valve at inlet*).  
Start up the pump at ultimate vacuum. When it is hot, open the nitrogen purge and adjust the flow.  
Wait for the pump stabilization.  
Open the inlet valve and pump on corrosive gases: check that the purge is running during all the pumping time.

### Stop

Isolate the pump from the pumping line (*close the isolation valve*).  
When pumping stops, allow the purge to operate for approximately 1 hour (*depending on the quantity of pumped gas*) at ultimate vacuum, with the purge, in order to degas the oil effectively and clean the pump with nitrogen to eliminate the traces of pumped gases.  
Stop the purge but let the pump running to avoid any condensation, or dampness introduction that can react with pumped gases.  
If the pump must be stopped, prepare it as described **on page 16** to store a pump which has been used.

### Using the two purges simultaneously (C2 series)

When the bubbler and the oil casing purge are used simultaneously, the gas flow rate must be adjusted to suit the application and the installation. **The adjustment data given in the table corresponds to the adding flow adjustment data.**

# 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 page 17*).

The use of these oils requires a special pump preparation (*see page 42*). The pump must be completely disassembled and all traces mineral oil removed. Flushing the oil case is not adequate.

 **DANGER**

**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 or continuous pumping at high pressure

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.

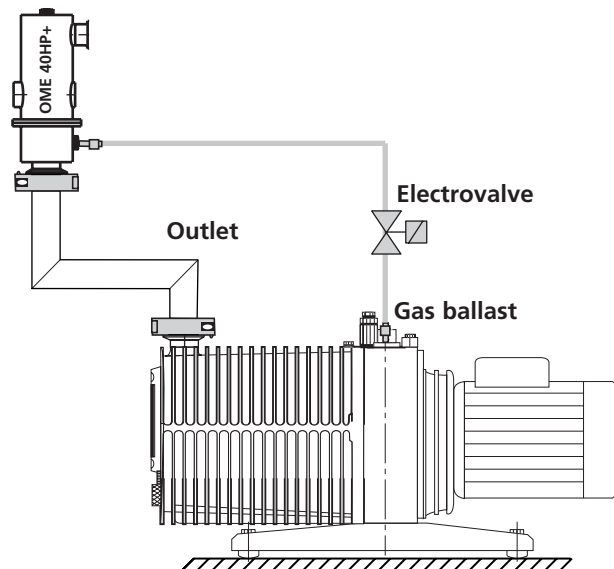
In order to pump in these conditions, the pump must be equipped with an oil mist eliminator and an oil draining kit, which enables oil recovery via the gas ballast (see **accessories page 14**).

**In case of oil recovery via the pump inlet port, consult us.**

#### Example:

**OME 40HP+ oil mist eliminator with ODK236 oil recovery device.**

**An electrovalve ensure the tightness when the pump is stopped.**



# Safety instructions for 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 41*).

### WARNING

Maintenance must be performed by a skilled maintenance operator trained in the relevant health and safety aspects (EMC, electrical hazards, chemical pollution, etc.).  
Isolate the product from all energy sources (mains electricity, compressed air, etc.) before starting work.

### DANGER

- Certain gases can become corrosive 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 oil fumes. Always use fully self-contained breathing apparatus.
- During pump removal, draining or maintenance operator could be in contact with process residues which could cause severe injury or death. Ask your safety department for instructions according to the local regulations.

We recommend to:

- To purge the pumping installation with dry nitrogen.
- Wear gloves, protective glasses and, if required for the used gases, a breathing mask.
- Ventilate the premises well.
- Do not eliminate maintenance waste via standard disposal channels. Have it destroyed by a qualified company if necessary.
- Install the inlet and exhaust blanking plates, thus accessories are delivered with the pump.

#### ▪ 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 adixen Vacuum Products original spare parts, delivered by adixen, containing i.e. all its components and sub-assemblies.

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

- If you return the product to an adixen repair service center, please make sure you follow the «procedure for returning products» and fill in the declaration of contamination found in the end of the manual or on the website.

### WARNING

Insufficient tightness after servicing could result in chemical hazards. Always perform a leak test after maintenance.

## 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 of oil pump damaged.	Replace it.
	• Incorrect anti-suckback system assembly.	Repeat the assembly and the setting.
	<b>Oil pressure sensor</b>	
	▪ It indicates a too low or too high pressure.	Clear the line or check the manometer/ plug tightness.
	▪ It continues to indicate a too low or too high pressure.	Disassemble, clean and reassemble using maintenance kit.
<b>The vacuum pump does not produce a vacuum</b>	<b>Ultimate pressure obtained: a few mbar/Torr</b>	
	• Direction of motor rotation incorrect.	Rewire.
	• Insufficient motor power.	Check the power supply.
	• Inlet filter blocked.	Clean the inlet filter.
	• 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 the LP safety valve.
• Part forgotten in reassembly.	Repeat the reassembly.	

• All series    ▪ C1    ► C2    ★ C1 and C2

Incidents	Causes	Corrective actions
<b>The vacuum pump does not produce a vacuum (<i>continued</i>)</b>	<b>Ultimate pressure obtained: a few <math>7.5 \times 10^{-3}</math> Torr (<math>10^{-2}</math> mbar)</b>	
	<ul style="list-style-type: none"> <li>• Gas ballast knob open (or supplied with dry nitrogen C1,C2 Series).</li> </ul>	Close the gas ballast or stop the dry air supply.
	<ul style="list-style-type: none"> <li>• O-ring pinched.</li> </ul>	Replace by a new one.
	<ul style="list-style-type: none"> <li>• One of the seals is damaged.</li> </ul>	Replace by new ones.
	<ul style="list-style-type: none"> <li>• One of the HP safety valves is damaged.</li> </ul>	Replace the HP safety valve.
	<ul style="list-style-type: none"> <li>• Lubrication holes blocked.</li> </ul>	Disassemble and clean.
	<ul style="list-style-type: none"> <li>• Incorrect anti-noise device setting.</li> </ul>	Repeat the assembly and setting.
	<ul style="list-style-type: none"> <li>• Part forgotten in reassembly.</li> </ul>	Repeat the reassembly.
	<ul style="list-style-type: none"> <li>▪ Filter cartridge clogged.</li> </ul>	Replace by a new cartridge.
	<b>Accessories</b>	
<ul style="list-style-type: none"> <li>• At the pump exhaust, the installation produces an exhaust pressure of 1,125 Torr (1.5 bar).</li> </ul>	Check the installation.	
<ul style="list-style-type: none"> <li>• Oil mist eliminator cartridge clogged.</li> </ul>	Replace.	
<b>Noisy pump</b>	<ul style="list-style-type: none"> <li>• Oil level too high.</li> </ul>	Drain and fill with a new oil.
	<ul style="list-style-type: none"> <li>• Oil contaminated (presence of particles).</li> </ul>	Drain, flush and refill with clean oil.
	<ul style="list-style-type: none"> <li>• Pump not prepared for the oil used.</li> </ul>	Check the pump configuration or the type of oil.
	<ul style="list-style-type: none"> <li>• Incorrect motor power supply.</li> </ul>	Check the power supply.
	<ul style="list-style-type: none"> <li>• Motor bearings damaged.</li> </ul>	Replace the motor after inspection.
	<ul style="list-style-type: none"> <li>• Motor coupling incorrectly set or damaged.</li> </ul>	Check the setting, replace the motor coupling.
	<ul style="list-style-type: none"> <li>• Incorrect fan assembly.</li> </ul>	Check the assembly.
	<ul style="list-style-type: none"> <li>• Incorrect anti-suckback device assembly.</li> </ul>	Repeat the assembly.
<ul style="list-style-type: none"> <li>• Vanes damaged or stuck.</li> </ul>	Replace the vanes.	
<b>Pump too hot</b>	<ul style="list-style-type: none"> <li>• Ambient temperature too high.</li> </ul>	Check that the temperature is between 12 and 45 °C.
	<ul style="list-style-type: none"> <li>• Pump placed in a poorly ventilated place or vents blocked.</li> </ul>	Check the installation.
	<ul style="list-style-type: none"> <li>• Operation at high pressure <math>P &gt; 22</math> Torr (30 mbar).</li> </ul>	Study an outside cooling device.
	<ul style="list-style-type: none"> <li>• Excess pressure at exhaust.</li> </ul>	Check the exhaust line.
	<ul style="list-style-type: none"> <li>• Motor in over-voltage or motor in short-circuit.</li> </ul>	Check the voltage, replace the motor.

• All series    ▪ C1    ► C2    ★ C1 and C2



## Troubleshooting and corrective actions (cont'd)

Incidents	Causes	Corrective actions
<b>Pump too hot (cont'ed)</b>	• 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.
<b>Considerable oil losses</b>	• Oil level too high.	Drain and fill with a new oil.
	• Operation at high pressure.	Use an HP type oil mist eliminator with oil recovery.
	• Gas ballast open: 1 - accidentally 2 - pumping of condensable vapors.	1 - Close. 2 - Use a condensate collector.
	• Leak at oil case seal or at front seal.	Check the assembly and replace the seals if necessary.
	★ Purges gas flow too important.	Readjust.
<b>Poor pump tightness when switched off</b>	• Gas ballast open.	Close the gas ballast.
	• Safety valve damaged.	Replace by a new one.
	• Incorrect anti-suckback assembly.	Repeat the assembly.
	• O-ring pinched.	Replace by a new one.
	• Seals damaged.	Replace by a new one.
	• Oil contaminated.	Drain, flush and refill with clean oil.
	▶ Using a plastic HP valve (not tight)	Check the installation. Contact us.
<b>Oil in plate</b>	• 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 by new ones.

• All series      ■ C1      ▶ C2      ★ C1 and C2

# Maintenance

## Maintenance frequency

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

The frequency values are minimum values for «normal» operating conditions: pressure < 1 mbar (0.75 Torr), clean 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. The oil can be regenerated using the gas ballast (*see page 31*).
- 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.

When the lubricating oil is expensive (fluorocarbon synthetic oils), the use of an oil mist eliminator allows oil recovery after deposition.

**Roughing** 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 roughing 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 accessories (*see page 14*) can reduce the frequency of these maintenance operations.

## Maintenance of the accessories

When an adixen accessory is connected to the pump, periodically it is necessary to make accessory overhaul.

Study the accessory user's manual and make sure you follow the safety instructions it gives regarding protection of personnel: operator could be in contact with process residues on the exhaust which could cause severe injury or death. Ask your safety department for instructions according to the local regulations.

### WARNING

**When an oil mist eliminator is installed, check periodically at the exhaust orifice that:**

- the exhaust valve can move, so the exhaust is not blocked,
- the exhaust valve can move, no overpressure in the oil casing.

# Maintenance (cont'd)

## Draining

### **WARNING**

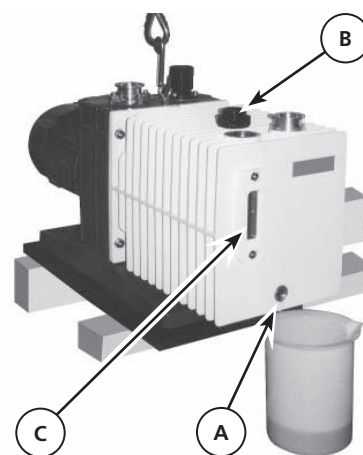
The draining operation places the contaminated pumping circuit in communication with the outside atmosphere. Take all necessary steps to ensure personal safety: wear gloves, protective glasses.

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 it 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 (A).
- Replace the draining plug (A) and fill with fresh oil to the appropriate maximum level of the oil sight glass (C) (see page 20) through the filling orifice (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 oil case, 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 17).

## Change of oil type

**2033/2063 m<sup>3</sup>/h SD and C1** pumps are tested in the factory with **A120** oil or **A119** for USA unless specified otherwise in the order.

**2033/2063 m<sup>3</sup>/h C2** pumps are tested in the factory with **A113** oil 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 using the new oil and fill the pump (see page 17).

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

## Change of type of oil (cont'd)

### 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 46*).
- 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 17*).

**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.**

## Start-up after pump disassembly or oil change

### Using noise limiter

The principle of the noise limiter is described page 9. It is adjusted at the factory when the pump is checked and need only to be readjusted after:

- pump disassembly-reassembly operations,
- changing the oil type (not all oils 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.
- Check the direction of rotation.
- Remove fill exhaust port) and unscrew gas inlet tube with a screwdriver all the way out.
- Run pump for about one hour at ultimate pressure.
- When the pump is hot, screw in tube, half a turn at a time, monitoring partial pressure and sound level (wait 3 to 4 minutes after each half turn). When the desired noise level is set, replace the exhaust port to evaluate the sound level.

