

OWNER'S MANUAL

12/07/2022 | REV00 58ZZZGXHP-MAN-EN

CDL VACUUM PUMPS





SUGARING EQUIPMENT



CDL 020

58020G11HP 58020G41HP 58020G51HP





- Inlet flange
- ② Oil filling plug
- ③ Exhaust filter
- ④ Exhaust port
- (5) Oil sight glass
- 6 Oil sump
- ⑦ Demist
- (8) Oil drain valve
- Vane
- Rotor
 Rotor
- ① Cylinder
- D Exhaust valve















1. PRINCIPLE OF OPERATION

This vacuum pump is an oil-circulated rotary vane type, which comprises rotor, vane and cylinder. 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 and returns and reuses 99.9% by the gravity, a demister and an exhaust filter 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 field 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 HazardsUpper 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 and the exhaust port 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 electromagnetic interference is to be expected.

- 5.1 Check voltage and amperage according to motor nameplate.
- 5.2 The pump always leaves factory with oil inside. However, check oil level and make sure it is at its maximum level.
- **5.3** To check direction of pump rotation, switch on power to the pump for a fraction of second. Looking at the fan cover, either of pump or motor, confirm direction of rotation according to the arrow identified on the pump (see photo). If rotation is in the wrong direction, refer to the identification on the motor nameplate to reverse the rotation.





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 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. 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 of the service unit, until the oil level reaches to the MAX-mark on an oil sight glass.

Type and quantity of oil, see Clause 8.4, "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!

7.2 HUMIDITY

First, you have to understand that these pumps are designed for high vacuum. Modern installations allow for better airtightness of tubing network through the woods. In doing so, vacuum is always higher and closer to level of absolute vacuum (29.9HG). On the other hand, this situation, combined with the fact that often the pumps are not always installed in heated rooms. Usage in periods close to freezing point and the fact that pumps create vacuum in tubing network which contains water and high humidity brings an additional challenge to pump maintenance. Condensation can form in the pump and in some cases, water accumulates in pump oil, even if it hasn't sucked in water.



It is strongly recommended to do a complete oil change (oil and oil filter) at least once during the season and at the end of the season. To maximize the performance of lubricating oil, it is important that there is no water or moisture in it. To drain as much water as possible, you can first install a drain valve (60115200) in replacement of the oil drain plug of the pump. As water is denser than oil, when pump isn't running, water will settle to the bottom. opening of drain valve before starting the pump will evacuate part water accumulated. The drain valve also makes it easier to do oil changes. To get the most humidity out when the pump, operating temperature must be equal or greater to 75 Celsius (167 Fahrenheit). It is then necessary to make a temporary air inlet to activate the humidity exit (when vacuum is too high, the movement of air towards pump air outlet does not take place). Here are 3 illustrations to help you understand what must be done.

Here we see that the temperature is below 75 degrees Celsius. The water (in blue) is not hot enough to become steam, so it remains under the oil (in yellow) in the pump and it will never be evacuated, even if we have good air circulation (green arrow).

Here we see that the temperature is above 75 degrees Celsius. On the other hand, there is no air circulation, so the humidity, even if it is in vapor (blue dots) is not evacuated.

Here is the ideal scenario. The temperature is above 75 degrees Celsius. So the water is steaming and there is good air circulation, so the moisture (blue dots) comes out nice and the oil comes back clear.

Of course, system must always be as waterproof as possible. It is therefore unthinkable to always allow intake of air at pump inlet. Therefore, it is recommended no less than once a day, to close the suction inlet valve on the pump for 10 minutes to heat oil in pump (have no fear, this practice will cause no harm to the pump). Then open the valve to quickly circulate air through the pump and purge out as much moisture as possible. An interesting option is CDL Modulating Vacuum Regulator Valve (668049). This valve, linked to the CDL Intelligence monitoring allows modulation of vacuum as needed when the temperature approaches the freezing point for example. It creates controlled air inlet in the system according to the temperature and vacuum instructions that are programmed in the CDL Intelligence interface. It can also be manually instructed to open and close.

Oil color is an excellent indicator. If lubricating oil is of rather light brown color and moisture is purged out well, oil will return to its original color. If the oil is dark brown or black color, it is a sign that the pump has likely sucked in maple sap, therefore sugar. When heated by the vacuum pump, sugar in water will turn into molasses and it will cause damage the system. As soon as oil is getting darker, stop the pump immediately and perform a complete oil change (oil and filter).







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, the oil should be added.

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

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. When the oil stops running, close the plug and start up the pump again for a few seconds. Reopen the oil drain plug and discharge the remaining oil. After refasten the oil drain plug, remove the oil filter and replace it. Fill with the fresh oil through the oil fill plug.

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

8.4 Oil type and quantity required

Use CDL vane pump oil 22.

