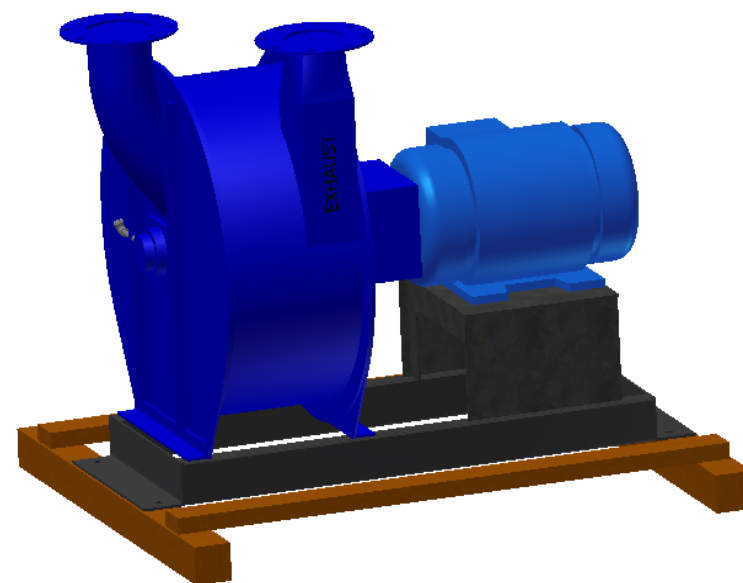
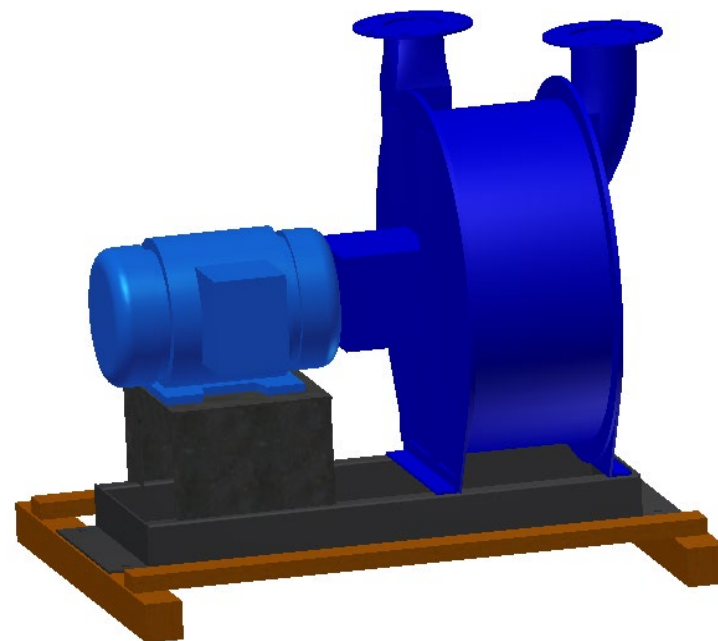




Models- M24B & M30B Vacuum Producer

Page 2	Product Information
Page 3	Safety Instructions
Page 4 - 5	Receiving, Handling & Storage
Page 5 - 10	Installation Steps
Page 10 - 11	Pre-Startup Checks/First Startup
Page 12	Operating Temperatures
Page 13	Maintenance Schedule
Page 14 - 16	Coupler Alignment
Page 17 - 19	Lubrication/ Bearing Replacement
Page 21 - 22	Setting Butterfly Intake Valve
Page 23 - 27	Surge and Motor Control Options



PRODUCT INFORMATION

Please take a moment to fill out the information below in order to aid us with any future sales or service inquiries. Model number and serial number information can be found on the serial tag located inside the control box and/or on the lower exterior of the can. Key number can be found on the tag that comes attached to the keys. There may be more than one key number depending on unit.

Please keep this information with your records.

MODEL#: _____

ORDER#: _____

SERIAL#: _____

DATE PURCHASED: _____

MOTOR F.L.A. _____ MOTOR NO LOAD AMPS _____

J.E. Adams Industries
1025 63rd Ave. S.W.
Cedar Rapids, IA 52404
1-800-553-8861
www.jeadams.com

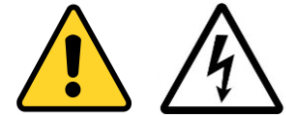
IMPORTANT SAFETY INSTRUCTIONS

When using an electrical appliance, basic precautions should always be followed, including the following:

READ ALL INSTRUCTIONS BEFORE USING (THIS APPLIANCE)

WARNING – To reduce the risk of fire, electric shock, or injury:

- Do not use on wet surfaces.
- Use only as described in manual. Use only manufactures recommended attachments.
- Do not allow to be used as a toy. Close attention is necessary when used by or near children.
- Do not put any object into openings. Do not use with any opening blocked; keep free of dust, lint, hair and anything that may reduce air flow.
- Keep hair, loose clothing, fingers, and all parts of body away from openings and moving parts.
- Do not use to pick up flammable or combustible liquids, such as gasoline, or use in areas where they may be present.
- Do not pick up anything that is burning or smoking, such as cigarettes, matches, or hot ashes.
- Do not use without dust bag and/or filters in place.



SAVE THESE INSTRUCTIONS

- **Installation Instructions:**
- Determine location to mount unit ("**DANGER**" "**THIS EQUIPMENT INCORPORATES PARTS SUCH AS SWITCHES, MOTORS, OR THE LIKE THAT TEND TO PRODUCE ARCS OR SPARKS THAT CAN CAUSE AN EXPLOSION. WHEN LOCATED IN GASOLINE-DISPENSING AND SERVICE STATIONS INSTALL AND USE AT LEAST 20 FEET (6 M) HORIZONTALLY FROM THE EXTERIOR ENCLOSURE OF ANY DISPENSING PUMP AND AT LEAST 18 INCHES (450 MM) ABOVE A DRIVEWAY OR GROUND LEVEL.**")
- Run electrical service to that location
- **Grounding Instructions:** This appliance must be connected to a grounded metal, permanent wiring system; or an equipment-grounding conductor must be run with the circuit conductors and connected to the equipment-grounding terminal or lead on the appliance.
- All local and national electric codes must be followed for installation and use.
- Licensed electricians are recommended for installation.

- Thank you for your purchase of a JE Adams Vacuum Producer fabricated steel multi stage centrifugal unit.
- Please take the time to review this manual in its entirety to assure that you are familiar with all the requirements and features of your equipment. Proper installation, operation and maintenance will assure the user of years of trouble-free service. Always refer to your specific model number and serial number, which are stamped on the nameplate attached to the inlet head.
- Our ongoing commitment to your satisfaction begins with the proper handling and installation of your new equipment.



Warning! Failure to follow good safety practices when handling the vacuum producer could result in injury or death!



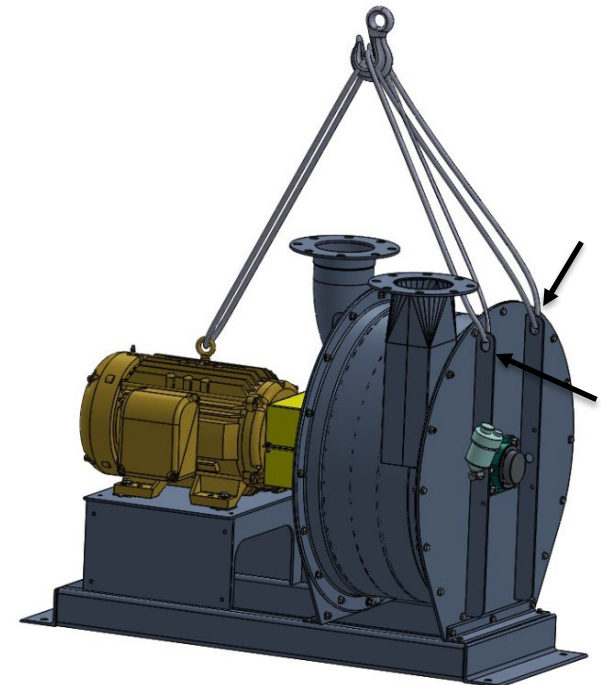
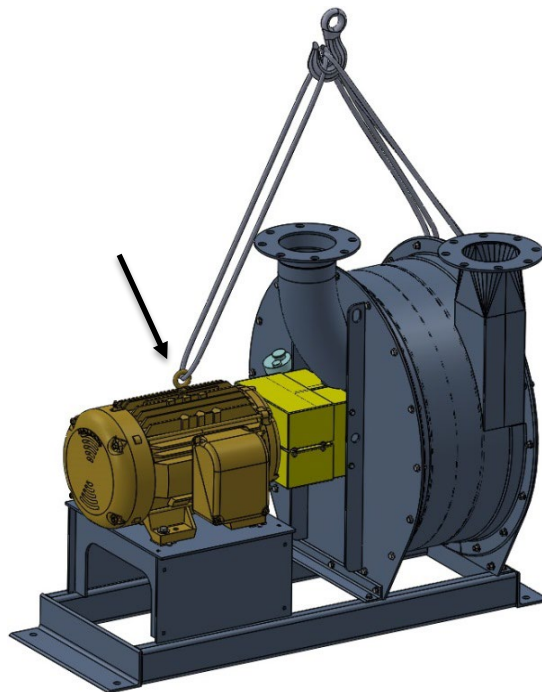
RECEIVING OF UNIT:

Immediately upon receipt, thoroughly examine the equipment. Both motor and blower shafts should rotate freely. There should be no evidence of damage, dented steel, or any other unusual observations. Check the packing list to verify that the shipment is complete, noting receipt of miscellaneous items in crates or boxes. If any damage has occurred, or any material is missing, make a note on the carrier's freight bill and make sure that the driver signs on the same receiving copy. Notify the delivering carrier at once and also notify JE Adams immediately.