# Tools and consumable products

## Special precautions

Read the safety instructions at the beginning of the maintenance chapter. Before disassembling the pump, drain it (see page 42). All the seals and faulty parts should be replaced: provide a seal kit or a maintenance kit.

## Spare parts

For fasted service, specify the following when ordering:

- Pump type.
- Serial number (on pump label).
- Part number (see list at end of manual).

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. It includes the flat gasket for oil casing (on former pumps) but also the o-ring for the new models.

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 models	P/N
2033 SD	054285
2063 SD	054485
2033 C1	054286
2063 C1	054488
2033 C2	065123
2063 C2	065552

### 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 models	P/N
2033 SD	054288
2063 SD	054487
2033 C1	054289
2063 C1	054489
2033 C2	065124
2063 C2	065553

### Screw kit

This kit contains all screws and washers for the pump.

Pump models	P/N
2033 / 2063 SD	105347
2033 / 2063 C1 - C2	105348

## Specific tools

This kit contains the useful tools to disassemble and reassemble the shaft seals in the different flanges and flanged stators.

### Tools kit

DESCRIPTION	P/N
<b>For all pump models, kit including:</b>	<b>065192</b>
Mounting mandrel Ø 19.5 mm	065089
Protective sleeve	065088
Washer	073331
Coupling adjustment tool	065087
Extraction tool	065186

## Recommended tools

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

- N° 3 and N° 9 flat screwdrivers
- Thin spanner
  - All models: 12 - 13 - 16 - 17 mm on face
  - C1: 14 - 16 - 50 mm on face
  - C2: 14 - 16 - 19 mm on face
- Allen wrenches: 2 - 4 - 5 - 6 - 8 mm
- 8mm extraction screws
- Filter cartridge key - automobile equipment supplier - (C1 serie)

# Disassembling the pump

## Removing pump from system

Study the general precautions listed on Maintenance chapter page 37.

The following steps are necessary to protect the pump as far as possible from the effects of corrosion:

- Flush pump with a neutral gas (dry nitrogen) during half an hour to prevent toxic or corrosive gases accumulating in the pump.
- C2 Model: Disconnect the nitrogen lines to the pump. If the sensors are connected, disconnect them.
- Disconnect the pump from the system and seal off the inlet and exhaust ports. Bring the pump to the maintenance area immediately.
- Drain pump (see page 42).

### DANGER

Do not store a pump in this condition for any length of time: once the neutral gas has dissipated, the inside of the oil case will be in contact with the ambient air laden with water vapor; this may react with the pumped gases to form acids that may corrode the pump even at room temperature.

The first phase of disassembly is to disassemble the motor, the second is to disassemble the pumping module.

Follow the chronological order of disassembling instructions. See the drawings and their part lists in pages N – 1 to N – 13

## Disassembling the motor block (see page N-2)

*C2 Model*

Unscrew 4 nuts (16) and washers (15).  
Remove motor assembly (C) and motor mounting plate (22). The coupling separates into two halves, one (2) (N-12) on the motor side, the other (1) (N-12) on the pump side.

In case of important pollution, roughly clean the pump with hot solvents under pressure.

### Disassembling of the fan

Prevent fan (17) from rotating by wedging a wooden shim against the side of the frame and two blades of the fan.

Remove elastomere coupling (1) (N-12).

Unscrew self-locking screw (19) (not reusable) and remove washer (18).

Using two M8 mm extraction screws, remove fan (17) and shim.

Remove screws (26) and washers (27).

Using two M8 mm extraction screws, remove cover (13) with double lip seal (12).

## Dismantling gas ballast (see page N-10)

*C2 Model*

Remove three screws (22) then (23), (40) and remove gas ballast assembly (25) and O-ring (26).

Unscrew plug (41) (1/8" NPT).

Remove PTFE tape from plug thread (41) and put new one when reassembling.

*SD/C1 Model*

Remove the fastening screw (19) (C1 model) from the gas ballast knob (20) and unscrew it completely, then remove the spring (21) (SD model) and the O-ring (24).

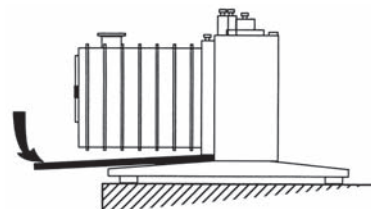
Remove the 3 screws (22) then (23), then remove the gas ballast assembly (25) and the O-ring (26).

**Valve (27)/valve support (28)/washer (29)/circlip (30) are not easy to disassemble. All parts are available in an equipped gas ballast sub-assembly (see N-11).**

**Removing the oil case**  
(see page N-2)

Install the pump vertically on a work bench using a hoist.  
Remove the nuts (4) then (5) and remove the oil casing (A) and its O-ring (3).

**The presence of an oil casing flat gasket may cause case (A) and frame (B) 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.**



C1 and C2 Models

When the oil casing has been disassembled, leave the pump under a suction hood for fifteen to thirty minutes before disassembling it to make sure all the pumped gases have been evacuated.

**Disassembling the oil sight glass**  
(see page N-8)

SD and C2 Models

Unscrew and remove the 2 nuts (25) and the washers (24). Remove the flange (23), the protection (22) (SD model), the sight glass (21) and the seal (20). Change the seal prior to reassemble.

C1 Model

Unscrew the oil sight glass body (51) using a 50mm spanner and remove the O-ring (50).  
Remove the circlip (54) then the glass (53) and the O-ring (52).

**Removing accessories**

**Removing bubbler**  
(C2 Model) (see page N-10)



Unscrew (50) with a thin spanner, while securing the base (54). Change the O-ring (51) prior to reassemble.  
Unscrew the two nuts holding the tube fasteners and remove it.  
Remove the tube (55).  
Unscrew the base (54).  
Remove the washer (52) and the O-ring (53) from the inside of the base. Change the seal prior to reassemble.  
Remove the PTFE tape from the base (54) and put a new one when reassembling.

**Removing oil pressure monitoring system**  
(C2 Model)



Remove pressure gauge or monitoring device or plug.  
Unscrew tube connector (10) (N-6) located on the oil pump (11) (N-6).  
Unscrew (50) with a thin spanner, while securing the base (54). Change the O-ring (51) prior to reassemble.  
Remove the tube (56).  
Remove the washer (52) and the O-ring (53) from the inside of the base (54). Change the seal prior to reassemble.  
Remove the PTFE tape from thread (54) and (10) (N-6), and put new one when reassembling.

**Removing the filter cartridge**  
(C1 model) (see page N-6)

Using the specific key (see page 45), remove the filter cartridge (33).



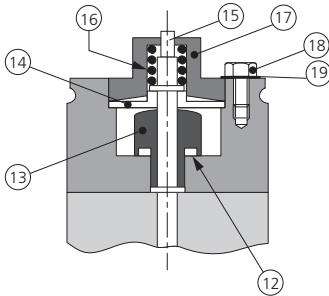
## Disassembling the pump (cont'd)

### Disassembling the pumping module (see page N-4)

#### Removing the exhaust valve cover (16) and (32)

Remove the screws (18), (17) then (34), (33) and the cover(s) (16), (32).  
Remove the exhaust valves (13), (30) and their springs (15) (31) and for 63C1 model, the washer (14).

#### Disassembling oil pump (11) (see page N-6)



C1 model: Remove the 2 screws (32) and remove the case bushing (31).  
Remove screws (21) then (18) and equipped body (11).  
Remove screws (20) then (19) and cylinder (17), spring (16), piston (15) and diaphragm (14).  
Remove seat (13) and O-ring (12). Change the O-ring prior to reassemble.  
Unscrew the oil inlet tube fixation (3) and (4) and remove the stop (5) (SD and C1 models). Remove the oil inlet tube (1).  
Unscrew air inlet tube (7) and remove spring (6).  
*If necessary, note setting of air inlet tube (7): number of turns until tube stops moving turning clockwise.*  
Remove vane (9).

#### Disassembling the rear flange (4)

Remove 4 nuts (1) then (2).  
Insert two screwdrivers into the two notches and twist to remove plate off pins (11).  
Pull flange (4) straight out, holding HP rotor (9) in place.  
Remove O-ring (5).

#### Removing HP rotor (9) and HP stator (12)

Remove the **HP rotor (9)** by sliding it out of the **HP stator (12)**.  
Remove vanes (10) and their springs (39).  
Insert two screwdrivers in the two notches of the HP stator (12) and twist to remove plate off pins (19).  
Remove **HP stator (12)** straight out.  
Remove the O-ring (20).

#### Removing flange (21)

Insert two screwdrivers in the notches of the **flange (21)** and release the **flange (21)**.  
Remove the O-ring (24).  
Remove tube (37) and O-ring (36).

#### SD Model

Oil jet (23) lubricates the first stage. Do not remove it for cleaning.  
When reassembling, spray with compresses air to remove any obstructions.

#### Removing LP rotor (26) and LP stator (29)

Remove the **LP rotor (26)** by sliding it out of the **LP stator (29)**.  
Remove vanes (27) and their springs (38).  
Insert two screwdrivers in the two notches of the LP stator (29) and twist to remove plate of pins (7) (N-2).  
Remove **LP stator (29)** straight out.  
Remove the O-ring (35).  
Remove tube (38) and O-ring (37) (N-2).

### Disassembling inlet nipple (9) (see page N-10)

Remove 4 screws (4), (7) then (3), (6) and remove clamps (2) and (5).  
Remove nipple (9) and its O-ring (8).  
Remove the metallic filter (31) and clean it.

### Disassembling exhaust nipple (3) (see page N-8)

Remove the protection (1).  
To remove the exhaust nipple (3), the nipple must be connected to a line with a NW40 centering ring with O-ring and quick connect clamp. Use the quick connect clamp to unscrew the nipple (3).  
Remove the O-ring (4).

#### SD Model

Remove the pin (7) and the filter (9), the sleeve (8), the shaft (6), the valve (2) and the circlip (5).

## 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

#### SD, C2 series pump

When cleaning the plastic sight glass, avoid contact with alcohol or alcohol based washing solutions. Clean the component with a solvent but do not dip it, and rinse it immediately.

#### C1 series pump

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

## Oil casing/frame surfaces cleaning

Replace the oil casing O-ring each time the pump is disassembled.

- If the oil casing was equipped with a flat gasket, clean the oil casing and central housing surfaces by scraping them with a piece of wood or plastic to avoid scratching them. When reassembling, oil the frame and case surfaces lightly.
- If the oil casing was equipped with an O-ring, lubricate it with the grease delivered in the minor kit before reassembling.

(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

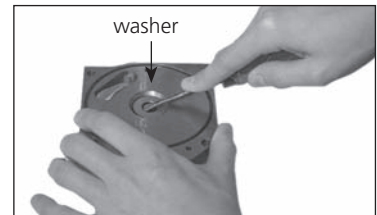
- Specific extraction tool.
- Specific assembly mandrel.
- A support plate (or washer).

## Recommended tools

- A flat screwdriver.
- A hammer.

## Extracting a shaft seal from its housing

With the flange flat: 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

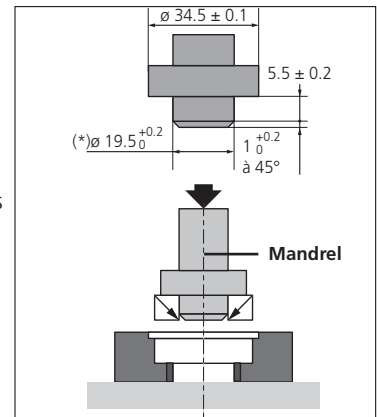
The seal housing is lubricated with the lubricant used in the pump. The flange is resting on a flat surface.

**According to the direction of assembly**, 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.

(\*) Ø 24.5 mm according to product configuration.



## Single lip seal greasing

The lip of the seal is lubricated with the lubricant used in the pump.

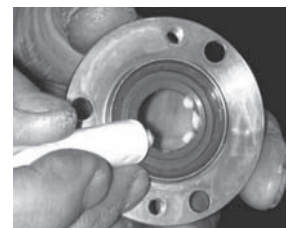
## Double lip seal greasing (12)

The double lip seal was installed on the mandrel **according to the right direction of assembly** and fit it into the seal holder (13) (see § *Assembling the shaft seal*).



