

Advantage-D
Advantage-L
Advantage-X



Central Vacuum Systems
(Simplex Tank Mounted Models)

(Ver. 7/12)

Operating Instructions and Maintenance Manual



DESCRIPTION

The Becker Advantage-D, Advantage-L, and Advantage-X central vacuum systems are available as either tank mounted simplex or duplex, or as vertically expandable/modular duplex through sextuplex models. All include automatic electrical controls to maintain vacuum levels between preset points; ASME coded receivers; inlet filters; check valves; isolation valves; vibra-

tion isolators; flexible connectors; and vacuum gauges.

Advantage-D and Advantage-X systems employ Becker 100% oil-less pumps, while Advantage-L systems employ Becker oil flooded models for operation at vacuum levels as high as 29.84"Hg (2 torr).

INSTALLATION

Unloading

Inspect the system carefully for any sign of damage incurred during transit. Becker ships all systems F.O.B., factory; therefore, damage is the responsibility of the carrier, and all claims must be made with them.

Using a fork lift truck, carefully lift the system from the transport vehicle. Using the fork lift truck, place the components in the final location, leaving a minimum of 24" around the package for service and ventilation. (see: COMPONENT ASSEMBLY below for instructions regarding systems assembly).

Location

Certain considerations should be given to the placement of the system. The package may be installed in any location that is level and will support its weight. Adequate ventilation is required since the pumps are air-cooled. The ambient temperature should be between 35°F and 100°F. The system should be located as

When selecting the installation location for the system, leave a minimum of 24" on all sides to permit routine servicing (i.e., changing filters) and ventilation.

close as possible to the point of usage to prevent excessive loss of operating pressure due to pressure drop.

Component Assembly

The system is shipped as a complete assembly. No further assembly is required beyond connecting the electrical supply and inlet and discharge (if supplied) piping connections.

Electrical Requirements

BE SURE THAT ALL POWER IS TURNED OFF PRIOR TO PERFORMING ANY WORK ON THIS ELECTRICAL PANEL!

The electrical controls for the system were wired at the factory and were fully tested.

NOTE: It may be necessary to switch two of the main power leads when performing start-up, if the pump rotation is in the wrong direction.

Attach the main power line to the main power terminal block and ground line to the ground lug in the control panel.

Vacuum Piping Connection

Before connecting any piping to the receiver, the plastic thread protector installed in the main receiver connection port must be removed. The main vacuum line to the receiver must never be reduced below that provided on the receiver. Long piping runs may need to be increased in size to minimize pressure drop. Improper line sizing may result in a loss of capacity. Ideally, piping should be constructed using long radius elbows and a minimum number of turns. Contact the factory for as-

sistance in determining proper line size and piping layouts.

All secondary lines should be taken from the top or side of the main line to prevent any accumulated moisture from draining towards the pumps. All lines should slope away from the pumps. Any low points in the piping should be equipped with pipe drains or drip legs to remove accumulated moisture. If the vacuum system remains under vacuum, a three valve setup may be required in order to drain the piping. Contact the factory for assistance.

START-UP

Lubrication

Advantage-D and **Advantage-X** pumps are 100% oil-less. On some models, the only lubrication that is necessary is to grease the bearings with a grease supplied in the grease gun that was shipped with the pumps. Check the pump owners manual that was supplied with the system to determine which models need to be greased, and the frequency.

NEVER ADD OIL TO THE INLET OF OIL-LESS PUMPS!

Advantage-L pumps are oil flooded. Advantage-L systems are shipped from the factory with oil in the pumps. Should it be necessary to add oil, it must be added to the pump through the oil fill port located at the top of the exhaust box. An exhaust pressure gauge is installed in the oil fill cap on all pumps; care must be taken not to damage the gauge when removing and replacing the cap. Add sufficient oil to bring the oil level to the the fill level as noted on the exhaust box casting. Non-detergent oil should always be used to prevent foaming and possible plugging of the exhaust filter elements.

NEVER ADD OIL THROUGH THE INLET OR EXHAUST PORTS OF A LUBRICATED PUMP!

Pump Rotation

Prior to actual operation, the pumps must be checked for correct rotation.

