EASTERN ALLOY INC.

SPECIALIZING IN ***TURBOMACHINERY CANISTERS***

Instruction Manual

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Attn: Qualified Maintenance or Millwright:

Thank you for your recent purchase, and choosing an Eastern Alloy Inc. built shipping/storage container.

We hope you find the following setup / startup manual supplied as part of the installation package helpful in guiding you in a trouble free and easy set up and installation of your rotating equipment.

As you reference this guide, you will find that your container may not be exactly the same as described in it. Not all containers are the same, in fact most of them are not. All of the containers we manufacture are custom designed and built. Although most containers are not identical they are all similar in function and purpose. The purpose and function is to provide long term storage and protection using a nitrogen purge and also enable the part to be shipped insuring maximum protection.

All of our containers come standard equipped with a vent (top) bottom low point drain, and a minimum of three ports generally located on the side. This manual will direct you on the use and purpose for all of the ports.

If you have any further questions concerning the set up of the container, or the installation of your equipment you can contact the factory direct via phone, fax or email. Please reference the container serial number and your purchase order number.

*Note: Eastern Alloy recommends only qualified personnel to perform the set up / start up functions as described in this manual.

GENERAL SET UP / START UP INSTRUCTIONS FOR MOST EASTERN ALLLOY MANUFACTURED ROTOR SHIPPING/STORAGE CANISTERS.

WARNING: These instructions assume that the rotor canister is in the horizontal position. Do not attempt any of these instructions with the canister in the vertical position. Any and all lifting must be done by trained personnel accustomed to lifting pieces of similar size and weight to the pieces described in this document. If any of these instructions do not comply with site safety regulations and/or procedures do not attempt it. Stop all work and clarify the instructions before proceeding.

WARNING: To lift the entire canister, only use the lifting holes or fork lift pockets on the steel I-beams. Do not use the lifting holes on the canister lid. The lifting provisions on the canister lid are designed only for the weight of the lid. Trying to lift the entire canister using the lid lifting provisions can lead to severe damage to the rotor, canister, personnel and/or surroundings.

Below are a list of options. If your container does not have one of these options listed, proceed with the next step.

Option 1: On board nitrogen system (20 cfm cylinder)
Option 2: Low pressure alarm system
Option 3: Sight glass windows (view ports)
Option 4: Humidity Indicator

1. Removing The Canister Lid:

1.1 Check that both valves for the small Nitrogen tank mounted on the canister are in the close position.

1.2 Check the pressure gauge on the outside of the canister and confirm if there is any pressure within the rotor canister. If the canister is pressurized, relieve the pressure as outlined below in **Section 6**.

1.3 Remove the container bolts on the horizontal joint. Remove the bolts in the sequence shown in **Figure 1**. The canister may contain more or less bolts then shown in **Figure 1**. (There may be only 6 bolts installed and hand-tightened if the rotor canister has been stored empty.) Regardless of number of canister bolts or exact configuration, use the same methodology: Work from side to side on the short ends and then the long ends working across the canister. As bolts are removed check them for wear and damage. Replace any damaged or worn out bolts with new equivalent bolts. Put bolts aside in a safe location.