Use only the grease delivered in the minor kit.

Put some spots of grease between the lips of the seal as shown on the picture.

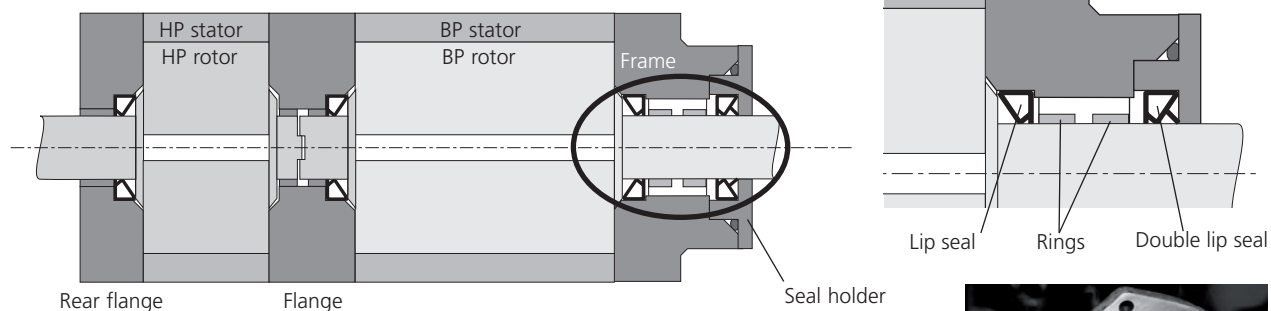


Spread meticulously the grease to fill in the space between the two lips: be aware to not damage the lips! then remove the excess of grease.



## Direction of assembly of shaft seals

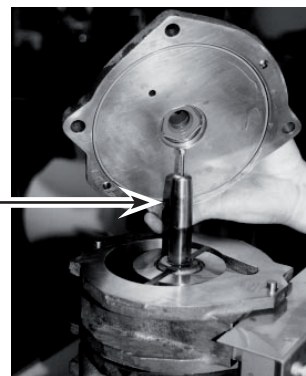
They are fitted using the assembly mandrel according to the direction of assembly below:



## Assembly the protective sleeve

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

Sleeve



# Reassembling the pump

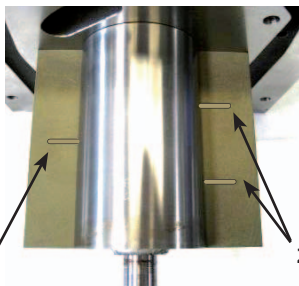
## Component preparation

- **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 50*).
- 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 (**B**) on a flat surface in order to assemble the pump vertically.

## Assembling moving parts (see page N-4)



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.

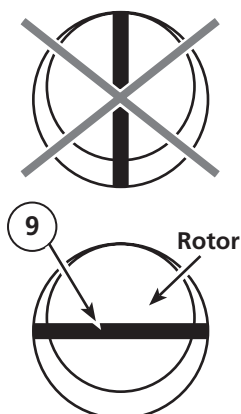
- Be aware of the LP valve (**27**) (*N-4*) direction of assembly: their grooves must be visible in a same side of view (*see the picture*).
- Reassemble moving parts in reverse order of disassembly.
- Before replacing valves, pour a little oil into the stators through the valve holes.
- Before reassembling oil pump (**11**) (*N-6*), assemble fan (**17**) (*N-2*): using a new self-locking screw (**19**) (*N-2*) to tighten it (*Maintenance kit page 44*).

## Installing bubbler (C2 Model) (see page N-10)

Before tightening nuts (**1**) (*N-4*) to fasten rear flange (**4**) (*N-4*), replace bubbler as follows:

- Put a PTFE tape on base (**54**) and gas connection threads.
- Set the pipe (**55**) in the central housing (**1**).
- Put a new seal (**53**) and the washer (**52**) on the upper end of the pipe and then screw it in the base (**54**).
- Set the two tube fasteners on the studs and screw it in the two nuts (**1**) (*N-4*).
- Put a new seal on (**51**) and screw it on (**50**).

## Assembling oil pump (see page N-6)



Mount all necessary parts on oil pump body proceeding in reverse order as described page 46. 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.**

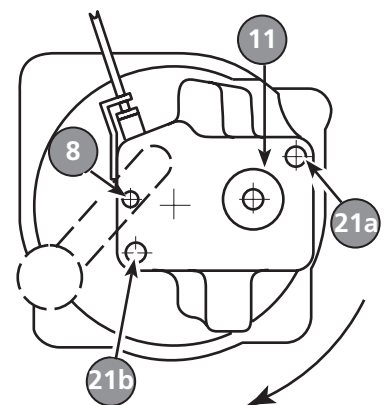
Place vane (**9**) in its slot.

With pump horizontal, let pump body (**11**) drop by gravity on to rotor.

With pump vertical, turn pump body (**11**) clockwise around alignment pin (**8**), to bring it into contact with the rotor without forcing.

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

Fit two screws (**21**) equipped with washer (**18**). They must be tightened first (**21a**), and (**21b**) second (**maximum torque: 10 Nm.**)



**Oil inlet tube (1) reassembly (C2 Model)**

When positioning the oil inlet tube (1), make sure that screw is properly centered in the centering hole, the collector located at the upper part of the tube must line up under the oil fill port in the oil casing.

**Air inlet tube (7) reassembly**

Install the spring (6) and screw the air inlet tube (7) and unscrew it of the number of turns given, when disassembling (usually 3 or 4 turns) (see page 48).

**Installing the filter cartridge (33) (C1 model)**

Install the case bushing (31) on the oil pump (11) (the direction is defined by the centering pins which allow to have a right oil circulation in the cartridge). Then, screw the filter cartridge (33).

**Installing oil pressure indicator (C2 Model) (see page N-10)**

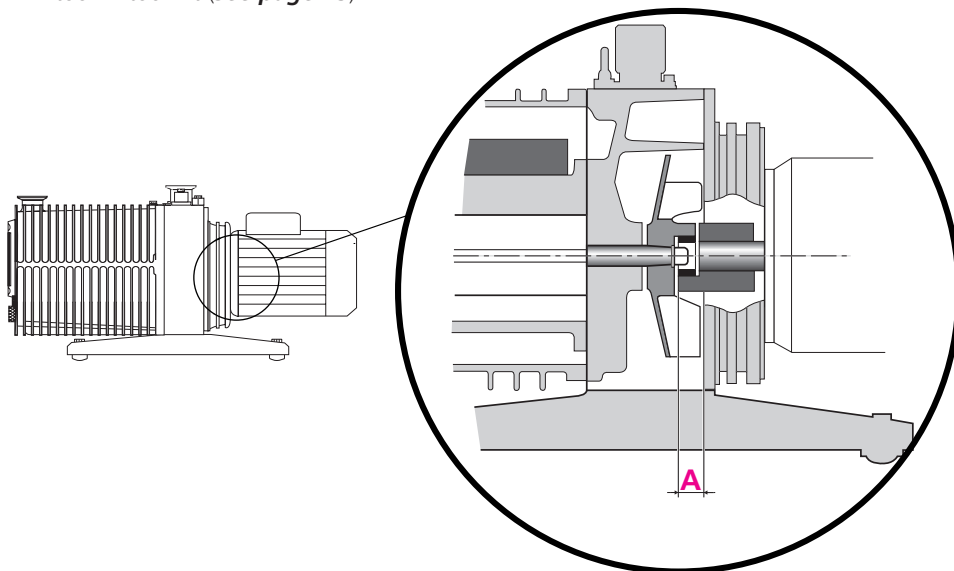
Place a strip of Teflon tape on thread of connectors (54) and (10) (N-6). Position one end of tube (56) in connector (10) (N-6) and the other end in the hole in the frame provided for this purpose. Install a new o-ring (52), the washer (53) on the top end of the tube and screw (54) on the frame (1). Screw connector (10) (N-6) into oil pump (11) (N-6). Change the O-ring (51) and screw the screw (50).

**Motor coupling (see page N-12)**

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 45).

Pump models	Dimension «A»
2033 SD - C1 - C2	16.6 ± 0.5 mm
2063 SD - C1 - C2	23.3 ± 0.5 mm



**Installing the oil sight glass (see page N-8)**

*SD, C2 Series*

Install a new flat seal (20) then the sight glass (21), the protection (22) (SD model) and the flange (23). Secure with 2 screws (25) equipped with washers (24) to a maximal torque of 12Nm ± 2 Nm.

*C1 series pump*

Place the O-ring (52), the glass (53) and the circlip (54) on the Oil sight glass body (51). Place the O-ring (50) and screw the oil sight glass body equipped (51) using a 50 mm spanner.

**Fill with oil**

After reassembling, fill the oil casing with oil (see page 17) before start-up the pump (see page 29).

# Declaration of contamination

## 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. Pfeiffer Vacuum 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..

Please fill in the present **DECLARATION OF CONTAMINATION**, print it and attach it to the product before shipping to your closest service center.

Equipment returned without this form fully completed, and secured to outside of package, will be returned to customer unprocessed, at his cost.

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 contact service center for any further recommendations.

### We wish to draw your attention to the following points:

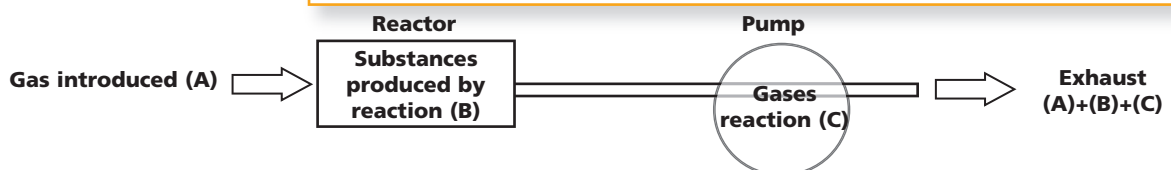
Equipment must be drained of fluids and residue, securely packaged and shipped prepaid. Concerning the closing of the ports (inlet & outlets of the product), metallic airtight blank flanges should be used if toxic or copper gases have been pumped.

### 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, detector, gauge or accessory).
- **Biological:** In case of contamination (such as pathogenic germs, micro-organisms (bacteria, viruses, etc.) classes 1 to 4 and group E), we are 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. A written evidence of decontamination will be requested prior to any service action. 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. A specific treatment is required, which generates extra cost.

### **AVERTISSEMENT**

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).



## DECLARATION OF CONTAMINATION

Repair and/or maintenance will be carried out on vacuum equipment or components only if a fully completed, correct declaration of contamination is provided. If it is not the case, the corresponding repair will be delayed or omitted. A separate declaration must be submitted for each device or each component.

**This declaration can only be completed and signed by an authorised and qualified person.**

<p><b>1. EQUIPEMENT</b></p> <p>Description: <input style="width: 90%;" type="text"/></p> <p>Reference (P/N): <input style="width: 90%;" type="text"/></p> <p>Serial N°: <input style="width: 90%;" type="text"/></p>	<p><b>2. REASON FOR RETURN - SERVICE REQUIRED (mandatory)</b></p> <p style="font-size: small;">Return N°: <input style="width: 90%;" type="text"/></p> <p style="font-size: small;"><input type="checkbox"/> Under warranty      <input type="checkbox"/> Out of warranty</p>
<p><b>3. EQUIPMENT CONDITION</b></p> <p>Has the equipment been used?    yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Type of pump oil used : <input style="width: 80%;" type="text"/></p> <p>Has the equipment been cleaned?    yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Cleaning detergent /method: <input style="width: 80%;" type="text"/></p> <p>Is the equipment free from potential harmful substances ?</p> <p style="text-align: right;">yes <input type="checkbox"/> no <input type="checkbox"/></p>	<p><b>5.1 PROCESS RELATED CONTAMINATION Chimique</b></p> <p>Toxic                            yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Carcinogenic                yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Combustible                yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Corrosive                    yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Explosive                    yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Biological*                 yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Radioactive*                yes <input type="checkbox"/> no <input type="checkbox"/></p> <p>Others <input style="width: 80%;" type="text"/></p> <p style="font-size: x-small;">(*) The equipment will be accepted only with a written decontamination certificate</p>
<p><b>4. COPPER PROCESS</b></p> <p>Has the equipment been used on a Copper process ?</p> <p style="text-align: right;">yes <input type="checkbox"/> no <input type="checkbox"/></p> <p style="font-size: x-small;">If «yes», sealed package and specific label are required</p>	

**5.2 Process and list of hazardous substances or by-products which may have come into contact with the equipment :**

	Chemical name <small>(or symbol)</small>	Risks and precautions associated with substances	Process description
1.	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	<input style="width: 100%; height: 100%;" type="text"/>
2.	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	
3.	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	
4.	<input style="width: 95%;" type="text"/>	<input style="width: 95%;" type="text"/>	

**6. Legally binding declaration**

We hereby guarantee that the information in this declaration is correct and complete. I, undersigned, am able to provide a true assessment. We are aware of our liability toward the contractor for damage resulting from incomplete or inaccurate details; we undertake to be responsible for any third-party claims based upon claims of contamination or other nonconformity with the statements herein.

