



E A S T E R N I N S T R U M E N T S



CentriFlow® Meter

**METER MODULE
INSTALLATION & OPERATION
MANUAL**



CentriFlow®
E A S T E R N I N S T R U M E N T S

REV 10/23

ORIGINAL LANGUAGE

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SAFETY

SAFE OPERATION

PLEASE READ BEFORE OPERATING THE CENTRIFLOW METER

- Only authorized personnel should operate the CentriFlow Meter. Untrained personnel present a hazard to themselves and the meter and improper operation will void the warranty.
- Check for damaged parts before operating the meter. Any damaged part should be properly repaired or replaced by trained personnel. Do not operate the meter if any component does not appear to be functioning correctly. Contact Eastern Instruments for assistance or for repair components.
- Use the appropriate Personal Protection Equipment as required for operating the meter within its installation location.
- The various surfaces of the CentriFlow Meter module may have sharp edges and have the potential to cause injury. Use the proper protection for your hands when servicing or maintaining your CentriFlow Meter
- The electrical panel (digital electronics) should be closed and the safety latch engaged at all times except during installation or service. At those times, only authorized personnel should have access to the electronics panel. When power is activated, AC voltage may be present throughout the panel. Therefore extreme caution is required.
- ◆ **DO NOT modify or alter this equipment in any way. If modifications are necessary, all such requests must be handled by Eastern Instruments. Any modification or alteration of any Eastern Instruments equipment could lead to personal injury and/or mechanical damage and will void the warranty.**

WARNINGS AND CAUTIONS

- Once power has been supplied to the CentriFlow Meter, it is always on and product may run through it at any time.
- Avoid entering or placing body parts within the meter's enclosure.
- Do not operate without proper training.
- Always wear proper PPE.
- NEVER service the meter while power is connected.



SAFETY PLACARDS

SOME OR ALL OF THESE WARNINGS MAY BE ON YOUR METER. BE AWARE OF THE POSSIBLE DANGERS PRESENT.



ELECTRICAL SERVICE

Electrical shock or electrocution is possible when servicing the electronics of any Eastern Instruments equipment. Be sure to disconnect power before conducting any repairs on the electronics.



PRODUCT FLOW

The Control Valve for the CentriFeeder is used only as a control valve and does not act as an isolation valve. A secondary isolation valve is recommended to be installed before the CentriFeeder's control valve in order to isolate the CentriFeeder from flow during maintenance or repairs.



PINCH POINTS

The control valve of the CentriFeeder can cause serious injury or amputation. Keep hands clear of the control valve at all times.



LIVE ELECTRICITY

Live electrical wires may be present. Please note that coming into contact with the live wires (AC Power) could cause electrical shock or electrocution.



Installation Guidelines

REQUIREMENTS

- The meter is to be used in a location where the product can be dropped from a fixed height such as a conveyor, or any type of feed system, which will give a reasonably constant, initial, vertical velocity. The design of the meter requires the product to contact the Tangential Plate and have some vertical drop.
- The meter should be installed so that it is level in two planes. Use the Bubble Level on top of the Seal Top to help (this is not applicable for meters that are installed at a 10° or 20° angle) .
- The mass of the mount should be at least two times the mass of the meter .
- The meter should be mounted using the mount holes only. The mounting method should minimize vibration and movement. With a Type II Configuration, mounting should not be done using the Inlet and Discharge Flanges.
- **Shipping brackets are not to be used for mounting the CentriFlow® Meter!**
- If the conveyor/feed system is wider than the meter Pan, guides are required to reduce product stream to the width of the meter Pan. Conversely, if the conveyor/feed system is considerably less than the width of the meter Pan, a spreader is required to widen the product stream to the width of the meter Pan.
- The discharge chute that the product stream empties into after traveling through the meter must be free flowing, meaning that it does not allow product to build up and consequently contact the Pan of the meter.

