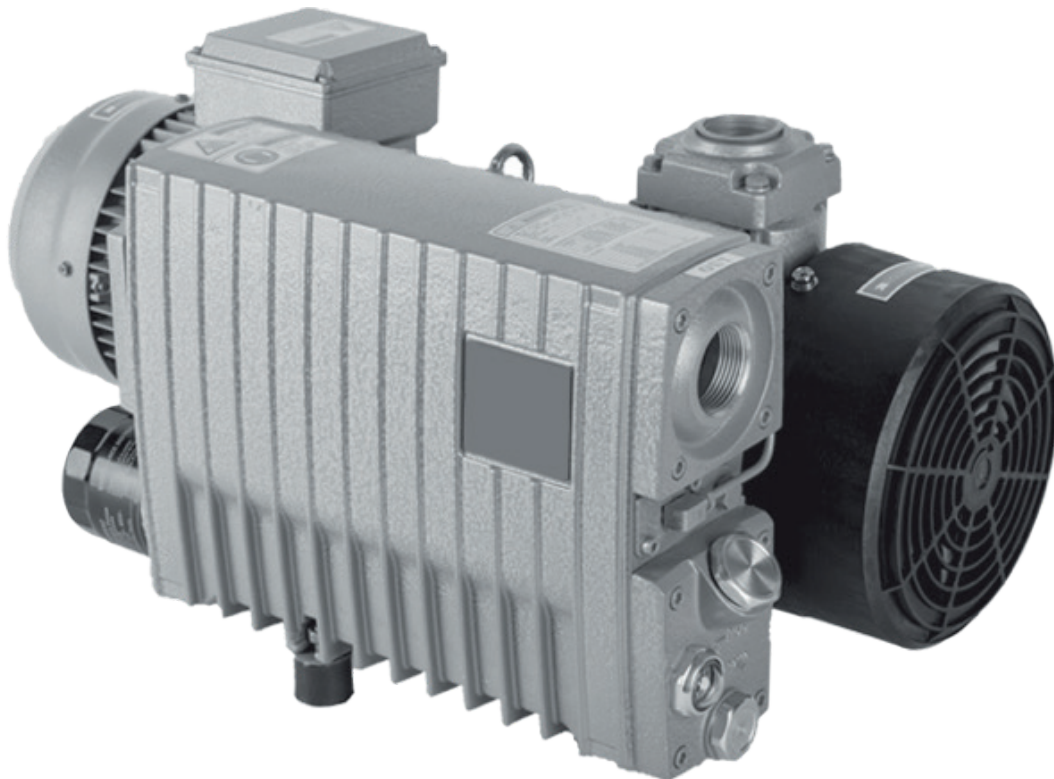


Version 1.0
07/02/2019

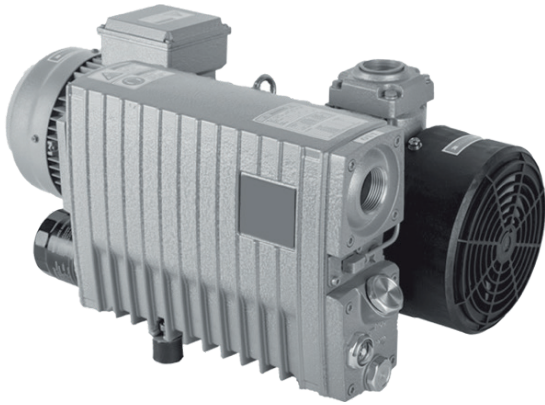
CDL

User manual

CDL vacuum pumps

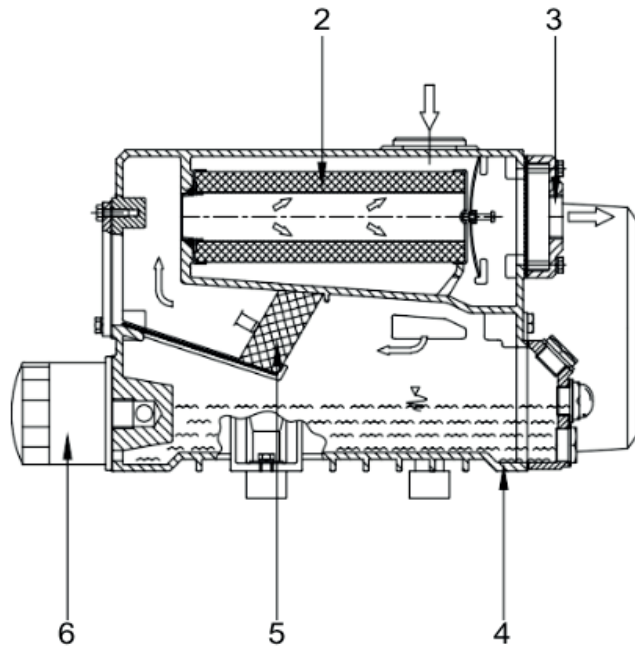
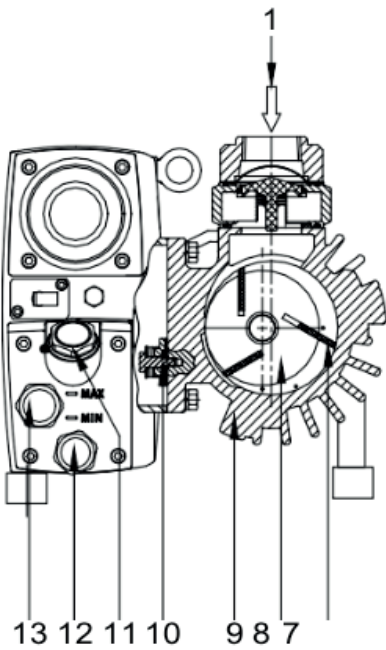


