

U 4 Series: The U 4 series vacuum models work on the principle of a positive-displacement pump that consists of vanes mounted in a rotor rotating inside of a cylinder. These vacuum models require oil to seal the gaps, to lubricate the vanes and to carry away compression heat.

Product Description: The Becker U 4.20, 4.40, 4.400, and 4.630 pumps are oil-lubricated rotary vane highly efficient, thermally suited, vacuum pumps designed to operate on a continuous basis, intended for use at vacuum levels above approximately 20 in HgV (below 250 Torr) and can be operated with its inlet blanked off. Prior to handling the vacuum pump, these operating, installation and safety instructions shall be read and understood.

- Check boxes next to explanation if you have understood the information.
- Call factory for any concerns.



The U 4 series are oil lubricated vane vacuum pumps intended for suction of air and other dry inert gases. Maximum Allowed Temperature of the inlet air/inert gas - **104 deg F = (40 deg C)**
Ambient temperature: 41-104 deg F Ambient pressure: Atmospheric



Warning. Danger. Caution. Note that ignoring notices may lead to accidents; minor, serious or fatal injuries to personnel; or may cause damage to the pump. If anything remains to be clarified, please contact your Becker Pumps representative.



The vacuum pump is set up for continuous operation, intended for suction or evacuation of the process involving air only and other dry, non-aggressive, non-toxic and non-explosive gases. Conveying higher density media leads to possible excessive thermal/mechanical load on the vacuum pump. Please consult with Becker Pumps when conveying these other vapors/media.



Liquids may not be conveyed. The use of the gas ballast counteracts the accumulation of condensates from the process gas inside the vacuum pump.



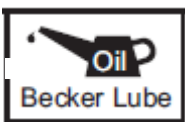
The vacuum pump should be placed in a non-potentially flammable/explosive/non-toxic environment. Therefore:



Flammable Substances may not be conveyed.



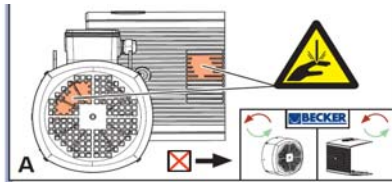
Explosive substances may not be conveyed.



The pump is an oil lubricated rotary vane vacuum pump. **Using Becker Synthetic Oil or Becker Premium Synthetic Oil extends the warranty of the pump.**

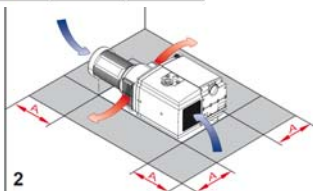


The vacuum pump will become **very hot** during operation. This is normal. Care should be taken to let the unit cool down before maintenance. **(High temps: 175+ degrees F (79+ degrees C))**

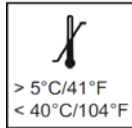


Cooling takes place by radiating heat from the surface of the pump; air flow from the fan wheel across the drive motor; air flow across/from the radiator squirrel cage fan. **Caution:** rotation of fans.

A > 100mm
A > 4"



Greater than 4" (100 mm) around the pump is the distance from any object for radiant heat dissipation. Allow even more area to provide access for maintenance of the pump.



The process gas will also supply cooling to the pump. This process inlet air and the surrounding ambient air should be within temperatures between 41 deg F – 104 deg F.

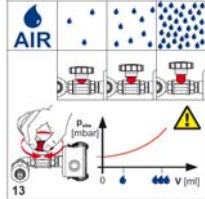
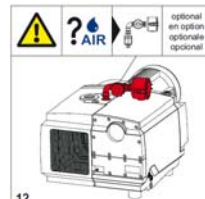
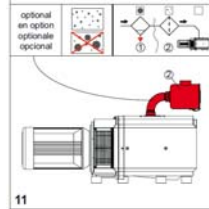


**CAUTION: PROTECT YOUR WARRANTY!
IF YOU ARE ABOVE 2,500 FT. ALTITUDE
CALL FACTORY BEFORE INSTALLATION.**

Characteristic data from the spec sheet is valid up to 3280 ft (1000 m). Consult with Becker for corrected specifications at altitude.