SPECIAL REQUIREMENTS

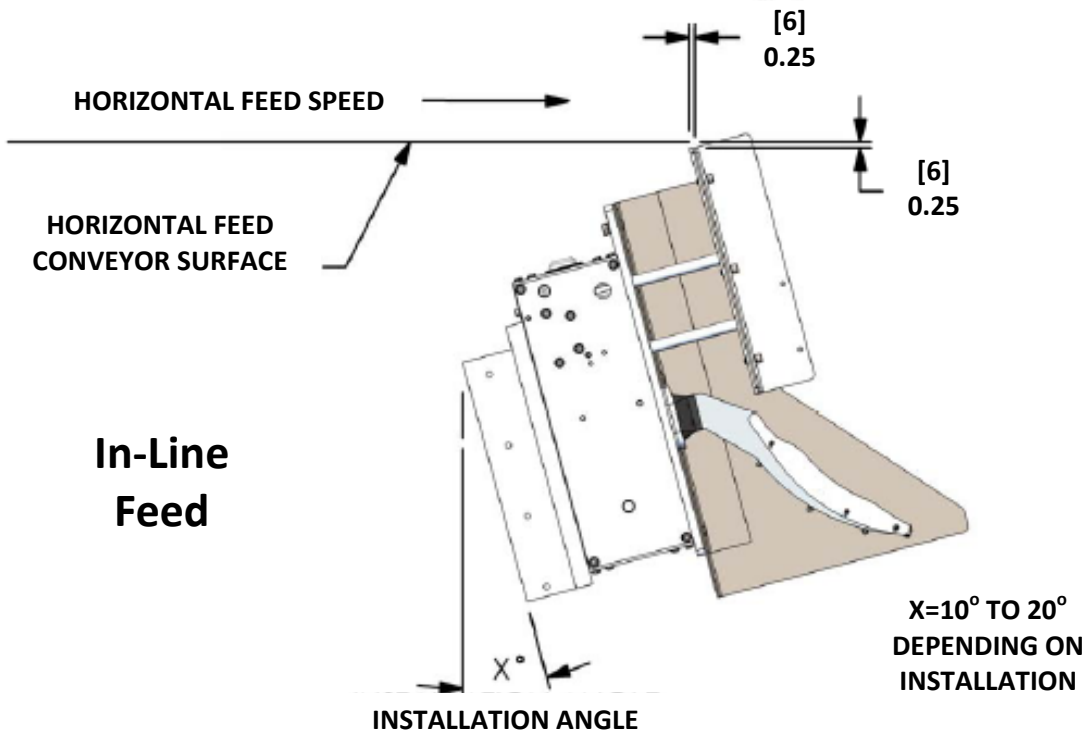
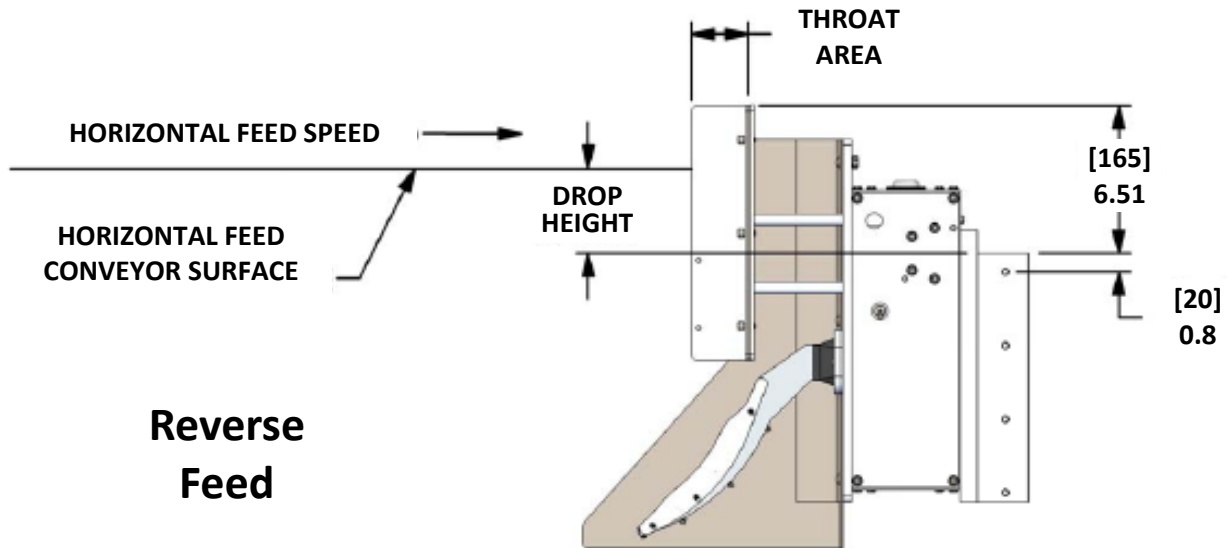
- The CentriFlow® Meter is balanced at a specific angle and should not be subject to vibration or movement.
- The Seal Top should be on the meter at all times, unless you are working inside the meter. This is to keep all foreign materials out of the meter that could obstruct its movement or impair its functionality.





