EASTERN INSTRUMENTS

CentriFeeder

Integrated Control Valve
INSTALLATION & OPERATION
MANUAL

CentriFeeder

REV 07/12

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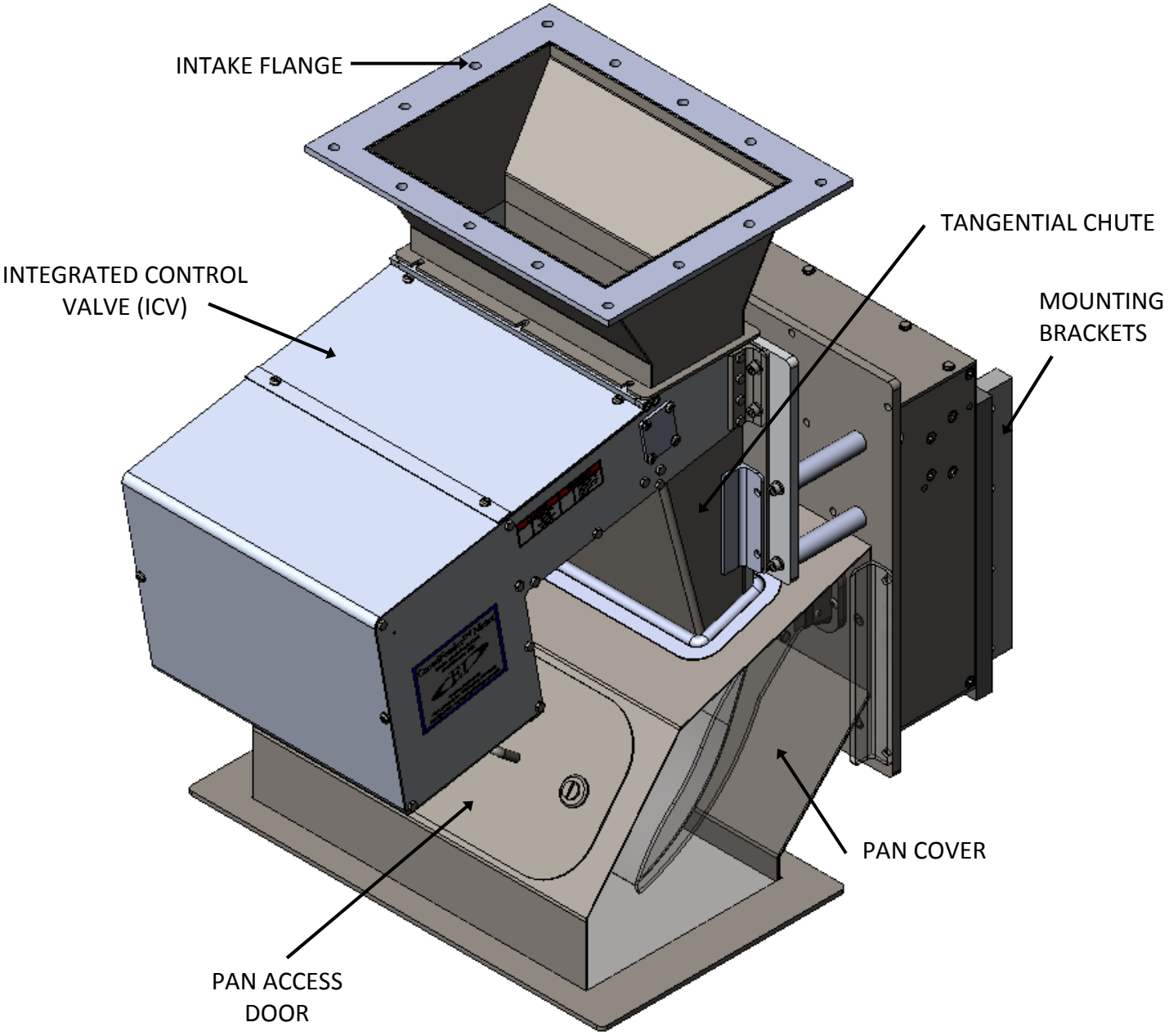
CentriFeeder Parts Breakdown



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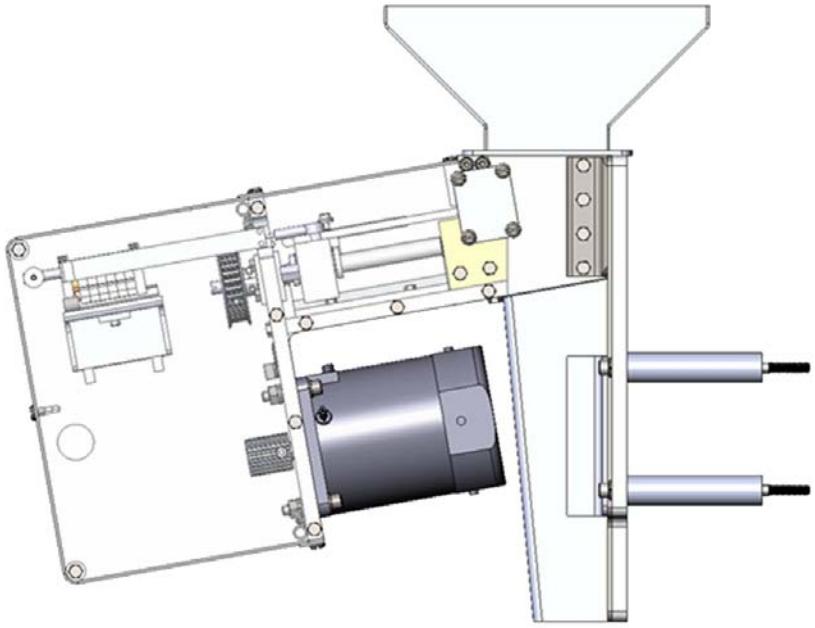
Configuration Drawing