HANDLING OF UNIT:

Your blower/exhauster is provided with 2 lifting eyes located on the inlet and outlet head. We recommend a 3-point lifting method by using the 2 lifting eyes on the unit and the one lifting eye on the motor.

DO NOT LIFT BY SHAFT OR BEARING HOUSINGS. AVOID BENDING OR DISTORTING OF BASE.



STORAGE OF UNIT:

If your blower/exhauster is not going to be installed for a period of up to 90 days then you must store it in a clean, dry, well-ventilated area. The unit must be covered and kept out of the elements. Plastic or canvas is preferred. **Rotation of the motor unit shaft should be done at least once a week** to redistribute bearing lubricant and prevent bearing damage. Keep a log of shaft rotation to ensure machine warranty protection.

If the storage of your blower/exhauster is longer than 90 days, then in addition to the above storage information, you will need to: suspend a bag of silica gel in the inlet and outlet heads to absorb **excess moisture**, **coat exposed machine surfaces with a protective grease** and **follow motor manufactures instructions so that the motor is properly maintained**.

INSTALLATION:

LOCATION:

- Indoor locations are preferable.
- The location selected should be clean, dry, properly drained and adequately ventilated.
- Plan ahead. Ample room is required for maintenance, lubrication and the removal of the machine or driver for servicing.

FOUNDATION:

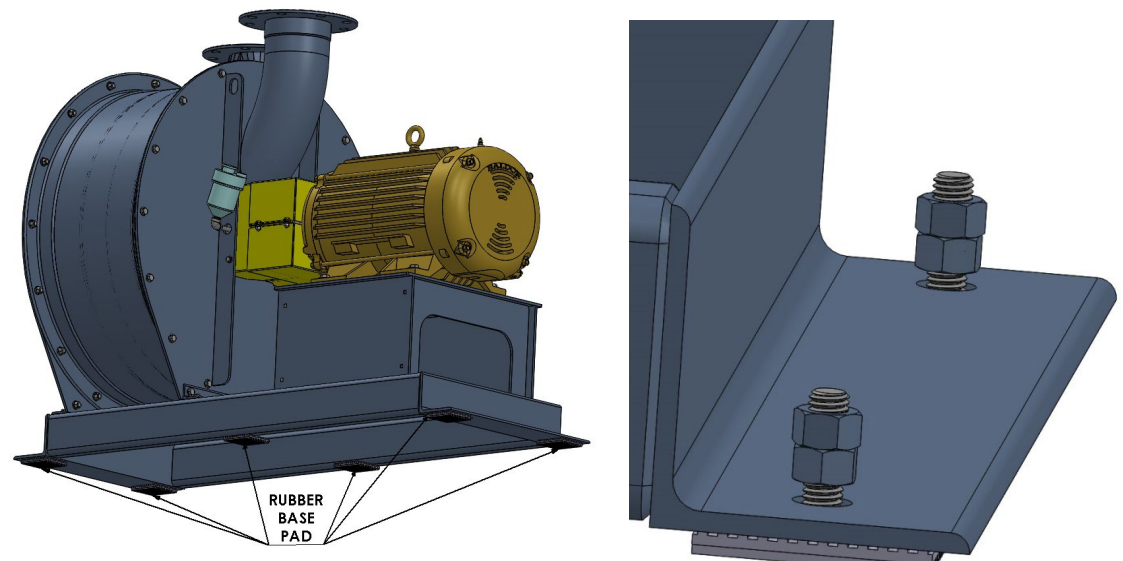
The blower/exhauster should be located on a solid, level, and flat surface. The best surface is a reinforced concrete slab however; a well reinforced above grade surface is suitable. Avoid mezzanines or catwalks and hollow floors.

POSITIONING:

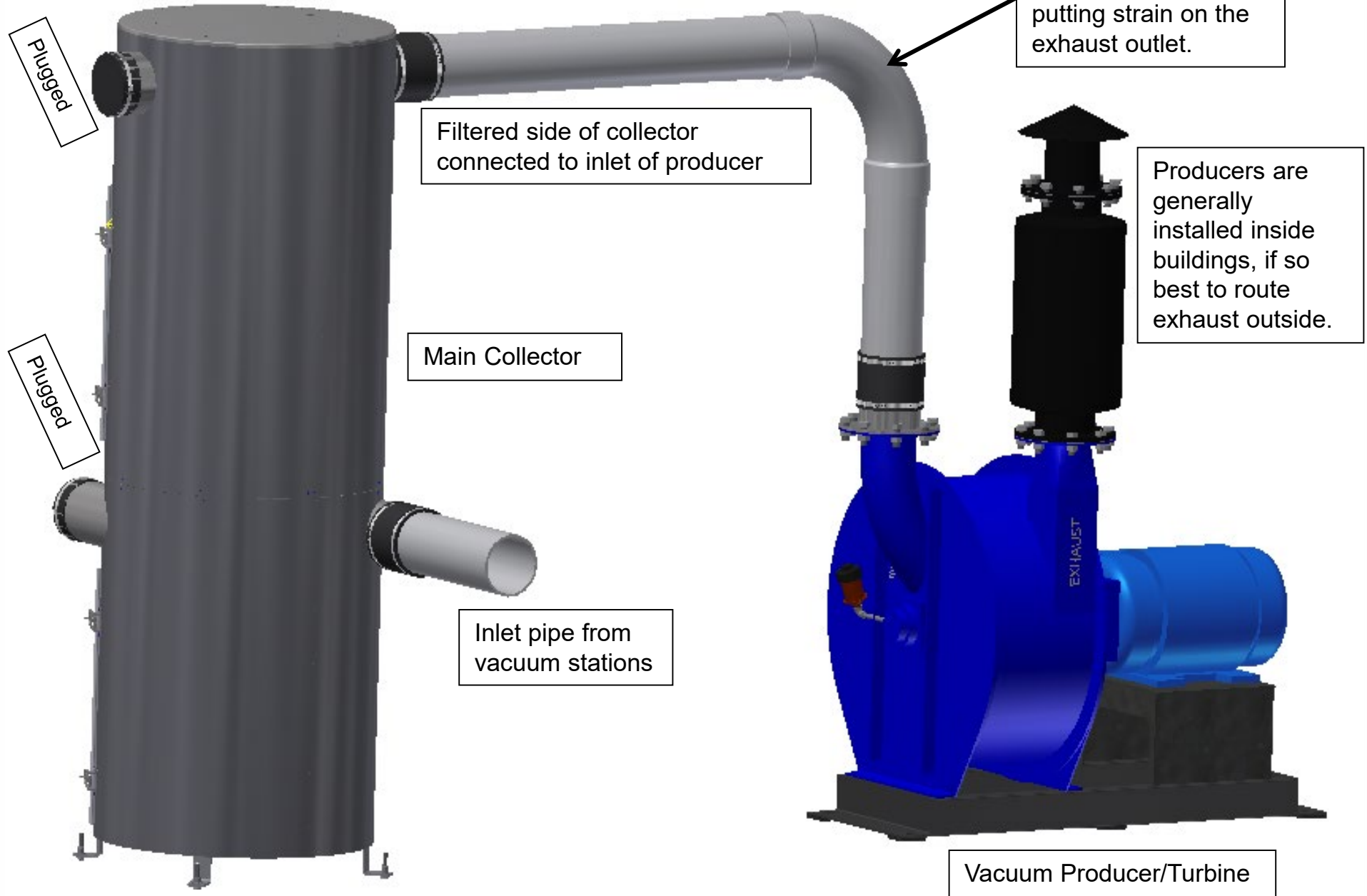
Bolt holes are provided for shipping and positioning purposes as seen in the image below. If floor bolts are used the **NUTS SHOULD NOT TOUCH THE BASE!**

NOTE: TIGHTENING MAY DISTORT THE BASE OR RESTRICT THE BASE PAD MOVEMENT AND CAUSE EXCESSIVE VIBRATION. DO NOT WRENCH TIGHTEN BASE BOLTS. THIS COULD VOID THE EQUIPMENT WARRANTY.