Configurations

TYPE I CONFIGURATION

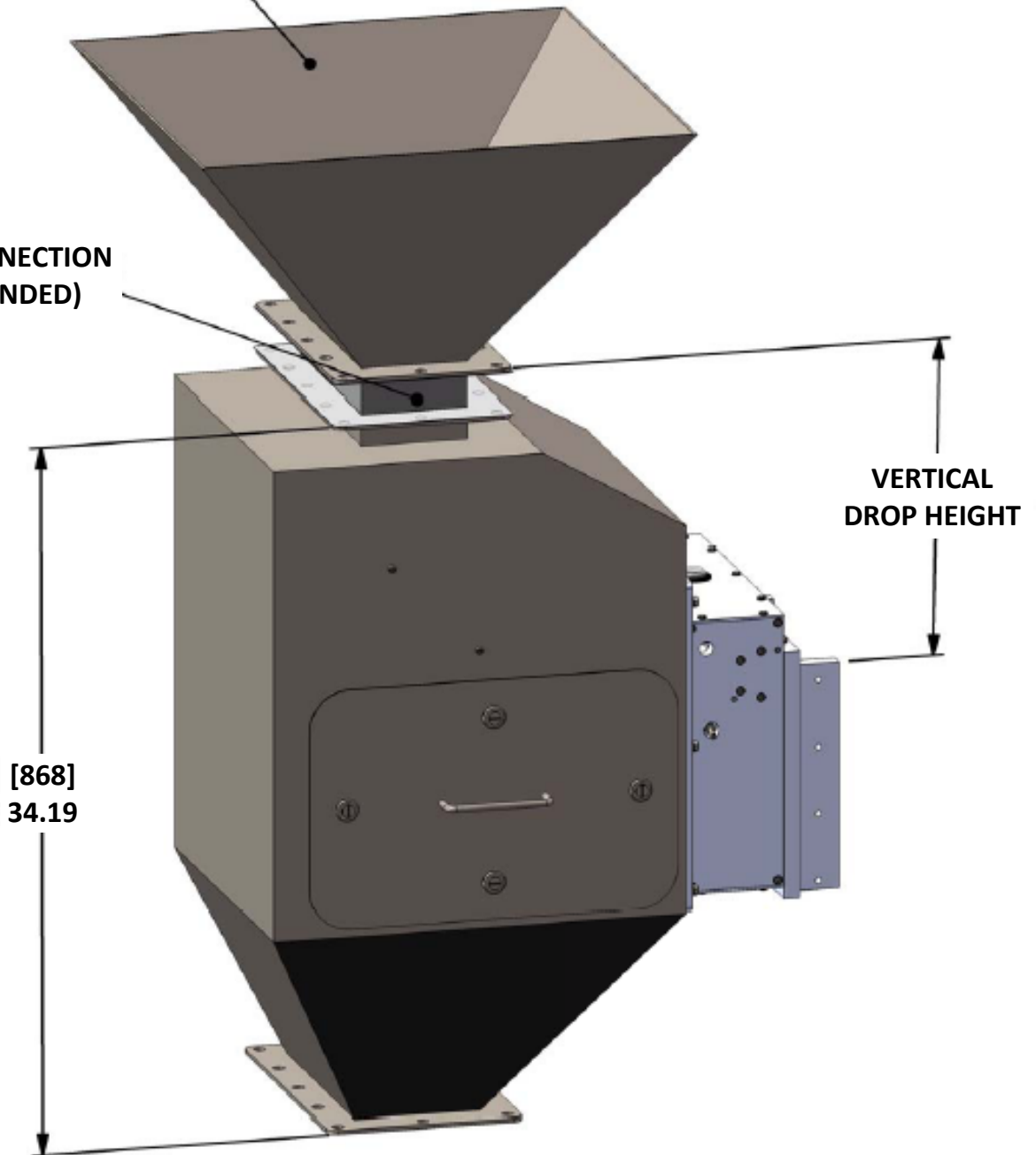




TYPE II CONFIGURATION

VERTICAL FEEDER/ HOPPER

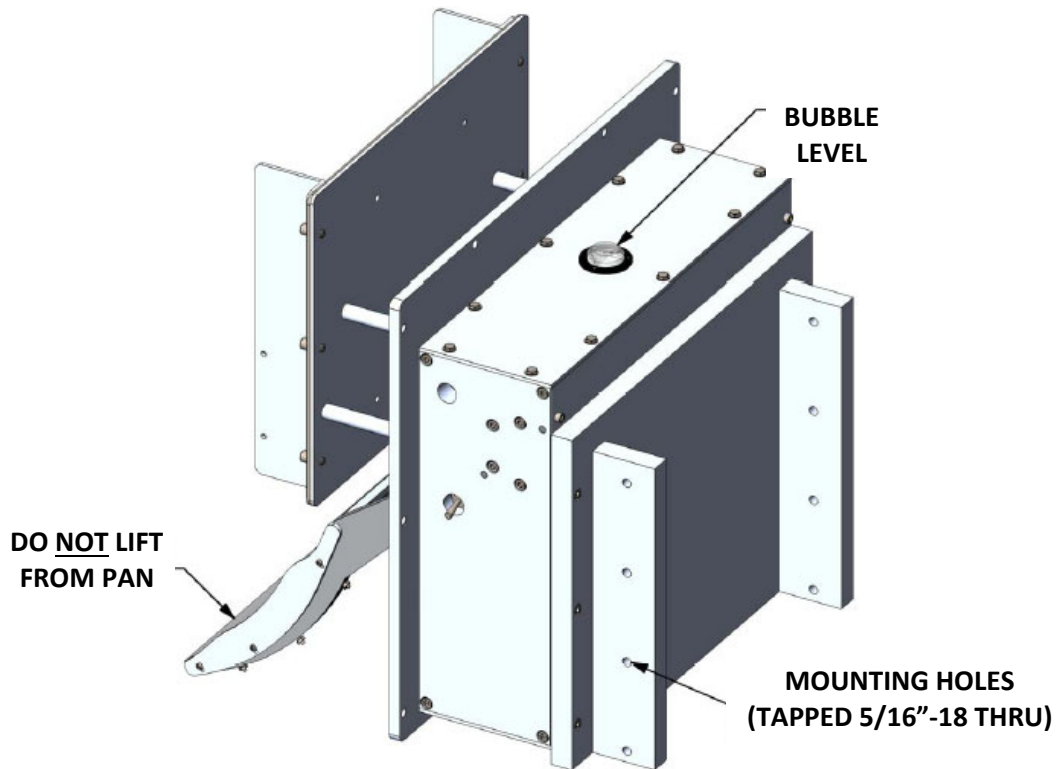
FLEXIBLE CONNECTION
(RECOMMENDED)





Mounting

When installing the CentriFlow® Meter, great care should be taken to not damage the Pan Section of the Module. This is the measurement section of the meter and should be handled with care. The Pan Section, although structurally strong, will not be able to withstand a direct side impact. Scratches or dents on the Pan's surface can cause the meter to function improperly or not at all by allowing the Pan to build up with product, resulting in output error.



When Mounting the CentriFlow® Meter, it is important that the meter should be held by means of the Mounting Holes located on the back of the Meter Module, as shown in the illustration above. These are a series of four 5/16"-18 tapped holes located on two 3/4" thick Mount Sides that are centered on the width of the meter and spaced 11" apart from inside to inside. The mounting of the meter should be vibration free and as sturdy as possible to eliminate the possibility of misinterpreting any vibration as actual meter measurement. Eliminating vibration is particularly important when flow rates are low.