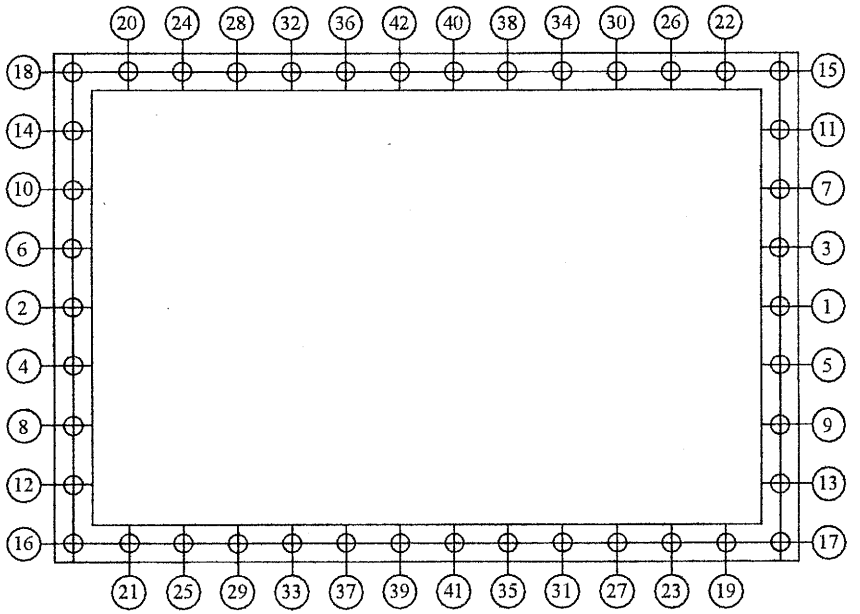

Figure 1

1.4 Using the lifting holes on the top of the canister lid, carefully lift the canister lid. Take care not to damage the canister's horizontal joint gasket or the canister lid.

1.5 After removing the canister lid, place it in a safe location where it will not be damage or warped. Be sure that where it is placed would not create a trip hazard for personnel.

2. Installing The Rotor Into The Canister

2.1 Remove the canister lid as described in **Section 1**.

2.2 Prior to installing a rotor, the rotor canister should be empty. If there is a rotor in the canister, remove it as described in **Section 4**. Inspect the inside of the canister. If there is anything other than a rotor in the canister identify the parts. If this is a newly received rotor canister, there may be items that are normally installed on the outside of the canister that were shipped inside the canister to avoid damage. There may also be installation related equipment such as the lift straps. There may be pipe plugs for canister vents. Do not throw any canister related items away.

2.3 Once any items that were in the canister are removed, check the canister for dirt and debris. If the canister is dirty, clean it with a mild cleaner which will not damage the gasket, the support liners or the humidity indicator. Do not fill the lower half of the canister with water. Excessive water can get into the purging system and cause problems later. To properly clean the canister wet a cloth, not the canister, and wipe away any dirt or debris. After any cleaning the canister should be wiped completely dry.

2.4 Remove the bolts from the top halves of the rotor support cradles. As bolts are removed check them for wear and damage. Replace any damaged or worn out bolts with new equivalent bolts.

2.5 Remove the unbolted top sections of the rotor support cradles.

2.6 Inspect the liners in both the upper and lower support cradles on both ends of the canister. If the liners are missing or are in poor condition and there could be damage to the shaft, replace the liners.

2.7 Put the support cradle tops and the bolts aside in a safe location.

2.8 It is suggested to lift the rotor using slings. Lifting the rotor should only be done by properly trained personnel. Care must be taken when lifting the rotor. Ensure the load is balanced in the slings. Improper handling of the rotor can cause severe damage to the rotor, canister, personnel and/or surroundings.

2.9 When lowering the rotor into the support cradles, stop the rotor descent while the rotor is still 2 or 3 inches above the support cradles. Position the rotor above the canister and confirm that the

rotor is in the proper orientation in relation to the canister. See **Figure 2**.