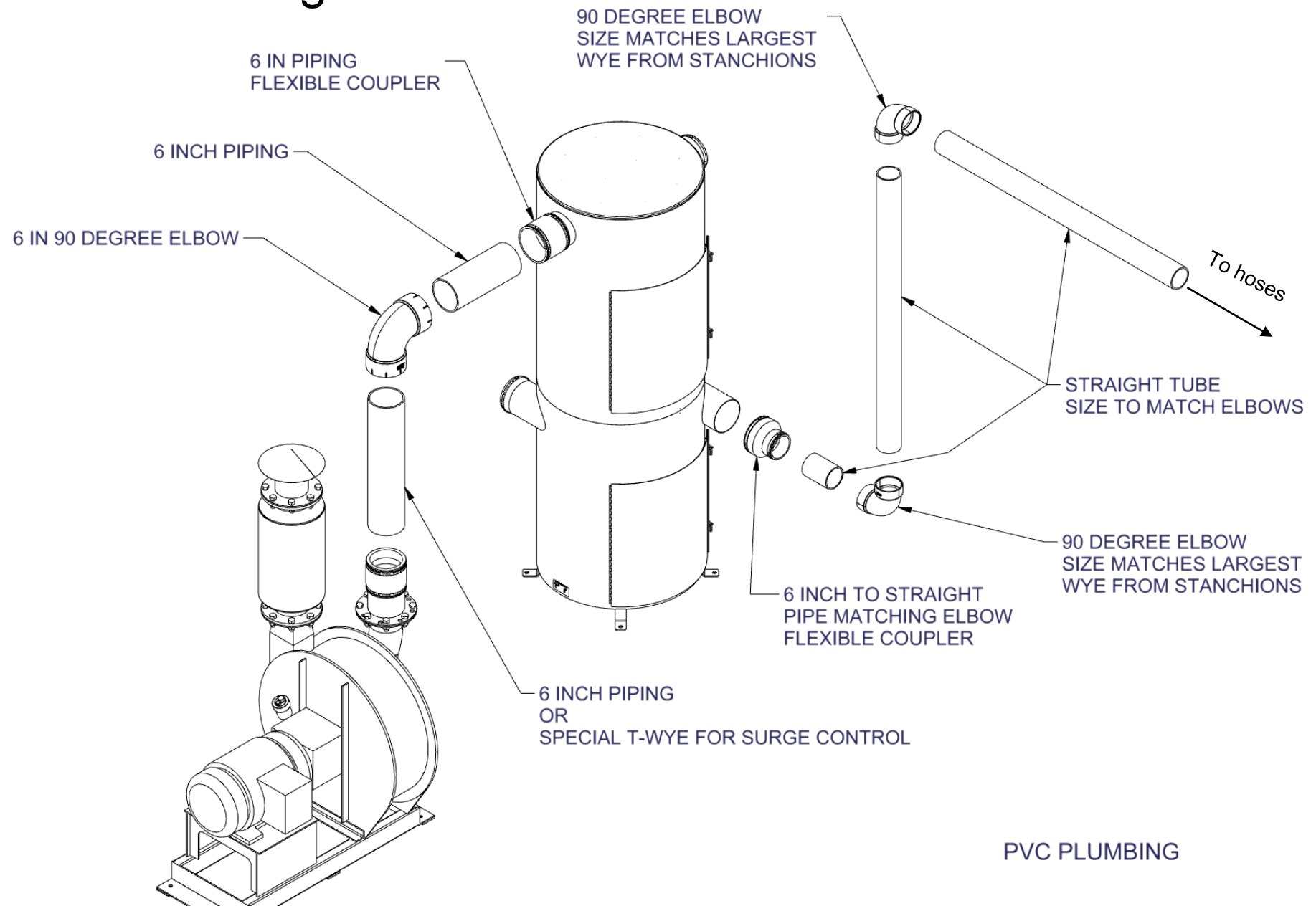
Rubber vibration isolation pads have been supplied. These must be installed under the base as follows: one under each corner of the unit and one under each side of the base at approximately the middle of the unit.



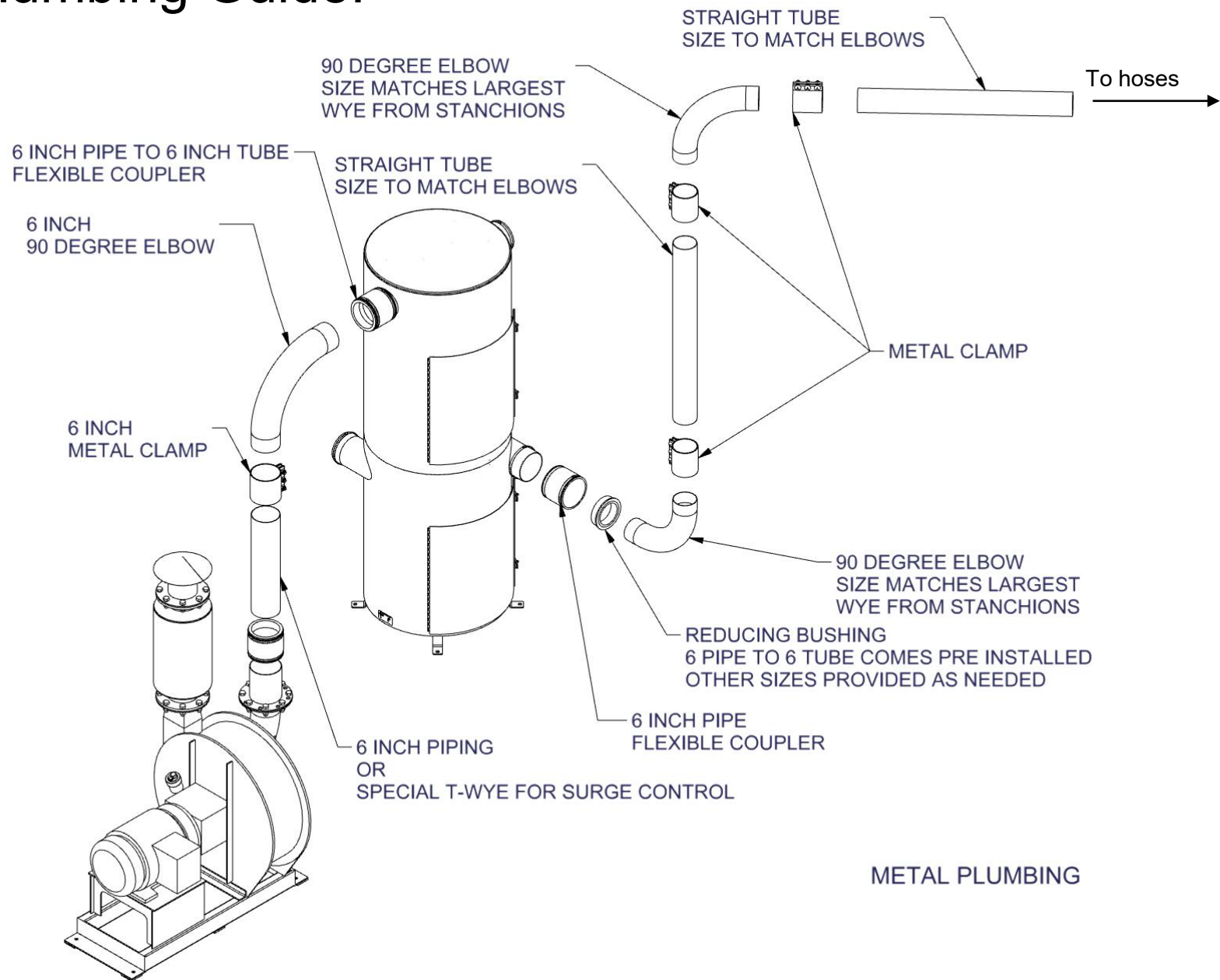
Turbine/Producer and Main Collector Installation **example:**



PVC Plumbing Guide:



Metal Plumbing Guide:



ELECTRICAL REQUIREMENTS

- Read and comply with motor manufacturer's installation and operation instructions which are attached to the motor. Make sure that the motor nameplate requirements agree with the available power supply at job site. **All wiring MUST be done by a licensed electrician (industrial experience preferred) in accordance with the National Electrical Code (NEC-NFPA 70), and other applicable national and local regulations.**

ELECTRIC MOTOR RECOMMENDATIONS

Every time an electric motor is energized the motor will draw 10-30 times the motor name plate amps. This initial amperage spike is commonly referred to as the "inrush current" and typically only lasts a few seconds until the motor can reach the normal operating current or what is called "steady state".

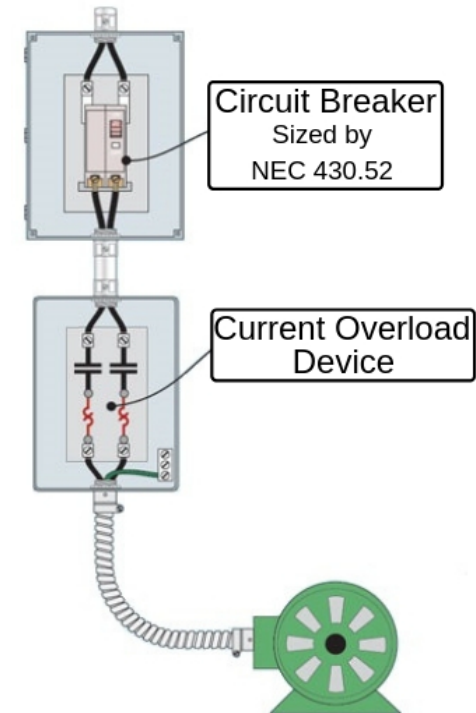
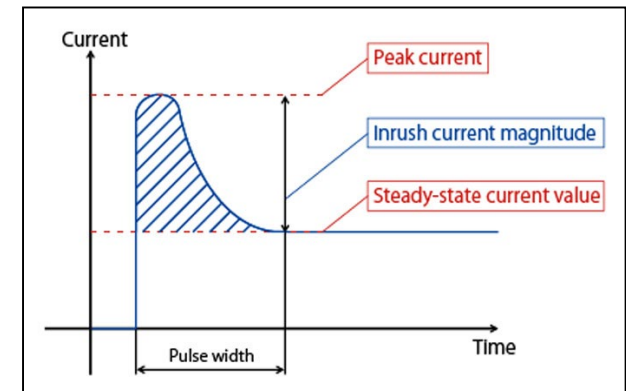
It is necessary to account for the inrush current when installing motors and starters; to avoid tripping breakers or blowing fuses unnecessarily when the blower/exhauster is energized. It is crucial to follow NEC Article 430 when installing electric motors to ensure safety and proper operation.