**This manual is suitable for
CDL 031/041/064/101/160/200/250 vacuum pumps models**



CDL 031/041

- 58031G41.5HP
- 58031G51.5HP
- 58031G11.5HP
- 58041G12HP
- 58041G42HP
- 58041G52HP

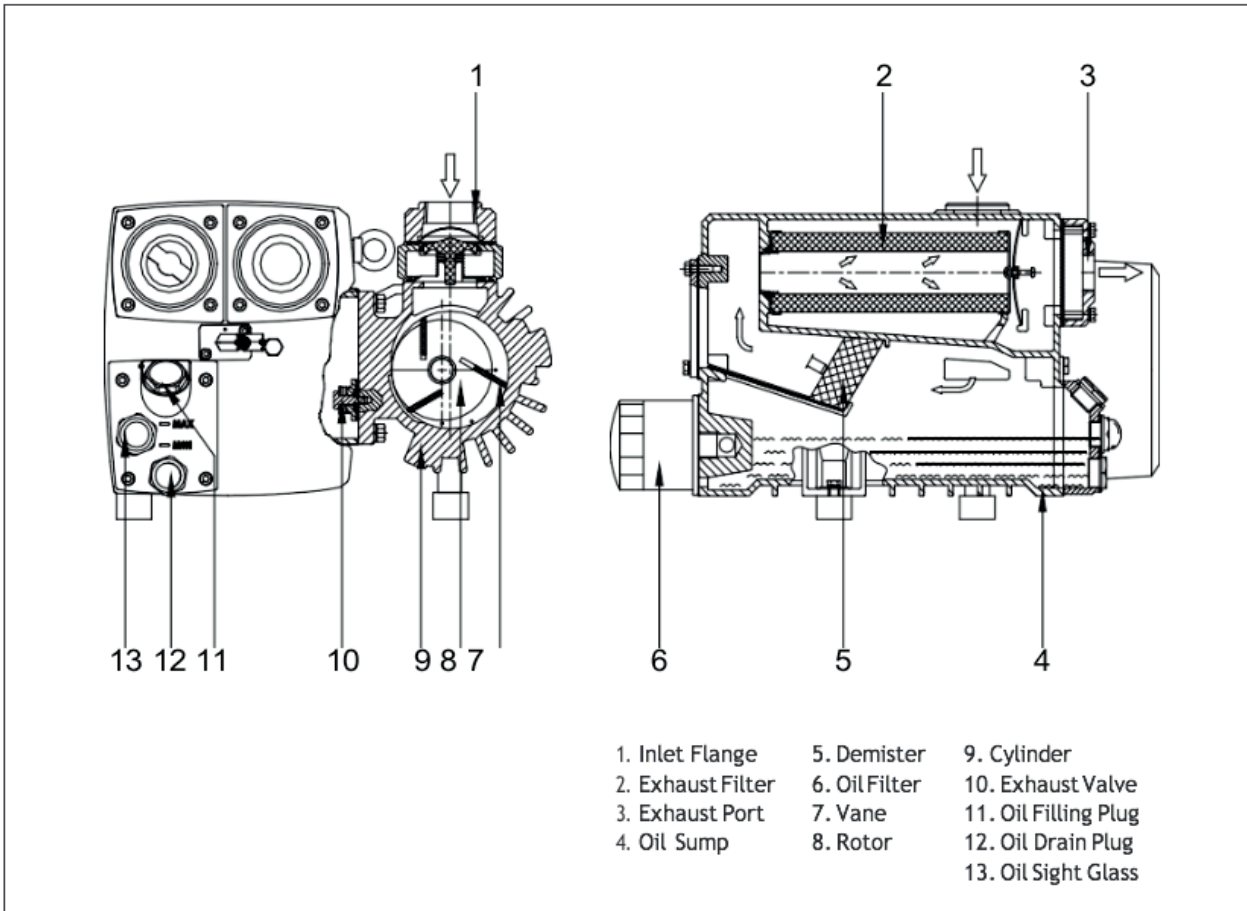


- | | | |
|-------------------|---------------|----------------------|
| 1. Inlet Flange | 5. Demister | 9. Cylinder |
| 2. Exhaust Filter | 6. Oil Filter | 10. Exhaust Valve |
| 3. Exhaust Port | 7. Vane | 11. Oil Filling Plug |
| 4. Oil Sump | 8. Rotor | 12. Oil Drain Plug |
| | | 13. Oil Sight Glass |