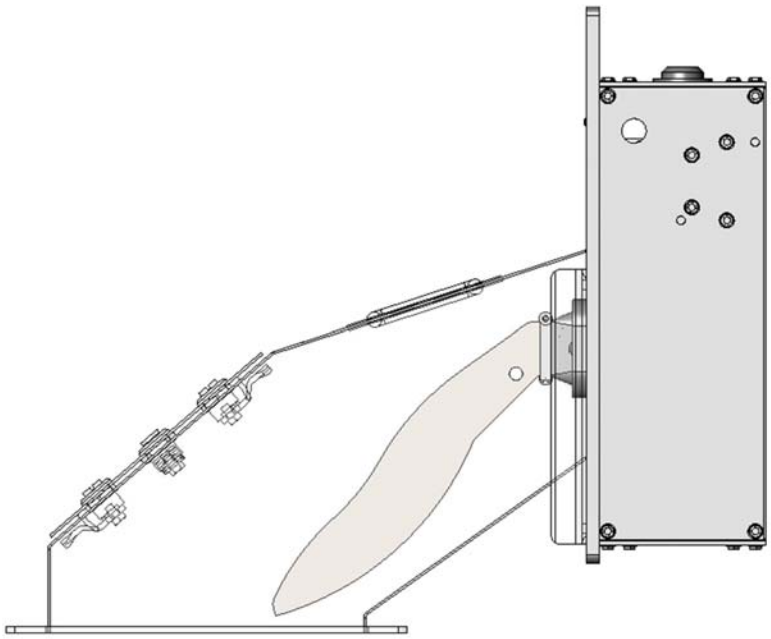


Integrated Control Valve (ICV)

Input Voltage 115 VAC
Input Current 5A
Input Frequency 47-63 Hz

CentriFlow Meter

For more information on the CentriFlow Meter portion of the CentriFeeder, please see the CentriFlow I&O Manual.



Wiring the ICV

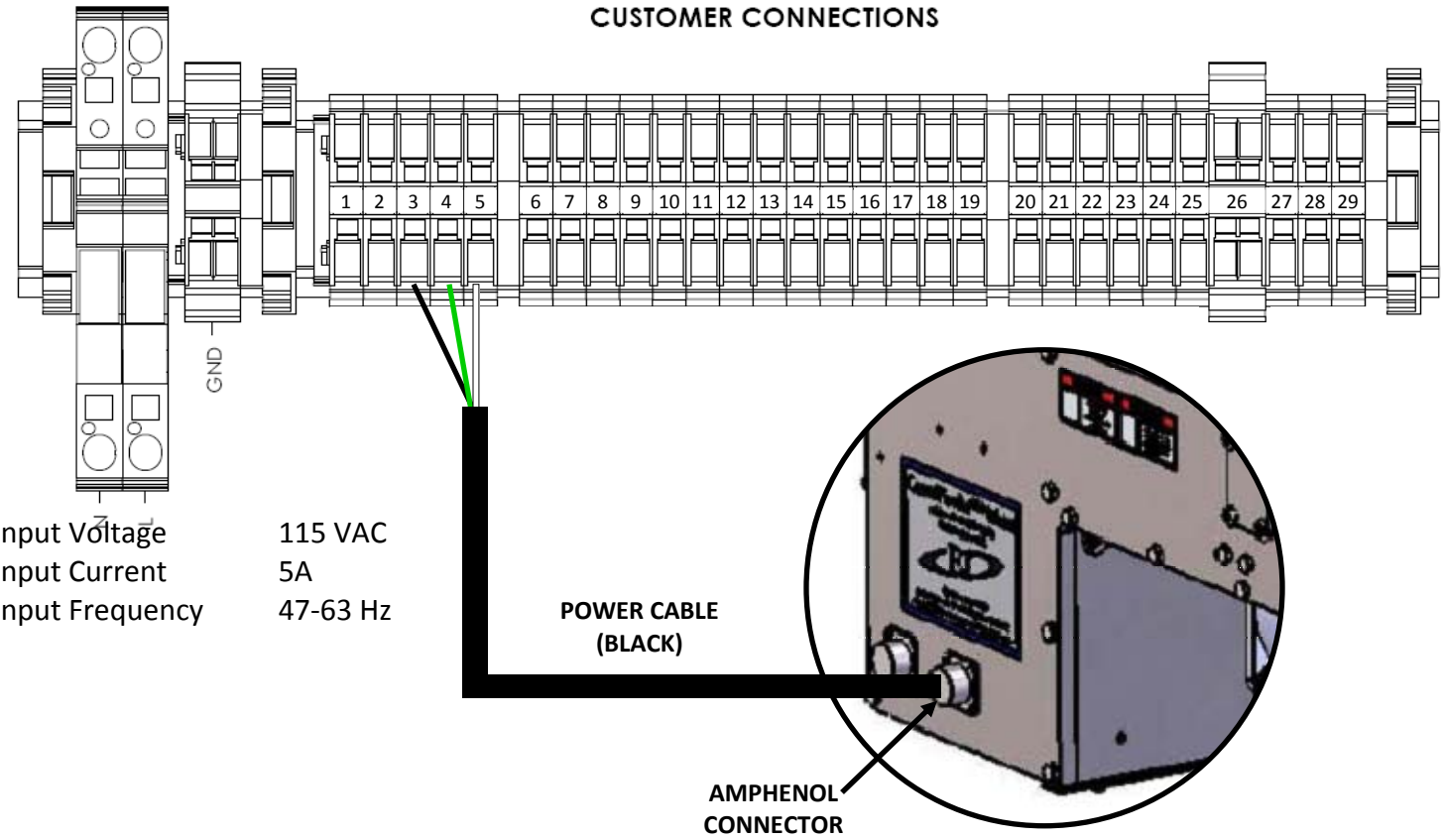
Integrated Control Valve

Black Cable (Power)

There are two steps to wiring the Integrated Control Valve properly. First, you must wire the Integrated Control Valve itself using the provided black cable (shown below), and then you must wire the Position Sensor using the provided white cable (next page). For both steps, the terminals are wired to the indicated terminal using the appropriate cables (provided).