Using the Manual-Off-Auto switch on the door of the control panel, jog the motor of the specific pump that is to be checked by momentarily turning the switch to "manual" and back to "Off". By observing the cooling fan of the motor you can determine the rotation of the pump. Look for the direction-of-rotation arrows on each pump to determine correct rotation. When viewed from the motor end, the correct rotation for each type of pump is as follows:

All VT, KVT, and VTLF series pumps: CW

U4.400 and U4.630 pumps: CW

U4.20 – U4.250 pumps: CCW

For three-phase systems, if the pumps are rotating in the wrong direction, rotation can be reversed by switching any two main incoming power leads. Correct rotation should be confirmed in the previous manner.

General Operation

On initial start-up, when operating in the AUTO mode, the pump will run until the high vacuum set-point has been reached.

If the system vacuum level remains between the low and high set-points with the pump meeting the demand, the pump will continue to operate. When the vacuum level exceeds the high set-point the pump will turn off if the minimum run timer has been satisfied.

Minimum run timers are incorporated on all

systems to prevent motor damage from excess starts per hour. Should the upper vacuum level set-point be reached, and the timer not be finished timing out, the pump will keep running until the timer is satisfied, at which time it will stop, unless the vacuum level has dropped below the lower vacuum level set-point. Should this occur, the vacuum level will rise until the integral vacuum relief valve opens on Advantage D and X systems, preventing damage to the pump. On Advantage-L systems, high vacuum levels will not harm the pump. Caution is advised if the process cannot tolerate higher vacuum levels. Contact the factory for advice.

MAINTENANCE

Pumps

Advantage-D and X:

Each pump in an Advantage-D and Advantage-X system is a Becker dry series model, which is an oil-less rotary vane vacuum pump. A separate operating manual for these pumps is included with this system.

Becker's oil-less pumps use greased bearings. Depending on the model, the pump may have bearings with grease fittings, shielded bearings, or sealed for life bearings. Refer to the operators manual for the pump. Manuals are provided with each system, and may be found in the pocket on the inside of the electrical enclosure door. See: Start-up; Lubrication, page 3.

Advantage-L:

Each pump in an Advantage-L system is an oil-flooded (lubricated) pump. Use of the proper oil is important for proper operation of the pump.

Follow the directions included with the pump regarding oil change frequency, and changeout of the internal oil mist eliminators (exhaust filters).

NEVER OVERFILL AN OIL-FLOODED PUMP!

Inlet Filters

Advantage-D and X:

Each dry pump is equipped with an integral 4 micron inlet filter (refer to the pump's operating manual for its location). It can be serviced by following these steps: first, close the isolation valve adjacent to the manifold; second, remove the bolts, knobs, or clamp on the filter housing and remove the filter cartridge. It is recommended that the filter be checked every week, initially. After experience is gained, the period for inspection may be altered. The filter element may be cleaned by blowing with compressed air from the inside. Care must be taken not to use too much pressure, which could damage the element.

Advantage-L:

Advantage-L systems include an externally-mounted 2 micron inlet filter. It can be serviced by unlatching the clamps holding the cover onto the filter housing. Then remove the inlet filter, taking care to prevent any debris from entering the inlet pipe. It is recommended that the filter be checked every week, initially. After experience is gained, the period for inspection may be altered. The filter element may be cleaned

by blowing with compressed air from the inside. Care must be taken not to use too much pressure, which could damage the element.

Relief Valve

Every Becker Advantage-D and Advantage-X dry pump is built with an integral vacuum relief valve. The purpose of this relief valve is to prevent the pump from operating at a vacuum level that is too high. The maximum operating point for dry pumps varies from model to model (check the operating manual for the pump to

determine the vacuum level), but is factory set before shipping.

The function of the relief is very important to the successful long term operation of the vacuum system. Since these pumps have no oil or water to carry away the heat of compression, an adequate flow of air through the pump, as well as around the pump, is vital.

NEVER SET THE VACUUM RELIEF VALVE AT A POINT THAT EXCEEDS THE FACTORY RECOMMENDED LEVELS!

ELECTRICAL CONTROL PANEL

Description

The Becker electrical control panel is designed to control one vacuum pump. It includes a low voltage control transformer (115 volt secondary) with fused primary and secondary; a pressure transducer that has digital pressure indication; a Hand-Off-Auto switch with pump run light; and motor starter with disconnect. All components are enclosed in a NEMA 4X enclosure.

Starter

The starter's magnetic coil will be energized when a 115 volt current passes through A1 and A2 terminals. When the starter coil is energized, the contacts between L1 to T1, L2 to T2, and L3 to T3, close.