	НР	Number of liters
006 Series	0.5 HP	300 mL
020 Series	1 HP	300 mL
031 Series	1.5 HP	1 L
041 Series	2 HP	1 L
064 Series	3 HP	2 L
101 Series	5 HP	2 L
160 and 200 Series	7.5 HP	7 L
250 Series	10 HP	7 L
300 Series	15 HP	7 L



8.5 Monitoring and changing of the exhaust filter

The exhaust filter 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 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 during the operation of the vacuum pump the exhaust filter must be change. When installing a new exhaust filter, 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 inletflange

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

8.8 Cleaning of fancovers

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	0					Keep line and inlet screen free	
Suction filter	0					of dust and debris	
Cooling fan						Remove anything stuck on	
Gas adjustable valve						the part	
Oil quantity inspection	0	50 50.				Maintain between MAX - MIN	
Oil	0			0		8	
Oil filter				0		Visual inspection	
Exhaust filter		0			0		

O: Check

▲ : Cleaning

O : Replace



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NO. 001 002 003	Part Name Cylinder Check valve body Screen	Q'ty 006 1 1 1 2	NO. 125 126 131	Part Name Filter spring O-ring Element cover	Q'ty 006 1 1 1	NO.	Part Name	Q'ty 006
NO. 001 002 003 004	Part Name Cylinder Check valve body Screen Snap ring Check Valve	Q'ty 006 1 1 1 2	NO. 125 126 131 [275] 276	Part Name Filter spring O-ring Element cover Nonreturn valve	Q'ty 006 1 1 1 1	NO.	Part Name	Q'ty 006
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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	111	Coupling guide	1									
015	Rotor	1	120	Oil separator element	1									
022	Vane	3	122	Base	2									
025	A-end plate	1	126	Oil seperator element base	1									
026	B-end plate	1	127	Oil separator element cap	1									
027	Bolt	21	128	Gasket	1									
035	Retainer	2	129	Exhaust cover	1									
037	Bearing	2	133	Washer	1									
044	Hydraulic nipple	4	185	Gasket	1									
045	Pipe	1	257	Check valve ass'y	1									
046	Pipe	1	258	Gasket	1									
050	O-ring	2	259	Gasket	1									
053	Bolt	13	260	Inlet flange	1									
060	Taper pin	2	261	Inlet screen	1									
061	Taper pin	2	272	Bolt	2									
065	Кеу	1	310	Coupling(P) ass'y	1			\square						
075	Oil Sump	1	313	Coupling (M)	1									
076	Gasket	1	314	Bolt	2									
077	Oil sump flange	1	400	Motor	1									
080	Ball	1	430	Кеу	1									
075	Oil Sump	1	432	Bolt	4									
083	Oil sight glass	1	460	Name plate	1									
084	O-ring	1												
088	Oil fill plug	1												
088-2	Gage	1												
089	O-ring	1												
095	Drain plug	1												
105	Oil sump cover	1												
106	Gasket	3												
107	Bolt	4												