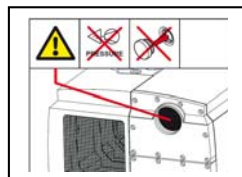
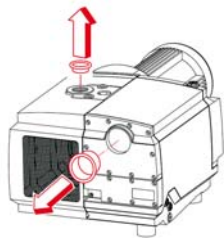
Protect the pump from humidity in storage/assembly. If placing the pump outside, protect from the outside elements by a protective roof and from rodent/vermin by blocking inlets with wire mesh fencing. Working environment and process application should convey air with a relative humidity between 30-90%.



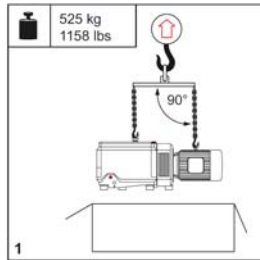
The gas ballast valve is optional/available with the U4 series vacuum pumps. Residual condensates dilute the oil deteriorating its lubricating properties. With an adjustment of the gas ballast, ambient air is sucked into the pump chamber; counteracting the accumulation of condensates inside the vacuum pump. This method is employed during the process and at the process end, with shut-off valve closed and gas ballast open, run the pump for another 20 minutes to sweep out vapors that may be contaminating to the oil.

SET-UP/ ASSEMBLY: Review and identify the position of the (see next page):

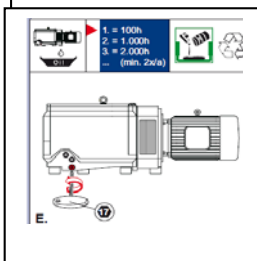
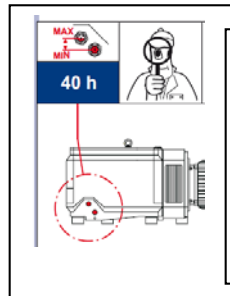
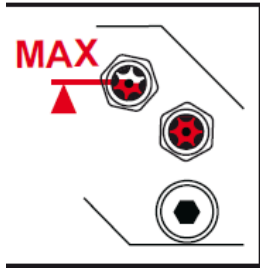
- Inlet port** (install piping of the vacuum line from the process to this port without restriction)
- Exhaust port** (leave open to atmosphere without restriction).
- Review and identify** dimensions of the pump, location of inlet filters (to avoid suction of any foreign media), the non-return valve (to avoid reverse rotation after switching off the vacuum pump), and locate the arrows that indicate correct rotation of motor/fan after electrical hook-up.
- Do **not reverse rotation** of the pump, this will spin the vanes backwards incorrectly and possibly break vanes locking the pump up. Also pressure could build up in the working chamber causing gaskets/seals to blow out.



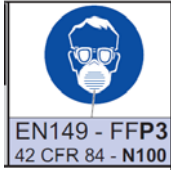
Remove all packing materials; cardboard/plastic covers/adhesive tape/foam from all ports and from the outside of the pump. Exhaust air must escape without back-pressure: not to exceed 1.5 psig (0.1 bar). Do **not** block exhaust air ports.



Make sure the eyebolts are fully screwed in. The position of the eyebolts fit to the center of gravity of a pump including the drive motor. If a pump without motor is to be lifted, attach another belt/rope at a suitable point. Lifting chain should be positioned a minimum of 2 meters. **Caution:** Do not tilt vacuum pump that is already filled with oil which can cause the oil to ingress into the cylinder.



Oil should be filled to the middle of the MAX oil sight glass. Check oil level every 40 hours. Maintain oil and oil filter with initial check at 500 hours and every 500 hours thereafter, determining a maintenance schedule. The minimum of twice per year is recommended. **Oil Capacity of each model pump:**
 U 4.20 = 0.52 liters (17.60 ounces)
 U 4.40 = 1.04 liters (35.20 ounces)
 U 4.400 and U 4.630 = 14 liters (3.70 gallons)
Using Becker Synthetic or Premium oil extends the warranty of the pump!



The pump is intended for industrial use. It shall be handled only by qualified personnel. Only qualified personnel shall transport, store, install, commission, maintain, troubleshoot, and overhaul the pump. The installation of the pump should be observed both by the manufacturer of the machinery into which the pump will be incorporated and by the operator. Marked operations may only be executed by qualified electricians.