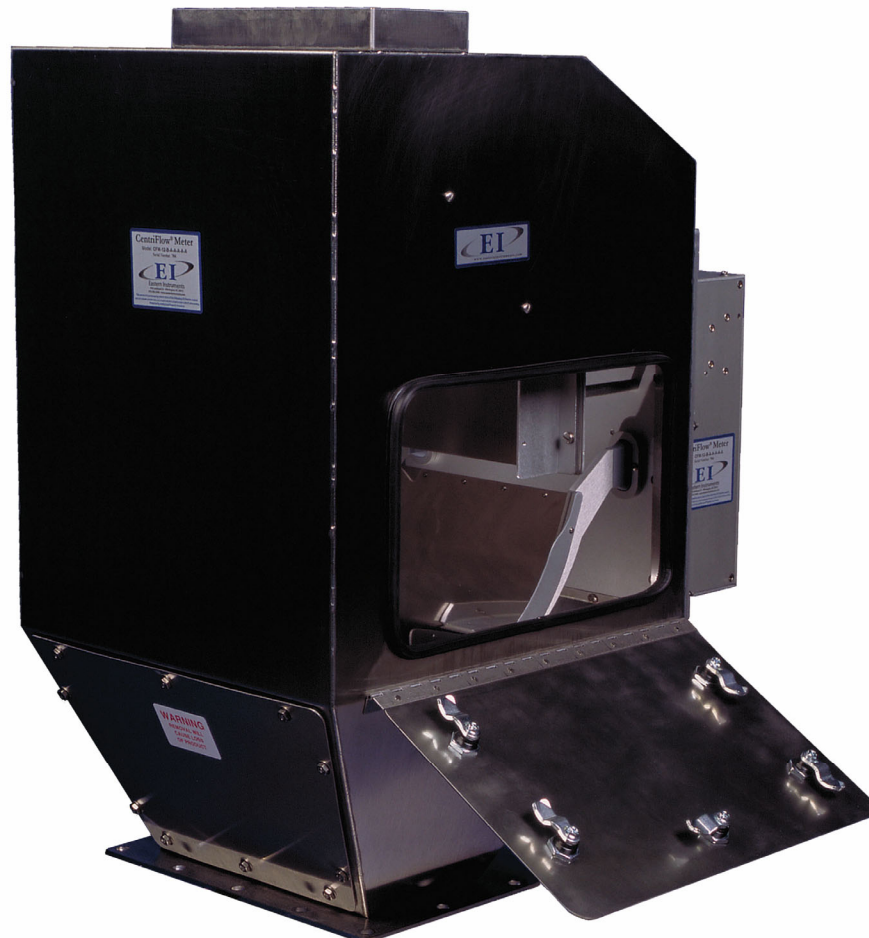
TYPE I CONFIGURATION

Using a Type I Configuration, it is important that the conveyor/feed device not be in direct contact with the CentriFlow® Meter. Contact could add vibration, which could be misinterpreted as actual meter measurement. Also, it is suggested that there be minimal, if not zero, air disturbance around the Pan Section of the meter. Due to the sensitivity of the measurement, air disturbance could, again, be misinterpreted as actual meter measurement.



TYPE II CONFIGURATION

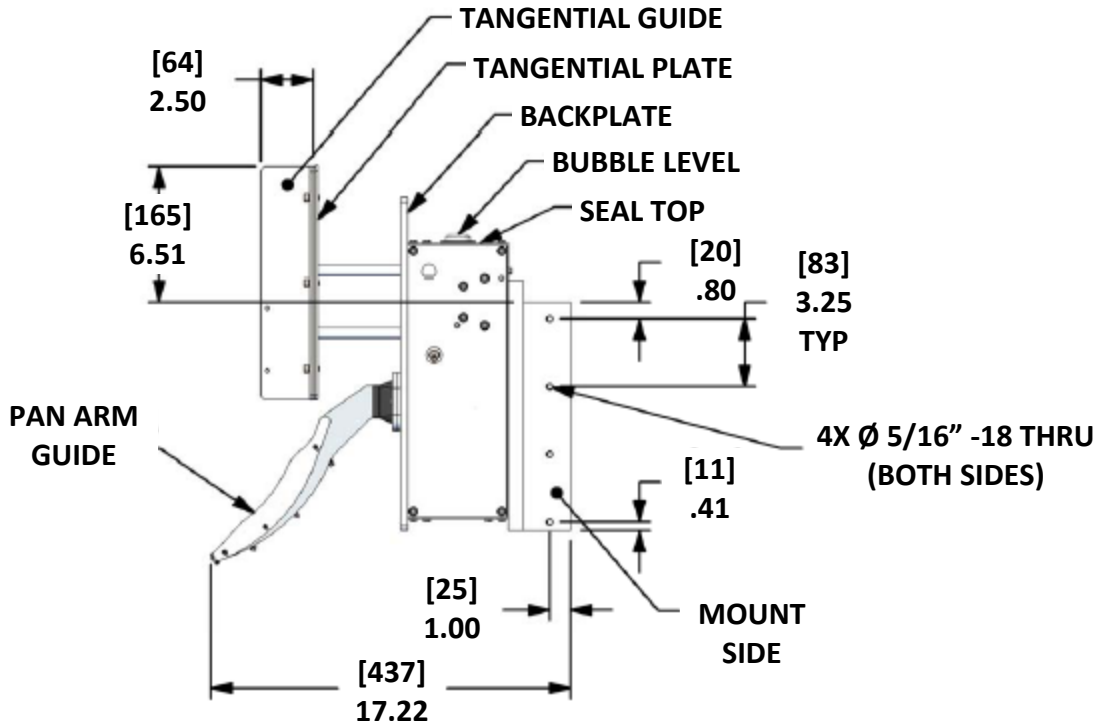
When using a Type II Configuration, the Enclosure surrounding the CentriFlow® Meter Module should not be used as a means of support or mount for the meter. Again, the Mount Sides attached to the back of the meter should hold the meter in place and support the entire weight of the meter and the enclosure. The Discharge Flange on the bottom of the Type II Enclosure should not be used to support the weight of any structure used to capture the product discharging from the meter. On the Intake, or top, of the Type II Enclosure, there is an optional Intake Flange that enables the Intake to be connected to the Feed System. It is recommended that it be connected with a flexible Boot or Flap. This will help to keep vibration minimized. There are also Access Doors that need to be kept clear when mounting the Type II Enclosure. These Access Doors are located on the side of the Enclosure. The Access Doors are used to gain access to the Meter Module for cleaning, calibration, and maintenance.