Name of the company / organization:

Address:

City:       State:       Post Code:

Country:       E-mail address:

Phone number:

Last Name:

First name:

Function:       Date:

Signature and company seal: \_\_\_\_\_



## DECLARATION OF CE CONFORMITY

We, **adixen Vacuum Products**  
98, avenue de Brogny · BP2069  
74009 Annecy cedex – France

### ISO 9001 CERTIFIED

declare under our sole responsibility that the following products:

#### Pascal Series / Rotary Vane Pumps

1005SD - 1015SD  
2005I - 2005SD - 2005SDI - 2005CI  
2010I - 2010SD - 2010C1 - 2010C2  
2015I - 2015SD - 2015C1 - 2015C2  
2021I - 2021SD - 2021C1 - 2021C2  
2033SD - 2033C1 - 2033C2  
2063SD - 2063C1 - 2063C2

to which this declaration relates are in conformity with the relevant provisions of the following European Directives:

**2006/042/EC: Machinery directive**

**2006/095/EC: Low voltage directive**

**2004/108/EC: Electromagnetic Compatibility Directive**

**2002/095/EC: Restriction of Hazardous Substances**


when used in accordance with the instruction manual of the product.  
The relevant operating instructions are in compliance with appendix VII, part B.


Those products comply with the relevant provisions of the above Directives and carry the CE marking.

Signatures:

Annecy, July 13, 2012

Authorized person to compile the relevant technical documentation:

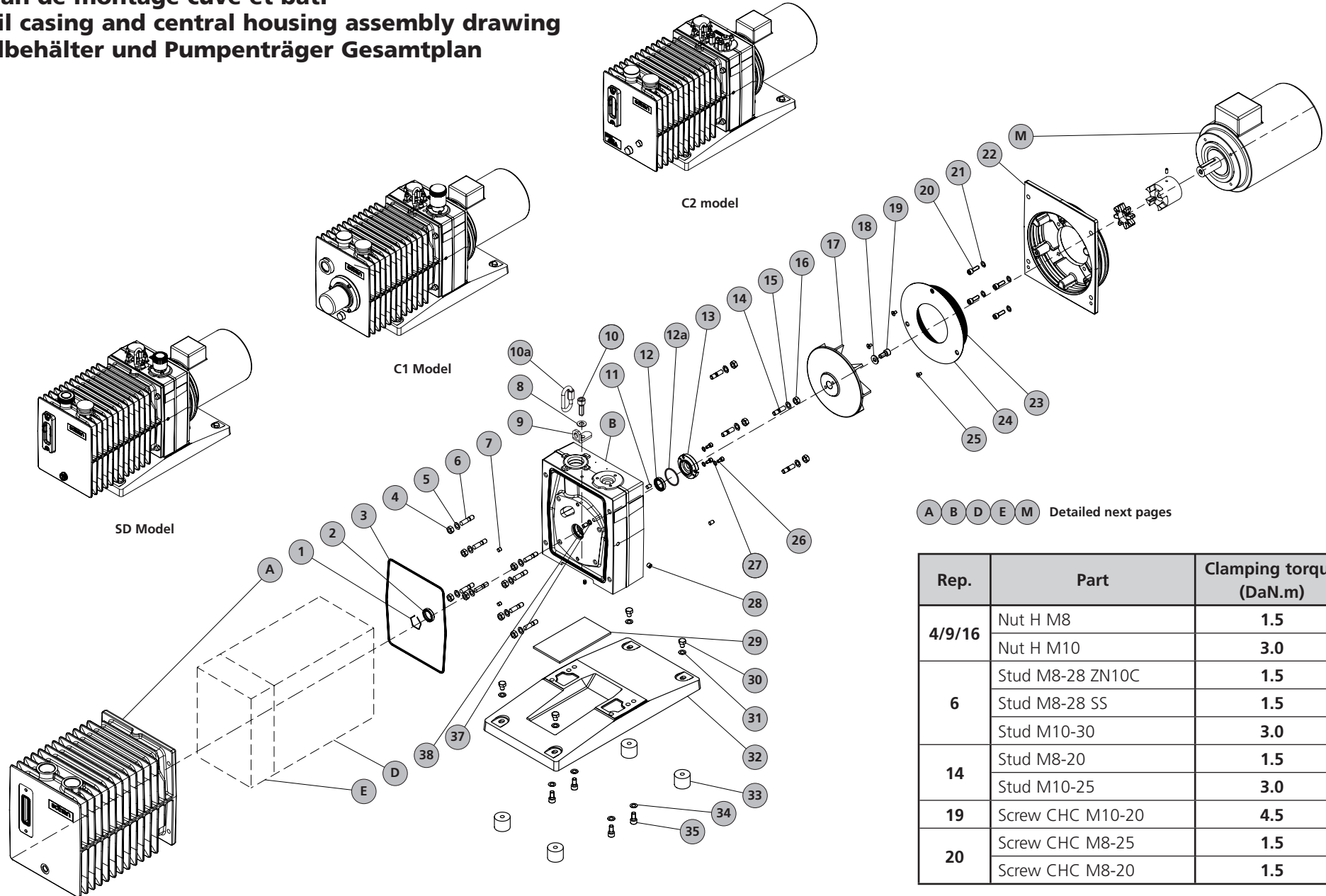
  
Mr. Eric TABERLET  
President

  
Mr. Gilles BARET  
Products and Technology Director  
98, avenue de Brogny · BP 2069 / 74009 Annecy - France

# Composants de maintenance / Maintenance components / Unterhaltung Teile

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# Plan de montage cuve et bâti Oil casing and central housing assembly drawing Ölbehälter und Pumpenträger Gesamtplan



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Rep.	Part	Clamping torque (DaN.m)
4/9/16	Nut H M8	1.5
	Nut H M10	3.0
6	Stud M8-28 ZN10C	1.5
	Stud M8-28 SS	1.5
	Stud M10-30	3.0
14	Stud M8-20	1.5
	Stud M10-25	3.0
19	Screw CHC M10-20	4.5
20	Screw CHC M8-25	1.5
	Screw CHC M8-20	1.5

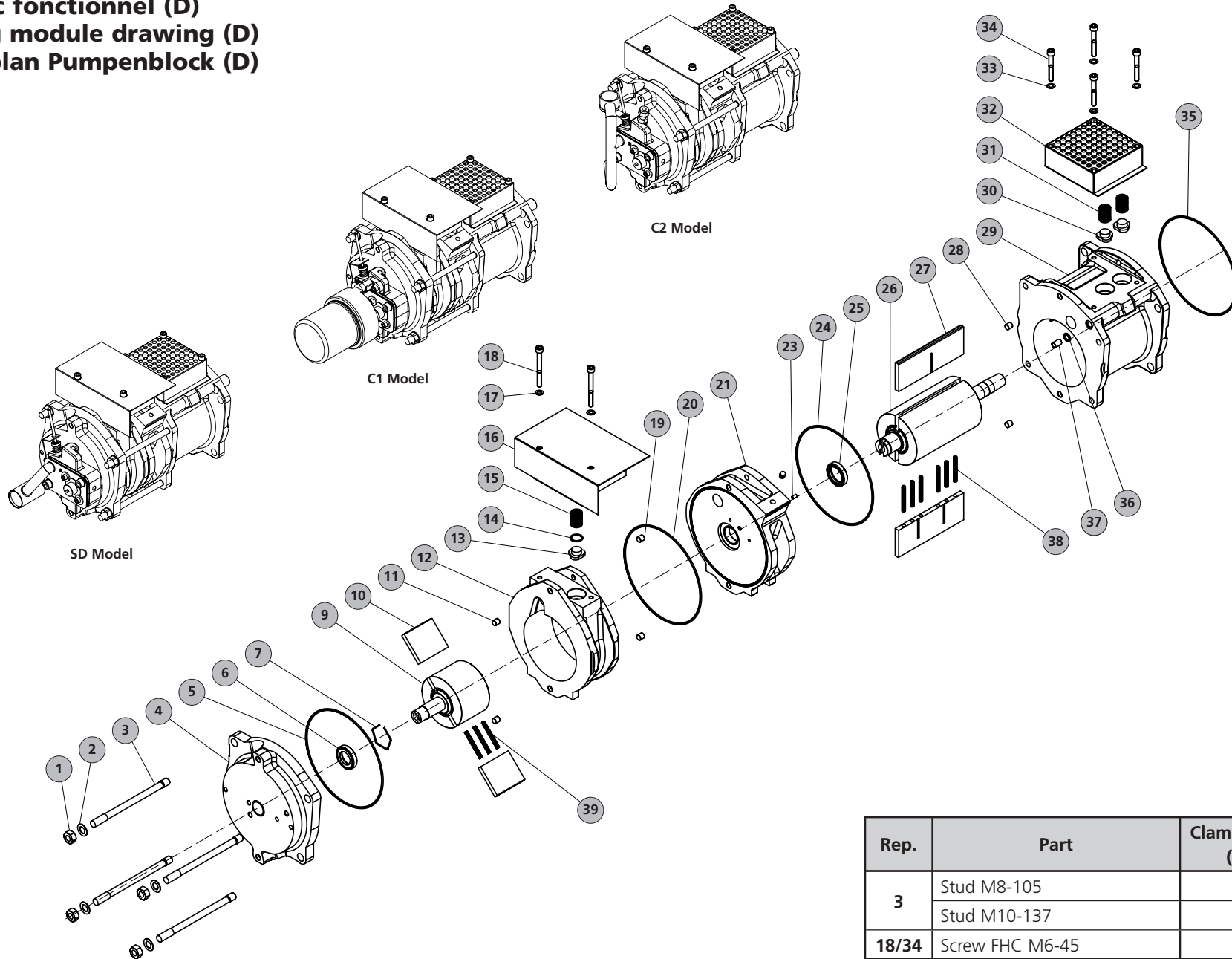
## Nomenclature cuve et bâti / Oil casing and central housing part list / Ölbehälter und Pumpenträger Nomenklatur