CDL 064/101

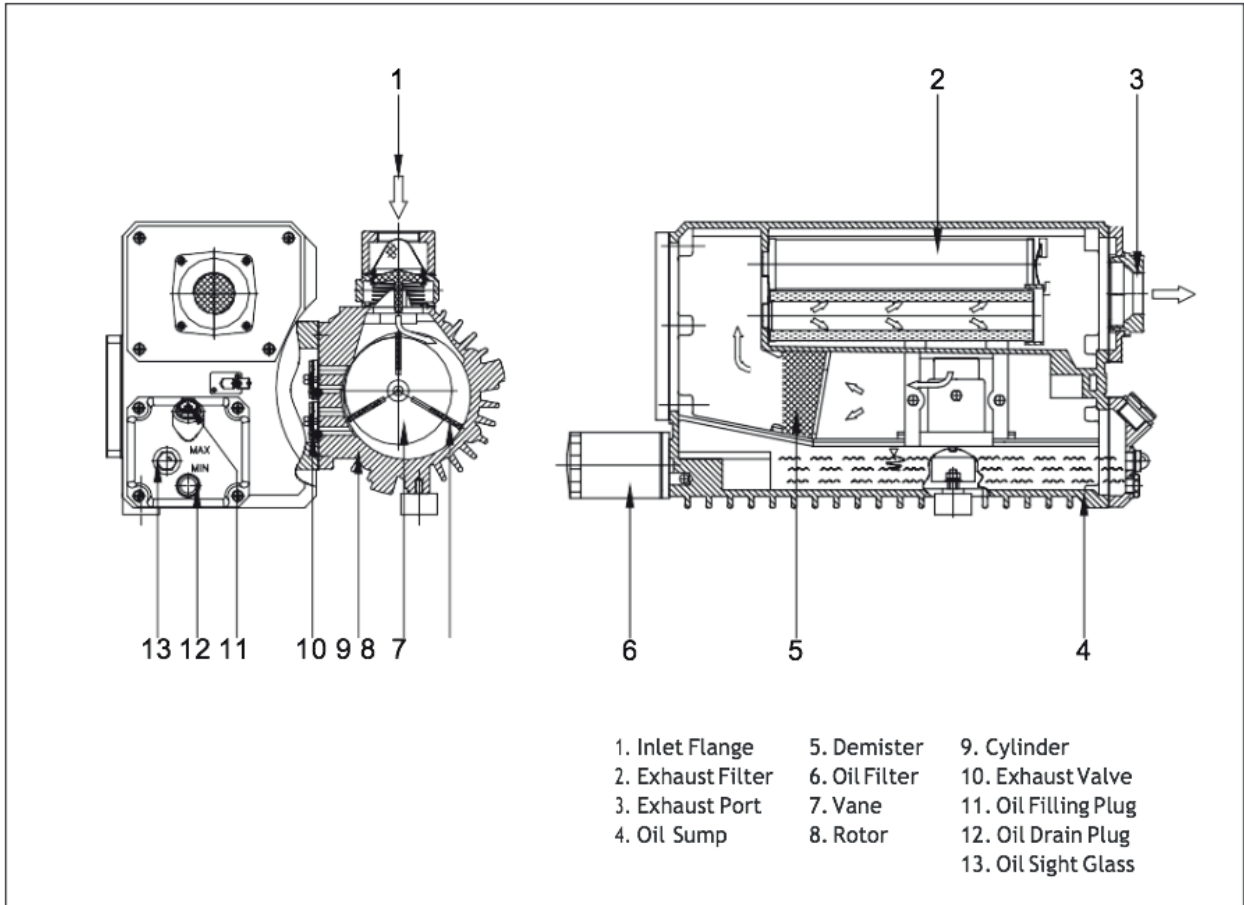
- 58064G13HP
- 58064G43HP
- 58064G53HP
- 58101G15HP
- 58101G45HP
- 58101G55HP





CDL 160/200/250

- 58160G17.5HP
- 58160G47.5HP
- 58160G57.5HP
- 58200G17.5HP
- 58200G57.5HP
- 58250G510HP
- 58250G110HP





1. PRINCIPLE OF OPERATION

This vacuum pump is an oil-circulated rotary vane type, which comprises rotor(8), vane(7) and cylinder(9). The center of a rotor is eccentrically assembled to the center of cylinder and 3 vanes rotate with a centrifugal force in a pushed state to the inside wall of cylinder. At this time, the vacuum takes place through 4 processes, which are suction, expansion, compression and discharge happened from the volume change between vane and vane. A stable and reliable vacuum may be obtained by using the oil for lubrication and sealing of a rotary part so that it can be used for various applications. The oil lubrication and sealing is consistently supplied to the cylinder without an extra oil pump through the pressure such as a suction is difference, and so on. A circulating oil is discharged to the oil sump(4) and returns and reuses 99.9% by the gravity, a demister(5) and an exhaust filter(2) discharging solely a clean air which make it possible to be used in any environment.

2. SAFETY

These vacuum pumps have been manufactured according to the latest technical standards and safety regulations. If not installed properly or not used as directed, dangerous situations or damage might occur.

APPLICATION

These vacuum pumps are designed for use in the fields of coarse vacuum and can be used to suck off air or dry gases, which are not aggressive, poisonous or explosive.

SAFETY ADVICE

In these operating instructions safety measures are advised before each steps. It is imperative that these safety precautions are observed.

Important

Liquid and solid particles must not enter the pump. In case of doubt, consult CDL.

3. SAFETY INSTRUCTIONS

CDL bears no responsibility for personnel injury or damages by the product due to misuse, neglect, attempt to repair, unauthorized alteration or modification by your intention.



3.1 Safety Warnings

Please pay an extra attention to Safety Signs since they may indicate a potential hazard that may result in death, serious personal injuries, or damages by the machine. These regulations should be observed to ensure the prevention of personnel injuries and damages or malfunctions of the product.

3.2 Locate Safety Signs Labels on pump:

- A) Electrical Hazards
Electrical power inputting side
- B) Mechanical Hazards
Upper side of cooling fan cover
- C) Hot Surface Hazards
Front upper side of oil cooler
Upper side of oil sump
- D) Name Plate
Front upper of oil sump

4. TRANSPORT AND PACKING

Vacuum pumps pass a rigorous operating test in the factory and are packed carefully to avoid transit damage. The inlet flange(1) and the exhaust port(3) are sealed with plugs, so that no dirt can enter the pump during transport. Before start-up these plugs have to be removed. Please check packing on delivery for any transport damage.

IMPORTANT: Do not lift the pump by fan covers

Packing materials should be disposed or reused of according to the environmental laws.

These operating instructions are a part of the consignment.

**Pumps are generally shipped without oil.
Operating the pump without oil will damage the pump**

5. ELECTRICAL CONNECTION

An electrical installation may only be conducted by trained specialists. The users or the related parties must follow the local or national regulations regarding to the electrical connection.

The operator of the vacuum pump must inform the manufacturer, if electric or electro-magnetic interference is to be expected.