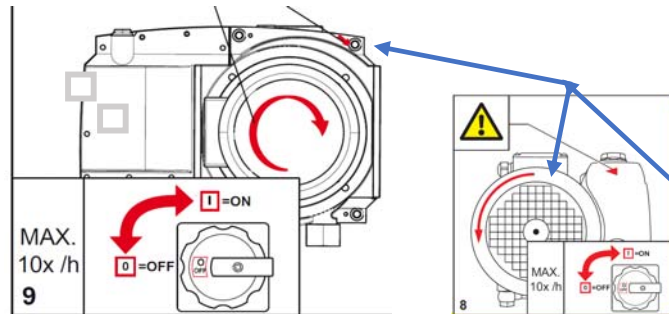
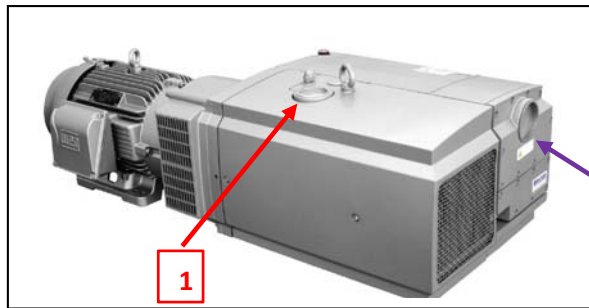
Follow all safety notes/warnings.

Always wear eye protection.

During operation, the surface of the pump may reach high temperatures of more than 160 deg F.

Wear protective gloves, stay clear of the pump. Risk of Burns!

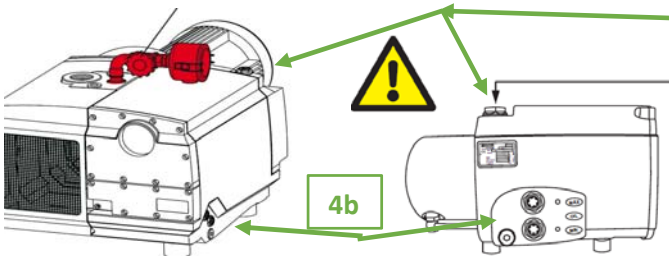
Increased risk of damage to health may be a concern when changing contaminated oil. Personal protective equipment must be worn during the changing of contaminated oil. Contaminated oil is special waste and must be disposed of separately in compliance with applicable regulations.



1.) Vacuum connection

2.) Exhaust air vents and/or exhaust ports. (Check port dimensions specified for type of lubricated pump model)

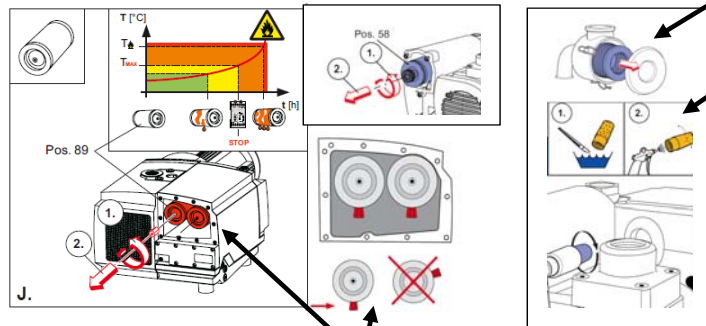
3.) Arrows to indicate correct rotation of motor/fan; depending on pump type. (clockwise or counterclockwise)



**4.) a.) Oil filler cap
b.) Oil sight glass and Screw plug oil drain**

5.) Internals of the pumps show filters/separators.

- a.) External inlet filter (not shown)
- b.) Gas ballast external inlet filter element
- c.) Gas ballast cone type can be washed and blown out
- d.) Coarse separator/s (Position 94- not shown)
- e.) Oil separator/s - position 89 or 58 - dependent on model type (orientate with key lock facing downward)



5e



When servicing the pump, the pump must be turned off. The motor must be disconnected from the main electrical source by a qualified electrician so that it cannot be started up again accidentally. Follow proper lockout/tag-out procedures.