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG							REF. P/N Bestell. Nr
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2	2063 C2	
A	Cuve	Oil casing	Ölbehälter	1	1	1	1	1	1	see N-9
B	Bâti	Central housing	Pumpenträger	1	1	1	1	1	1	see N-11
1	Frein d'axe	Circlips	Achsbremse	1	1	1	1	1	1	●
2	Joint à lèvres 20X35X7 FMP81	Shaft seal 20X35X7 FMP81	Lippendichtung 20X35X7 FMP81	1	1	1	1	1	1	●
3	Joint torique c 3,53 - d 221,85	O-ring c 3,53 - d 221,85	Dichtung c 3,53 - d 221,85	1		1				●
3	Joint torique c 3,53 - d 278,99	O-ring c 3,53 - d 278,99	Dichtung c 3,53 - d 278,99		1		1			●
4	Ecrou H M8	Nut H M8	Mutter H M8	8		8		8		✚
4	Ecrou H M10	Nut H M10	Mutter H M10		8		8		8	✚
5	Rondelle D10	Washer D10	Unterlegscheibe D10		8		8		8	✚
5	Rondelle D8	Washer D8	Unterlegscheibe D8	8		8		8		✚
6	Goujon M8-28 INOX	Stud M8	Stehbolzen M8	8		8		8		054209
6	Goujon M10-25	Stud M10	Stehbolzen M10		8		8		8	054441
7	Pion de positionnement D6	Pin D6	Zylinder D6	2		2		2		071240
7	Pion de positionnement D8	Pin D8	Zylinder D8		2		2		2	071042
B	Bâti	Central housing	Pumpenträger	1	1	1	1	1	1	see N-11
8	Rondelle D10	Washer D10	Unterlegscheite D10	1	1	1	1	1	1	✚
9	Equerre fixation	Square support	Winkel Träger	1	1	1	1	1	1	A465526
10	Vis CHC M10 x 30	Screw CHC M10-30	Schraube CHC M10-30	1	1	1	1	1	1	075548
10a	Mousqueton	Snap hook	Karabiner Haken				1	1		118743
11	Pion de positionnement D6	Pin D6	Zylinder D6	2		2		2		071041
11	Pion de positionnement D8	Pin D8	Zylinder D8		2		2		2	071046
12	Joint à 2 lèvres 20X35X7 FMP81	Double lip seal 20X35X7 FMP81	2 Lippendichtung 20X35X7 FMP81	1	1	1	1	1	1	●
12a	Joint torique c 2,5 - d 38	O-ring c 2,5 - d 38	Dichtung c 2,5 - d 38	1	1	1	1	1	1	●
13	Couvercle	Cover	Deckel	1	1					054126
13	Couvercle	Cover	Deckel			1	1	1	1	054204
14	Goujon M8-20	Stud M8-20	Stehbolzen M8-20	4		4		4		075837
14	Goujon M10-25	Stud M10-25	Stehbolzen M10-25		4		4		4	075838
15	Idem 5	Idem 5	Ebenso 5	4	4	4	4	4	4	✚
16	Idem 4	Idem 4	Ebenso 4	4	4	4	4	4	4	✚
17	Ventilateur	Fan	Ventilator	1		1		1		054115
17	Ventilateur	Fan	Ventilator		1		1		1	054435
18	Rondelle	Washer	Unterlegscheibe	1	1	1	1	1	1	✚
19	Vis CHC M10-20	Screw CHC M10-20	Schraube CHC M10-20	1	1	1	1	1	1	●
20	Vis CHC M8-25	Screw CHC M8-25	Schraube CHC M8-25		4		4		4	✚
20	Vis CHC M8-20	Screw CHC M8-20	Schraube CHC M8-20	4		4		4		✚
21	Idem 8	Idem 8	Ebenso 8	4	4	4	4	4	4	✚
22	Flasque moteur 50/60 Hz	50/60 Hz motor flange	50/60 Hz Motorflansch	1		1		1		054118

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG							REF. P/N Bestell. Nr
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2	2063 C2	
22	Flasque moteur 50/60 Hz	50/60 Hz motor flange	50/60 Hz Motorflansch		1		1		1	054419
M	Motor tri	Electric motor 3ph.	Elektromotor 3ph.	1	1	1	1	1	1	see N-13
23	Grille de protection	Screening grid	Abschirmgitter	1		1		1		054264
23	Grille de protection	Screening grid	Abschirmgitter		1		1		1	065511
24	Déflecteur	Deflector	Deflektor	1		1		1		054147
24	Déflecteur	Deflector	Deflektor		1		1		1	054432
25	Vis FHC M6-10	Screw FHC M6-10	Schraube FHC M6-10	3	3	3	3	3	3	✚
26	Vis CHC M6-20	Screw CHC M6-20	Schraube CHC M6-20	3	3	3	3	3	3	✚
27	Rondelle D6	Washer D6	Unterlegscheibe D6	3	3	3	3	3	3	✚
28	Bouchon 1/8 NPT	Plug 1/8 NPT	Blindstopf 1/8 NPT	1	1	1	1	1	1	103421
29	Feutre	Felt	Filz	1		1		1		●
29	Feutre	Felt	Filz		1		1		1	●
30	Vis H M10-12	Screw H M10-12	Schraube H M10-12	4	4	4	4	4	4	✚
31	Idem 5	Idem 5	Ebenso 5	4	4	4	4	4	4	✚
32	Socle	Base	Sockel		1		1		1	054408
32	Socle	Base	Sockel	1		1		1		054102
33	Butée	Stop	Anschlag	4	4	4	4	4	4	053323
34	Idem 5	Idem 5	Ebenso 5	4	4	4	4	4	4	✚
35	Vis CHC M8-20	Screw CHC M8-20	Schraube CHC M8-20	4		4		4		✚
35	Vis CHC M10-20	Screw CHC M10-20	Schraube CHC M10-20		4		4		4	✚
37	Joint torique c 2,00 - d 8,00	O-ring c 2.00 - d 8.00	Dichtung c 2,00 - d 8,00	1	1	1	1	1	1	●
38	Tube porte-joint	Tube	Röhre	1	1	1	1	1	1	054140
D	Bloc fonctionnel	Pumping module	Pumpenblock	1	1	1	1	1	1	see N-5
E	Pompe à huile	Oil pump system	Ölpumpensystem	1	1	1	1	1	1	see N-7

● Lot joints / Minor kit / Dichtungssatz    ■ Lot maintenance / Major kit / Wartungssatz    ✚ Lot visserie / Screw kit / Schraubensatz

**Plan bloc fonctionnel (D)**  
**Pumping module drawing (D)**  
**Gesamtplan Pumpenblock (D)**



Rep.	Part	Clamping torque (DaN.m)
3	Stud M8-105	1.5
	Stud M10-137	3.0
18/34	Screw FHC M6-45	0.65

## Nomenclature bloc fonctionnel (D) / Pumping module part list (D) / Pumpenblock Nomenklatur (D)

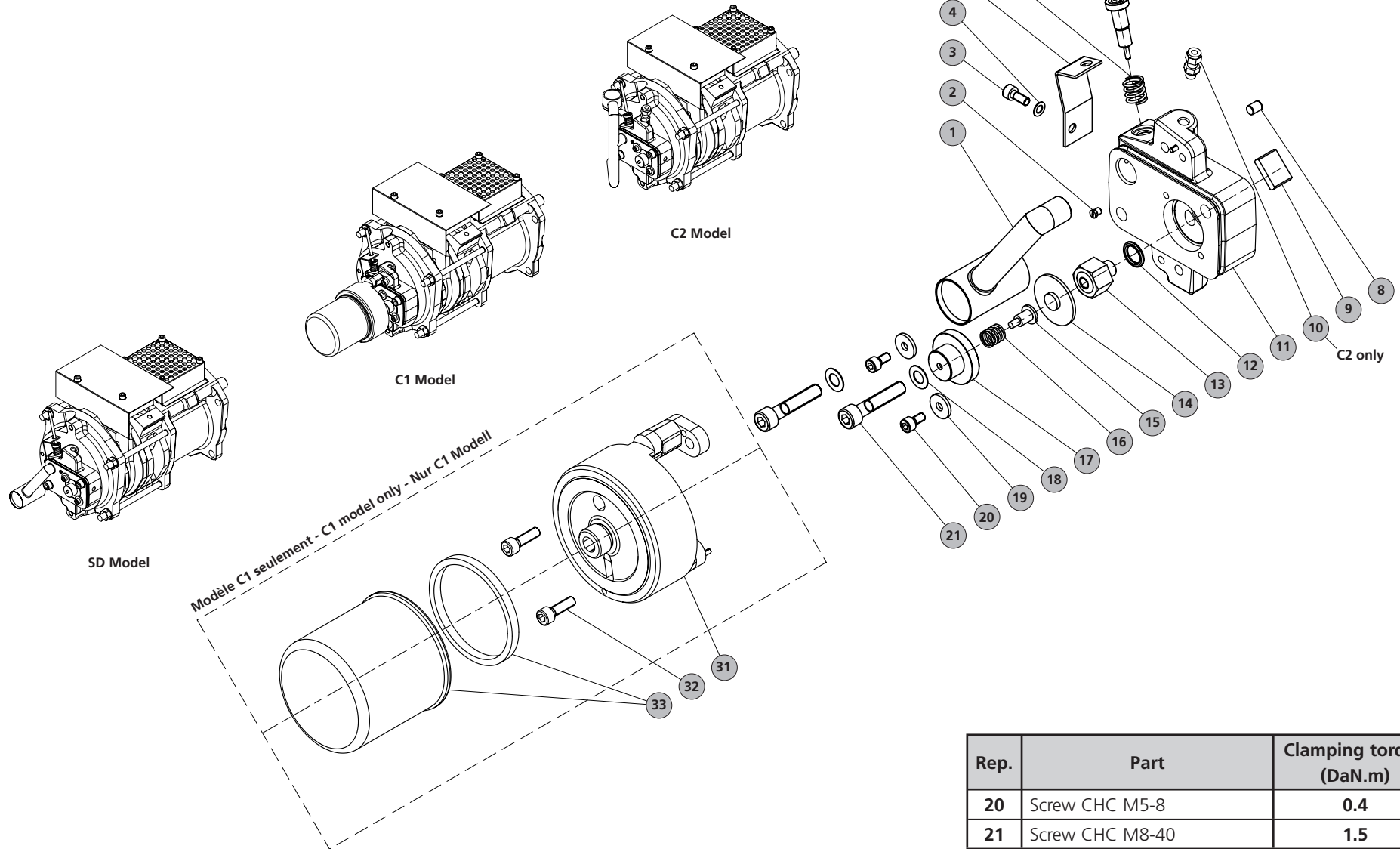
REP	DÉSIGNATION	SPECIFICATION	BENENNUNG							REF. P/N Bestell. Nr
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2	2063 C2	
1	Ecrou H M8	Nut H M8	Mutter H M8	4						+
1	Ecrou H M10	Nut H M10	Mutter H M10		4	4	4	4		+
2	Rondelle D10	Washer D10	Unterlegscheibe D10	4	4	4	4	4	4	+
3	Goujon M8-105	Stud M8-105	Stehbolzen M8-105	4		4				054208
3	Goujon M10-137	Stud M10-137	Stehbolzen M10-137		4		4		4	054443
4	Flasque arrière	Rear plate	Hintere Flansch	1						0542505
4	Flasque arrière	Rear plate	Hintere Flansch		1					0655055
4	Flasque arrière	Rear plate	Hintere Flansch			1		1		0542515
4	Flasque arrière	Rear plate	Hintere Flansch				1	1		0655065
5	Joint torique c 2,00 - d 127,50	O-ring c 2,00 - d 127,50	Dichtung c 2,00 - d 127,50	1		1		1		●
5	Joint torique c 2,00 - d 148,00	O-ring c 2,00 - d 148,00	Dichtung c 2,00 - d 148,00		1		1		1	●
6	Joint à lèvres 20X35X7 FMP81	Shaft seal 20X35X7 FMP81	Lippendichtung 20X35X7 FMP81	1	1	1	1	1	1	●
7	Frein d'axe	Circlips	Achsbremse	1	1	1	1	1	1	●
9	Rotor HP diam. 20	HP rotor diam. 20	Hochdruckrotor diam. 20	1						0541255
9	Rotor HP diam. 25	HP rotor diam. 25	Hochdruckrotor diam. 25		1					A2147945
9	Rotor HP diam. 20	HP rotor diam. 20	Hochdruckrotor diam. 20		1					0544335
9	Rotor HP diam. 20	HP rotor diam. 20	Hochdruckrotor diam. 20			1				0541835
9	Rotor HP diam. 25	HP rotor diam. 25	Hochdruckrotor diam. 25				1			A2147955
9	Rotor HP diam. 20	HP rotor diam. 20	Hochdruckrotor diam. 20				1			0544405
9	Rotor HP diam. 20	HP rotor diam. 20	Hochdruckrotor diam. 20					1		0650755
9	Rotor HP diam. 25	HP rotor diam. 25	Hochdruckrotor diam. 25						1	A2148085
9	Rotor HP diam. 20	HP rotor diam. 20	Hochdruckrotor diam. 20						1	0655465
10	Palette HP	HP vane	Hochdruckschieber	2		2				■
10	Palette HP	HP vane	Hochdruckschieber		2		2			■
10	Palette HP	HP vane	Hochdruckschieber					2		■
10	Palette HP	HP vane	Hochdruckschieber						2	■
11	Pion de positionnement D8	Pin D8	Zylinder D8		2		2		2	071042
11	Pion de positionnement D6	Pin D6	Zylinder D6		2		2		2	071040
12	Stator HP	HP stator	Hochdruckstator	1		1		1		0541225
12	Stator HP	HP stator	Hochdruckstator		1		1		1	0544155
13	Soupape	Valve	Ventil	1	1	1	1	1	1	●
14	Rondelle D14	Washer D14	Unterlegscheibe D14	1	1	1	1	1	1	●
15	Ressort	Spring	Feder	1	1	1	1	1	1	■
16	Capot de soupape HP	HP valve cover	Hochdruckventilgehäuse	1						054159
16	Capot de soupape HP	HP valve cover	Hochdruckventilgehäuse		1					054476
16	Capot de soupape HP	HP valve cover	Hochdruckventilgehäuse			1		1		054216
16	Capot de soupape HP	HP valve cover	Hochdruckventilgehäuse				1	1		054478
17	Rondelle D6	Washer D6	Unterlegscheibe D6	2	2	2	2	2	2	+