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Exhoust Gas Ball	V/V (159] 167 167 167 167 167 167 167 167	236 234 QTy 1	No. 136	Part Name Oil inlet plate	Q'ty 1	No. 227	Part Name 06.0 Pipe 06.0 Pipe		No. 302	Part Name Bolt	Q'ty 4	No.	107 Part Name	Q'ty	
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Exhoust Gas Ball No. 001 015 018 022	V/V 162165 (159) 162165 Part Name Cylinder Rotor Bearing Vane	236 234 234 1 1 2 3	No. 136 137 141 142	Part Name Oil inlet plate Gasket Demister Expanded metal	Q'ty 1 1 1	No. 227 228 230 231	Part Name Φ6.0 Pipe Φ6.0 Pipe Gas ballast valve cock Gas ballast valve body	Q'ty 1 1 1	No. 302 311 312 313	Part Name Bolt Coupling (P) Coupling (M)	Q'ty 4 1 1 1	No.	Part Name	Q'ty	
Exhoust Gas Ball No. 001 015 018 022 025	V/V 162 b5 (159) 162 b5 Part Name Cylinder Rotor Bearing Vane A-end plate	QTy 1 234 1 1 2 3 1	No. 136 137 141 142 144	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C)	Q'ty 1 1 1 1	No. 227 228 230 231 232	Part Name 06.0 Pipe 06.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve nipple	Q'ty 1 1 1 1	No. 302 311 312 313 314	Part Name Bolt Coupling (P) Coupling (M) Bolt	Q'ty 4 1 1 2	No.	Part Name	Q'ty	
Exhoust Gas Ball No. 001 015 018 022 025 026	V/V 162 b5 (159) 162 b5 Part Name Cylinder Rotor Bearing Vane A-end plate B-end plate	QTy 1 23 23 4 1 1 2 3 1 1	No. 136 137 141 142 144 145	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O)	Q'ty 1 1 1 1 1	No. 227 228 230 231 232 233	Part Name Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve nipple Gas ballast valve guide	Q'ty 1 1 1 1 1 1	No. 302 311 312 313 314 315	Part Name Bolt Coupling (P) Coupling (M) Bolt Bolt	Q'ty 4 1 1 2 3	No.	Part Name	Q'ty	
Exheuse Gees Beili No. 001 015 018 022 025 026 030	V/V 159 152 159 159 152 155 152 155 152 155 152 155 152 155 152 155 152 155 157 237 237 237 237 237 237 237 23	Qty 1 234 1 1 2 3 1 1 2 2 3	No. 136 137 141 142 144 145 149	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring	Q'ty 1 1 1 1 1 1 1	No. 227 228 230 231 232 233 234	Part Name Ф6.0 Pipe Ф6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve nipple Gas ballast valve guide Gas ballast valve lip	Q'ty 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot	QTY 4 1 1 1 2 3 1	No.	Part Name	Q'ty	
Exhouses Cos Ball No. 001 015 018 022 025 026 030 035	V/V 162 b5 159 159 Part Name Cylinder Rotor Bearing Vane A-end plate Bearing Retainer	236 234 1 1 2 3 1 1 2 2	No. 136 137 141 142 144 145 149 152	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (C) Snap ring O-ring	Q'ty 1 1 1 1 1 1 1	No. 227 228 230 231 232 233 234 235	Part Name Ф6.0 Pipe Ф6.0 Pipe Ф6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve nipple Gas ballast valve guide Gas ballast valve spring	Q'ty 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321	Part Name Bolt Coupling (P) Coupling (M) Bolt Bolt Assist base foot Fan (pump sided)	0 460 0 460 4 1 1 1 2 3 1 1 1 1	No.	Part Name	Q'ty	
Exhouses (cos Bal) No. 001 015 018 022 025 026 030 035 042 045	V/V 162 b5 159 Part Name Cylinder Rotor Bearing Vane A-end plate Bearing Retainer Snap rig	QTy 1 234 1 1 2 3 1 1 2 2 2 2	No. 136 137 141 142 144 145 149 152 155	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-in	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 2277 228 230 231 232 233 234 235 236	Part Name Ø6.0 Pipe Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve nipple Gas ballast valve guide Gas ballast valve guide Gas ballast valve spring Gas ballast valve spring Gas ballast valve spring	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt	Qty 4 1 1 1 2 3 1 1 1 1 2	No.	Part Name	Q'ty	
Exhouse (2005 Bol) No. 001 015 018 022 025 026 030 035 042 050	V/V 162 b5 (159) 162 b5 Part Name Cylinder Rotor Bearing Vane A-end plate B-end plate Bearing Retainer Snap ring Oil cooler (only MVO 101) O-ring	234 234 1 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 2 2 1 2 2	No. 1255 235 235 235 235 235 235 235	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>236</li> </ul>	Part Name 06.0 Pipe 06.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve spring Gas ballast valve plate Gas ballast valve plate	Q ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer	QTY 4 1 1 1 2 3 1 1 1 1 3 1	No.	Part Name		
Exhouse (Cos Bol) No. 001 015 018 022 025 026 030 035 042 045 050 053	VV 162 b5 159 Part Name Cylinder Rotor Bearing Vane A-end plate Bearing Retainer Snap ring Oll cooler (only MVO 101) O-ring Rot	234 234 1 1 2 2 2 1 2 2 2 1 2 2 6	No. 1255 1255 1255 1255 1255 1255 1255 1556 1559 160	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Evhaust valve lin	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> </ul>	Part Name Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve plate Gas ballast valve nut Gas ballast valve nut	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326 371	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball	Qty 4 1 1 1 2 3 1 1 1 1 3 1 1 1	No.	Part Name		
Exhouse Roo Roo 001 015 018 022 025 026 030 030 035 042 045 050 053 054	V/V 162 b5 (159) 162 b5 Part Name Cylinder Rotor Bearing Vane A-end plate Bearing Retainer Snap ring Oil cooler (only MVO 101) O-ring Bolt Washer	2354 234 1 1 2 2 2 1 2 2 1 2 2 1 2 6 10	No. 1255 255 255 255 255 255 136 141 142 144 144 145 155 156 159 160 161	239 238 Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Exhaust valve lip Exhaust valve body	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 2 2 2	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> <li>250</li> </ul>	Part Name Φ6.0 Pipe Φ6.0 Pipe Gas ballast valve cock Gas ballast valve pipe Gas ballast valve nipple Gas ballast valve guide Gas ballast valve guide Gas ballast valve spring Gas ballast valve spring Gas ballast valve plate Gas ballast valve nut Gas ballast valve nut Gas ballast valve nut Gas ballast valve fing Check valve body	Qty 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326 371 372	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin	Qty 4 1 1 1 2 3 1 1 1 1 3 1 1 1 1 1 1 1	No.	Part Name		