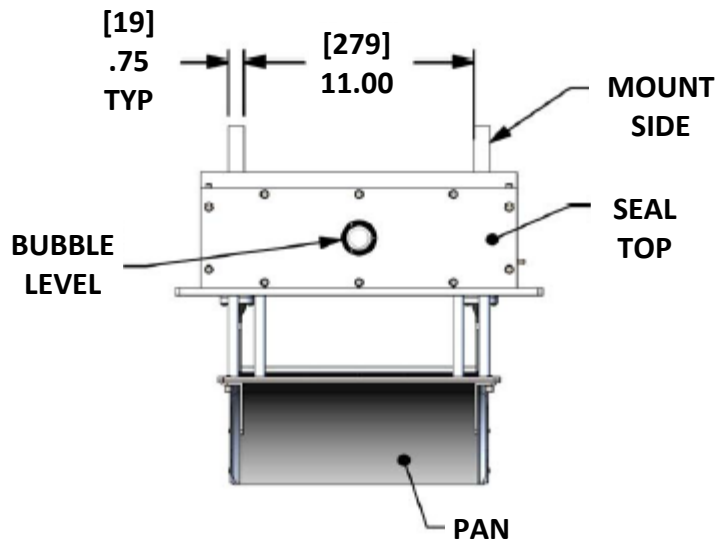


Mounting Specification Drawings

RIGHT VIEW



TOP VIEW





Type II Mounting Procedure To Various Feed Devices

Rotary Valve:

When installing the meter under a rotary valve/rotary airlock, it is important to ensure that the meter will not have air pressure forced into the intake. There will most likely be a transition from the discharge of the valve to the intake of the meter, so keeping the transition short and symmetrical will get the best results. Here the drop from the rotary valve/rotary airlock becomes the drop point and will give consistency even as the flow pulsates from the valve. Sizing is important because the valve should not be so large that the rotation is so slow that large slugs drop through the meter with periods of no flow. This will not give an “average” flow reading. The best scenario is when the pulsations from the valve do not drop down to “zero” instantaneously.

Screw Conveyor:

When installing the meter under a screw conveyor, the drop from the screw becomes the drop point to the meter. There will most likely be a transition from the discharge of the screw to the intake of the meter, so keeping the transition short and symmetrical will get the best results. When installing under a screw, it is important to ensure that the device below the meter takes away the product faster than the screw feeds the product, and that if this device stops, the screw stops. This is so that the product will not pack into the meter and damage the meter. The screw conveyor, unlike the rotary valve, will continue to force product into the meter if the product does not discharge out.

Bucket Elevator:

When installing the meter at the discharge of a bucket elevator, all attempts should be made to allow the product to discharge from the bucket and transition to the meter, making the transition the drop point. This may have to be done with an offset transition. If the fill of the bucket is consistent and if the product drops from the bucket elevator, then a direct transition to the meter can be made, following the guidelines in the previous two sections.

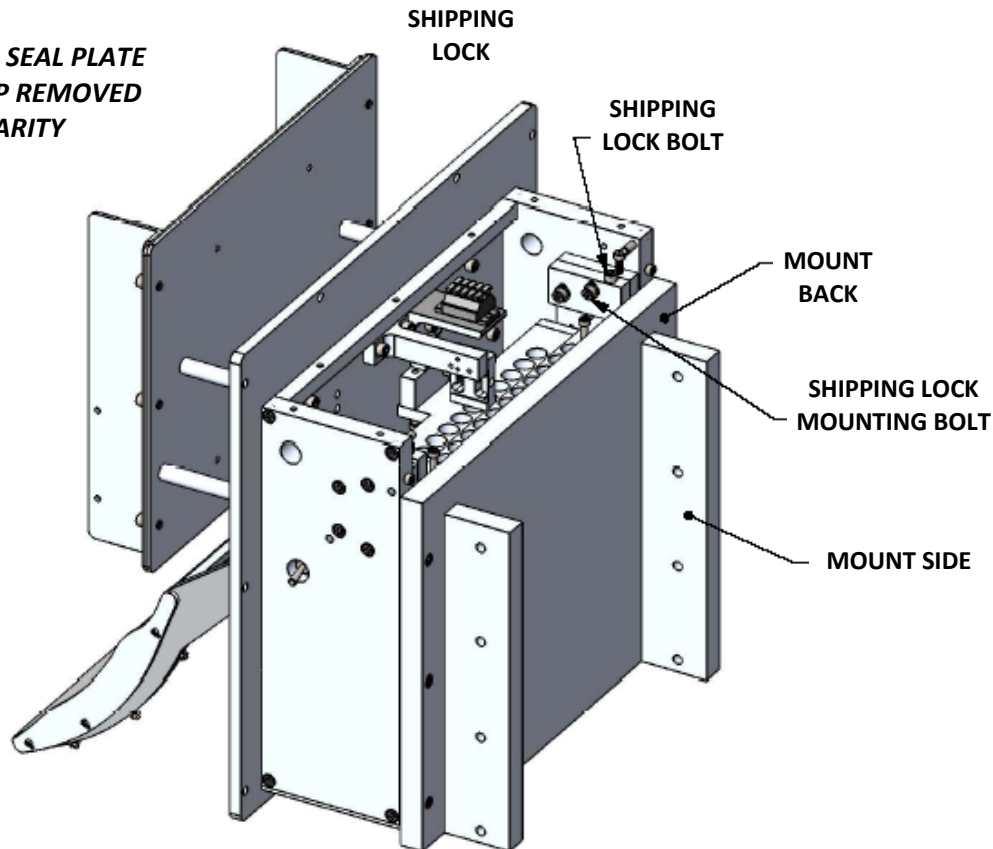
Slide Gate:

Installing the meter under a slide gate is typically the simplest of the feed devices. Typically the product being measured is free-flowing and the slide gate provides a smooth, non-pulsating flow stream. When installing the meter under a slide gate, the drop from the gate becomes the drop point to the meter. There will most likely be a transition from the discharge of the gate to the intake of the meter, so keeping the transition short and symmetrical will get the best results. One thing to keep in mind is that if the silo/hopper above the gate empties completely, the gate should be closed to allow a small amount of head to be created. This is so that when the silo/hopper is being filled, the product does not fall directly through the open gate, causing a variance on the drop point.



Shipping Locks

SHOWN WITH SEAL PLATE
AND SEAL TOP REMOVED
FOR CLARITY



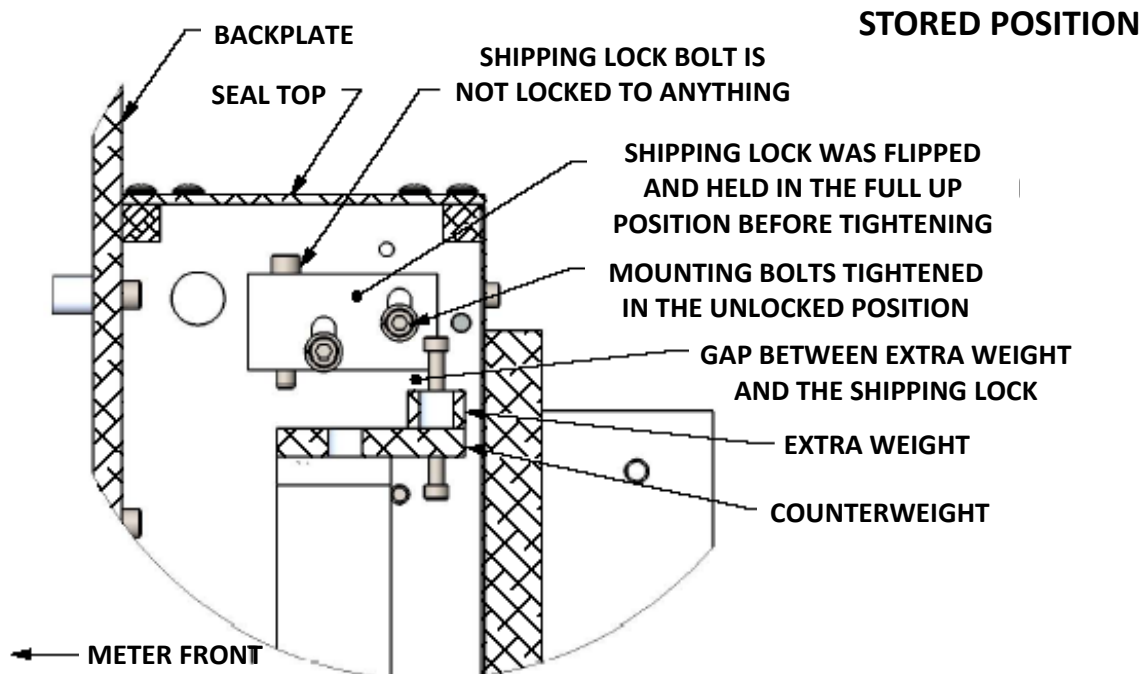
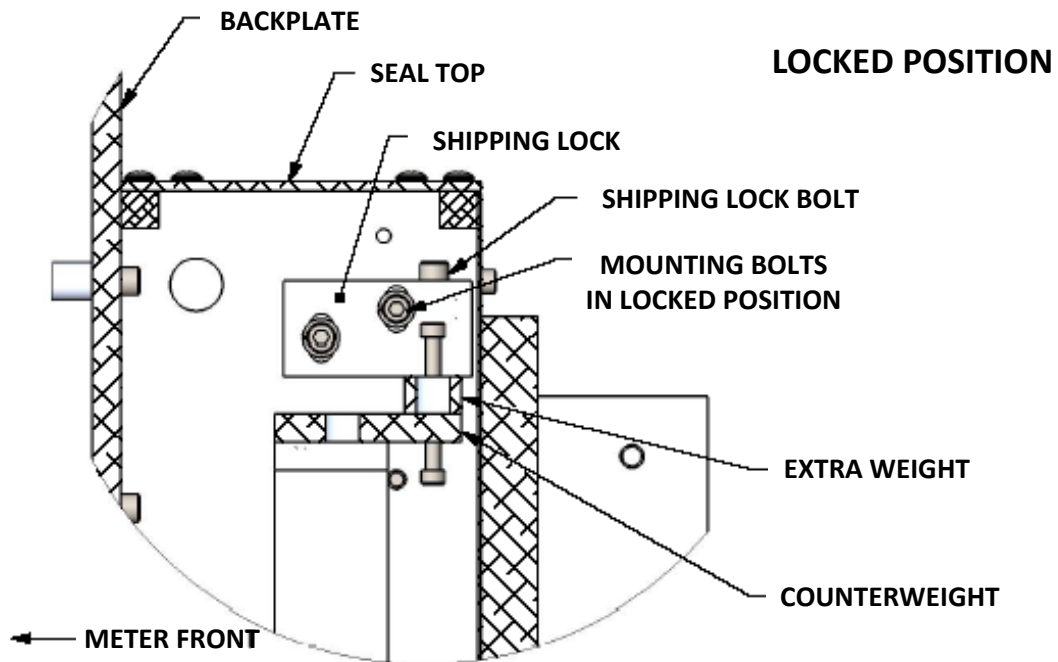
USING THE SHIPPING LOCKS