BECKER
D-42279 Wuppertal
www.becker-international.com

CE

year _____
No. _____
type _____
frequency _____ Hz
speed _____ min⁻¹
power required _____ kW
inlet capacity _____ m³/h
max. vacuum **MAX. VACUUM** mbar

Made in Germany

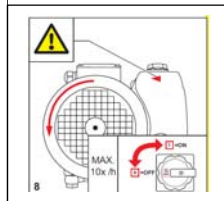
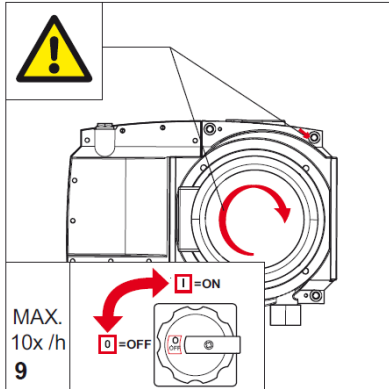
On every pump there will be the **pump nameplate**. It will state: the year the pump was manufactured, the serial number of the pump, the type of pump, frequency, rpm, kW (motor HP), volumetric flow inlet capacity, and the max vacuum. The data sheet will also provide this information.

BECKER Mat.Nr. XXXXXX ENXXXX CE
3~Mot. XXXXXXXX
NoUD XXXXXX XX

50 Hz XXXKW XXX-XXX / XXX-XXX V Δ / Y XX-XX / XX-XX A cos φ 0.XX-0,XX XXXX-XXXX /min	60 Hz XXXKW XXX-XXX / XXX-XXX V Δ / Y XX-XX / XX-XX A cos φ 0.XX-0,XX XXXX-XXXX /min
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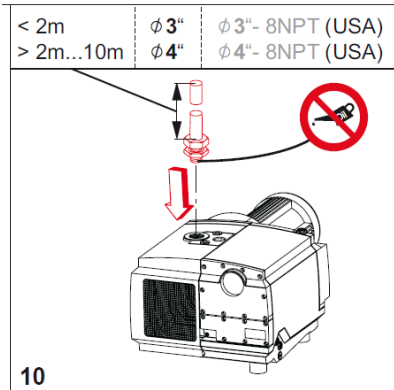
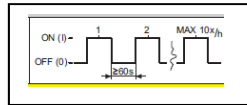
XX kg

On every motor there will be the **motor nameplate**. It will state the motor electrical information with kW, Hz, voltage, amps, speed, with the wiring diagram on the motor nameplate or inside the motor box, IP rating, UL/CSA recognition, and operating mode (S1).



Locate the arrows that indicate correct rotation of motor/fan after electrical hook-up. Do **not reverse rotation** of the pump, this will spin the vanes backwards incorrectly and possibly break or chip vanes. **Bump** the drive motor and watch the fan wheel to determine the direction.

The pump should **not** be switched on/off more frequently than 3 times/hour or 6 times/hour if using a soft start or frequency drive.. This may lead to excess temperature limit of the motor winding and the bearings.

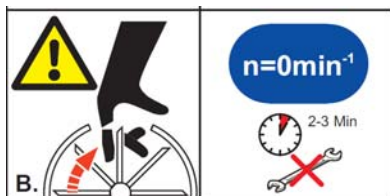


Flexible pipe should be used for pipe connections at an angle. This will prevent pipe line cracks/breakage/damage.

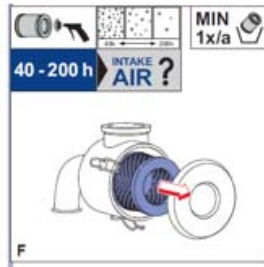
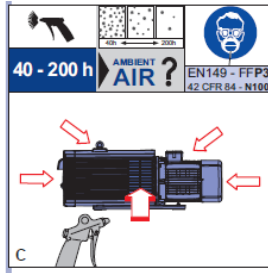
Proper sizing of pipe diameter should not restrict inlet. Piping diameter should be at least the same size as the inlet port size for up to 30 meters (98 ft of equivalent length). Larger pipe diameters should be used for longer equivalent lengths.

An external check valve 1x should be used to prevent reverse operation when there is vacuum in the line, due to the process stopping, pipeline closed and/or also when two or more pumps are inline.

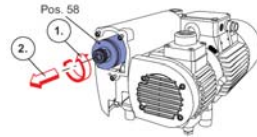
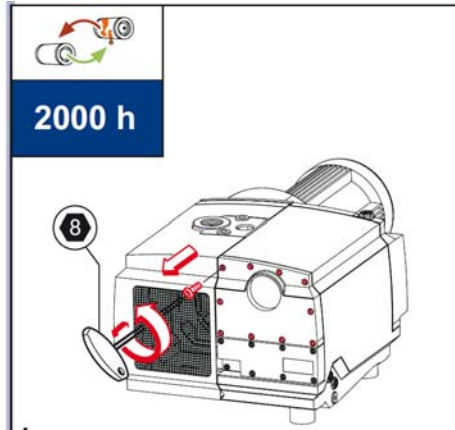
Do not use oil on threads of the piping.