Black Wire	-	#3 CUSTOMER CONNECTIONS
Green Wire	-	#4 CUSTOMER CONNECTIONS
White Wire	-	#5 CUSTOMER CONNECTIONS

CENTRIFEEDER CUSTOMER CONNECTIONS



Input Voltage	115 VAC
Input Current	5A
Input Frequency	47-63 Hz

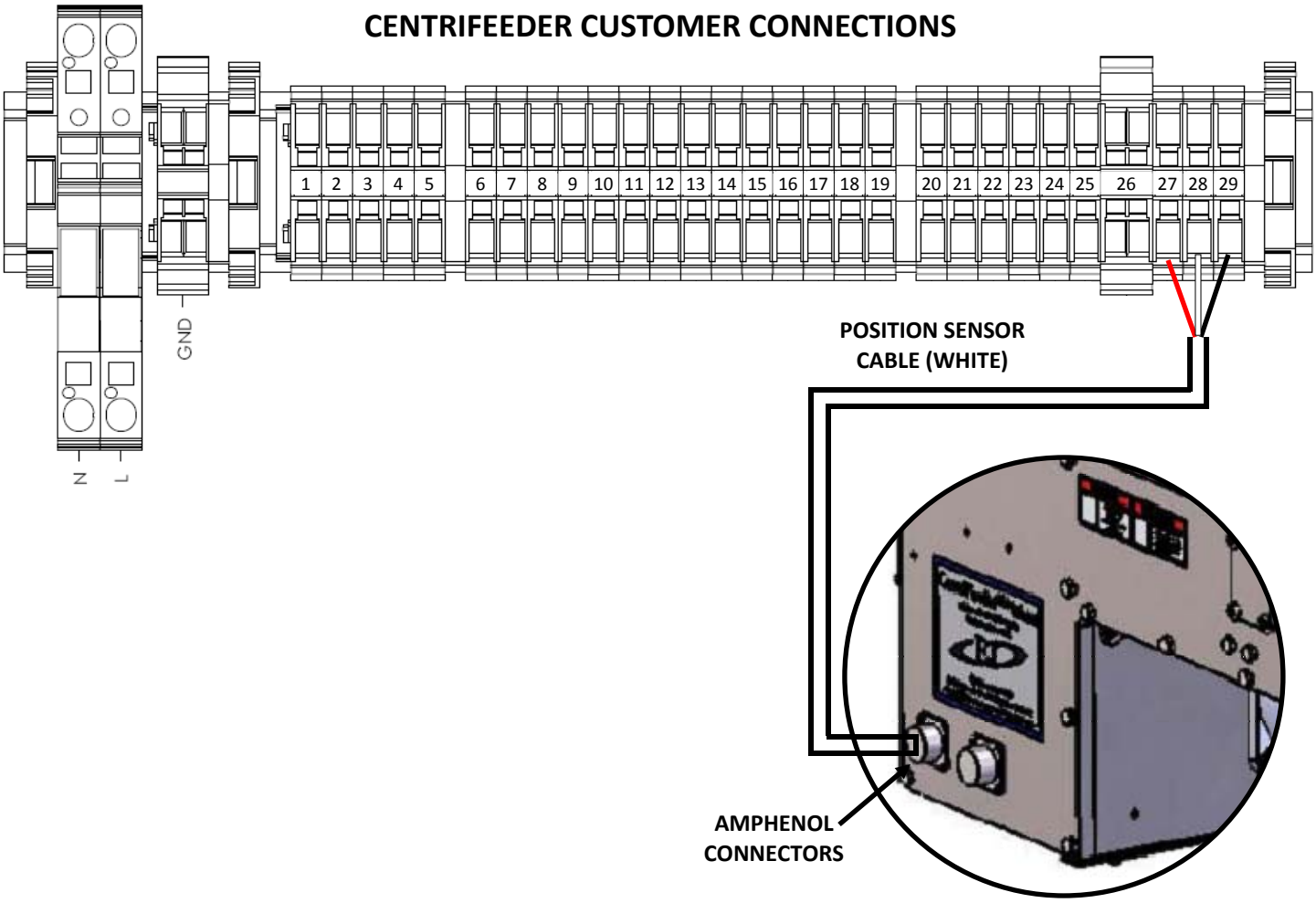
Position Sensor

White Cable

The Position Sensor allows the Digital Electronics to "sense" the position of the blade within the valve in order to determine how open or how closed it is. To wire the Position Sensor, use the White cable provided to wire the terminals on your **Customer Connections** to the corresponding terminal in your Integrated Control Valve as shown below:

RED WIRE	-	#27 CUSTOMER CONNECTIONS
WHITE WIRE	-	#28 CUSTOMER CONNECTIONS
BLACK WIRE	-	#29 CUSTOMER CONNECTIONS

CENTRIFEEDER CUSTOMER CONNECTIONS

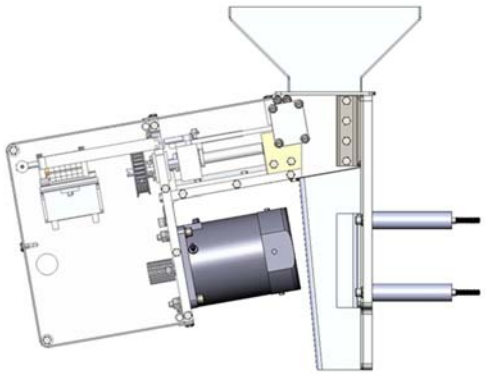


All Connections are made to the Bottom of the Terminal Blocks

PROCEDURES

CentriFeeder ICV
Replacement Procedure

REMOVING THE ICV



1. Ensure that power is disengaged from the valve by flipping the circuit breakers to the off position inside the electronics enclosure.
2. Ensure that the proper lock out tags are in place.
3. Disconnect all wiring leading from the meter's electronics to the ICV including the Power Cable (Black) and the Position Sensor (White).
4. Ensure that the transition above the CentriFeeder is disconnected from the inlet flange on the CentriFeeder.
5. Remove the (4) bolts holding the ICV Valve to the Meter using a 7/16" socket wrench.
6. Gently remove the valve by pulling outward until it is free from the meter.