Exhouses (Gas Bal) No. (OO1 015 018 022 025 025 025 025 025 025 025 025 025	V/V 162 b5 V/V 252 V 252 V Part Name Cylinder Rotor Bearing Vane A-end plate Bearing Retainer Snap ring Oil cooler (only MVO 101) O-ring Bolt Washer Taper pin	2356 234 1 1 2 3 1 1 2 2 2 1 2 2 1 2 2 6 10 4	No. 1255 2255 1366 1377 1411 1422 1444 1455 1556 1559 1600 1611 162	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Exhaust valve body Exhaust valve bolt	Q'hy 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 227 228 230 231 232 233 234 235 236 237 238 239 250 251	Part Name Φ6.0 Pipe Φ6.0 Pipe Φ6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326 371 372 373	Part Name Bolt Coupling (P) Coupling (P) Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve rubber	Q'ty 4 1 1 1 1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1	No.	Part Name		
No.         O           001         015           018         022           025         026           030         035           042         045           050         053           054         060	V/V 162 159 Vane A-end plate Bearing Vane A-end plate Bearing Cylinder Retainer Snap ring Oil cooler (only MVO 101) O-ring Bolt Washer Taper pin Key (A-end plate sided)	QTy 236 234 1 1 2 2 2 1 1 2 2 2 1 2 2 6 10 4 1	No. 1255 1255 1255 1255 136 137 141 142 144 145 149 152 155 156 159 160 161 162 163	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Exhaust valve body Exhaust valve body Exhaust valve nut	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> <li>250</li> <li>251</li> </ul>	Part Name Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve nipple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve spring Gas ballast valve spring Gas ballast valve spring Gas ballast valve spring Check valve body Check valve cock Check valve guide	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326 371 372 373 374	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve rubber Float valve o-ring	Q ty 4 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	No.	Part Name		
No.           001           015           018           022           025           026           030           035           045           050           053           054           065           066	V/V 162 b5 Part Name Cylinder Rotor Bearing Vane A-end plate Bearing Retainer Snap ring Oil cooler (only MVO 101) O-ring Bolt Washer Taper pin Key (A-end plate sided) Key (B-end plate sided)	2356 2334 1 1 2 2 3 1 1 2 2 2 2 1 2 2 2 1 2 6 10 4 1 1 1 2 2 2 1 2 3 1 1 1 2 2 5 4	No. 1255 1255 1255 1255 136 137 141 142 144 145 155 156 159 160 161 162 163 164	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Exhaust valve body Exhaust valve body Exhaust valve bodt Exhaust valve nut Exhaust valve nut	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> <li>250</li> <li>251</li> <li>252</li> <li>253</li> </ul>	Part Name 06.0 Pipe 06.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve spring Gas ballast valve plate Gas ballast valve spring Check valve cock Check valve cock Check valve o-ring Check valve o-ring	Qty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326 371 372 373 374 376	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve o-ring Float valve body	Q ty 4 1 1 1 1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1	No.	Part Name		
Exhouses (000 001 001 001 001 001 001 00	VY 162 152 Part Name Cylinder Rotor Bearing Vane A-end plate Bearing Vane A-end plate Bearing Retainer Snap ring Oll cooler (only MVO 101) O-ring Boit Washer Taper pin Key (A-end plate sided) Key (B-end plate sided)	2354 2354 2354 1 1 2 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 3 1 1 1 2 2 3 1 1 1 2 2 3 1 1 1 2 2 3 1 1 1 2 2 3 1 1 1 2 2 3 1 1 1 2 2 3 1 1 1 2 2 3 1 1 1 2 2 3 1 1 1 2 2 3 1 1 1 2 2 2 1 1 1 2 2 2 1 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 2 1 1 2 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 2 1 1 2 2 1 1 2 2 2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 2 1 1 2 1 1 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 1255 1255 136 137 141 142 144 145 155 156 159 160 161 162 163 164 165	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (O) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust valve ass'y Exhaust valve ass'y Exhaust valve body Exhaust valve body Exhaust valve bodt Exhaust valve bolt Exhaust valve nut Exhaust valve spring Exhaust valve washer	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> <li>250</li> <li>251</li> <li>252</li> <li>253</li> <li>254</li> </ul>	Part Name Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve guide Check valve body Check valve cock Check valve guide Check valve o-ring Check valve spring	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326 371 372 373 374 376 379	Part Name Bolt Coupling (P) Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float Valve pin Float valve pin Float valve o-ring Float valve body Float valve body Float valve ass'y	Q'ty 4 1 1 1 1 2 3 1 1 1 1 1 1 1 1 1 1 1 1 1 1	No.	Part Name		
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Pipe Φ6.0 Pipe Gas ballast valve cock Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve guide Check valve cock Check valve cock Check valve guide Check valve guide Check valve guide Check valve spring O-ring Check valve cock	Q ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326 371 322 373 374 376 379 391	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve pin Float valve pin Float valve o-ring Float valve body Float valve ass'y Bolt	0 460 0 460 4 1 1 1 1 1 1 1 1 1 1 1 1 1	No.	Part Name		