5.1 Voltage and frequency on the nameplate must agree with the supply voltage.

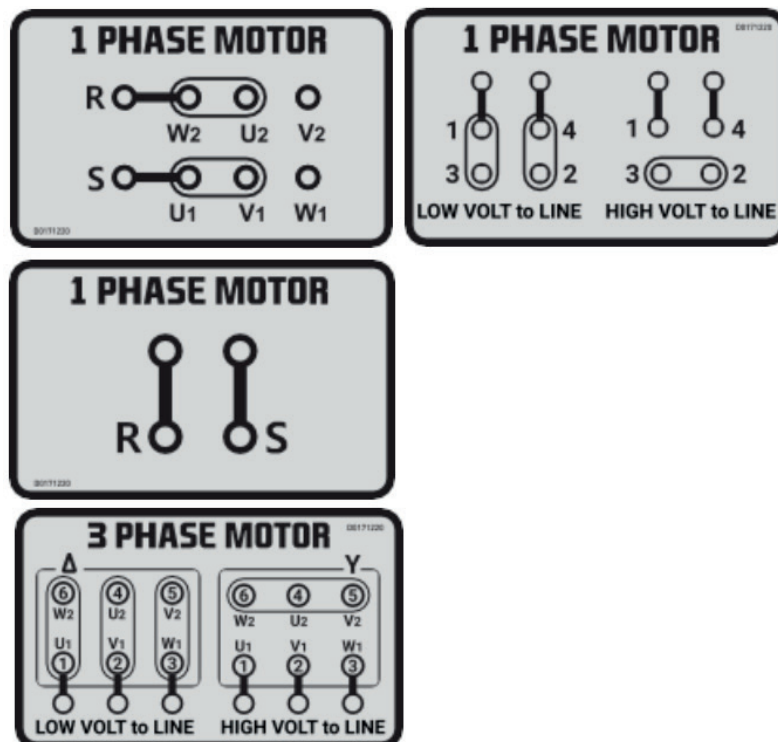
5.2 The drive motor must be protected against overloads.

In case of a portable installation of the vacuum pump, the electrical connection must be equipped with cable guides that have the function of a traction relief.

5.3 To check the direction of rotation of the pump, flick the ON/OFF switch. In case of incorrect direction, reverse the polarity of any two of the electrical phases.

Looking at the motor fan cover, the direction of rotation has to be counter-clockwise.

5.4 Circuit diagram examples





6. START-UP

It is essential to observe the following instructions step by step to ensure a safe start-up. Start-up may only be conducted by trained specialists.

6.1 Set-up

The pump must be set up or mounted horizontally on a flat surface.

A special mounting is not required. The pump can be mounted with screws via the threads of the rubber feet of the pump. The following ambient operating environment must be observed:

Ambient temperature: 12 to 30(°C) Ambient pressure = Atmosphere

In order to avoid over-heating of the pump, an undisturbed fresh-air flow to the pump is necessary.

6.2 Inlet connection

The inlet flange(1) can be connected with a vacuum tight flexible hose or pipe.

The mounted pipes should cause no tension on the pump's flanges.

If necessary, compensators must be installed.

Restriction of the pipes must be avoided in order not to decrease the displacement of the pump. The nominal diameter of the pipes has to be at least the same as the diameter of pump's inlet flange(1). No foreign particles (e.g. solder soot) or liquids may enter the inlet line, as they could destroy the vacuum pump.

Restricting devices should not be installed in the exhaust line. Always connect the exhaust pipe in a manner, so that no condensate can enter the pump (slope and siphon).

6.3 Oil filling

The vacuum pump always leaves the factory without oil. Operation without oil destroys the pump! Therefore, the pump must be charged with oil before start-up.

This is accomplished by charging the oil through an oil filling plug(11) of the service unit, until the oil level reaches to the MAX-mark on an oil sight glass(13)

Type and quantity of oil, see Clause 8, "Maintenance", page.



7. OPERATION ADVICE

In case of doubt, please contact CDL.

Attention! Not to be used with aggressive and explosive gases or gas mixtures and fluids.

7.1 To get rid of a condensable vapours, a gas ballast valve should be installed. The vacuum pump should run for 30 minutes prior to the operation with the inlet connection closed, in order to reach the operating temperature of 75(°C). Only at this operating temperature, the condensating vapours can be transported. After using the pump should be left running for additionally 30 minutes to clear the oil of condensate.

Attention! During operation the surface temperature of the pump can reach more than 70(°C). Danger of burning!

Attention! To avoid the destruction of machine parts and the building of a flammable mixture due to overheating during operation, the prescribed oil quantity must be preserved and a sufficient cooling air flow must be guaranteed. Danger of fire!

8. MAINTENANCE

The vacuum pump must be switched off and secured against an accidental switch-on for all maintenance.

8.1 The oil level should be checked at least once a day.

8.2 If the oil level is below the MAX-mark on the oil sight glass(13), the oil should be added.

Filling with the oil until the level reaches the MAX-mark on the oil sight glass(13).

8.3 The oil and the oil filter changing

The oil must be changed after the first 100 hours of operation.

Further oil changes depend on the operating conditions. The oil must be changed after 500-2000 hours of operation, but at least semi-annually.

If there is a considerable pollution, it would be necessary to change the oil more frequently.



To change the oil, the warm pump must be switched off and be ventilated to reach atmospheric pressure. Drain the oil through the oil drain plug(12). When the oil stops running, close the plug and start up the pump again for a few seconds. Reopen the oil drain plug(12) and discharge the remaining oil. After refasten the oil drain plug(12), remove the oil filter and replace it. Fill with the fresh oil through the oil fill plug(11).

The used oil and the used oil filters are to be disposed according to the environmental laws.

8.4 Oil Types

The oils according to DIN, lubricating oil group VC must be used. Please contact CDL for recommended oil.

Application	Recommended type of oil	Temperature
	Call CDL	< 0°C
V	Call CDL	0 - 12°C
V	Call CDL	12 - 30°C
V	Call CDL	> 30°C
V	Call CDL	> 30°C

8.5 Monitoring and changing of the exhaust filter(2)

The exhaust filter(2) is best monitored using a filter pressure gauge(see Accessories). This filter pressure gauge can be screwed into the thread of the oil filling plug.