CONTROL PANEL COMPONENT DESCRIPTION

Standard equipment furnished with the Becker expandable control panel is as follows:

Illuminated Hand/Off/Auto Switch	The pump is equipped with an illuminated H/O/A switch. The switch lights whenever the pump is running. When the switch is in the Hand position, all program logic is bypassed and the pump will run continuously. In the Off position, the pump will not run. In the Auto position, the pump is connected to the system logic and will automatically come on and off as needed.
Control Voltage Transformer	All controls are operated at 115 volts AC single phase power, which is provided by the CVT. Both primary legs of the voltage as well as the secondary leg are fused. The transformer will accept 208, 230, or 460 volt input.
Pressure Transducer	Senses vacuum level in the receiver.
Starter	The starter provides short circuit and thermal overload protection as well as a lockable branch circuit disconnect for the motor circuit. These starter meets all requirements of UL 508, Category E, for self-protected combination starters.

SIMPLEX VACUUM TRANSDUCER PROGRAMMING

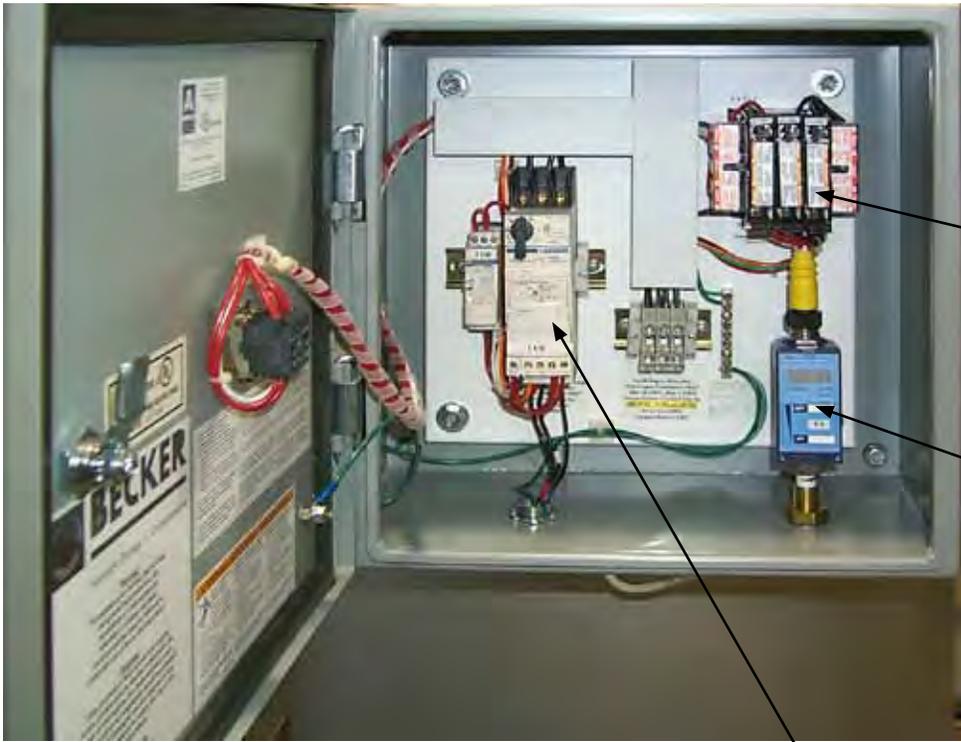
Catalog number: XMLFM01E2046

<u>Action:</u>	<u>Result:</u>
1. Press and hold down ↑ + ↓ + Enter for 5 seconds	ProG
2. Press Enter	DiaG
3. Press ↓	DisP
4. Press Enter	unit
5. Press Enter	Psi / bAr
6. Press ↑ ↓	bAr
7. Press Enter	unit
8. Press ↓	dA-d
9. Press Enter	FSt / nor/Slo
10. Press ↑ ↓	FSt
11. Press Enter	dA-d
12. Press Menu	DisP
13. Press ↓	SP01
14. Press Enter	Fct1
15. Press Enter	Hnc1/Hno1/Fnc1/Fno1
16. Press ↑ ↓	Hno1
17. Press Enter	Fct1
18. Press ↓ twice	rP1
19. Press Enter	0.00
20. Press ↑ ↓	Adjust to deep vacuum value
21. Press Enter	rP1
22. Press ↑	SP1
23. Press Enter	0.00
24. Press ↑ ↓	Adjust to low vacuum value
25. Press Enter	SP1
26. Press Menu several times to exit programming mode	