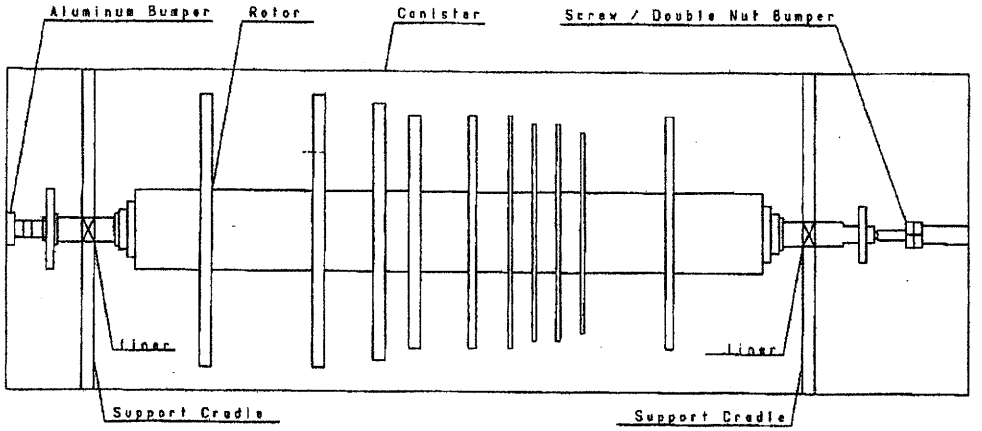

Figure 2

2.10 Confirm that the support areas of the rotor, align with the support cradles in the rotor canister.

2.11 Take necessary precautions to ensure that hands, fingers, toes or any other body parts cannot be caught between the rotor and the canister.

2.12 Once the rotor orientation has been confrimed and is correct, slowly finish lowering the rotor on to the support.

2.13 Ensure the rotor is resting securely in the support cradles.

2.14 Ensure the coupling end of the rotor is snugly against the square bumper plate.

2.15 Remove the slings and any other lifting apparatus from the rotor.

2.16 Adjust the screw and double nut bumper assembly against the rotor. Tighten the nuts so that the rotor is secured snugly between the two aluminum bumpers within the canister.

3. Installing The Canister Lid:

3.1 Check the condition of the gasket of the canister horizontal joint. If the gasket is in poor condition, replace the gasket. If the gasket is in poor condition and a rotor is installed in the canister, remove the rotor in accordance with **Section 4**, prior to replacing the gasket. After replacing the gasket, reinstall the rotor in the canister in accordance with **Section 2**.

3.2 Ensure that there are no foreign objects or dirt that can become

trapped between the horizontal gasket and the canister lid.

3.3 Check that the canister lid is clean and undamaged. Use a mild cleaner on the canister lid as necessary. After any cleaning the canister lid should be wiped completely dry.

3.4 Using the lifting holes on the top of the canister lid, carefully lift the canister lid. Take care not to damage the canister, rotor or the canister lid.

3.5 There are alignment pins for the lid on the lower canister half. Confirm that the lid is oriented correctly with the alignment pins.

3.6 Slowly lower the lid onto the lower half of the canister. Once lowered into place, the canister lid should sit snugly on the horizontal joint gasket. If the installed rotor is causing the lid not to sit firmly on the horizontal joint, carefully remove the lid and adjust the rotor placement within the canister until the issue is resolved.

3.7 Install the canister nuts and bolts. Tighten the nuts and bolts until they are hand-tight.

3.8 Finish tightening the bolts in the order show in **Figure 3**. The canister may contain more or less bolts then shown in **Figure 3**. Regardless of number of canister bolts or exact canister configuration, use the same methodology: From the middle, work from side to side on the long ends and then from side to side across the short ends.