Electrical Soft Starters

Electrical soft starters are used reduce the voltage supplied to the motor when it is energized which reduces the inrush current. The voltage is then slowly increased to the line voltage over several seconds (depending on the soft start this can be up to 30 seconds). Many electrical soft starters monitor current and have settings to protect the motor from over drawing amperage. Soft starters are sized by the size motor they are driving and should be installed to the manufactures specifications.

Sizing Circuit Breaker

Correctly sizing the circuit breaker for a motor is critical to supplying the amount of current required to start the motor. Due to the inrush current the circuit breaker should be sized by using NEC code 430.52. On the next page there is a reduced table from NEC 430.52 for reference.



NEC Table 430.52 Sizing Circuit Breaker for Motor Power Supply			
Percent of Full-Load Current			
Type of Motor	Non-Time Delay Fuse	Dual- Element (Time- Delay) Fuse	Inverse Time Breaker
Single-phase	300	175	250
Three-phase			

Note: Sizing is based on full load amp values shown in Table 430.247 through 430.250, NOT MOTOR NAMEPLATE VALUES

Current Overload Device

- JE Adams recommends installing a current overload device to protect the motor. The breaker is oversized allowing the motor to draw the required current to start the motor but this can leave the motor susceptible to overload under normal operation.

PRE-INITIAL STARTUP CHECKS

- 1) A visible inspection should be done to ensure unit is on a solid, flat, level, and smooth foundation with vibration pads installed.
- 2) Check motor connections to make sure it is wired properly. Refer to motor nameplate and control panel connections per electrical drawings. If additional items such as: temperature sensors, surge controls, vibration switches etc. have been provided then these must be correctly wired according to the manufacturer's instructions.
- 3) Check for and remove any foreign material located in the intake or discharge piping.
- 4) Remove coupling guard and recheck coupling alignment. The blower/exhauster and motor shafts were properly aligned at the factory prior to shipment. **However, rough handling in transit could have disturbed this alignment. Therefore, alignment MUST be rechecked, and the unit realigned if necessary.** Refer to coupling alignment instructions in the COUPLING ALIGNMENT section of this manual.
- 5) After alignment has been checked the shaft should be rotated by hand several times to ensure that the rotation is free, and the unit rotor assembly does not rub.
- 6) Your blower/exhauster has been pre-lubricated at the factory. The automatic lubrication system for the blower/exhauster bearings should be installed as outlined in the following pages of the manual under LUBRICATOR INSTALLATION before operation.
 - Electrical motor bearings should be lubricated per manufactures instructions.
 - Owner's manuals for the appropriate motor brand and HP size can be found online.

PRE-INITIAL STARTUP CHECKS - CONTINUED

- 7) Bump the power to the motor to ensure that the direction of rotation agrees with sticker on the inlet head. The direction of rotation may be observed on many TEFC motors by watching the cooling fan at the end of the motor. (This will allow the coupling guard to be reinstalled for this check.)

NOTE: CAUTION SHOULD BE OBSERVED TO KEEP HANDS, FEET AND ANY LOOSE CLOTHING AWAY FROM THIS ROTATING EQUIPMENT. THE COUPLING GUARD IS ONLY REMOVED TO CHECK ALIGNMENT AND ROTATION IF ROTATION CAN NOT BE OBSERVED IN ANOTHER LOCATION. NEVER OPERATE THIS EQUIPMENT WITHOUT THE COUPLING GUARD SECURELY BOLTED IN PLACE.

- 8) Place an amp meter on one incoming power lead to measure the amp draw.

Note: A true RMS meter is best to measure 3 phase current.

- 9) The blower/exhauster is equipped with a butterfly intake valve, follow the procedure outlined in the SETTING THE BUTTERFLY INTAKE VALVE section of the manual before proceeding with step 10.

- 10) After setting the butterfly valve, start the blower/exhauster and check the amperage reading for FLA.

NEVER EXCEED THE MOTOR F.L.A.!!

- 11) Allow the unit to run until it has reached full operating temperature. This should take about 15 minutes.

- 12) Now that the blower/exhauster is running check for unusual noises and/or vibration.

NOTE: IF ANY NOISE OR VIBRATION IS DETECTED SHUT THE UNIT DOWN IMMEDIATELY.

- 13) Now that the blower/exhauster is running, an operational check should be made on any optional item, such as:

- surge protection device
- surge prevention device
- bearing temperature devices
- etc.

Refer to individual operating instructions sheet for each specific item.

OPERATING TEMPERATURES

Although it may vary depending on size of unit and application, normal operating levels are:

Vibration: Less than .24 in/sec (6.1 mm/sec) in the vertical plane at each bearing.

Note: Vibration is measured at operating speed with air flowing through the machine.

Temperature Range

Inlet = 85°F to 120°F (29°C to 49°C)

Outlet = 170°F to 235°F (77°C to 113°C)

OPERATING TEMPERATURES

It is the nature of centrifugal compressors to run hot due to heat of compression and internal friction caused by movement of air. The higher temperatures will be on the discharge side of the machine. The following information will serve as a guide in determining acceptable temperature limitations under normal operating conditions. For specific applications, or operating temperatures outside of the figures shown, contact the factory.

BEARING TEMPERATURES

Bearings used in your centrifugal blower are designed to operate continuously in temperatures in excess of 200°F (93°C), measured on the bearing housing. Standard alarm circuitry, if supplied, is set to alarm at 230°F (110°C). If bearing temperature monitors are not supplied, check bearing housing temperatures, periodically, and notify JE Adams if readings exceed 220°F (104°C).

DISCHARGE AIR TEMPERATURE

Under normal operating conditions, using ambient or atmospheric air, typical discharge air temperatures may also exceed 200°F (93°C) measured in the discharge air stream or on the surface of the discharge (outlet) head. Discharge temperature is affected by many factors including efficiency, flow, pressure, altitude, inlet temperature etc. so it is difficult to determine the exact discharge temperature to expect.

Generally speaking, the discharge air temperature should not exceed 275°F (135°C) under normal operating conditions. In all cases where other than ambient or atmospheric air is being compressed, or discharge temperatures reach 275°F (135°C), consult factory. Failure to do so could nullify factory warranty.

Blower and motor surfaces can remain hot for an extended period of time after equipment shut down. Exercise caution when working on or around this equipment when hot.





Maintenance Schedule

NEVER perform maintenance procedures while vacuum is running. Always disconnect the power to exhaustor/blower motor.

TASK	DAILY	MONTHLY	QUARTERLY	YEARLY
Inspect and shake main collector filter bags	X			
Empty main collector dirt bin	X			
Clear debris from top compartment of main collector		X		
Clean/Wash main collector filter bags			X	
Check bearing housing temperature			X	
Inspect coupler for excessive wear		X		
Inspect electronic lubricators		X		
At a minimum, replace electronic lubricators yearly				X
Inspect and clean intake filter on surge control system		X		
Replace air filter on surge control system				X
IF using mechanical surge control, inspect for proper operation		X		

A NOTE ON NOISE...

Every effort has been made to keep the noise level of operating equipment below 85dBA, the current acceptable limit mandated by OSHA. Although hearing protection is not required by law, the manufacturer suggests the use of hearing protection when operating or working around this equipment.

COUPLING ALIGNMENT

- The following procedure is applicable to direct driven machines only. Correct alignment will ensure a longer life and trouble free operation of your blower/exhauster. **REALIGNMENT AFTER INSTALLATION MUST BE DONE.**
- **Damage to equipment due to improper alignment is not covered by your equipment warranty.**
- **Misalignment is one of the most common causes of unit vibration and will cause premature bearing failure.**



FINAL SHAFT ALIGNMENT IS THE RESPONSIBILITY OF THE INSTALLER/OWNER.



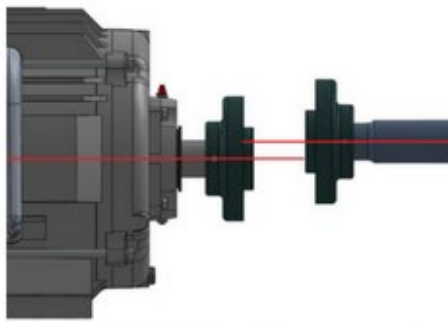
The following conditions can affect alignment and can be a factor in trying to achieve a good alignment.

- 1) Base and foundation not level and smooth.
- 2) System piping not isolated with flexible sleeve or expansion joint.
- 3) Blower/exhauster base not mounted on vibration pads.
- 4) Blower/exhauster bolted down.

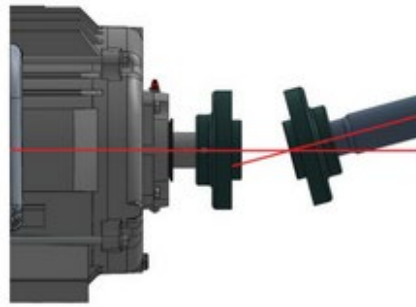
NOTE: LACK OF VIBRATION ON START-UP DOES NOT INDICATE THAT THE UNIT IS IN PERFECT ALIGNMENT.

TYPES OF MISALIGNMENT:

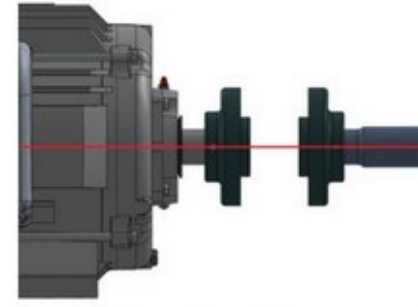
Misalignment can occur as either parallel or as an angular displacement on two of the three possible axes. The manufacturer recommended alignment tolerance is +/- .005 inches parallel and .250 degree angular.