Exhouses (Gas (Bal)) (No. (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cast) (Cas	VY 162 152 Part Name Cylinder Rotor Rotor Bearing Vane A-end plate Bearing Retainer Snap ring Oil cooler (only MVO 101) O-ring Bolt Washer Taper pin Key (A-end plate sided) Key (B-end plate sided) Key (B-end plate sided) Oil sump Oil sight glass O-ring	234 234 1 1 2 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 2 2 2 1 2 2 2 1 2 2 2 1 2 2 3 4 1 1 1 2 2 2 3 4 1 1 1 2 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 4 1 2 3 1 1 2 3 1 2 3 4 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 1 2 2 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 3 1 2 2 2 2	No. 1255 225 136 137 141 142 144 145 149 152 155 156 159 160 161 162 163 164 165 185 185	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-out Exhaust screen-out Exhaust screen-out Exhaust valve body Exhaust valve body Exhaust valve bodt Exhaust valve bolt Exhaust valve bolt Exhaust valve bolt Exhaust valve spring Exhaust valve washer Gasket Bolt	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> <li>250</li> <li>251</li> <li>252</li> <li>253</li> <li>254</li> <li>255</li> <li>257</li> <li>257</li> </ul>	Part Name Φ6.0 Pipe Φ6.0 Pipe Gas ballast valve cock Gas ballast valve poly Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve guide Check valve body Check valve cock Check valve o-ring Check valve spring O-ring Check valve ass'y	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No.           302           311           312           313           314           315           321           323           324           325           326           371           372           373           374           376           379           391           400	Part Name Bolt Coupling (P) Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve pin Float valve orring Float valve orring Float valve body Float valve body Float valve ass'y Bolt Motor	Qty         4           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1	No.	Part Name		
Exhou s a a a a a a a a a a a a a	V/V 162/65 Part Name Cylinder Rotor Rotor Bearing Vane A-end plate Bearing Vane A-end plate Bearing Oll cooler (only MVO 101) O-ring Bolt Washer Taper pin Key (A-end plate sided) Oll sump Oll sight glass O-ring Oll sight glass	234 234 1 1 2 2 2 1 1 2 2 2 1 2 2 1 2 2 1 2 2 1 2 2 1 1 1 2 2 2 1 1 1 2 2 2 1 1 1 1 2 2 3 4 1 1 1 2 2 3 4	No. 1255 1255 1255 1255 136 137 141 142 144 145 149 152 155 156 159 160 161 162 163 164 165 185 186 188 188 199	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Exhaust valve ass'y Exhaust valve body Exhaust valve body Exhaust valve body Exhaust valve body Exhaust valve body Exhaust valve body Exhaust valve spring Exhaust valve washer Gasket Bolt Nut	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 227 228 230 231 232 233 234 235 236 237 238 239 250 251 252 253 254 255 257 260 261	Part Name Ø6.0 Pipe Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve nipple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve spring Gas ballast valve filter Gas ballast valve filter Gas ballast valve guide Check valve body Check valve cock Check valve spring O-ring Check valve ass'y Inlet flange	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No.           302           311           312           313           314           315           319           321           323           325           326           371           372           373           374           376           379           391           400           460	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve rubber Float valve o-ring Float valve body Float valve pin Float valve pin Float valve sided Float valve pin Float valve body Float valve body Float valve body Float valve body Float valve body Float valve pin Float valve body Float valve body Float valve pin Float valve body Float valve body Float valve pin Float valve pin Float valve body	Q by 4 1 1 1 1 1 1 1 1 1 1 1 1 1	No.	Part Name		
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Exhouses (Case Bel) (Case Bel) (C	V/V 162/65 Part Name Cylinder Rotor Bearing Vane A-end plate Bearing Vane A-end plate Bearing Oil coler (only MVO 101) O-ring Bolt Vasher Taper pin Key (A-end plate sided) Key (A-end plate sided) Oil sight glass O-ring Oil sight glass O-ring Oil fill plug Gage O-ring Drai plua	Q ty           1           2           3           1           2           2           1           2           2           1           2           1           2           1           1           2           1           1           1           1           1           1           1           1           1           1           1           1           1	No. 1255 1255 136 137 141 142 144 145 155 155 156 159 160 161 162 163 164 165 185 185 185 185 185 185 185 18	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (O) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-in Exhaust screen-out Exhaust valve ass'y Exhaust valve body Exhaust valve spring Exhaust va	Q'ty       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       2       2       2       2       2       2       2       2       2       2       2       2       2       2       2       2       2       2       2       1       4       6       2       1	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> <li>250</li> <li>251</li> <li>252</li> <li>253</li> <li>254</li> <li>255</li> <li>257</li> <li>260</li> <li>261</li> <li>265</li> <li>266</li> </ul>	Part Name Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve plate Gas ballast valve plate Gas ballast valve plate Gas ballast valve guide Check valve body Check valve cock Check valve cock Check valve guide Check valve spring O-ring Check valve ass'y Inlet flange Inlet screen Bolt Wahser	Q ty         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           4         4	No. 302 311 312 313 314 315 319 321 323 325 326 371 372 373 374 376 379 391 400 460	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float Valve ball Float Valve pin Float valve o-ring Float valve o-ring Float valve body Float valve body Float valve body Float valve body Float valve ass'y Bolt Motor Name plate	Q'ty 4 1 1 1 1 1 1 1 1 1 1 1 1 1	No.	Part Name		