Caution: rotating unit. Do not work on the pump/motor until it is idle with no rotation. This may take up to 3 minutes. Follow proper lockout/tag-out procedures.



The outside shroud of the pump should be blown with compressed air every 40 – 200 hours. (Squirrel cage fan of the pump, motor fan, motor fins, top and sides of the pump and motor). Filter/elements should be checked - the **external inlet filter** (between 40 - 200 hours) and the gas ballast filter (every 1000 hours). The elements should be blown with compressed air from the inside out. Blast air should be felt coming through the filter/element. The element needs to be replaced if dirty or clogged. **Use only Becker Genuine filters to maintain warranty protection.**

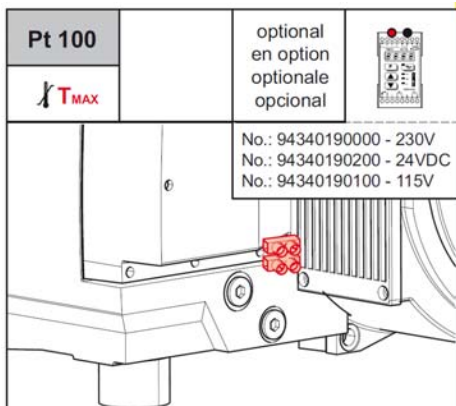
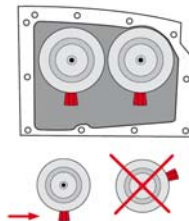
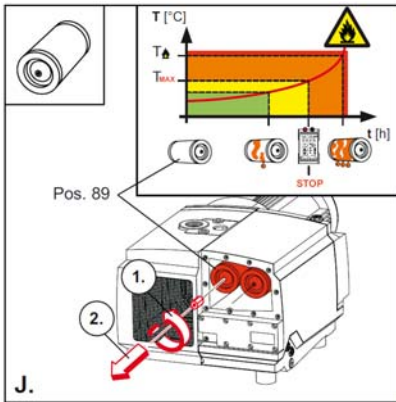


After 2000 hours of run time on the pump, (H1) the oil separator/s and course separators behind the exhaust ports should be maintained. The running vacuum level of the pump should be above 0.6 bar relative (= 400 mbar absolute) or above 18"HgV. **This maintenance schedule is dependent on running vacuum level and how much air has been pulled through the oil separators.**

To open exhaust port location area, remove plastic end cover. Be mindful of the torque specs on bolts.

Extending past the max 2000 hour maintenance schedule for the separator/s may cause a lack of performance due to thickening/caramelizing oil. This may become a concern/possible fire hazard.

Orientate the separator/s with the key lock facing downward.



The U4 series lubricated models pumps are fitted with a temperature probe Pt100 at the bottom of the body or in the motor box. This is an optional accessory that monitors the internal temperature of the cylinder housing.

ASK ABOUT OUR MOBILE SERVICE



**Use Only Becker Genuine Replacement Parts To Maintain
Warranty Protection!**

Available Spare Parts/Accessories



Maintenance Kit— Visit Our Store for Part #'s

Use the Becker Genuine Maintenance Kit to maintain your warranty and to increase the longevity and performance of your Becker Rotary Vane Pumps. Each of these components is engineered specifically for this pump. The kit includes Becker Genuine oil, oil filter, oil separation element, oil separation gasket, gas ballast filter. Keep an extra kit on the shelf to ensure you have all of the components on hand for regularly scheduled maintenance.



BPC Clear Filters

Use an inline see through canister filter with paper filter element that removes 99% of particles down to 2 micron and connects easily on to the Becker Check Valve Assembly. Eliminates the need for removing the filter cover on the pump and allows for visual inspection of the filter element preventing any interruption in the vacuum process.



Check Valve Kit/Gauge

The Check Valve Kit comes complete with all parts necessary to connect to the pump. Liquid filled 0-30" Hg vacuum gauge with 2-1/2" face, 1/4" center back mount easily fits onto the Check Valve Kit piping.

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www.beckerpumps.com/shop