Parallel Misalignment



Angular Misalignment



Coupling in Alignment

Alignment can be done by several different methods:

- 1) Laser Alignment - is the most accurate and quickest method.
- 2) Dial Indicator Methods
 - Reverse Dial Indicator Method
 - Single Dial Indicator or Rim and Face Alignment

TOOLS NEEDED FOR ALIGNMENT

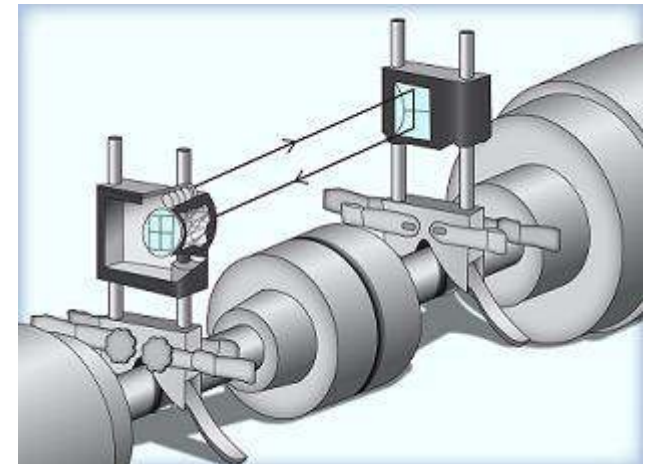
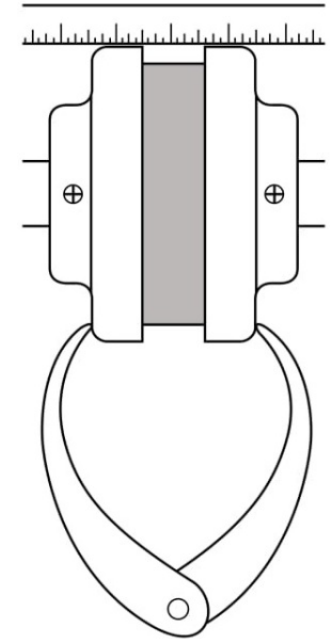
- Calipers
- Dial Indicator
- Straight Edge
- 6" Level

ROUGH ALIGNMENT:

A rough alignment may be necessary due to the range limitations of the dial indicators. The simplest method is to use a straight edge and calipers to bring the machines into rough alignment. Place a straight edge across the outside diameters (O.D.) of the coupling hubs at 90-degree intervals to check and correct the parallel misalignment. Use the calipers to check and correct the angular misalignment. The calipers should be used at the same 90 degree intervals as the straight edge.

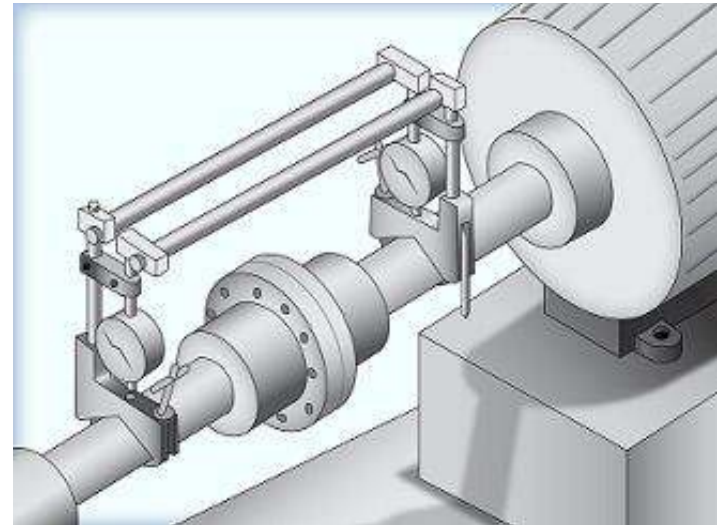
LASER ALIGNMENT METHOD:

The laser alignment method uses a laser to span the shaft-to-shaft distance. As both shafts are rotated together the misalignment is determined by the movement of the laser beam on the detector surface. The laser is connected to a computer to that displays the misalignment and the amount of correction needed. This is the most accurate method available and is the recommended method for the vacuum producer.



REVERSE DIAL INDICATOR METHOD:

The reverse dial method is similar to the laser alignment method, however, less accurate and can take more time. This method also takes shaft-to-shaft readings but uses two dial indicators instead of a laser for measurement. As both shafts are rotated together, both the parallel and angular misalignment are combined in one indicator reading. This method will require the use of two special brackets to hold the indicators during the measurements.

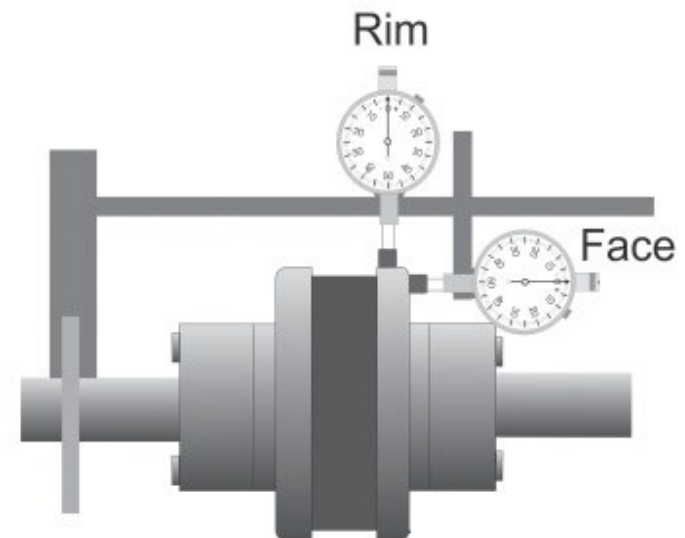


SINGLE DIAL INDICATOR OR RIM AND FACE ALIGNMENT METHOD:

This method is similar to the rough alignment but more accurate since dial indicators are used. The rim reading measures the offset between the coupling halves. The face reading measures the angular difference between the faces of the coupling.

The procedure is as follows -

- 1) Clamp dial indicator on driving (Motor) side of coupling and locate the indicator probe on the rim (O.D.) of the driven (Blower) coupling half. Rotate shaft and take reading at 90-degree intervals to determine the amount of parallel misalignment. Misalignment of coupling is $\frac{1}{2}$ of Total Indicator Reading (TIR).
- 2) Locate indicator probe at the extreme point on the coupling face, rotate shaft and take readings at 180-degree intervals to correct any angular misalignment.
- 3) Once the angular misalignment has been corrected be sure to re-check the rim alignment to ensure it is still correct.



LUBRICATOR INSTALLATION

Your **JE Adams** unit is supplied with electronic lubricators, **P/N 35000-192**. When the selector switches are moved from the off to the on position an electro-chemical reactor cell is activated. This begins an electro-chemical reaction whereby electrical energy is converted into nitrogen gas. As the gas is generated and captured in a set of bellows, the pressure is used to move a piston. The piston forces the grease out of the end of the lubricator. **The electronic lubricator is not designed to be recharged or refilled and is one time use part.**

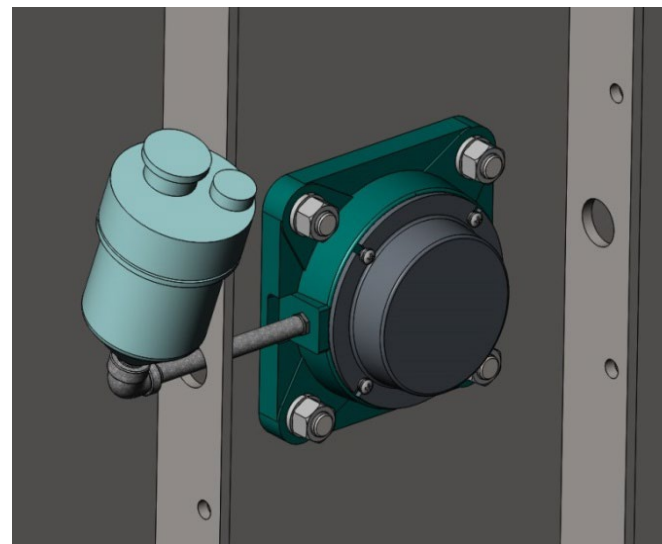
The electronic lubricators are shipped loose to prevent any possible damage in transit.

INSTALLATION OF THESE (Qty 2) MUST BE DONE BEFORE START-UP OF EQUIPMENT.

INSTALLATION:

When you receive your JE Adams centrifugal vacuum producer it will be necessary to install both of the automatic lubricators to provide the proper amount of lubrication to the bearings. The process is as follows:

- 1) Remove the cap on the electronic lubricator that protects the 1/4" NPT thread.
- 2) The bearing has been plugged to prevent any foreign material from entering the grease during shipment. Remove the plug in the elbow.
- 3) Thread the automatic lubricator into the elbow, hand tight, being careful not to overtighten.
- 4) Once the lubricators have been installed in both bearings it will be necessary to set the rate that they dispense the lubricant



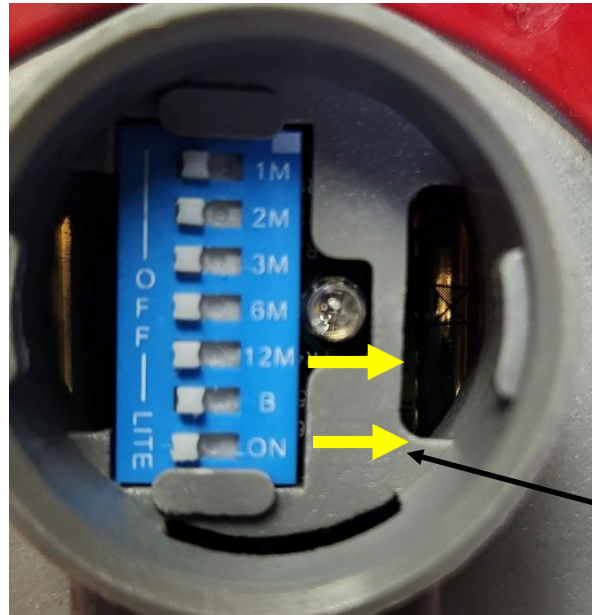
REPLACE AUTO-LUBERS ONCE A YEAR!!