REPLACING THE ICV

1. Put the new valve in place and ensure that the valve seats correctly into place.
2. Replace the (4) bolts that secure the ICV Valve to the Meter, again, using a 7/16" socket wrench.
3. Reconnect the transition to the inlet flange on the CentriFeeder.
4. Reconnect both the Power Cable (black) and the Position Sensor Cable (white).
5. Restore power to the CentriFeeder ICV by reengaging the breakers within the digital electronics enclosure.

Site Calibration

When the CentriFeeder™ Meter is sent from the Factory it is set with Default values for the Static Calibration and the Calibration Voltage, which were chosen for the particular material being measured with the meter. As described in the previous Section, the Static Calibration is an adjustment that ranges the Transducer, the Measurement Element of the meter. This Setting will not change unless the Electronic Full Scale is changed.

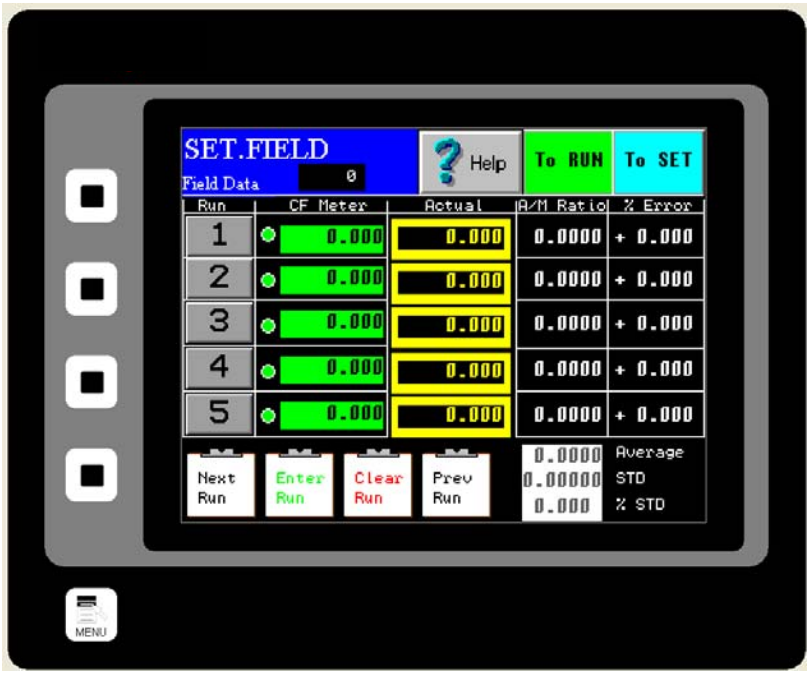
The Calibration Voltage, however, is the adjustment that is made to Calibrate or Site Calibrate the Electronics to a particular application. Although the Factory setting may be quite accurate, it is likely due to differences in installation, feed systems, and material being measured, that an adjustment be made after the CentriFeeder™ Meter is installed. This procedure is very simple and will require a means of capturing material that is run through the meter and weighing that material. Depending on the Configuration of the CentriFlow® Meter, either Type I or Type II, the method of capturing the material to be weighed will be different. For a Type I Configuration the material can be captured after it leaves the Pan Section of the meter, if the installation allows, or at some other point in the flow path after it has been measured by the CentriFlow® Meter. The closer the capture point is to the end of the Pan Section of the meter the less likely that there will be loss in the measurement sample and therefore less likely that there will be an error in the Calibration of the Electronics. It is important not to come in contact with the Pan Section when capturing the measurement sample so that the Electronics does not give incorrect results from measuring the contact. Always remember to fully secure the door back to the enclosure before resuming normal flow through the meter.

When performing the Site Calibration, it is recommended that a minimum of five samples be taken before making any Adjustments to the Electronics. Also, it is recommended that the sample run be a minimum of 10 seconds long. This will allow a reasonable amount of material to be run through the CentriFeeder™ Meter ensuring an accurate adjustment to the Calibration. The procedure is explained as follows:

Step 1: Make sure that the TOP.RUN page is accessed to begin the procedure. Press the Reset Button on the Lower Left to reset your count to zero before running product through the meter.

Step 2: Run product through the meter for a designated period of time, collecting the material in some manner after it has passed through the meter.

Step 3: After product has stopped flowing through the meter, go to the SET.FIELD page located under the SET option on the MAIN MENU. **HINT: Press the MENU softkey, then press SET, and finally, FIELD DATA.**



Step 4: Click on the "ENTER RUN" Button and you should see the GREEN value (CF Meter) change from "0.000" to a number signifying the weight that the electronics calculates passed through the meter.

Step 5: Weigh the collected material on a static scale and record the weight in the YELLOW block (Actual) next to the value automatically entered in STEP 4. Press the YELLOW box to bring up a numeric keypad. After entering the value, press the NEXT RUN Button to prepare for the next run. It is important that the container holding the material not be included in the weight. The only weight that is important is the material that actually went through the meter.