When the measured pressure reaches → 0,6 bar(8.7 PSI) (Overpressure), the exhaust filter (2) has to be changed.

The soiled exhaust filter could also result to the severe damage of the motor by the increased energy intake.

If the oil mist escapes from the exhaust port(3) during the operation of the vacuum pump the exhaust filter(2) must be change. When installing a new exhaust filter(2), a new seal for the exhaust cover plate must also be installed.

8.6 Cleaning of the gas ballast valve

In case of visible dirt in the gas ballast valve, the sinter must be unscrewed and cleaned with the blast air.

8.7 Cleaning the inlet flange(1)

To clean the inlet flange screen(1), disconnect the four screws and remove the inlet flange(1). Take out the screen and clean with blast air.

8.8 Cleaning of fan covers

Both fan covers should be inspected regularly for dirt. Soiling of the fan covers prevents cool air intake and may lead to the overheating of the vacuum pump.

8.9 Pump control table

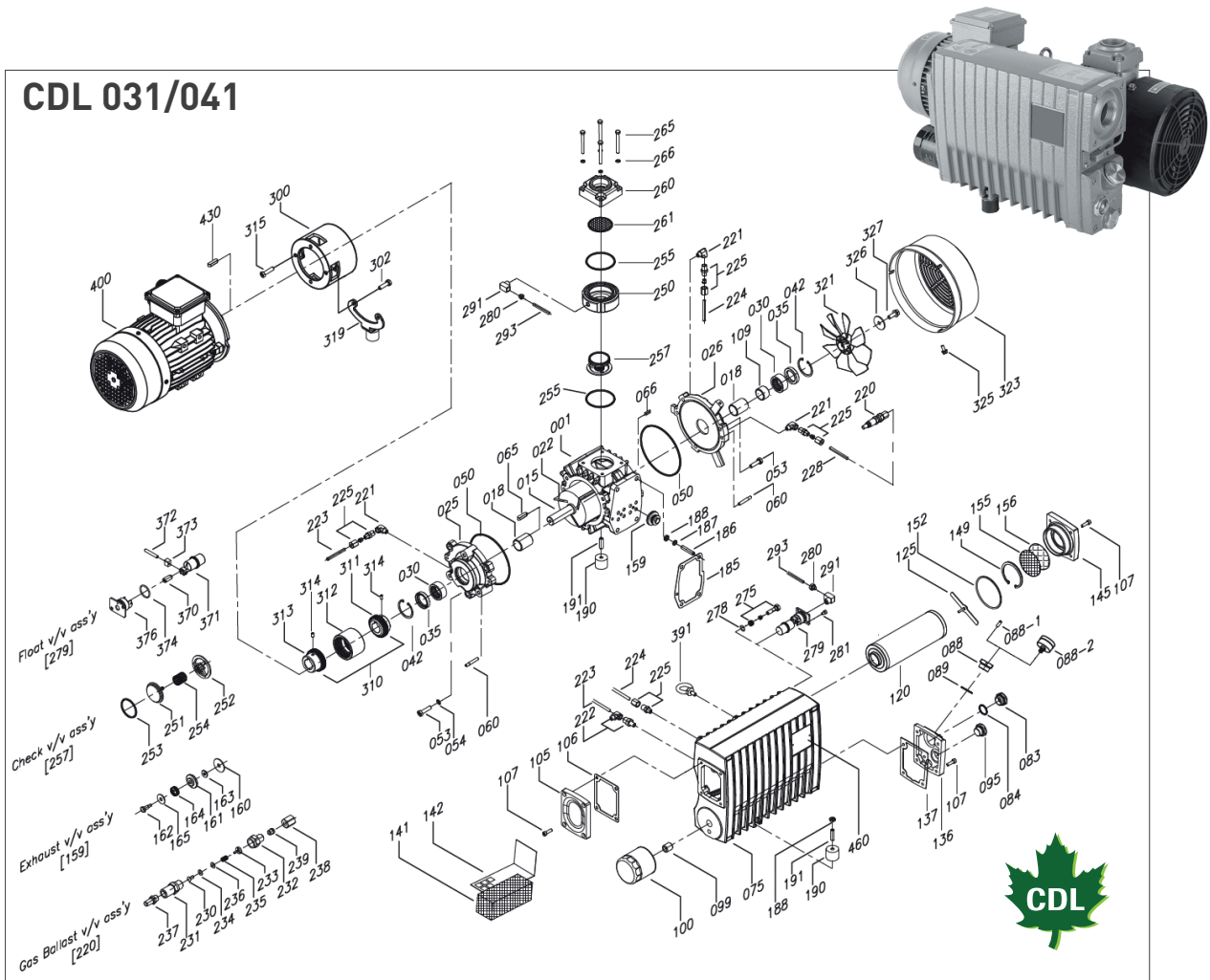
	daily	weekly	500hr	1000hr	2000hr	
Suction line	○	▲				On inflowing dust severely, check and clean, <u>continuously</u>
Suction filter	○	▲				
Cooling fan			▲			When being foreign materials severely on an visible inspection clean frequently
Gas adjustable valve		▲				
Oil quantity inspection	○					Maintain between MAX -MIN
Oil	○			⊙		When inflowing the foreign materials severely, exchange <u>frequently</u>
Oil filter				⊙		
Exhaust filter		○			⊙	