Replacement auto-lubers (35000-192) are available through JE Adams Industries, 1-800-553-8861

STARTING AND SETTING:

After installation of the automatic lubricators remove the switch cover by rotating the cover cap off, in the direction the arrow next to the word “OPEN” indicates. With a pencil, slide **ONLY** the dip switch marked “12M” from the “OFF” position to the “ON” position. The 12M setting will provide you with a 1-year supply of lubricant.

If a visual indicator of operation is desired then you can slide the switch marked “LITE” from the off position to the on position. This will activate a LED light that will flash every 15 seconds and indicate that the unit is in operation and producing the required gas to displace the grease. It will take about 10 days for the lubricant to begin to flow. Your turbine has been provided with pre-lubricated bearings to allow for this time lag.



**REPLACE AUTO-LUBERS
ONCE A YEAR!!**
Replacement auto-lubers
(35000-192) are available
through JE Adams
Industries, 1-800-553-8861

OPTIONAL

MANUAL LUBRICATION:

JE Adams provides automatic lubricators for all series blowers and exhausters equipped with 4 bolt flange bearing. The manufacturer of these bearings has stated “a small amount of grease at frequent intervals is preferable to a large amount at infrequent intervals”. This is the preferred method of lubrication, however automatic lubricators have to be replaced every 9-12 months, depending on use.

If lubricating manually is preferred (we do not recommend), install a zerk grease fitting where the automatic lubricators is screwed into the elbow. The bearing should be greased at the interval outlined in the section below.

Do not mix greases!! The JE Adams vacuum producer uses a proprietary Centron B grease – **PLEASE CONTACT US!**

Mixing grease types can cause the grease to break down due to chemical incompatibility and will result in rapid bearing failure. **BEARING FAILURE DUE TO THE USE OF INCORRECT GREASE IS NOT COVERED BY YOUR EQUIPMENT WARRANTY.**

MANUAL LUBRICATION INTERVAL

Model	Interval	Grease Amount
M24B	Weekly	3.5 CC

Model	Interval	Grease Amount
M30B	Weekly	4.0 CC

GREASE SPECIFICATIONS - FOR 4 BOLT FLANGE BEARING

NGLI GRADE..... NO. 2
THICKENER TYPE..... LITHIUM COMPLEX
OIL..... SYNTHETIC OIL
VISCOSITY 445 cSt @ 40° C
VISCOSITY INDEX..... 150
DROPPING POINT (ASTM D2265) 509°F (265°C)
CORROSION PROTECTION PASS
TEMPERATURE RANGE -40°F (-40°C) TO 302°F (150°C)
TEXTURE..... SMOOTH
COLOR..... RED

BEARING REMOVAL & REPLACEMENT -- (MAINTENANCE ONLY)

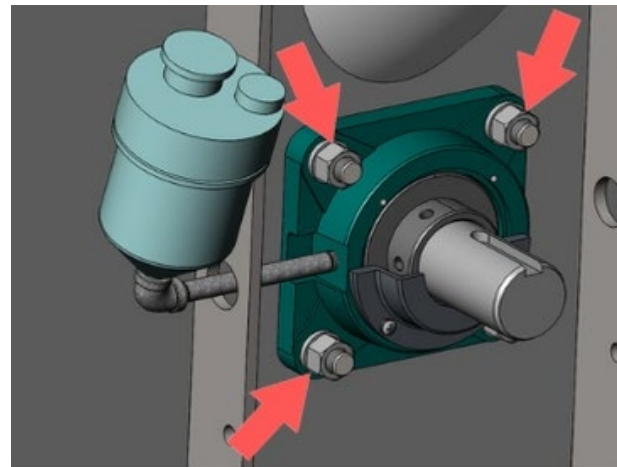
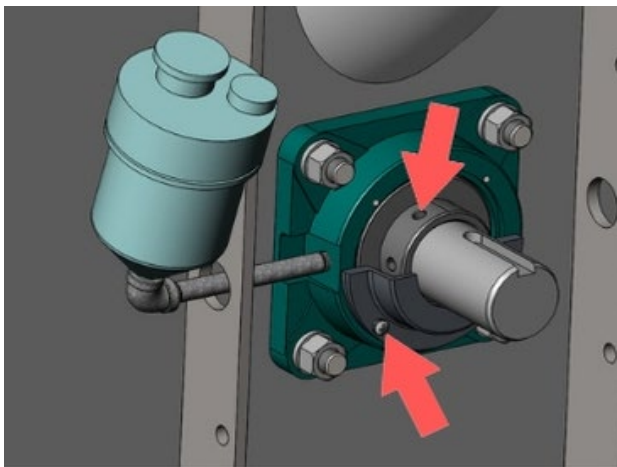
When a bearing becomes noisy it should be changed at once. You should change only one bearing at a time!! **NEVER REMOVE BOTH BEARINGS AT THE SAME TIME. THIS WILL CHANGE INTERNAL SETTINGS AND DAMAGE TO ROTOR ASSEMBLY MAY RESULT.**

Please note, bearings should always be replaced in pairs.

Procedure to replace bearings:

- 1) Remove the automatic lubricator and piping from the bearing.
- 2) Remove the 4 screws that hold the bearing cap to the flange bearing. The cap covers 2 set screws (internal hex head) located in the inner race of the bearing. These set screws hold the rotor in axial alignment.
- 3) Remove the 4 nuts holding the bearing to the head. With the hardware removed pull the bearing off shaft.
- 4) Install new bearing on the shaft and replace the 4 nuts that hold the bearing to the head and tighten them down to the required torque.
- 5) Remove the set screws from the inner race of the bearing and apply a small amount of medium strength thread locker. Reinstall the set screws in the inner race and tighten them down to the required torque.
- 6) Install the bearing cap to cover the set screws.
- 7) Repeat process for other bearing.
- 8) Before reinstalling the automatic lubricator piping JE Adams recommends cleaning out any old grease from the piping and refilling the piping with the lithium grease recommended for the 4 bolt flange bearing.

NOTE: Bearings are approximately 33% filled with lubricant at the factory. No grease should be pumped into the bearing.



SETTING THE BUTTERFLY INTAKE VALVE

BUTTERFLY VALVE DESCRIPTION

The butterfly valve is used to regulate the air flow through the blower/exhauster. The inlet butterfly valve may be a necessary tool to protect the motor from drawing more than the full load amps.

VACUUM SYSTEM LEAK TEST :

Purpose: To establish a no flow amperage baseline for future service inquiries.

- 1) Position the handle on the butterfly valve to the closed position (normally perpendicular to the inlet tube) – use allen wrench to loosen handle.
- 2) Place an amp meter on the incoming power leads to measure the amp draw.

Note: A true RMS meter will be needed to measure 3 phase current.

3) Start the exhauster with all the vacuum hoses in their holders and the surge control disabled. Now position the handle on the butterfly valve to the fully open position (parallel to the inlet tube).

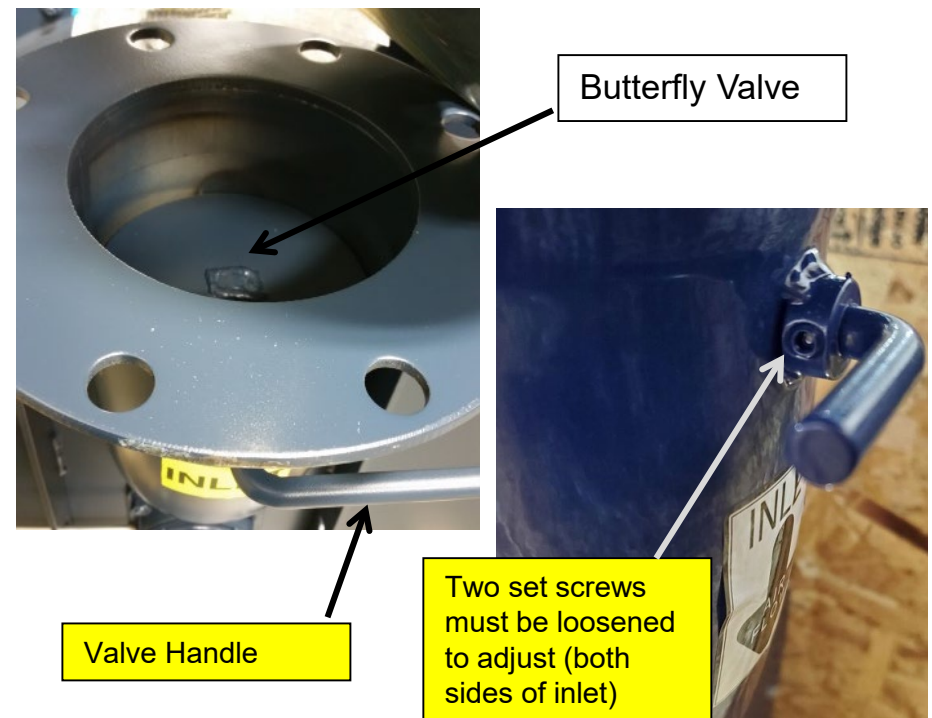
4) Record the no load amps on the cover of this manual. If the system is tight the exhauster will be in surge and should not be ran in this condition for more than 2 minutes.