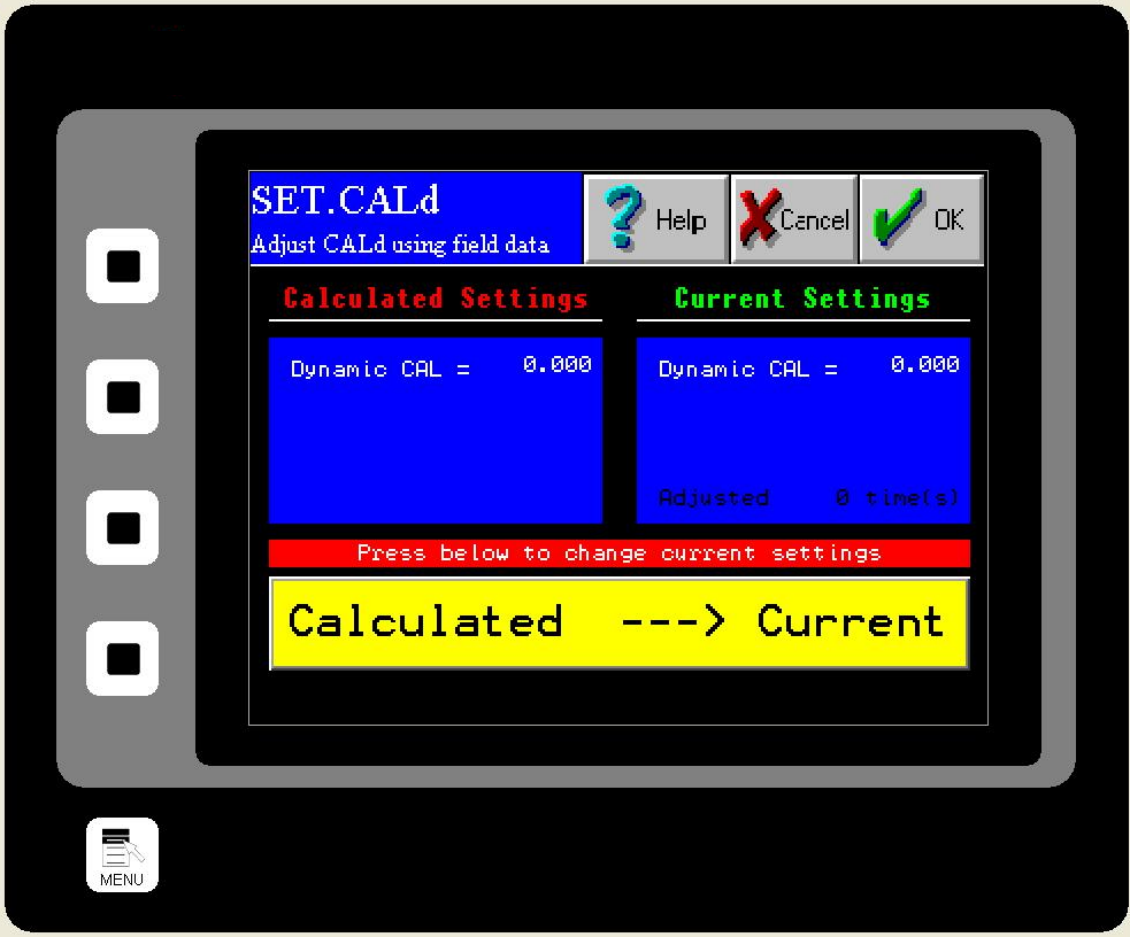
Step 6: Return to the TOP.RUN page and press the RED RESET Button on the bottom left.

Step 7: Repeat Steps 2-6 four more times to complete the 5 Field Data runs.

Step 8: Once all five runs are completed click on the RUN Number next to each set of data in order to select each data RUN. When selected the circles next to the numbers will become green as seen in the picture above.

Step 9: Now return to the TOP.SET page by clicking on the TO SET shortcut key in the top right corner. Now press the FIELD CALd Button.

Step 10: You should now be on the SET.CALd page. The newly calculated Dynamic Calibration can be seen on the left side of the page, while the current Dynamic calibration can be seen on the right side of the screen. If you would like to change your current settings with the settings that you calculated please move on to Step 11. If you would like to keep your current settings, please press the CANCEL Button.

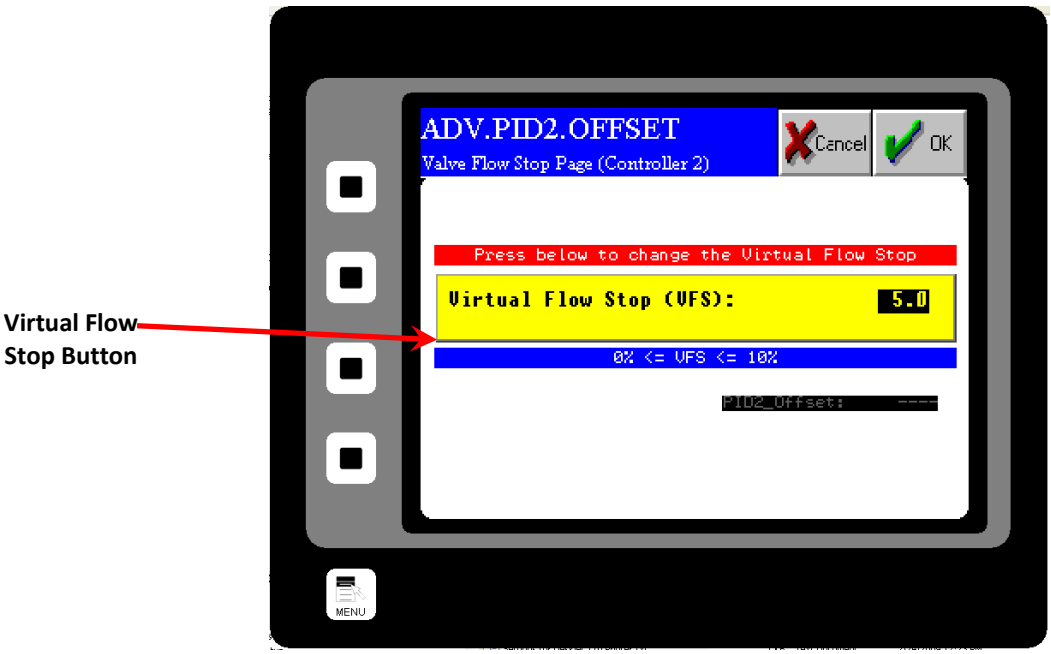


Step 11: To accept the new Dynamic Calibration press the YELLOW CACULATED to CURRENT Button and press the OK Button. A pop up screen will appear, asking if you are sure you would like to accept this value. Press YES.