Residue         Residue <t< td=""><td>VY 162 152 Part Name Cylinder Rotor Rearing Vane A-end plate Bearing Vane A-end plate Bearing Oll coler (only MVO 101) O-ring Rott Washer Taper pin Key (A-end plate sided) Key (B-end plate sided) Key (B-end plate sided) Cil sight glass O-ring Oll soll fill plug Gage O-ring Drai plug Oll fill robot</td><td>Qty       1       2       1       1       2       2       1       2       2       1       1       2       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1</td><td>No. 1255 1255 136 137 141 142 144 145 149 152 155 156 159 160 161 162 163 164 165 185 185 185 186 188 190 191 193 220</td><td>Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-in Exhaust valve ass'y Exhaust valve ass'y Exhaust valve bolt Exhaust valve spring Exhaust valve spring Exhaust</td><td>Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1</td><td><ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> <li>250</li> <li>251</li> <li>252</li> <li>253</li> <li>254</li> <li>255</li> <li>257</li> <li>260</li> <li>261</li> <li>265</li> <li>266</li> <li>275</li> </ul></td><td>Part Name Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve guide Check valve body Check valve cock Check valve cock Check valve guide Check valve guide Check valve spring O-ring Check valve ass'y Inlet flange Inlet screen Bolt Wahser Nonreturn valve</td><td>Q'ty           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           4      1</td><td>No.           302           311           312           313           314           315           319           321           323           326           371           372           373           374           376           379           391           400           460</td><td>Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve boll Float valve pin Float valve pin Float valve o-ring Float valve body Float valve body Float valve ass'y Bolt Motor Name plate</td><td>Q'ty         4           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1</td><td>No.</td><td>Part Name</td><td></td><td></td></t<>	VY 162 152 Part Name Cylinder Rotor Rearing Vane A-end plate Bearing Vane A-end plate Bearing Oll coler (only MVO 101) O-ring Rott Washer Taper pin Key (A-end plate sided) Key (B-end plate sided) Key (B-end plate sided) Cil sight glass O-ring Oll soll fill plug Gage O-ring Drai plug Oll fill robot	Qty       1       2       1       1       2       2       1       2       2       1       1       2       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1	No. 1255 1255 136 137 141 142 144 145 149 152 155 156 159 160 161 162 163 164 165 185 185 185 186 188 190 191 193 220	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-in Exhaust valve ass'y Exhaust valve ass'y Exhaust valve bolt Exhaust valve spring Exhaust	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	<ul> <li>No.</li> <li>227</li> <li>228</li> <li>230</li> <li>231</li> <li>232</li> <li>233</li> <li>234</li> <li>235</li> <li>236</li> <li>237</li> <li>238</li> <li>239</li> <li>250</li> <li>251</li> <li>252</li> <li>253</li> <li>254</li> <li>255</li> <li>257</li> <li>260</li> <li>261</li> <li>265</li> <li>266</li> <li>275</li> </ul>	Part Name Ø6.0 Pipe Ø6.0 Pipe Gas ballast valve cock Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve guide Check valve body Check valve cock Check valve cock Check valve guide Check valve guide Check valve spring O-ring Check valve ass'y Inlet flange Inlet screen Bolt Wahser Nonreturn valve	Q'ty           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           4      1	No.           302           311           312           313           314           315           319           321           323           326           371           372           373           374           376           379           391           400           460	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve boll Float valve pin Float valve pin Float valve o-ring Float valve body Float valve body Float valve ass'y Bolt Motor Name plate	Q'ty         4           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1	No.	Part Name		
Exhou s ( 001 015 018 022 025 026 030 032 042 045 042 045 053 053 054 066 075 066 075 083 084 088 088 088 088 088 088 088	IPart Name         Cylinder         Rotor         Bearing         Vane         A-end plate         Bearing         Vane         A-end plate         Bearing         Oil cooler (only MVO 101)         O-ring         Bolt         Vasher         Taper pin         Key (A-end plate sided)         Oil sump         Oil sight glass         O-ring         Golt         Oil sight glass         O-ring         Oil fill plug         Gage         O-ring         Data plug         Oil filter bolt	Qty         1           1         1           2         2           1         1           2         2           1         1           2         2           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1	No. 135 137 141 142 144 145 149 152 155 156 159 160 161 161 161 162 163 164 165 185 186 188 190 191 193 220 221	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust creen-in Exhaust screen-in Exhaust screen-out Exhaust valve ass'y Exhaust valve body Exhaust valve body	Q'ity 1 1 1 1 1 1 1 1 1 1 1 1 1	No.           227           228           230           231           232           233           234           235           236           237           238           239           250           251           252           253           254           255           257           260           261           265           266           275           278	Part Name Φ6.0 Pipe Φ6.0 Pipe Gas ballast valve cock Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve spring O-ring Check valve o-ring Check valve ass'y Inlet flange Inlet screen Bolt Wahser Nonreturn valve	Q'ty         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           4         4           1         1	No. 302 311 312 313 314 315 319 321 323 325 326 371 372 373 374 376 379 391 400 460	Part Name Bolt Coupling (P) Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve pin Float valve pin Float valve body Float valve body Float valve ass'y Bolt Motor Name plate	Q'ty           4           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1	No.	Part Name		