Pressure Reference Table

Bar	in/hg	Setting
-1.000	30	1.00
-0.967	29	0.97
-0.933	28	0.94
-0.900	27	0.90
-0.867	26	0.87
-0.833	25	0.84
-0.800	24	0.80
-0.767	23	0.77
-0.733	22	0.74
-0.700	21	0.70
-0.667	20	0.67
-0.633	19	0.64
-0.600	18	0.60
-0.567	17	0.57
-0.533	16	0.54
-0.500	15	0.50
-0.467	14	0.47
-0.433	13	0.44
-0.400	12	0.40
-0.367	11	0.37
-0.333	10	0.34
-0.300	9	0.30
-0.267	8	0.27
-0.233	7	0.24
-0.200	6	0.20
-0.167	5	0.17
-0.133	4	0.14
-0.100	3	0.10
-0.067	2	0.07
-0.033	1	0.04
0.000	0	0.01

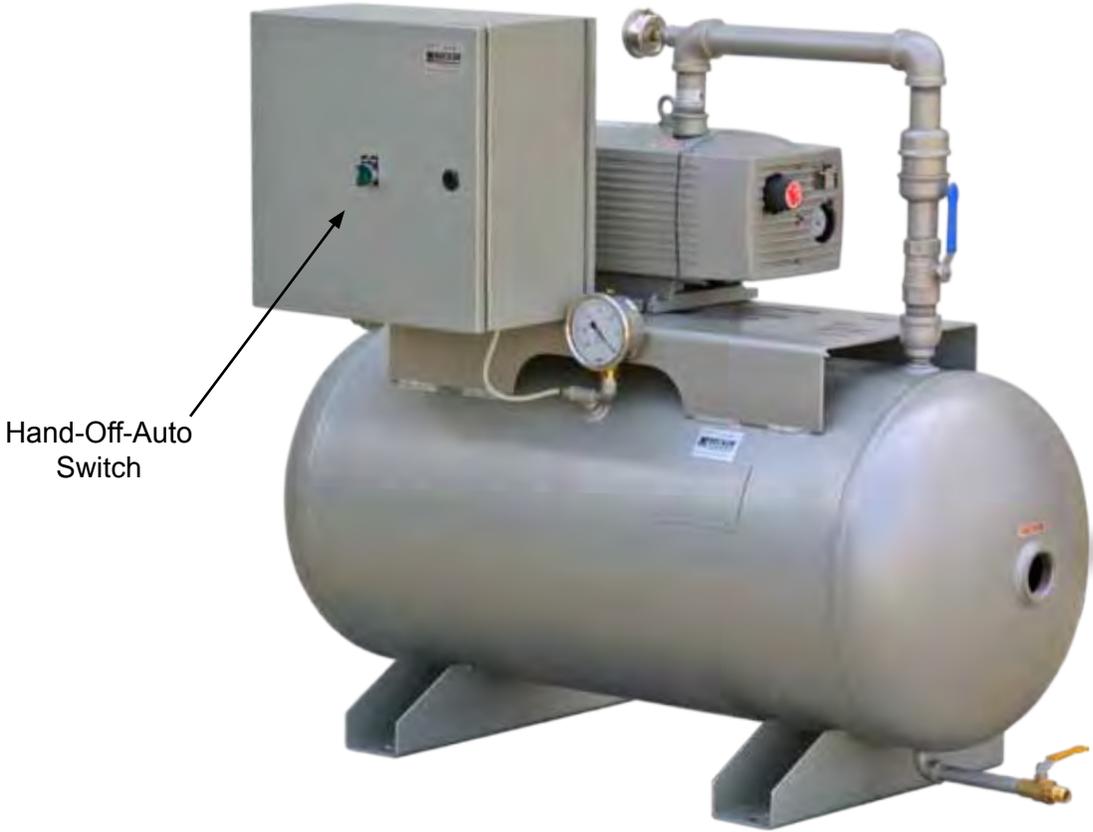
Note: This table is based on sea level pressure settings. Contact the factory for settings at elevations above sea level.



Transformer

Transducer/
Pressure Switch

Starter



Hand-Off-Auto
Switch

Simplex Control Panel Arrangement