Setting the Virtual Flow Stop™

Virtual Flow Stop™ is a function of the CentriFeeder™ that allows you to manipulate the position of the blade of the Integrated Control Valve so that flow can be stopped without closing the Integrated Control Valve completely, thus, not damaging product and minimizing damage to the leading edge of the valve and the Tangential Back Plate as well.

To Set the Virtual Flow Stop™ press the ADV Button from the TOP (Main Menu) page. Press the PID #2 Tuning Button and from this page, press the Virtual Flow Stop Button. You should now be on the ADV.PID2.OFFSET page as shown below. Press on the Virtual Flow Stop Button to open a numeric keypad and enter the percentage value you wish to set for your Virtual Flow Stop™.



The Virtual Flow Stop™ is typically set by increasing the Manual Valve until flow just begins to trickle from the valve and then, set the Virtual Flow Stop™ to 66% of that value. This value is, of course, dependant on the particle size and characteristics of your product.

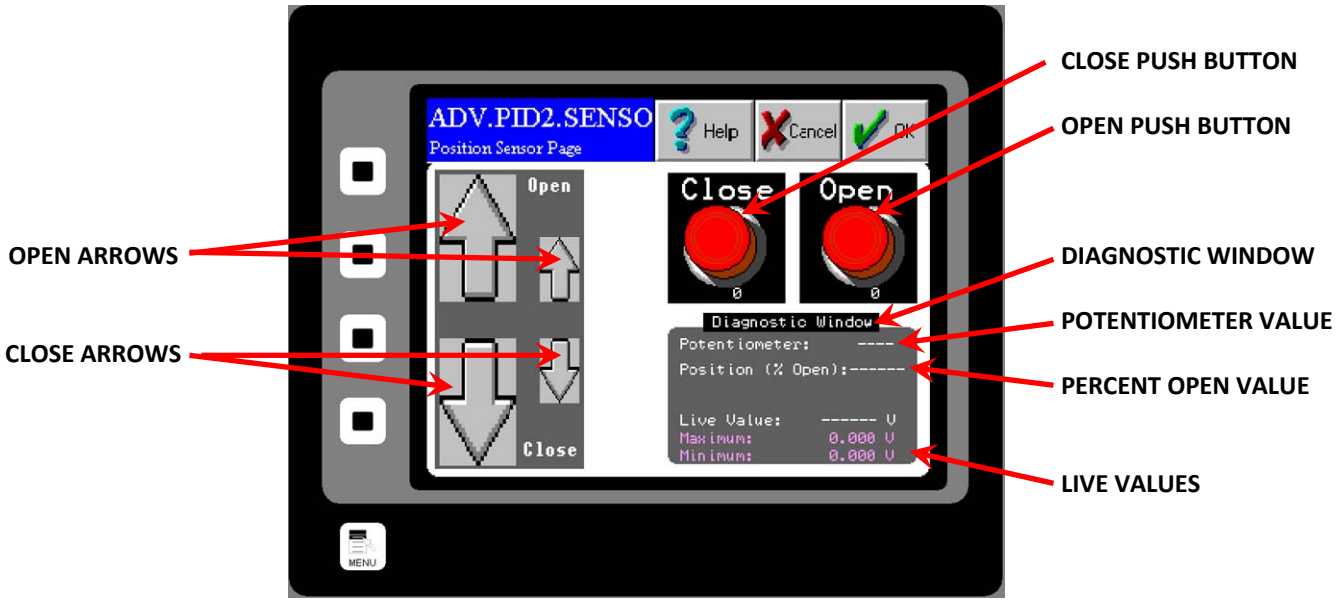
Please note that it is very important that the valve not stick or "crunch" upon closure. If this happens, increase the Virtual Flow Stop value to 85% of the "flow just starts value". It is normal for the valve to "trickle" for a short period after a stop command as it establishes the Virtual Flow Stop condition.

Stroking the Valve

Stroking the Integrated Control Valve is a way of setting the position sensor output to correspond to the actual stroke or range of travel of the valve's blade. Stroking the valve may be required if the electronics package is replaced or the HMI is reprogrammed, however, new installations will typically include a properly stroked valve that will not need to be adjusted.

Please note that the operating stroke of the valve is 3.5". Mechanical Stops are the actual, mechanical endpoints (fully open and fully closed) of the valve's stroke. In order to properly stroke the valve, the electronic endpoints should be moved from these actual stops to 1% under the defined closed position and to 4% over the defined open position. This will prevent damage to the valve.

To stroke the valve, you must access the Position Sensor page. To access this page press the ADV Button from the TOP (Main Menu) page. Then, press the PID #2 Tuning Button and finally, press the Position Sensor Button. You should now be on the ADV.PID2.SENSOR page seen below.



Step 1: Move the valve to the mechanical stops by depressing the Open or Close arrows. ***DO NOT PRESS THE RED CLOSE or OPEN PUSH BUTTONS.*** The large arrow produces a hard movement command and the small arrow produces a softer movement command. Use the small arrow for all movements towards the stops. Do not use the large arrow against the stops. It should only be used to bring the valve off the stops, if needed. The speed of travel is about the same for both arrows and takes less than a minute for a full stroke. The valve is at the end of its stroke when it quits moving as indicated in the Potentiometer value in the Diagnostic Window. Confirm the end of the stroke by moving off and then back on to the mechanical stop.

Step 2: Check your Percent Open values in the Diagnostic Window. The Percent Open values should read **+104% (±0.4%)** against the open stops and **-1% (±0.2%)** against the closed stops. The Maximum Live Value should be 2.0V, ±0.25V the Minimum Live value should be 0.5V, ±0.25 V.

Step 3: If conditions described in Step 2 are met, then the valve is properly stroked and the valve position is correctly read into the system. If the conditions described are not met, continue to Step 4.

Step 4: Move the valve to the fully open position against the mechanical stops as described in Step 1 and press the Open Push Button. ***Please note that the Open Push Button and Open Arrows are not the same button!*** This will set the Percent Open Value to 100% in the Diagnostic Window.