5) Shut the exhauster down.

SETTING THE BUTTERFLY INTAKE VALVE ON A VACUUM SYSTEM:

Purpose: To establish the maximum volume of air the exhauster can handle within the constraints of the motor.

- 1) With the vacuum leak test completed and the amp meter still on the incoming power leads, reposition the handle on the butterfly valve to the closed position (perpendicular to the inlet tube).
- 2) Then open the valve about 15-20 degrees to gain some flow (the handle should be around the 4 o'clock position).
- 3) Remove ****all the vacuum hoses**** from their holders and re-enable the surge control. ****System should be at a full draw based on how many hoses the vacuum producer was sized for. Please consult your JE Adams sales rep if unsure.**
- 4) Start the exhauster and allow it to come up to full speed (it should take about 20 seconds, or 60 seconds with VFD).



SETTING THE BUTTERFLY INTAKE VALVE - CONTINUED

5) Slowly open the butterfly valve while watching the amp meter. As the exhausters valve is opened the amperage will climb until:

A) The motor reaches the full load amps on the name plate of the motor (try to stay under FLA by $\frac{1}{2}$ to 1 full amp).

OR

B) The valve is completely open and the exhauster is at its maximum flow.

Once either condition "A" or "B" is met tighten the set screw on the collar at the base of the valve to lock it in place.

Note: This procedure may require periodic adjustment if small leaks develop and certainly if more hose drops are added.

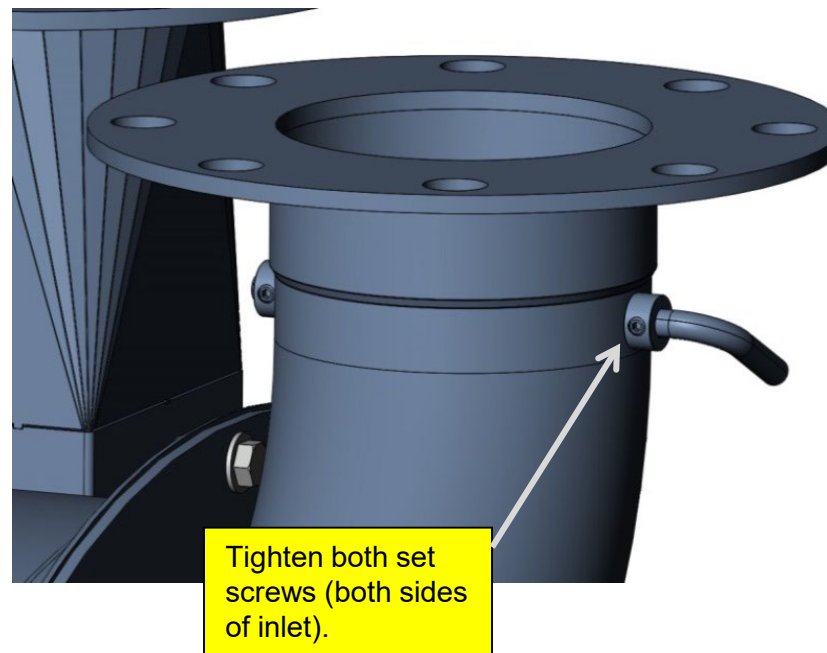
NEVER EXCEED THE MOTOR F.L.A.!!



IF ANY DETECTION OF NOISE OR VIBRATION, SHUT UNIT DOWN IMMEDIATELY!!



IF UNIT IS RUNNING IN SURGE, SHUT DOWN WITHIN 2 MINUTES AND CHECK SURGE CONTROL!!



SURGE IN CENTRIFUGAL COMPRESSORS (BLOWERS AND EXHAUSTERS)

A centrifugal blower is normally connected to a piping system and delivers air through that system for ultimate use on some required operation. If the demand of this operation (and consequently of the piping system) gradually or suddenly decreases, the pressure from the blower and in the piping system will increase until it reaches the highest pressure peak of which the blower is capable.

If the load or volume requirement (demand) decreases still further, the blower delivery pressure tends to decrease from its peak, resulting in the pressure in the piping system becoming greater than the pressure from the blower. Air then tends to reverse its direction and flow back into the blower until both pressures become equalized and the blower can again resume its normal function of pumping air into the system.

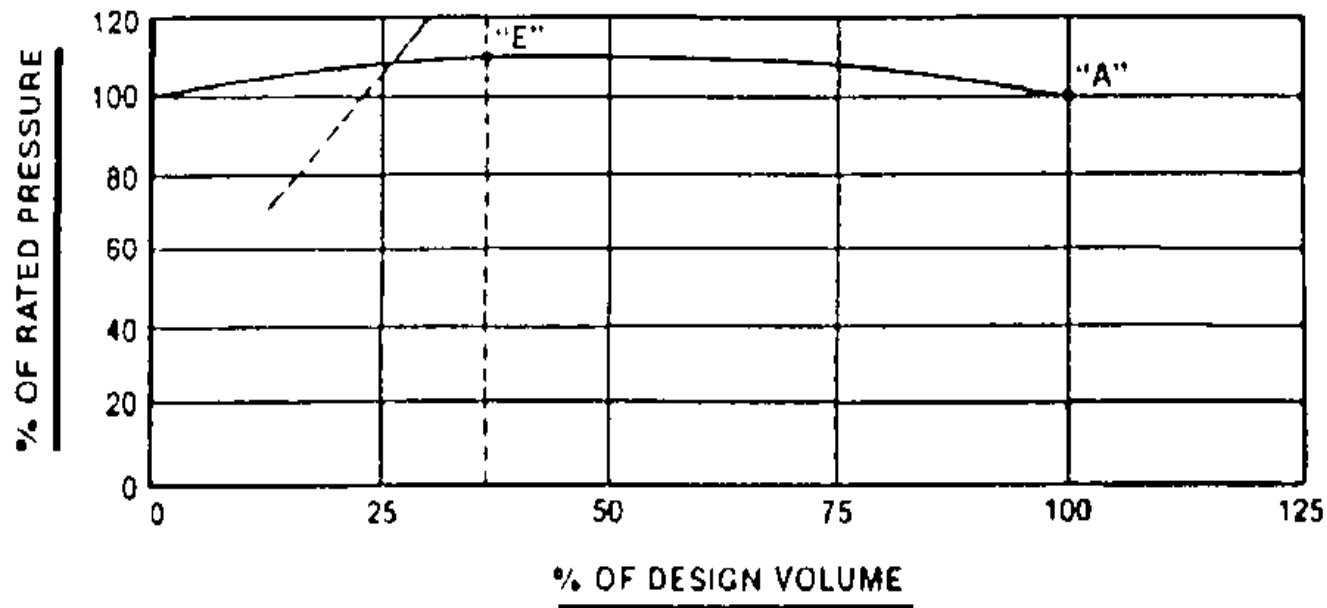
Until demand requirements increase, this backward and then forward flow of air – this pulsation or surge – will continue. **It can cause undue strains on the blower and possibly failure of bearings and/or rotating assembly due to repetitive thrust strain and overheating. It is costly and dangerous to permit volume (load) requirements to drop so low as to cause surge.**

Perhaps the foregoing will be more easily understood by reference to the sketch below, which is a typical pressure volume curve of a centrifugal blower. Point "A" indicates the normal operating point of a blower. Point "E" is the high point on the curve. Stable conditions will always be experienced when the volume demand is to the right of this point. Under actual operation, surge is not a factor until the volume demand of the system drops to a point to the left of point "E", and until pressure consequently drops below that at point "E".

The frequency and intensity of pulsation or surge depend upon the slope of the characteristic curve of the blower involved, the rate at which the air is being removed, the pressure in the blower, and the volume of the piping system to which the blower is delivering air. Backward curved impellers have a lower volume than units with radial vane impellers. Occasionally a blower will deliver air to a system so balanced that resonance occurs; in this case, even a slight surge will build up forces to significant amounts.

These same principles apply whether a centrifugal unit is operating as a blower or an exhaustor.

The approximate surge point is commonly shown on blower and exhaustor performance curves as the first data volume point.



SURGE IN SUMMARY- to summarize, surge can be defined as a potentially destructive phenomenon that occurs during low airflow conditions through a centrifugal blower or vacuum producer, noted by a churning or pulsing sensation. So in other words, if the vacuum producer is running and not sucking air, it is a low air flow condition. Surge is both an audible noise and can also be felt by placing your hand over the exhausted air coming from the vacuum producer. Amp draw on the motor will also fluctuate during surge.

YOUR VACCUM PRODUCER MUST BE PROTECTED AGAINST SURGE!!