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG							REF. P/N Bestell. Nr
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2	2063 C2	
18	Vis FHC M6-45	Screw FHC M6-45	Schraube FHC M6-45	2	2	2	2	2	2	+
19	Idem 11	Idem 11	Ebenso 11	2	2	2	2	2	2	-
20	Idem 5	Idem 5	Ebenso 5	1	1	1	1	1	1	●
21	Flasque médian diam. 20	Central plate diam. 20	Mittelflansch diam. 20	1						0541215
21	Flasque médian diam. 25	Central plate diam. 25	Mittelflansch diam. 25		1					A1105435
21	Flasque médian diam. 20	Central plate diam. 20	Mittelflansch diam. 20		1					0544135
21	Flasque médian diam. 20	Central plate diam. 20	Mittelflansch diam. 20			1		1		0541905
21	Flasque médian diam. 25	Central plate diam. 25	Mittelflansch diam. 25				1		1	A1105445
21	Flasque médian diam. 20	Central plate diam. 20	Mittelflansch diam. 20				1		1	0544345
23	Gicleur flasque médian	Central plate jet	Mittelflanschdüse	1						087997
23	Gicleur flasque médian	Central plate jet	Mittelflanschdüse		1					065001
24	Idem 5	Idem 5	Ebenso 5	1	1	1	1	1	1	●
25	Idem 6	Idem 6	Ebenso 6	1	1	1	1	1	1	●
25	Joint à lèvres 25X35X7 FMP81	Lip seal 25X35X7 FMP81	Lippendichtung 25X35X7 FMP81		1		1		1	●
26	Rotor BP diam. 20	LP rotor diam. 20	Niederdruckrotor diam. 20	1		1				0541825
26	Rotor BP diam. 25	LP rotor diam. 25	Niederdruckrotor diam. 25		1		1			A2147975
26	Rotor BP diam. 20	LP rotor diam. 20	Niederdruckrotor diam. 20		1		1			0544395
26	Rotor BP diam. 20	LP rotor diam. 20	Niederdruckrotor diam. 20					1		0650745
26	Rotor BP diam. 25	LP rotor diam. 25	Niederdruckrotor diam. 25						1	A2148065
26	Rotor BP diam. 20	LP rotor diam. 20	Niederdruckrotor diam. 20						1	0655455
27	Palette BP	LP vane	Niederdruckschieber	2		2		2		■
27	Palette BP	LP vane	Niederdruckschieber		2		2		2	■
28	Idem 11	Idem 11	Ebenso 11	2	2	2	2	2	2	-
29	Stator BP	LP stator	Niederdruckstator	1		1		1		0541205
29	Stator BP	LP stator	Niederdruckstator		1		1		1	0544115
30	Idem 13	Idem 13	Ebenso 13	2	2	2	2	2	2	●
31	Idem 15	Idem 15	Ebenso 15	2	2	2	2	2	2	■
32	Capot de soupape BP	LP valve cover	Niederdruckventilgehäuse	1						054129
32	Capot de soupape BP	LP valve cover	Niederdruckventilgehäuse		1					054428
32	Capot de soupape BP	LP valve cover	Niederdruckventilgehäuse			1		1		054191
32	Capot de soupape BP	LP valve cover	Niederdruckventilgehäuse				1	1	1	054442
33	Idem 17	Idem 17	Ebenso 17	4	4	4	4	4	4	+
34	Idem 18	Idem 18	Ebenso 18	4	4	4	4	4	4	+
35	Idem 5	Idem 5	Ebenso 5	1	1	1	1	1	1	●
36	Joint torique c 2,00 - d 8,00	O-ring c 2,00 - d 8,00	Dichtung c 2,00 - d 8,00	1	1	1	1	1	1	●
37	Tube porte-joint	Tube	Röhre	1	1	1	1	1	1	054140
38	Ressort de palette	Vane spring	Schieberfeder	6	6	6	6	6	6	■
39	Idem 38	Idem 38	Ebenso 38	3	3	3	3	3	3	-

● Lot joints / Minor kit / Dichtungssatz    ■ Lot maintenance / Major kit / Wartungssatz    + Lot visserie / Screw kit / Schraubensatz



**Plan système de lubrification pompe à huile (E)**  
**Oil pump system drawing (E)**  
**Ölpumpsystem Gesamtplan (E)**



## Nomenclature système de lubrification pompe à huile (E) / Oil pump system part list (E) / Ölpumpsystem Nomenklatur (E)

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG	Types/model						REF. P/N Bestell. Nr
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2	2063 C2	
1	Tube de prise d'huile	Oil admission tube	Öleinlass	1						054268
1	Tube de prise d'huile	Oil admission tube	Öleinlass		1					065509
1	Tube de prise d'huile	Oil admission tube	Öleinlass				1			065047
1	Tube de prise d'huile	Oil admission tube	Öleinlass			1				065046
1	Tube de prise d'huile	Oil admission tube	Öleinlass					1		065058
1	Tube de prise d'huile	Oil admission tube	Öleinlass						1	065534
2	Gicleur	Jet	Düse	1	1	1	1	1	1	054241
3	Vis CHC M6-12	Screw CHC M5-12	Schraube CHC M5-12	1	1	1	1	1	1	✚
4	Rondelle D5	Washer D5	Unterlegscheibe D5	1	1	1	1	1	1	✚
5	Butée pour tube	Stop tube	Anschlag	1	1	1	1			065510
6	Ressort	Spring	Feder	1	1	1	1	1	1	■
7	Tube de prise d'air	Air admission tube	Lufteinlass	1	1	1	1	1	1	054212
8	Pion de positionnement D6	Pin D6	Zylinder D6	1	1	1	1	1	1	071040
9	Palette	Vane	Schieber	1		1				■
9	Palette	Vane	Schieber		1		1			■
9	Palette	Vane	Schieber					1		■
9	Palette	Vane	Schieber						1	■
10	Raccord	Connector	Verschluss					1	1	076635
11	Corps de pompe à huile	Oil pump body	Ölpumpenkörper	1						054253
11	Corps de pompe à huile	Oil pump body	Ölpumpenkörper		1					065513
11	Corps de pompe à huile	Oil pump body	Ölpumpenkörper			1				054255
11	Corps de pompe à huile	Oil pump body	Ölpumpenkörper				1			065512
11	Corps de pompe à huile	Oil pump body	Ölpumpenkörper					1		065071
11	Corps de pompe à huile	Oil pump body	Ölpumpenkörper						1	065536
12	Joint torique c 2,70 - d 10,50	O-ring c 2.70 - d 10.50	Dichtung c 2,70 - d 10,50	1	1	1	1	1	1	●
13	Siège	Seat	Sitz	1	1					054144
13	Siège	Seat	Sitz			1	1	1	1	054203
14	Membrane	Membrane	Membran	1	1	1	1	1	1	●
15	Piston	Piston	Kolben	1	1					083331
15	Piston	Piston	Kolben			1	1	1	1	054194
16	Ressort	Spring	Feder	1	1	1	1	1	1	■
17	Cylindre	Cylinder	Zylinder	1	1					083077
17	Cylindre	Cylinder	Zylinder			1	1	1	1	054195
19	Rondelle D8	Washer D8	Unterlegscheibe D8	2	2	2	2	2	2	✚
19	Rondelle	Washer	Unterlegscheibe	2	2	2	2	2	2	✚
20	Vis CHC M5-8	Screw CHC M5-8	Schraube CHC M5-8	2	2	2	2	2	2	✚
21	Vis CHC M8-40	Screw CHC M8-40	Schraube CHC M8-40	2	2	2	2	2	2	✚
31	Traversée cuve	Case bushing	Ölbehälterdurchführung			1	1			054193
32	Vis CHC M6-20	Screw CHC M6-20	Schraube CHC M6-20			2	2			✚
33	Filtre	filter	filter			1	1			065159

● Lot joints / Minor kit / Dichtungssatz

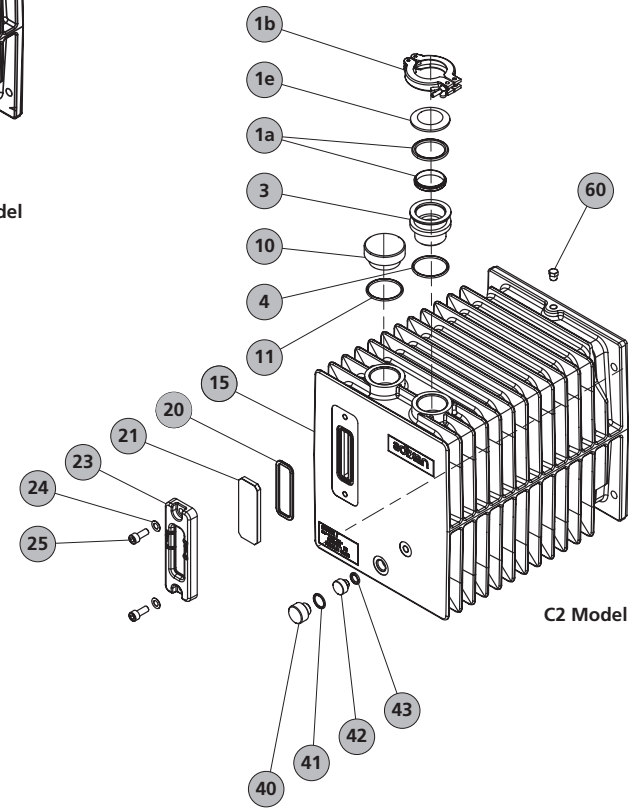
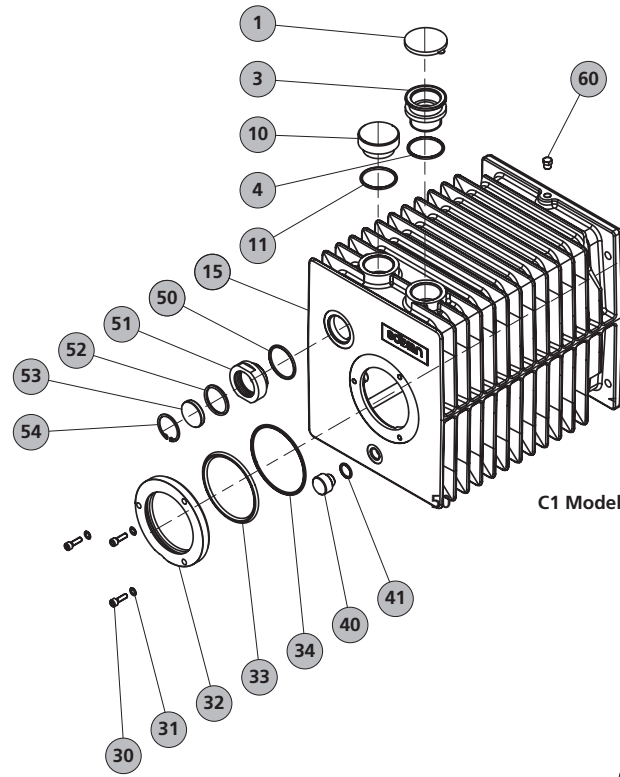
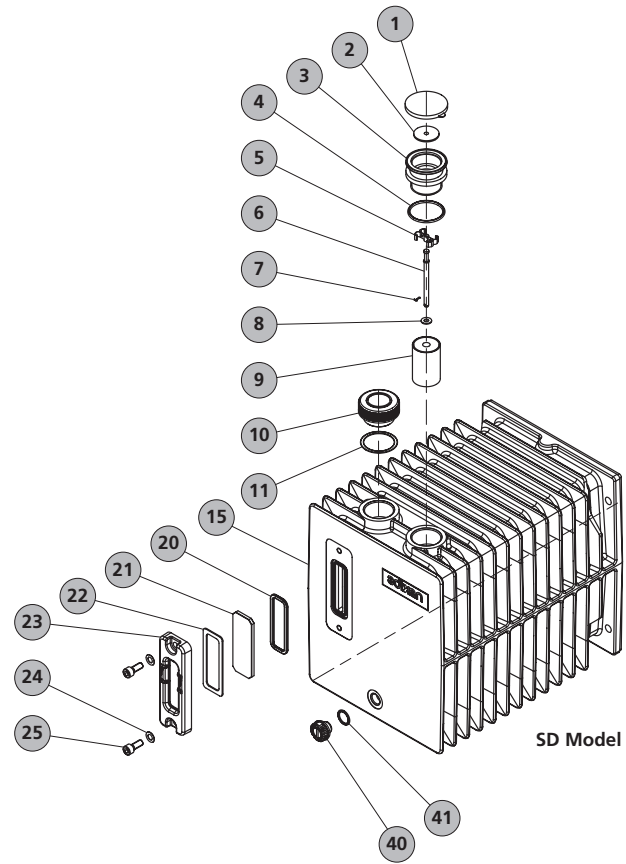
■ Lot maintenance / Major kit / Wartungssatz