Exhou shou shou shou shou shou shou shou s	IPart Name         Cylinder         Rotor         Bearing         Vane         A-end plate         Bearing         Vane         A-end plate         Bearing         Oil cooler (only MVO 101)         O-ring         Bolt         Vasher         Taper pin         Key (&-end plate sided)         Oil supp         Oil sight glass         O-ring         Oil fill plug         Gage         O-ring         Diffill plug         Oil supp cover	Qty           1           2           3           1           2           2           1           2           2           1           2           1           2           1           1           2           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1	No.           1255           225           136           137           141           142           144           145           149           152           156           159           160           161           162           163           164           165           185           186           188           190           191           193           220           221           222	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (O) Exhaust cover (O) Snap ring O-ring Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve bolt Exhaust valve bolt Exh	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No.           227           228           230           231           232           233           234           235           236           237           238           239           250           251           252           253           254           255           257           260           261           265           266           275           278           279	Part Name Φ6.0 Pipe Φ6.0 Pipe Gas ballast valve cock Gas ballast valve poly Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve plate Gas ballast valve plate Gas ballast valve plate Gas ballast valve guide Check valve body Check valve cock Check valve cock Check valve o-ring Check valve o-ring Check valve ass'y Inlet flange Inlet screen Bolt Wahser Nonreturn valve Washer Float valve ass'y	Q'ty         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1	No.           302           311           312           313           314           315           319           321           323           325           326           371           372           373           374           376           379           391           400           460	Part Name Bolt Coupling (P) Coupling sleeve Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve pin Float valve orring Float valve orring Float valve body Float valve body Float valve ass'y Bolt Motor Name plate	Q'ty           4           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1	No.	Part Name		
Exhouses           Ros           001           015           018           022           025           026           030           0325           042           030           0325           042           050           042           053           042           054           050           053           054           066           0755           088           0884           0885           099           1004           1055           1064	IPart Name         Cylinder         Rotor         Bearing         Vane         A-end plate         Bearing         Vane         A-end plate         Bearing         Oil cooler (only MVO 101)         O-ring         Bolt         Vasher         Taper pin         Key (A-end plate sided)         Oil supp         Oil sight glass         O-ring         Dil fill plug         Gage         O-ring         Dia iplug         Oil filter bolt         Oil supp cover	Qty           1           2           3           1           2           2           1           2           2           1           2           1           2           1           1           2           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1	No.           1255           225           136           137           141           142           144           145           149           152           156           159           160           161           162           163           164           185           186           188           190           191           193           220           221           222	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (O) Snap ring O-ring Exhaust cover (O) Snap ring O-ring Exhaust screen-out Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Exhaust valve bolt Exhaust valve spring Exhaust valve washer Gasket Bolt Rubber foot Bolt Gas ballast valve ass'y Hydraulic fitting B.M.L Nipple O6.0 Pipe	Q'ty           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           2           2           2           2           2           2           2           2           2           2           2           2           2           2           1           3           1           1	No.           227           228           230           231           232           233           234           235           236           237           238           239           250           251           252           253           254           255           257           260           261           265           275           266           275           278           279           280	Part Name Φ6.0 Pipe Φ6.0 Pipe Gas ballast valve cock Gas ballast valve pody Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve guide Check valve body Check valve cock Check valve guide Check valve spring Check valve spring Check valve spring Check valve ass'y Inlet flange Inlet screen Bolt Wahser Nonreturn valve Washer Float valve ass'y BM.L. Nipple	Q'ty           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           2           1           1           2	No.           302           311           312           313           314           315           319           321           323           325           326           371           372           373           374           376           379           391           4000           460	Part Name Bolt Coupling (P) Coupling sleeve Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve pin Float valve ring Float valve or-ring Float valve body Float valve body Float valve body Float valve body Float valve ass'y Bolt Motor Name plate	Q'ty         4           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1	No.	Part Name		