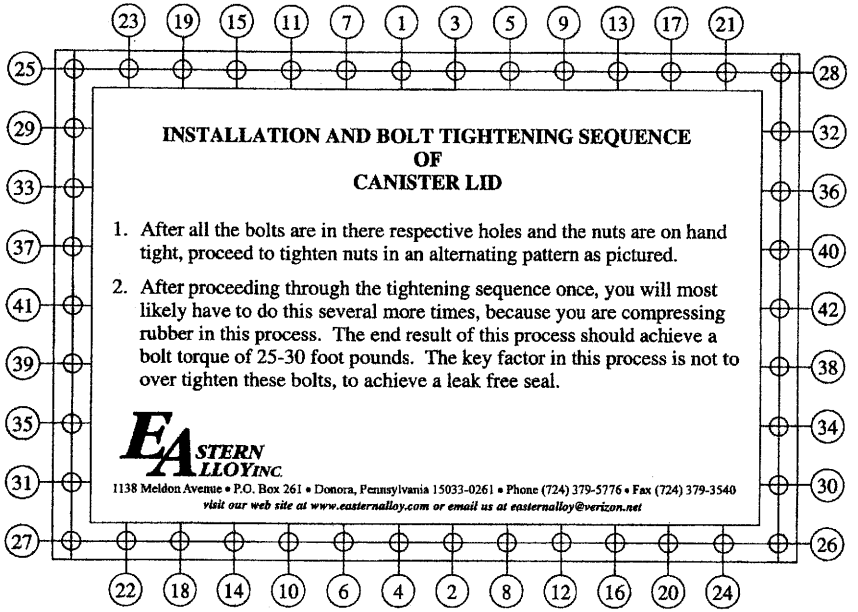

Figure 3

3.9 Tighten the bolts to 25 to 30 ft-lbs.

***Note: If you have a canister with a lower and a mid seal, it is suggested that the lower seal (bottom skirt to base plate) be installed and torqued first.

4. Removing A Rotor From The Canister

4.1 If the lid is installed on the canister, remove the lid per **Section 1**.

4.2 Remove the bolts from the top halves of the rotor support cradles. As bolts are removed check them for wear and damage. Replace any damaged or worn out bolts with new equivalent bolts. Bag all but 6 of the canister nuts and bolts. Set the 6 nuts and bolts aside.

4.3 Remove the unbolted top sections of the rotor support cradles.

4.4 Inspect the liners in the upper support cradles on both ends of the canister. If the liners are missing or are in poor condition where there could be damage to the shaft, replace the liners.

4.5 Put the support cradle tops and the bolts aside in a safe location.

4.6 Loosen the screw and double nut bumper assembly. Move the assembly away from the rotor.

4.7 Inspect slings prior to use. Use only slings in good condition.

4.8 Lift the rotor. Lifting the rotor should only be done by properly trained personnel. Care must be taken when lifting the rotor. Ensure the load is balanced in the slings. Improper handling of the rotor can cause severe damage to the rotor, canister, personnel and/or surroundings.

4.9 Inspect the liners in both the upper and lower support cradles on both ends of the canister. If the liners are missing or are in poor condition where there could be damage to the shaft, replace the liners.

4.10 Reassemble the rotor support cradles and place the horizontal joint bolts bagged in step 4.2 into the canister.

4.11 Remove the pipe plugs from the canister vent and drain connections. Place the plugs inside the canister lower half.

4.12 Replace the canister lid per **Section 3.1 to 3.6**.

4.13 Install and hand tighten the 6 with held bolts equally spacing them around the canister lid horizontal joint. This should ensure no parts are lost while the rotor canister is empty and minimize the amount of dirt entering the canister.

4.14 The empty canister will not be purged. In place of the canister vent and drain plugs, install plastic caps with notches cut in them. This will reduce the amount of condensation which forms inside the canister due to changes in ambient temperature and pressure.

4.15 There is a 12-volt battery which powers the low pressure switch. While the canister is empty, disconnect the wires from one of the battery terminals. (PLEASE NOTE THIS IS AN OPTION)

5. Establishing The Nitrogen Purge Of The Rotor Canister.

WARNING: This section deals with pressurized containers. Improper handling of any pressurized tank, canister, valve or other container can cause severe damage to the rotor, canister, personnel and/or surroundings.

WARNING: Only pressurize or de-pressurize the rotor canister in an open area that is properly ventilated. Breathing pure Nitrogen or high concentration of it can lead to asphxia or death.

5.1 A rotor should be installed in the canister per **Section 2** and the canister lid should be installed per **Section 3**. The interior of the canister should be at atmospheric pressure.

5.2 Check the pressure gauge on the outside of the canister and confirm there is no pressure with the rotor canister. If the canister is pressurized, relieve the pressure as outlined below in **Section 6**.