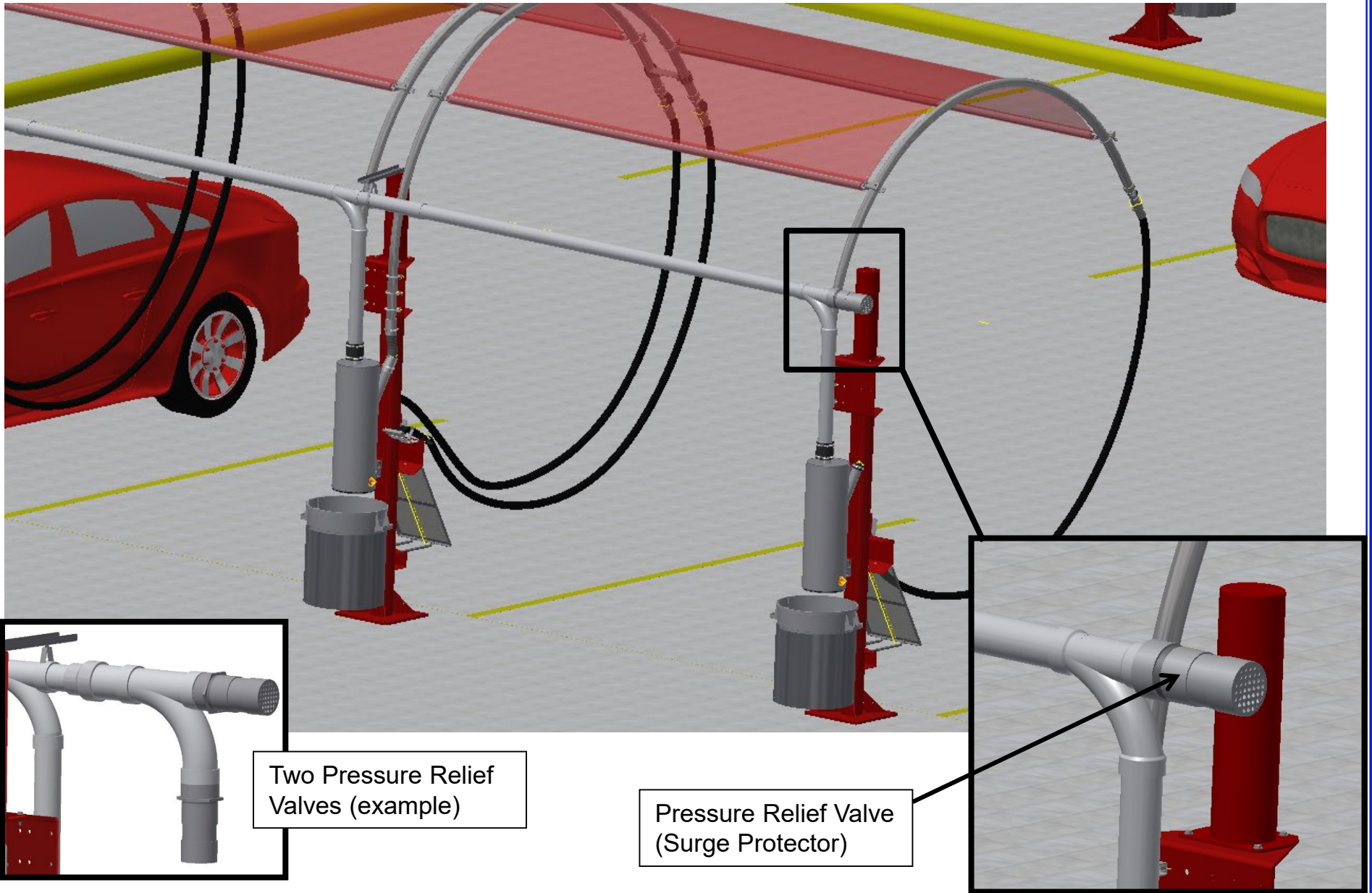
J.E. Adams recommends using a Modulating Surge Control with VFD or an Electronic Surge Control with a Soft Start motor starter. In the rare occasion that neither recommended option is appropriate for the job site, JE Adams recommends mechanical relief valves. The mechanical relief valves are a lower cost option, but do require functional checks once or twice a month. **Mechanical relief valves are much louder** than the other surge control options. On larger producers this can be an issue if there are noise ordinances. An example of the mechanical surge protection device is on the following pages.

Other available motor control accessories are: vibration protection, bearing temperature monitoring, motor overload protection, etc.

Please contact your JE Adams sales representative for available motor protection options, best suited to your application.

Pressure Relief Valve Placement:

To protect against surge, the system must have a pressure relief valve and for best results it should be placed at end of main suction line behind last hose drop. This can help keep your overhead pipe flushed of debris by placing it at end of run.



To adjust Pressure Relief Valve (PRV):

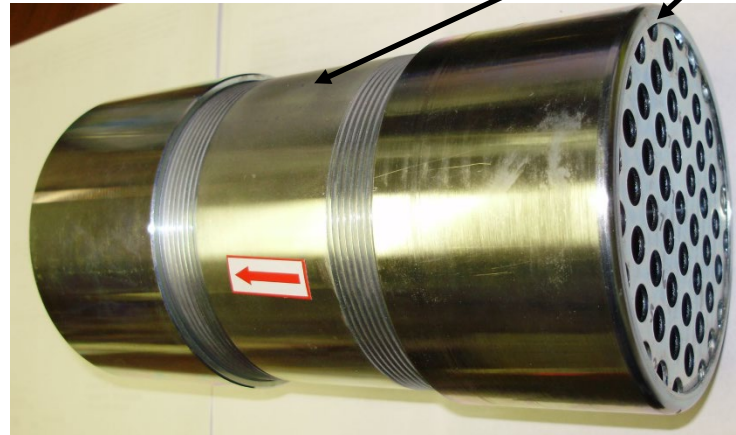
M24B vacuum producers should target the equivalent of 1 vacuum hose open flowing to keep unit out of surge.

M30B vacuum producers should target the equivalent of 3 or 4 vacuum hoses open flowing to keep unit out of surge.

These are based on averages as the units total CFM and vacuum level can vary depending on HP of motor, impeller size, elevation, and temperature.

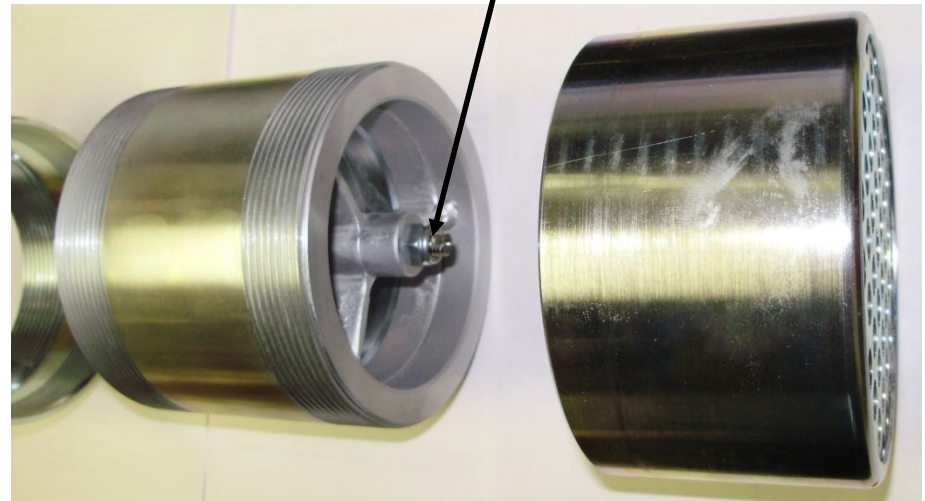
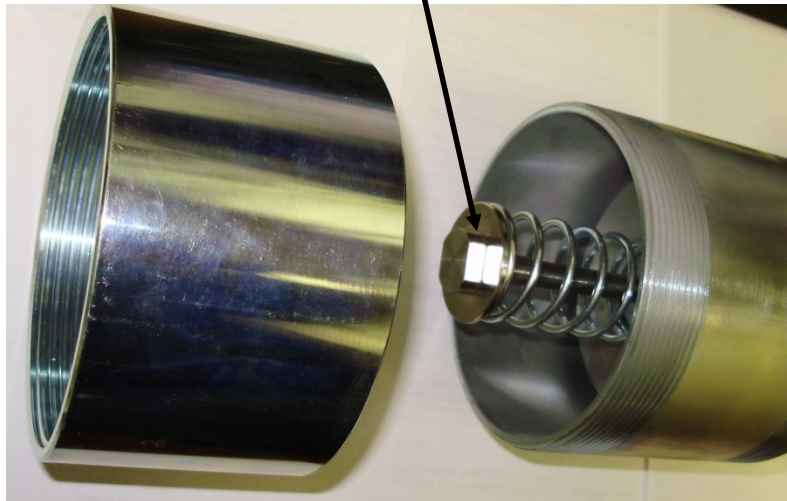
Example, for an M30B producer based on the above information, PRV should not be sucking air if 4 vacuum hoses are open flowing. If 3 or less hoses are in operation, valve must be sucking air.

Use 11/16" wrench.
Tighten will compress spring and not allow as much air in. Loosen allows more air in.



Remove outer cover and middle section to access adjustment bolt.

Hold nut with 1/2" socket.



Warning: all high voltage components and controls must be installed and configured by a licensed electrician and/or certified field technician. Failure to follow this requirement can result in severe personal injury or even death and/or damage to product. At minimum, bypassing this requirement will void product warranty.

Electronic Surge Control:

Surge control system to be used with a Motor Starter or Smart Motor Control.

- See *separate manual* for installation instructions

Modulating Surge Control:

Surge control system for use with a Schneider ATV630 VFD.

- See *Modulating Surge Control with VFD Manual* for installation instructions

Optional Electrical Accessories:

- Motor Starter
- Smart Motor Control
- Variable Frequency Drive (VFD)