Exhouses           Ros	IPart Name         Cylinder         Rotor         Bearing         Vane         A-end plate         Bearing         Vane         A-end plate         Bearing         Oil cooler (only MVO 101)         Oil sight glass         Oil sight glass         Oil sight glass         Oil fill plug         Gage         Oil filler bolt         Oil filter bolt         Oil glasket         Bolt	Qty           1           2           3           1           2           2           1           2           2           1           2           6           10           4           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1           1	No.           1255           136           137           141           142           144           145           159           156           159           160           161           162           163           164           165           185           186           188           190           191           193           220           221           222           223           224	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (C) Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Exhaust valve bolt Exhaust valve bol	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No.           227           228           230           231           232           233           234           235           236           237           238           239           250           251           252           253           254           255           257           260           261           265           275           266           275           266           275           266           275           280           281	Part Name 06.0 Pipe 06.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve piple Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plate Gas ballast valve ring Check valve body Check valve cock Check valve cock Check valve cock Check valve o-ring Check valve spring O-ring Check valve ass'y Inlet flange Inlet screen Bolt Wahser Float valve ass'y B.M.L. Nipple Bolt	Q ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 325 326 371 322 373 374 376 379 391 400 460	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float valve pin Float valve pin Float valve o-ring Float valve body Float	Q by         4           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1	No.	Part Name		
Exhouses           Rose	IPart Name         Cylinder         Rotor         Bearing         Vane         A-end plate         Bearing         Vane         Bearing         Vane         Bearing         Name         Bearing         Bearing         Bearing         Bearing         Oil cooler (only MVO 101)         Oil sight glass         Oil sight glass         Oil sight glass         Oil fill plug         Gage         Oil filler bolt         Oil filter bolt         Oil filter         Oil sowp cover         Gasket         Bolt         Oil soprator element	Q ty       1       1       2       3       1       2       2       1       2       2       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1       1	No.           1255           136           137           141           142           144           145           159           156           155           156           157           160           161           162           163           164           165           185           186           188           190           191           193           220           221           222           223           224           225	Part Name Oil inlet plate Gasket Demister Expanded metal Exhaust cover (O) Snap ring O-ring Exhaust screen-in Exhaust screen-out Exhaust screen-out Exhaust valve ass'y Exhaust valve bolt Exhaust valve ass'y Hydraulic fitting B.M.L Nipple O6.0 Pipe B.M.C Nipple	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No.           227           228           230           231           232           233           234           235           236           237           238           239           250           251           252           253           254           255           257           260           261           265           266           275           276           280           281           293	Part Name 06.0 Pipe 06.0 Pipe Gas ballast valve cock Gas ballast valve body Gas ballast valve plople Gas ballast valve guide Gas ballast valve guide Gas ballast valve guide Gas ballast valve plote Gas ballast valve plote Gas ballast valve plote Gas ballast valve plote Gas ballast valve guide Check valve body Check valve cock Check valve cock Check valve o-ring Check valve o-ring Check valve spring O-ring Check valve ass'y Inlet flange Inlet screen Bolt Wahser Nonreturn valve Washer Float valve ass'y B.M.L. Nipple Bolt 04.0 Pipe	Q'ty 1 1 1 1 1 1 1 1 1 1 1 1 1	No. 302 311 312 313 314 315 319 321 323 326 371 323 326 371 327 373 374 376 379 391 400 460	Part Name Bolt Coupling (P) Coupling sleeve Coupling (M) Bolt Bolt Bolt Assist base foot Fan (pump sided) Fan cover (pump sided) Bolt Washer Float Valve ball Float Valve ball Float valve pin Float valve pin Float valve o-ring Float valve body Float valve body Float valve body Float valve body Float valve ass'y Bolt Motor Name plate	Qty         4           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1           1         1	No.	Part Name		