5.3 Check the pressure gauge on the small Nitrogen tank on the rotor canister. Close the valve on the tank and open the valve on the side of the canister into which the small tank is tubed.

5.4 Any gas in the tubing between the small tank and the canister should be released.

5.5 Close the valve installed in the canister wall.

5.6 Remove the tubing from the valve which is installed in the canister wall.

5.7. If the small Nitrogen tank is not full, remove the tank, fill it and re-install the tank on the rotor canister skid. This should only be done by personnel that are trained and familiar with pressurizing tanks. Do not replace the tubing between the small tank regulator and the valve installed in the canister wall.

5.8 The small tank provided on the rotor canister does not contain enough volume for the initial Nitrogen purge of the rotor canister. Obtain an external source of clean and dry Nitrogen. Ensure any Nitrogen source has an appropriate regulator installed to supply the Nitrogen at **3 psig**.

5.9 Remove the metal plug n the 3/4" canister lid vent connection.

5.10 Confirm the metal plug is installed in the 3/4" canister drain connection.

5.11 Attach the external Nitrogen source to the valve which is installed in the canister wall, (the one from which the tubing was removed).

5.12 Slowly turn on the external Nitrogen supply. Watch the pressure gauge on the side of the rotor canister. If at any point the gauge goes to 4 PSIG shut off the external supply of Nitrogen.

5.13 Let the canister fill until an oxygen sensor placed at the canister vent reads zero and the canister pressure reads 3 PSIG.

5.14 Have one person install the 3/4" metal canister vent plug while another person controls the external Nitrogen supply. If at any point the gauge goes to 4 PSIG shut off the external supply of Nitrogen.

5.15 Close the external Nitrogen supply.

5.16 Watch the canister pressure gauge. If the pressure starts to decrease, check the canister for leaks using the soap bubble method.

5.16.1. If the leak is on the horizontal joint try tightening the horizontal bolts. If this does not remedy the leak, relieve the canister pressure as outlined below in **Section 6** and fix the leaks.

5.16.2. If a leak is detected that is not on the horizontal joint, relieve the canister pressure as outlined below in **Section 6** and fix the leaks.

5.16.3. Begin the Nitrogen purging system again from **Section 5.1**.

.5.17 When the pressure is holding, close the valve in the canister wall. Remove the external Nitrogen supply from the valve installed in the canister wall.

5.18 Replace the tubing between the small tank's regulator and the valve installed in the canister wall.

5.19 Check the pressure gauge on the small Nitrogen tank. The tank should be full. This tank should supply make-up gas if, for some reason, the interior pressure of the canister decreases.

5.20 Open the valve on the canister wall.

5.21 Open the tank's valve slowly. Watch the pressure gauge on the rotor canister.

5.21.1. If opening the valve for the small tank causes the canister relief valve to open, close the valve of the small tank.

5.21.2. Adjust the setting of the regulator that feeds the Nitrogen from the small tank into the canister.

5.21.3. If opening the tank's valve causes the pressure to drop, tighten the tubing connections. If the canister pressure falls below 2.5 PSIG start the pressurization procedure again from **Section 5.1**.

5.22 Repeat step 5.21 and it's sub-steps until the pressure is held and the relief valve is not opening.

5.23 Check that the battery for the low pressure alarm (added option to canister) is installed in the alarm box, that all the wires are connected and that the battery voltage is acceptable. If the voltage is not acceptable, replace the battery with a Power Sonic brand, model #PS-1230, 12-volt, 3.4 amp battery.

5.24 Press the alarm test button. An audible alarm should sound. If it does not, investigate and remediate the situation.

5.25 Once canister pressure appears stable, the rotor canister can be placed in its final storage location.

6. <u>De-Pressurizing the Rotor Canister</u>

6.1 Confirm that the valve for the small Nitrogen tank mounted on the canister is in the closed position.

6.2 Confirm that the valve installed in the canister wall is closed.

6.3 Remove the tubing between the small tank's regulator and the valve

installed in the canister wall. Do this carefully because the tubing is pressurized. A small amount of Nitrogen should escape.