✚ Lot visserie / Screw kit / Schraubensatz



**Plan de détail cuve (A)**  
**Oil casing detail drawing (A)**  
**Einzelplan Ölbehälter (A)**

Rep.	Part	Clamping torque (DaN.m)
25	Screw CHC M8-20	1.5
30	Screw CHC M6-20	0.65



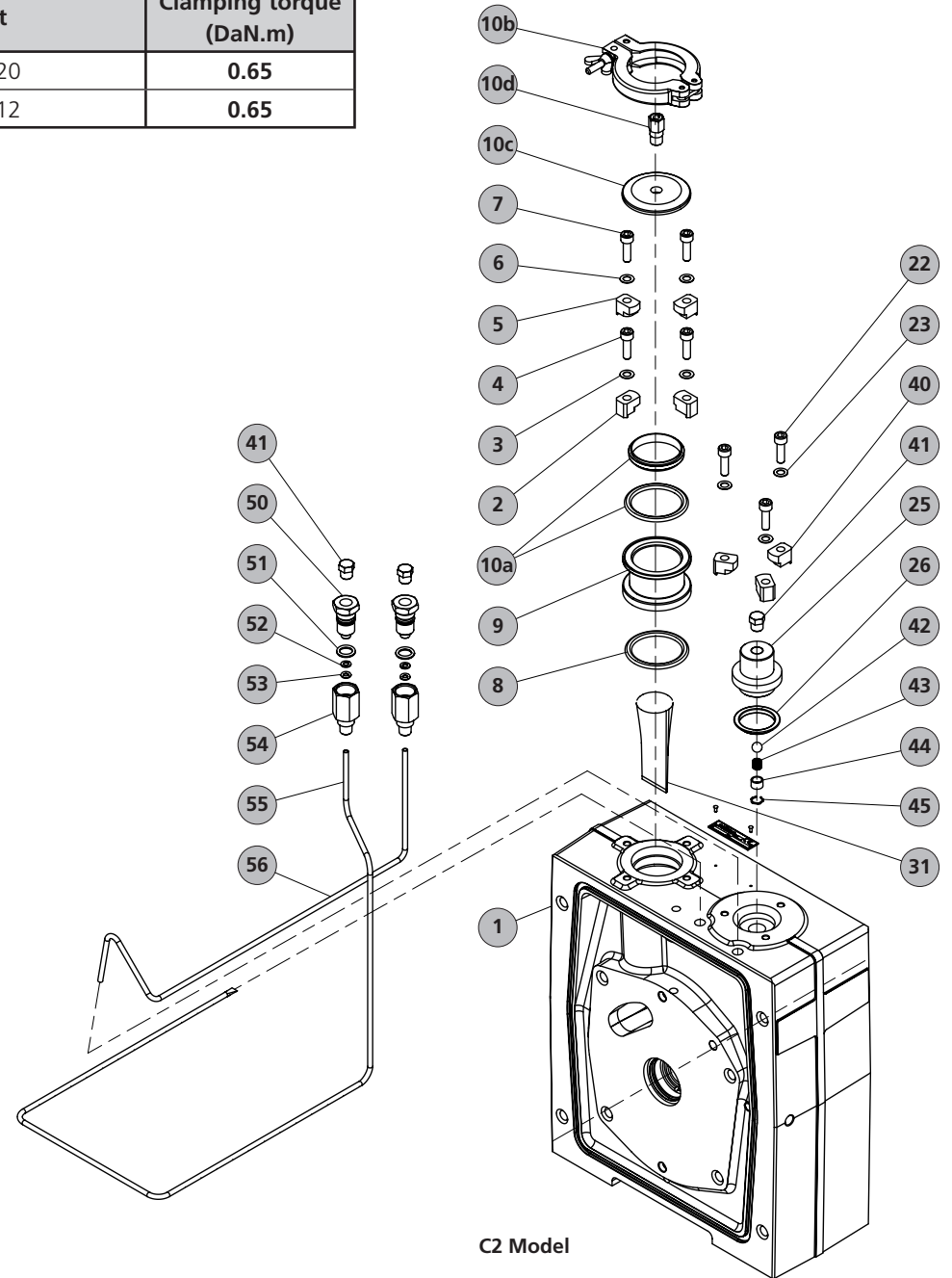
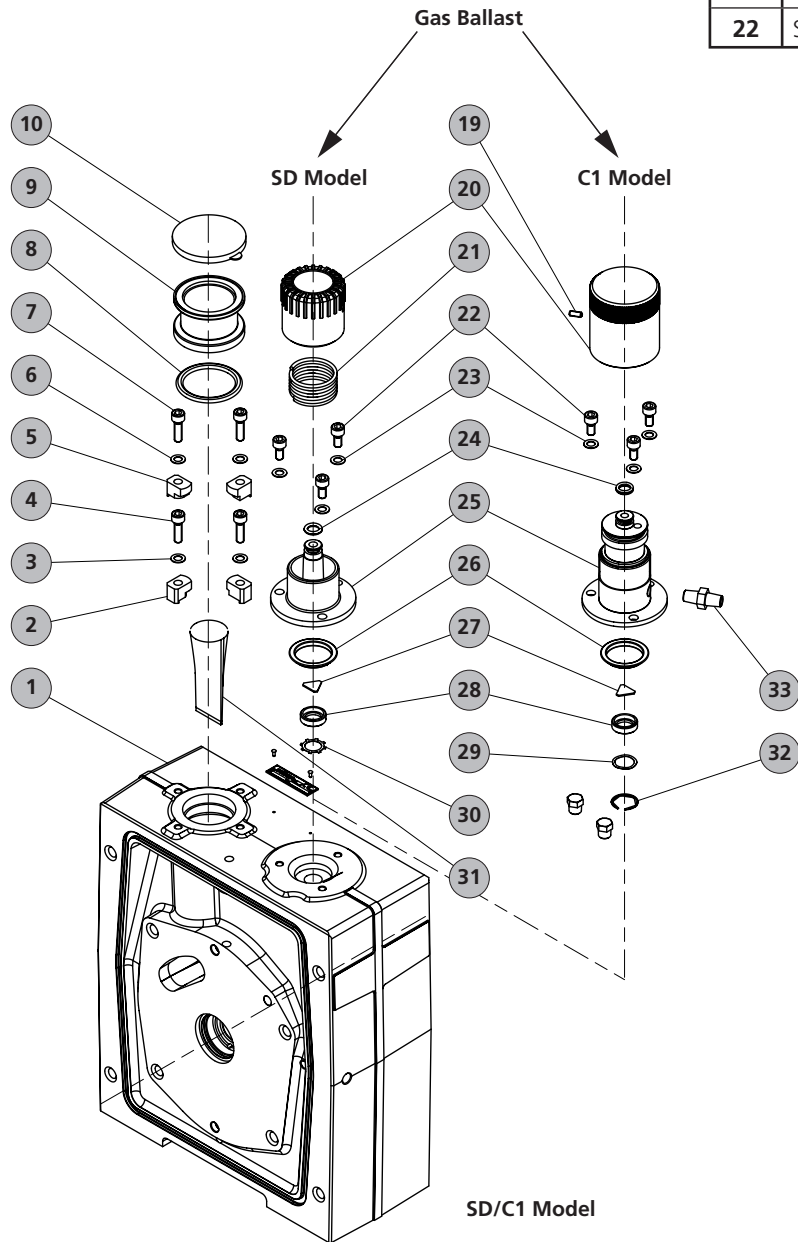
## Nomenclature cuve (A) / Oil casing part list (A) / Nomenklatur Ölbehälter (A)

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG						REF. P/N Bestell. Nr	
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2		2063 C2
1	Protecteur plat	Flat protector	Blindflansche	1	1	1	1			068012
1a	Anneau porte-joint DN40 équipé d'un joint	Centering ring with o-ring DN 40 ISO KF	Zentrierring mit Rundschnurring DN 40 ISO KF					1	1	068230
1b	Collier de serrage	Quick connect clamp	Spannring					1	1	083267
1e	Obturateur DN 40 ISO KF	Blank off flange DN 40 ISO KF	Blindflansche DN 40 ISO KF					1	1	068595
2	Soupape de refoulement	Exhaust valve	Auspuffventil	1	1					●
3	Embout de refoulement	Exhaust nipple	Auspuffstutzen	1	1					054131
3	Embout de refoulement	Exhaust nipple	Auspuffstutzen			1	1	1	1	054205
4	Joint torique c 3,00 - d 44,00	O-ring c 3.00 - d 44.00	Dichtung c 3,00 - d 44,00	1	1	1	1	1	1	●
5	Circlips	Circlips	Klemmen	1	1					054133
6	Axe refoulement	Exhaust valve shaft	Auspuffventilachse	1	1					054223
7	Goupille	Forelock	Stift	1	1					●
8	Rondelle	Washer	Unterlegscheibe	1	1					073309
9	Filtre de refoulement	exhaust filter	Auspuff-Filter	1	1					100116
10	Bouchon	Fill plug	Stopfen	1	1					082925
10	Bouchon	Fill plug	Stopfen			1	1	1	1	054213
11	Joint torique c 3,00 - d 41,00	O-ring c 3.00 - d 41.00	Dichtung c 3,00 - d 41,00	1	1					●
11	Idem 4	Idem 4	Ebenso 4			1	1	1	1	●
15	Cuve	Oil case	Behälter	1						065158
15	Cuve	Oil case	Behälter			1				104008
15	Cuve	Oil case	Behälter		1					065566
15	Cuve	Oil case	Behälter				1			104008
15	Cuve	Oil case	Behälter					1		065051
15	Cuve	Oil case	Behälter						1	065532
20	Joint torique c 3,53 - d 63,10	O-ring c 3.53 - d 63.10	Dichtung c 3,53 - d 63,10	1	1			1	1	●
21	Verre de voyant	Glass	Glas	1	1					103307
21	Voyant plastique (PA)	Oil sight glass (PA)	Glas (PA)					1	1	105452
22	Protection verre	Glass protection	Glasprotektion	1	1					■
23	Bride de voyant	Oil sight glass flange	Ölschauglasklammer	1	1					103308
23	Bride de voyant	Oil sight glass flange	Ölschauglasklammer					1	1	104483
24	Rondelle D8	Washer D8	Scheibe D8	2	2			2	2	●
25	Vis CHC M8-20	Screw CHC M8-20	Schraube CHC M8-20	2	2			2	2	075608
30	Vis CHC M6-20	Screw CHC M6-20	Schraube CHC M6-20			3	3			✚
31	Rondelle D6	Washer D6	Scheibe D6			3	3			✚
32	Bride	Flange	Flansch			1	1			054214
33	Joint torique c 5,33 - d 91,44	O-ring c 5.33 - d 91.44	Dichtung c 5,33 - d 91,44			1	1			●
34	Joint torique c 3,00 - d 96,00	O-ring c 3.00 - d 96.00	Dichtung c 3,00 - d 96,00			1	1			●
40	Bouchon	Plug	Stopfen	1	1					102847

