

## **DURAVANE ROTARY VANE VACUUM PUMP SYSTEMS**

DuraVane systems utilize rotary vane vacuum pumps. The pumps are typically lubricated rotary vane pumps which are single-stage pumps with an integrated, closed-loop oil circulation system. While not as common, the systems can also use oil-free (dry) rotary vane vacuum pumps.

The construction is heavy-duty and compact, resulting in a small footprint. When using lubricated rotary vane pumps, the vane material provides 50,000 hours of vane life.

The vacuum pumps are direct driven with a flange-mounted motor and are equipped with an internally mounted inlet check valve. The standard design is air cooled and when utilizing the lubricated rotary vane vacuum pump, the pump will use a high-efficiency, multistage exhaust filter that results in 99.9% oil-mist removal.

All DuraVane lubricated rotary vane vacuum pumps are equipped with a gas ballast valve. The main function of the gas ballast valve is to prevent water vapor from condensing in the pump which can cause emulsification of the lubricating oil, resulting in possible pump seizure.

If the vacuum pump does not reach the rated ultimate vacuum, it may be because the oil is contaminated with process vapors or water. To clean out the pump, close the inlet valve completely and operate the pump for 30 minutes in order to remove any condensables from the oil. If after 30 minutes the pump still does not reach ultimate vacuum, stop the pump and change oil. For best pump performance, always use the correct DuraVane oil.



Simplex units (vacuum systems utilizing only one vacuum pump) are started via the control panel, manual motor starter, or by other customer-supplied means. Some simplex systems are controlled through the use of a vacuum switch.



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Multiplex units (vacuum systems utilizing two or more vacuum pumps) are started through the use of a control panel. Multiplex systems that have been supplied with a DEKKER control panel utilize a PLC to control the system. The system operation can be varied through the use of the HOA (Hand/Off/Auto) switch on the control panel.

In “Hand” mode, each pump can be individually started and operated. The pump will run but will not be controlled by the PLC to start or stop based on vacuum level.

In “Auto” mode, the pumps will operate through a PLC to control starting and stopping the vacuum pump based on vacuum level. The PLC will also control the alternation sequence to alternate which pump will be the lead pump and which pump will be the lag pump. This alternation sequence is designed to maintain even run hours on all pumps.

The differential for each pump is usually 3” HgV and the offset between pumps is usually 1” HgV.

For example:

Pump 1 is set to turn on at 17” HgV and turn off at 20” HgV to provide the 3” HgV differential.

Pump 2 is set to turn on at 16” HgV and turn off at 19” HgV to provide the 1” HgV offset from pump 1.

The switches are set in this manner so that if pump 1 cannot satisfy demand and the vacuum level drops below 16” HgV, pump 2 starts.

The system also includes frequent stop/start protection by incorporating a fixed 10-minute minimum run timer. The pumps will continue to operate for 10 minutes, then evaluate if the vacuum level setpoints have been met. This will prevent premature coupling and electrical component failure.

The system also includes automatic alternation to allow for even run time for the pumps. On Multiplex systems using Siemens LOGO! PLC's, alternation takes place at a set time (usually just before midnight). On Multiplex systems using the OnDek Controller, alternation takes place every time the run hours of the Lead pump exceed the run hours on the other pumps; the Lag pump with the least amount of run hours will assume Lead position the next time there is demand for vacuum.

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