Step 5: Close the valve to the fully closed position against the mechanical stops as described in Step 1 and press the Closed Push Button. ***Please note that the Closed Push Button and Closed Arrows are not the same button!*** You have now set your 0% and 100% values to the mechanical stops, so you must now set the Operating Stroke of the Valve.

Step 6: Since you are on the Closed mechanical stop, move the valve off the mechanical stop by 1%. You are now at the defined Closed Valve position. Again, press the Close Push Button. The Percent Open value should now be 0%. If you move the valve back to the mechanical closed stop, the value should read -1.0%.

Step 7: Now move the valve to the fully open position as described in Step 1. Ease it against the fully open mechanical stop The Percent Open value should be 100%. Back the valve off of the mechanical stop until the Percent Open value is 96%. You are now at the defined Full Open position. Press the Open Push Button. The Percent Open value should now be 100%. You may check by easing the valve back to the mechanical stop and confirm a reading of 104%. To verify that the stroking of the valve was successful, check your values against those specified in Step 2.

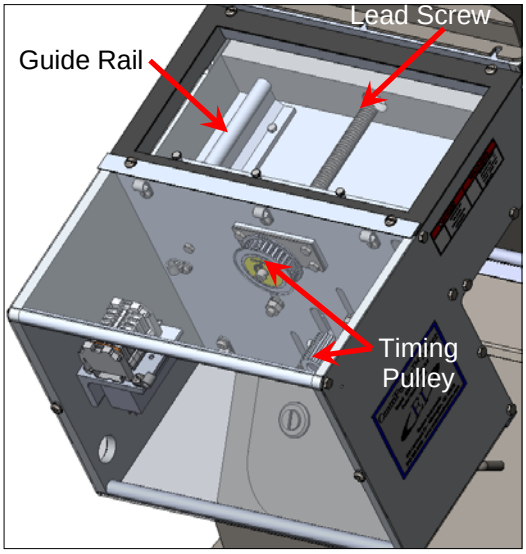
Helpful Hint:

If the valve becomes inadvertently stuck against the mechanical stops, it can be freed by removing the access cover and with a large screwdriver, moving the large timing belt pulley in the direction required to free the valve. There is a direction arrow on the pulley indicating which direction causes the valve to open. If the valve is stuck in the open position, then the pulley should be turned in the closed direction. Do the opposite if stuck in the closed position. If you are unsure of the position, it may be determined by the Mechanical Position Indicator on the side of the valve.

ICV Valve Inspection

The ICV Valve Inspection consists of three separate items, greasing the Lead Screw, changing the Timing Belt and inspecting the Thrust Bearing.

Lead Screw: To ensure that the valve is able to quickly and accurately move from position to position in order to maintain an accurate and consistent flow as well as to prolong the life of the valve itself, the Lead Screw must be inspected to ensure that enough grease is present. Follow the below procedure in order to grease the Lead Screw.



1. Ensuring that the Valve is completely closed, Remove the Valve Cover by first removing the screws on the front of the valve and on top of the valve and then, gently removing the two piece Valve Cover
2. Place a liberal amount of grease on the Lead Screw as indicated

With the Valve Cover removed, you can also inspect the Thrust Bearing and the Timing Belt.

Timing Belt: The Timing Belt is the belt that runs between the two Timing Pulleys on the front of the valve.

1. Inspect the Timing Belt to ensure that it has not become loose over time. If it has become loose, replace immediately
2. Replace the Timing Belt by first, placing the belt over the top Timing Pulley and then, pulling the belt downward over the bottom Timing Pulley

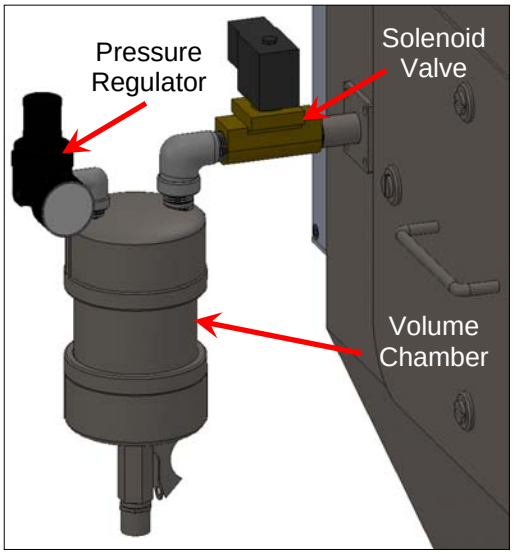
Thrust Bearing: The Thrust Bearings ensure the proper movement of the Lead Screw as the valve opens and closes.

1. Inspect the Thrust Bearings and ensure that there is no increase in the internal clearance or degradation of the tolerances. If any degradation is present, the valve must be sent back to Eastern Instruments for repair or an Eastern Instruments technician can visit in order to make the proper repairs/replacement. Please contact your EI representative immediately.

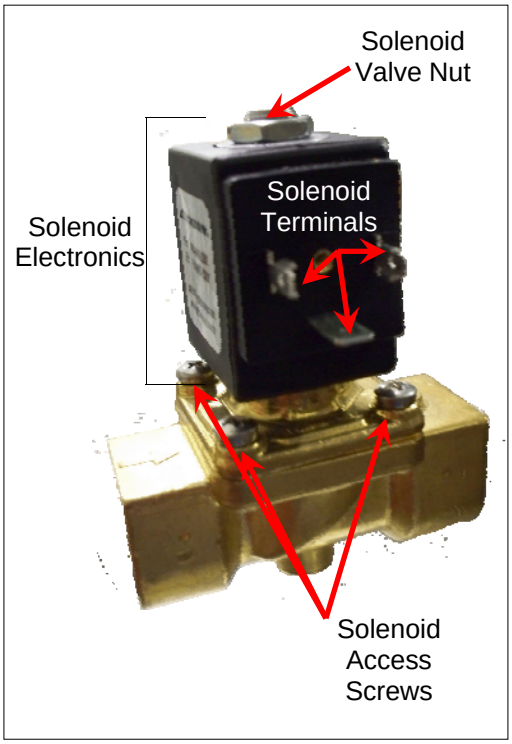
Pulsed Air Inspection

The Pulsed Air Inspection involves an inspection of the Solenoid Valve and the Pressure Regulator for your optional Pulsed Air System.