6.4 To de-pressurize the rotor canister, open the valve in the canister wall.

6.5 Do not stand in the path of the exhaust of this valve.

6.6 As the canister pressure drops, the low pressure alarm should activate at 1.5 PSIG. Ensure the alarm is functioning. Then remove a wire from the one terminal of the 12-volt battery in the alarm box to stop the alarm.

6.7 Leave the valve open until the rotor canister pressure gauge reads zero.

6.8 Close the canister valve.

7. If The Small Tank Empties:

7.1 When full, the 20 CF Nitrogen tank should initially read between 2000 and 2200 PSI on the regulator's pressure gauge. When in use, the pressure shown on the small tank's regulator pressure gauge should not read below 100 PSIG. If it does, the tank needs to be refilled.

7.2 If the rotor canister is in the vertical position, return the rotor canister to the horizontal position.

7.3 Confirm that the rotor canister pressure is at 3 PSIG. If it is not, depressurize the canister per **Section 6** and re-pressurize the canister per **Section 5**. Close the valve in the canister wall.

7.4 If the canister is still at 3 PSIG, close the valve located on the canister wall.

7.5 Close the valve for the small Nitrogen tank mounted on the canister.

7.6 Remove the tubing between the canister wall valve and the tank's valve.

7.7 Re-fill the small tank from another clean and dry Nitrogen source. This should only be done by personnel that are trained and familiar with pressurizing tanks.

7.8 Re-install the tubing between the canister wall valve and the tank's valve.

7.9 Open the tank's valve slowly. Watch the pressure gauge on the rotor canister.

7.9.1. If opening the valve for the small tank causes the canister relief valve to open, close the valve of the small tank.

7.9.2. Adjust the setting of the regulator that feeds the Nitrogen from the small tank into the canister.

7.9.3. If opening the tank's valve causes the pressure to drop, tighten the tubing connections.

7.9.4. Repeat step 7.9 and its sub-steps until the pressure is held and the relief valve is not opening.

7.10 Once canister pressure appears stable, the rotor canister can be placed in its final storage location.

8. Maintenance While A Rotor Is Installed In A Pressurized Canister:

8.1. The rotor canister pressure gauge and the small nitrogen tank pressure gauge should be checked once a day at approximately the same time to ensure that the purge is holding.

8.1.1. If the canister pressure decreases to 1.5 PSIG a battery-operated switch will activate an audible alarm. (Optional item on canister)

8.1.2. If the low pressure alarm is not sounding, press the alarm test button. The alarm should sound.

8.1.2.1. If the alarm does not sound, check the alarm battery voltage with a voltmeter to see if the battery is still good. If the battery is dead, replace it with a Power Sonic brand, model # PS-1230, 12-volt, 3.4 amp battery.

8.1.2.2. If the alarm does not sound and the battery is good, check the rest of the electrical alarm system until the problem can be found and fixed.

8.2. Once a day the humidity gauge (Optional item on canister) should be checked to see that the canister is dry.

8.3. If either the canister pressure is less than 3 PSIG or humidity is unacceptable, depressurize the canister per **Section 6** and re-pressurize the canister per **Section 5.**

8.4. If the 20 CF Nitrogen tank regulator pressure is unacceptable, procedure outlined in **Section 7**.

8.5. Once a month look into the view ports (Optional item on canister) and confirm the rotor is in good condition.

8.5.1. If the rotor is not in good condition, depressurized the canister per **Section 6**.

8.5.2. Open the canister and remove the rotor per **Sections 1 & 4**.

8.5.3. Have any necessary repairs made to the rotor.

8.5.4. Determine why the rotor condition deteriorated and fix the problem before reusing the rotor container.

Again we would like to thank you for choosing a canister from Eastern Alloy Inc. If for any reason you have questions regarding the above mentioned procedures please do not hesitate to give us a call @ 724-379-5776.