○:Check

▲:Cleaning

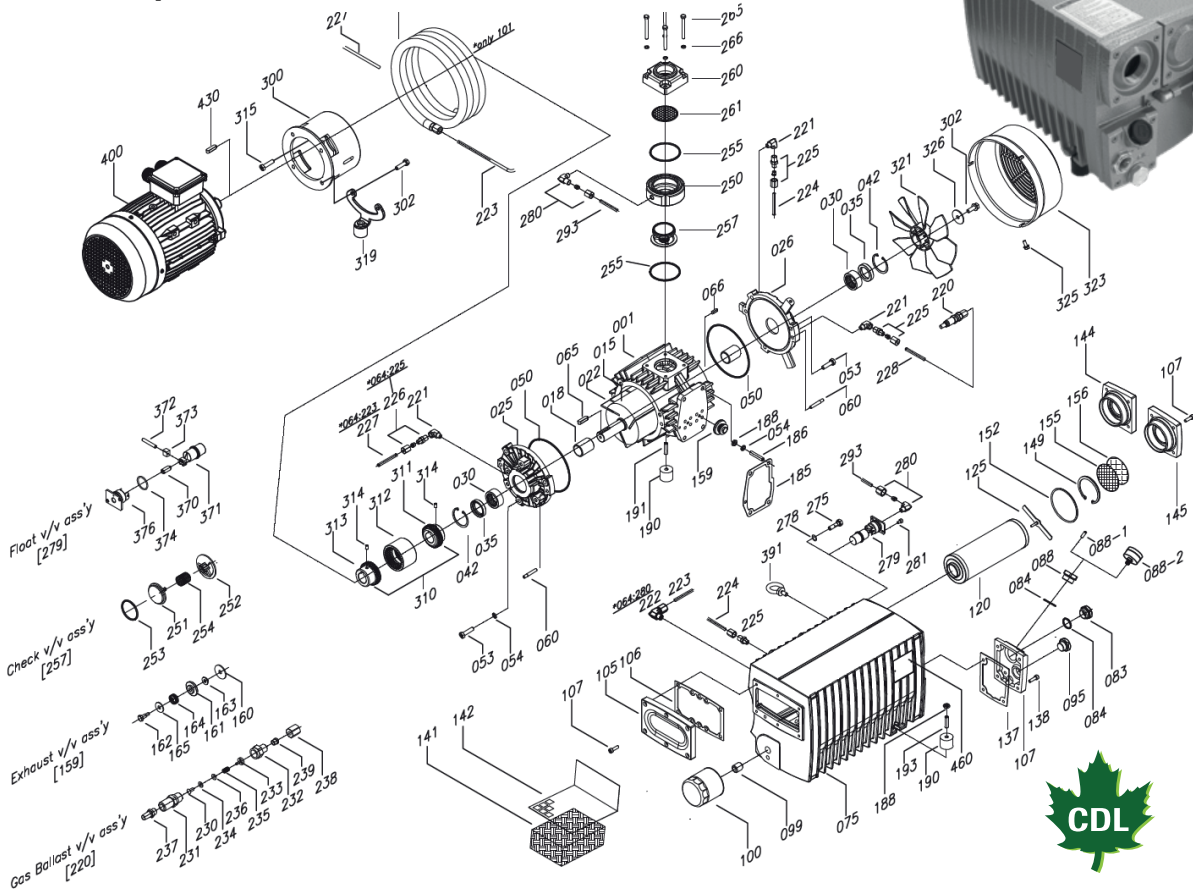
⊙:Exchange

CDL 031/041



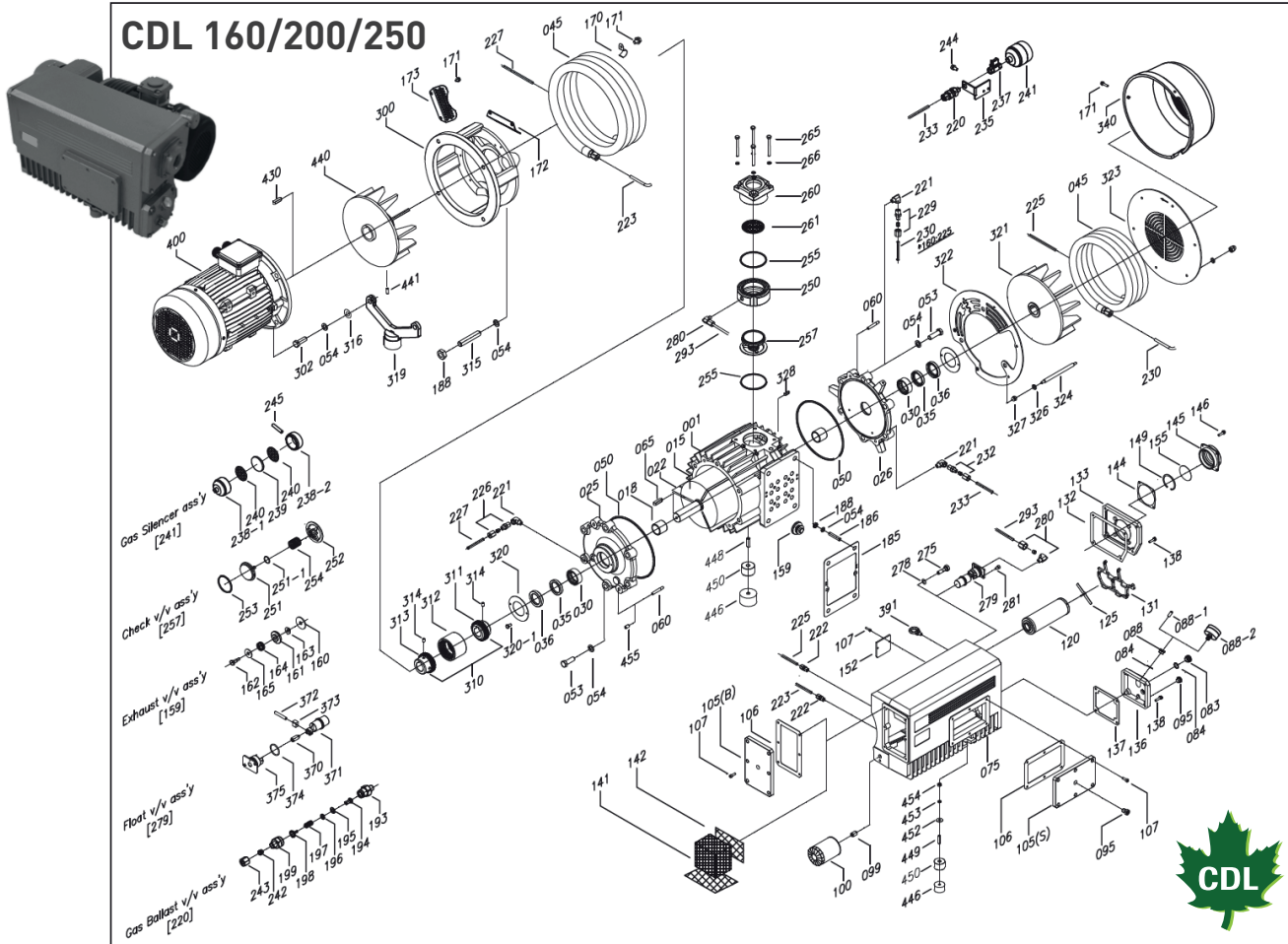
No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty
001	Cylinder	1	136	Oil inlet plate	1	230	Gas ballast valve cock	1	311	Coupling (P)	1			
015	Rotor	1	137	Gasket	1	231	Gas ballast valve body	1	312	Coupling sleeve	1			
018	Bearing	2	141	Demister	1	232	Gas ballast valve nipple	1	313	Coupling (M)	1			
022	Vane	3	142	Expanded metal	1	233	Gas ballast valve guide	1	314	Bolt	2			
025	A-end plate	1	145	Exhaust cover	1	234	Gas ballast valve lip	1	315	Bolt	3			
026	B-end plate	1	149	Snap ring	1	235	Gas ballast valve spring	1	319	Assist base foot	1			
030	Bearing	2	152	O-ring	1	236	Gas ballast valve plate	1	321	Fan (pump sided)	1			
035	Retainer	2	155	Exhaust screen-in	1	237	Gas ballast valve filter	1	323	Fan cover (pump sided)	1			
042	Snap ring	2	156	Exhaust screen-out	1	238	Gas ballast valve nut	1	325	Bolt	3			
050	O-ring	2	159	Exhaust valve ass'y	2	239	Gas ballast valve ring	1	326	Washer	1			
053	Bolt	6	160	Exhaust valve lip	2	250	Check valve body	1	327	Bolt	1			
054	Washer	6	161	Exhaust valve body	2	251	Check valve cock	1	371	Float valve ball	1			