Required Items: 1 Solenoid Valve Repair Kit



1. Check for a loss of pressure in the system. If pressure loss is present, there may be a worn or damaged seat or diaphragm within the Solenoid Valve.
2. To repair the solenoid, first disconnect or turn off the air supply and disconnect all wires from the solenoid terminals
3. With power disconnected, you can now remove the Solenoid Valve Nut. The Solenoid Electronics will now slide off of the inner shaft of the Solenoid Valve (See below)
4. Once the electronics have been removed, please remove the four Solenoid Access Screws on the base of the Solenoid Valve
5. Now remove the top of the Solenoid Valve so that the Diaphragm and Solenoid Valve Seat are exposed. Be careful when removing the top of the Solenoid Valve as the Seat contains tiny parts as well as a spring
6. Replace the Solenoid Valve Seat and Diaphragm
7. Remount the top of the Solenoid Valve and secure it with the Solenoid Access Screws
8. Remount the Solenoid Electronics and secure with the Solenoid Valve Nut

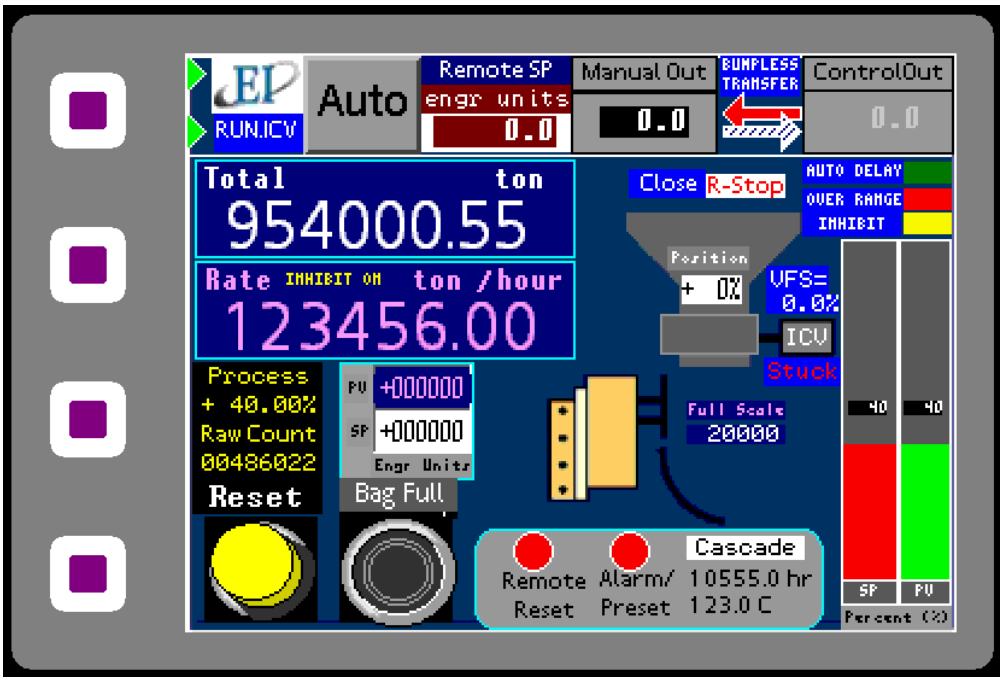


Please note: It is recommended that when the solenoid valve is refurbished, the Pressure Regulator should be replaced as well. Unscrew the old Pressure Regulator and mount the new one via the 1/4" street elbow mounted to the top of the Volume Chamber. Teflon Tape or pipe dope is required in order to properly secure the connection.

Start Up

Upon initial startup of the CentriFeeder, several procedures need to be performed in order to ensure proper functioning of the device. Once installation of the CentriFeeder is complete, please follow the below list of procedures to properly commission your CentriFeeder. Please note that the location of those procedures not specifically called out below can be found within the "Procedures" section of this manual.

1. Perform a Zero along with a Static Calibration (see CentriFeeder Manual). Static Calibration properly sets the Range of the Transducer within the CentriFeeder.
2. Perform a Dynamic Calibration or Site Calibration. The Site Calibration procedure ensures that the electronics is calibrated to the particular product that you are running.
3. Set the Virtual Flow Stop for your particular product. Setting the Virtual Flow Stop will allow product to stop flowing without closing the valve all the way, thus protecting the valve's blade as well as your product from



damage.

Maintenance Schedule

The CentriFeeder is a rugged piece of equipment that is built to withstand a great deal of wear, however some care should be taken to ensure that the CentriFeeder is always working at its optimal level of performance. Below are some recommended evaluations and Inspections that can be undertaken to ensure that the meter functions, and continues to function, with optimal performance well into the future.

Wear Surface Inspection: It is recommended that your wear surfaces be checked periodically to ensure that any coating or liner is functioning and does not show signs of wear. Of course the frequency of the wear surface inspection will vary due to product and environmental conditions, however **we recommend an inspection every 4-5 years or 5000 hours of operation**, whichever comes first. Please note that action should be taken during the initial signs of wear as the Pan can be recoated. If wear continues unchecked, the Pan itself may wear and would thus, need replacement.

ICV Valve Inspection: It is recommended that **the Lead Screw be greased, the thrust bearing be inspected and the timing belt be replaced every two years or 5000 hours whichever comes first**. If the unit is mainly used for filling, then the ICV Valve Inspection is recommended every 2500 starts or 5000 hours of operation, whichever comes first. For a more in depth explanation of the ICV Valve Inspection, please see the "Procedures" section of this manual.

Pulsed Air Inspection (Optional): If the Pulsed Air option has been purchased, **the Pulsed Air Inspection should be implemented every 5000 starts**. Inspect the Regulator and Solenoid Valve Seat for leaks or damage. If pressure is not holding replace both the Regulator and the Solenoid Valve Seat.