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG						REF. P/N Bestell. Nr	
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2		2063 C2
40	Bouchon	Plug	Stopfen			1	1	1	1	■
41	Joint torique c 2,70 - d 16,90	O-ring c 2.70 - d 16.90	Dichtung c 2,70 - d 16,90	1	1	1	1	1	1	●
42	Bouchon M10	Plug M10	Stopfen M10							065078
43	Joint torique c 2,70 - d 10,50	O-ring c 2.70 - d 10.50	Dichtung c 2,70 - d 10,50					1	1	●
50	Joint torique c 3,60 - d 37,30	O-ring c 3.60 - d 37.30	Dichtung c 3,60 - d 37,30			1	1			●
51	Corps	Body	Körper			1	1			054198
52	Idem 4	Idem 4	Ebenso 4			1	1			●
53	Disque verre	Glass	Glas			1	1			054199
54	Circlips	Circlip	Klemmen			1	1			●
60	Bouchon	Plug	Stopfen			1	1	1	1	082926

**Plan de détail bâti (B)**  
**Central housing detail drawing (B)**  
**Einzelplan Pumpenträger (B)**

Rep.	Part	Clamping torque (DaN.m)
4	Screw CHC M6-20	0.65
22	Screw CHC M6-12	0.65



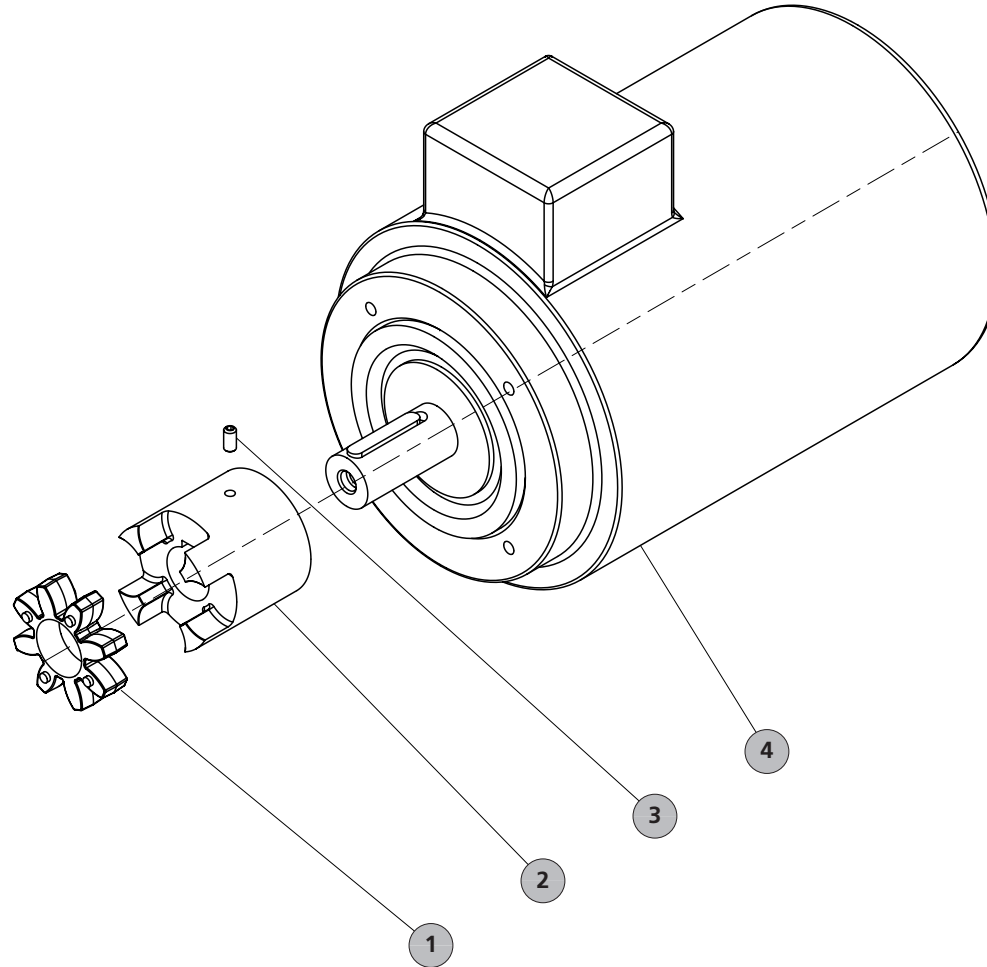
## Nomenclature bâti (B) / Central housing part list (B) / Pumpenträger Nomenklatur (B)

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG							REF. P/N Bestell. Nr
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2	2063 C2	
1	Bâti	Central Housing	Pumpenträger	1						<b>054117S</b>
1	Bâti	Central Housing	Pumpenträger		1					<b>054405S</b>
1	Bâti	Central Housing	Pumpenträger			1		1		<b>065070S</b>
1	Bâti	Central Housing	Pumpenträger				1	1		<b>065535S</b>
2	Taquet	Wedge	Knagge	2	2	2	2	2	2	<b>068504</b>
3	Rondelle D6	Washer D6	Unterlegscheibe D6	2	2	2	2	2	2	❖
4	Vis CHC M6-20	Screw CHC M6-20	Schraube CHC M6-20	2	2	2	2	2	2	❖
5	Idem 2	Idem 2	Ebenso 2	2	2	2	2	2	2	-
6	Idem 3	Idem 3	Ebenso 3	2	2	2	2	2	2	❖
7	Idem 4	Idem 4	Ebenso 4	2	2	2	2	2	2	❖
8	Joint torique c 5,33 - d 40,64	O-ring c 5.33 - d 40.64	Dichtung c 5,33 - d 40,64	1	1	1	1	2	2	●
9	Embout DN40 ISO KF	Nipple DN40 ISO KF	Anschweißflansch	1	1					<b>054232</b>
9	Embout DN40 ISO KF	Nipple DN40 ISO KF	Anschweißflansch			1	1	1	1	<b>054231</b>
10	Protecteur plat	Flat protector	Blindflansche	1	1	1	1			<b>068012</b>
10a	Anneau porte-joint DN40 ISO KF équipé d'un joint	Centering ring with o-ring DN40 ISO KF	Zentrierung mit Rundschnurring DN40 ISO KF					1	1	<b>068230</b>
10b	Collier de serrage	Quick connect clamp	Spannring					1	1	<b>083267</b>
10c	Obturbateur DN40 G 1/8	Blank off flange DN40 ISO KF G 1/8	Blindflansche DN40 ISO KF G 1/8					1	1	<b>065053</b>
10d	Raccord G 1/8	Plug G 1/8	Verschluss G 1/8					1	1	<b>082981</b>
	Lest d'air équipé comprenant 20, 21, 24, 25, 27, 28, 30	Equipped gas ballast including 20, 21, 24, 25, 27, 28, 30	Gasballast Einrichtung mit 20, 21, 24, 25, 27, 28, 30	1	1					<b>054279S</b>
	Lest d'air équipé comprenant 19, 20, 24, 25, 27, 28, 29, 32, 33	Equipped gas ballast including 19, 20, 24, 25, 27, 28, 29, 32, 33	Gasballast Einrichtung mit 19, 20, 24, 25, 27, 28, 29, 32, 33			1	1			<b>065080S</b>
19	Vis HC M4-10	Screw HC M4-10	Schraube HC M4-10			1	1			❖
20	Bouton de manoeuvre	Knob	Drehknopf	1	1					-
20	Bouton de manoeuvre	Knob	Drehknopf			1	1			-
21	Ressort lest d'air	Gas ballast spring	Gasballast Feder	1	1					-
22	Vis CHC M6-12	Screw CHC M6-12	Schraube CHC M6-12	3	3	3	3	3	3	❖
23	Idem 3	Idem 3	Ebenso 3	3	3	3	3	3	3	❖
24	Joint torique c 2,70 - d 8,90	O-ring c 2.70 - d 8.90	Dichtung c 2,70 - d 8,90	1	1	1	1			●
25	Corps de lest d'air	Gas ballast spring	Gasballast Feder	1	1					-
25	Corps de lest d'air	Gas ballast spring	Gasballast Feder			1	1			-
25	Corps de lest d'air	Gas ballast spring	Gasballast Feder					1	1	<b>065146</b>
26	Joint torique c 3,60 - d 29,30	O-ring c 3.60 - d 29.30	Dichtung c 3,60 - d 29,30	1	1	1	1	1	1	●
27	Clapet	Valve	Klappe	1	1	1	1			■
28	Support clapet	Valve support	Unterstützung Klappe	1	1	1	1			-
29	Rondelle élastique	Spring washer	Federnde Scheibe			1	1			-
30	Anneau frein diam. 20	Clamp ring diam. 20	Ring diam. 20	1	1					●

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG							REF. P/N Bestell. Nr
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2	2063 C2	
31	Filtre d'aspiration	Inlet filter	Inlate filter	1		1		1		<b>054202</b>
31	Filtre d'aspiration	Inlet filter	Inlate filter		1		1		1	<b>054426</b>
32	Frein d'axe	Circlips	Achsbremse			1	1			●
33	Raccord inox 1/8 NPT	Connecting nipple 1/8 NPT	Verschluss 1/8 NPT			1	1			-
40	Idem 2	Idem 2	Ebenso 2					3	3	-
41	Bouchon	Plug	Stopfen					3	3	<b>082926</b>
42	Bille	Ball	Murmel					1	1	<b>082566</b>
43	Ressort	Spring	Feder					1	1	■
44	Bague	Ring	Öse					1	1	<b>065147</b>
45	Frein d'axe	Circlips	Achsbremse					1	1	●
50	Vis M14	Screw M14	Schraube M14					2	2	<b>065038</b>
51	Joint torique c 2,70 - d 10,50	O-ring c 2.70 - d 10.50	Dichtung c 2,70 - d 10,50					2	2	<b>082007</b>
52	Rondelle Z	Washer Z	Scheibe Z					2	2	●
53	Joint torique c 1,90 - d 4,20	O-ring c 1.90 - d 4.20	Dichtung c 1,90 - d 4,20					2	2	●
54	Embasse	Base	Hülse					2	2	<b>065039</b>
55	Tube bulleur	Bubbler tube	Rohr (Ölbegasungs)					1		<b>065050</b>
55	Tube bulleur	Bubbler tube	Rohr (Ölbegasungs)						1	<b>065049</b>
56	Tube pression d'huile	Oil pressure tube	Rohr (Öldruckanzeige)					1		<b>065072</b>
56	Tube pression d'huile	Oil pressure tube	Rohr (Öldruckanzeige)						1	<b>065537</b>

● Lot joints / Minor kit / Dichtungssatz    ■ Lot maintenance / Major kit / Wartungssatz    ❖ Lot visserie / Screw kit / Schraubensatz

**Plan ensemble motorisation (M)**  
**Motor assembly drawing (M)**  
**Motor Gesamtplan (M)**



Rep.	Part	Clamping torque (DaN.m)
3	Screw Hc M6 x 8.8 (s.steel)	0.9

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

REP	DÉSIGNATION	SPECIFICATION	BENENNUNG	Types/model						REF. P/N Bestell. Nr
				2033 SD	2063 SD	2033 C1	2063 C1	2033 C2	2063 C2	
1	Anneau élastique denté	Elastic coupling	Elastische Zahnscheibe	1		1		1		■
1	Anneau élastique denté	Elastic coupling	Elastische Zahnscheibe		1		1		1	■
2	Manchon moteur	Motor coupling	Motorkupplung	1		1		1		054116
2	Manchon moteur	Motor coupling	Motorkupplung		1		1		1	054436
3	Vis HC M6-12	Screw HC M6-12	Schraube HC M6-12	1	1	1	1	1	1	⊕
4	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	Elektromotor 3 ph. EUROPA 1.1/1.3 kW 190/480V - 50/60Hz - 1500/1800 tr/mn	1		1		1		119978
4	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	Elektromotor 3 ph. EUROPA 2.2/2.6 kW 190/480V - 50/60Hz - 1500/1800 tr/mn		1		1		1	119979
4	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	Elektromotor 3 ph. USA/JAPAN 1.1/1.3 kW 175/460V - 50/60Hz - 1500/1800 tr/mn	1		1		1		119977
4	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	Elektromotor 3 ph. USA/JAPAN 2.2/2.6 kW 175/460V - 50/60Hz - 1500/1800 tr/mn		1		1		1	119980
4	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	Elektromotor 3 ph. ASIA/ROW 1.1/1.3 kW 180/480V - 50/60Hz - 1500/1800 tr/mn	1		1		1		114449
4	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	Elektromotor 3 ph. ASIA/ROW 2.2/2.6 kW 180/480V - 50/60Hz - 1500/1800 tr/mn		1		1		1	114450

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