060	Taper pin	4	162	Exhaust valve bolt	2	252	Check valve guide	1	372	Float valve pin	1			
065	Key(A-end plate sided)	1	163	Exhaust valve nut	2	253	Check valve o-ring	1	373	Float valve rubber	1			
066	Key(B-end plate sided)	1	164	Exhaust valve spring	2	254	Check valve spring	1	374	Float valve o-ring	1			
075	Oil Sump	1	165	Exhaust valve washer	2	255	O-ring	2	376	Float valve body	1			
083	Oil sight glass	1	185	Gasket	1	257	Check valve ass'y	1	379	Float valve ass'y	1			
084	O-ring	1	186	Bolt	4	260	Inlet flange	1	391	Bolt	1			
088	Oil fill plug	1	187	Washer	4	261	Inlet screen	1	400	Motor	1			
088-2	Gage	1	188	Nut	4	265	Bolt	4	430	Key	1			
089	O-ring	1	190	Rubber foot	2	266	Wahser	4	460	Name plate	1			
095	Drain plug	1	191	Bolt	2	275	Nonreturn valve	1						
099	Oil filter bolt	1	195	Nut	1	278	Washer	1						
100	Oil filter	1	220	Gas ballast valve ass'y	1	279	Float valve ass'y	1						
105	Oil sump cover	1	221	Hydraulic fitting	3	280	Nut	2						
106	Gasket	1	222	B.M.L Nipple	1	281	Bolt	2						
107	Bolt	12	223	Φ6.0 Pipe	1	291	Hydraulic nipple	2						
109	Bushing(B-end plate)	1	224	Φ6.0 Pipe	1	293	Φ4.0 Pipe	1						
120	Oil separator element	1	225	B.M.C Nipple	4	300	Coupling guide	1						
125	Filter spring	1	228	Φ6.0 Pipe	1	302	Bolt	3						

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No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty
001	Cylinder	1	136	Oil inlet plate	1	227	Φ6.0 Pipe	1	302	Bolt	4			
015	Rotor	1	137	Gasket	1	228	Φ6.0 Pipe	1	311	Coupling (P)	1			
018	Bearing	2	141	Demister	1	230	Gas ballast valve cock	1	312	Coupling sleeve	1			
022	Vane	3	142	Expanded metal	1	231	Gas ballast valve body	1	313	Coupling (M)	1			
025	A-end plate	1	144	Exhaust cover (C)	1	232	Gas ballast valve nipple	1	314	Bolt	2			
026	B-end plate	1	145	Exhaust cover (O)	1	233	Gas ballast valve guide	1	315	Bolt	3			
030	Bearing	2	149	Snap ring	1	234	Gas ballast valve lip	1	319	Assist base foot	1			
035	Retainer	2	152	O-ring	1	235	Gas ballast valve spring	1	321	Fan (pump sided)	1			
042	Snap ring	2	155	Exhaust screen-in	1	236	Gas ballast valve plate	1	323	Fan cover (pump sided)	1			
045	Oil cooler (only MVO 101)	1	156	Exhaust screen-out	1	237	Gas ballast valve filter	1	325	Bolt	3			
050	O-ring	2	159	Exhaust valve ass'y	2	238	Gas ballast valve nut	1	326	Washer	1			
053	Bolt	6	160	Exhaust valve lip	2	239	Gas ballast valve ring	1	371	Float Valve ball	1			
054	Washer	10	161	Exhaust valve body	2	250	Check valve body	1	372	Float valve pin	1			
060	Taper pin	4	162	Exhaust valve bolt	2	251	Check valve cock	1	373	Float valve rubber	1			
065	Key (A-end plate sided)	1	163	Exhaust valve nut	2	252	Check valve guide	1	374	Float valve o-ring	1			
066	Key (B-end plate sided)	1	164	Exhaust valve spring	2	253	Check valve o-ring	1	376	Float valve body	1			
075	Oil sump	1	165	Exhaust valve washer	2	254	Check valve spring	1	379	Float valve ass'y	1			
083	Oil sight glass	1	185	Gasket	1	255	O-ring	2	391	Bolt	1			
084	O-ring	2	186	Bolt	4	257	Check valve ass'y	1	400	Motor	1			
088	Oil fill plug	1	188	Nut	6	260	Inlet flange	1	460	Name plate	1			
088-2	Gage	1	190	Rubber foot	2	261	Inlet screen	1						
089	O-ring	1	191	Bolt	2	265	Bolt	4						
095	Drai plug	1	193	Bolt	1	266	Wahser	4						
099	Oil filter bolt	1	220	Gas ballast valve ass'y	1	275	Nonreturn valve	1						
100	Oil filter	1	221	Hydraulic fitting	3	278	Washer	1						
105	Oil sump cover	1	222	B.M.L Nipple	1	279	Float valve ass'y	1						
106	Gasket	1	223	Φ6.0 Pipe	1	280	B.M.L. Nipple	2						
107	Bolt	12	224	Φ6.0 Pipe	1	281	Bolt	2						
120	Oil separator element	2	225	B.M.C Nipple	1	293	Φ4.0 Pipe	1						
125	Filter spring	2	226	B.M.C Nipple	1	300	Coupling guide	1						

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No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty	No.	Part Name	Q'ty
001	Cylinder	1	144	Gasket	1	223	Φ10.0 pipe	1	275	Nonreturn valve	1	450	Assist ring	2
015	Rotor	1	145	Exhaust cover	1	225	Φ10.0 pipe	1	278	Washer	1	452	Washer	1
018	Bearing	2	146	Bolt	4	226	B.M.C nipple	1	279	Float valve ass'y	1	453	Washer	1
022	Vane	3	149	Snap ring	1	227	Φ10.0 pipe	1	280	B.M.L nipple	2	454	Nut	1
025	A-end plate	1	152	Exhaust valve cover	1	230	Φ10.0 pipe	1	293	Φ6.0 pipe	1	449	Bolt	1
026	B-end plate	1	155	Exhaust screen	1	232	B.M.C nipple	1	300	Coupling guard	1			
030	Bearing	2	159	Exhaust valve ass'y	4	233	Φ8.0 pipe	1	302	Bot	4			
035	Retainer	2	160	Exhaust valve lip	4	235	Gas ballast valve bracket	1	311	Coupling (P)	1			
036	Retainer	2	161	Exhaust valve body	4	237	Gas ballast ball valve	1	312	Coupling sleeve	1			
045	Oil cooling coil	2	162	Exhaust valve bolt	4	238-1	Silencer body	1	313	Coupling (M)	1			
053	Bolt	9	163	Exhaust valve nut	4	238-2	Silencer body	1	314	Bolt	2			
054	Washer	20	164	Exhaust valve spring	4	239	Silencer screen	1	315	Bolt	3			
060	Taper pin	4	165	Exhaust valve washer	4	240	Silencer filter	2	319	Assist base foot	1			
065	Key(A-end plate sided)	1	170	Clamp	4	241	Silencer ass'y	1	320	Retainer cover	2			
075	Oil Sump	1	171	Bolt	9	242	Gas ballast valve ring	1	320-1	Bolt	4			
083	Oil sight glass	1	172	Protection mesh	1	243	Gas ballast valve nut	1	321	Fan (pump sided)	1			
084	O-ring	2	173	Protection mesh	1	244	Bolt	2	322	Fan cover bracket body	1			
088	Oil fill plug	1	185	Gasket	1	245	Silencer pipe	1	324	Bolt	6			
088-2	Gage	1	186	Bolt	4	250	Check valve body	1	326	Washer	12			
095	Drain plug	2	188	Nut	7	251	Check valve cock	1	327	Nut	12			
099	Oil filter bolt	1	193	Gas ballast valve body	1	251-1	Check valve o-ring	1	328	Key	1			
100	Oil filter	1	194	Gas ballast valve cock	1	252	Check valve guide	1	340	Pump fan cover	1			
105	Oil sump cover	2	195	Gas ballast valve lip	1	253	Check valve o-ring	1	391	Bolt	1			
106	Gasket	2	196	Gas ballast valve plate	1	254	Check valve spring	1	400	Motor	1			
107	Bolt	14	197	Gas ballast valve spring	1	255	O-ring	2	430	Key	1			
120	Oil separator element	4	198	Gas ballast valve guide	1	257	Check valve ass'y	1	440	Axial fan (motor sided)	1			
125	Filter spring	4	199	Gas ballast valve nipple	1	260	Inlet flange	1	441	Bolt	4			
138	Bolt	7	220	Gas ballast valve ass'y	1	261	Inlet screen	1	446	Rubber foot	2			
141	Demister	1	221	Hydraulic fitting	3	265	Bolt	4	448	Bolt	1			
142	Expanded metal	1	222	B.M.C nipple	2	266	Washer	4	449	Bolt	1			

MAPLE SUGARING
EQUIPMENT