- Step 1.** Remove the Seal Top.
- Step 2.** Unscrew the Shipping Lock Bolt using a 3/16" hex key.
- Step 3.** With a 7/16" wrench, loosen and remove the two Shipping Lock Mounting Bolts. *Take care not to drop the bolts or the Shipping Lock.*
- Step 4.** Remove the Shipping Lock Bolt and rotate the Shipping Lock 180° before reattachment and storage. *Please see illustration on next page.*
- Step 5.** Tighten the Shipping Lock Mounting Bolts while holding the Shipping Lock up. Make sure that the locks do not interfere with the Counterweight. Drop the Shipping Lock Bolt into the hole in the top of the Shipping Lock. ***The Shipping Lock Bolt will not be attached to any part, but instead will just be stored here for future use. Please see illustration on next page.***



Step 6. Repeat for opposite side.

Step 7. If this unit is either a CFM-24, CFM-36, or CFM-48 continue on to Step 8, if not, reinstall the Seal Top.





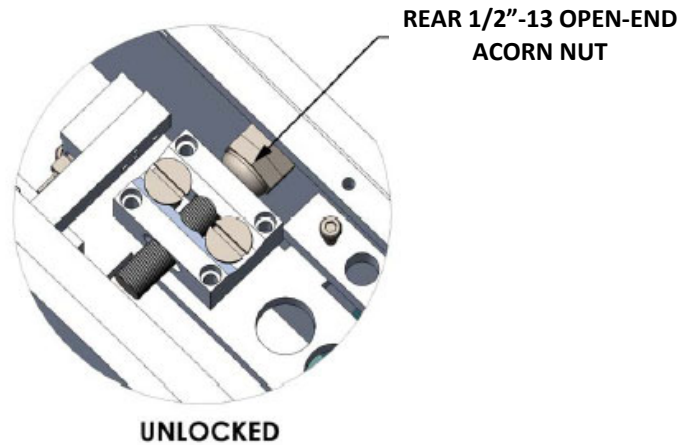
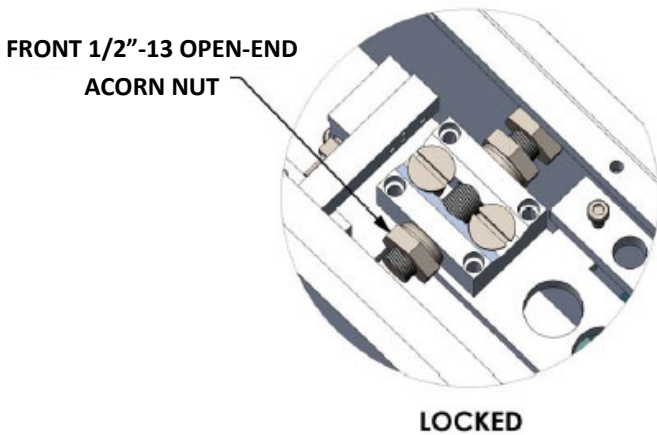
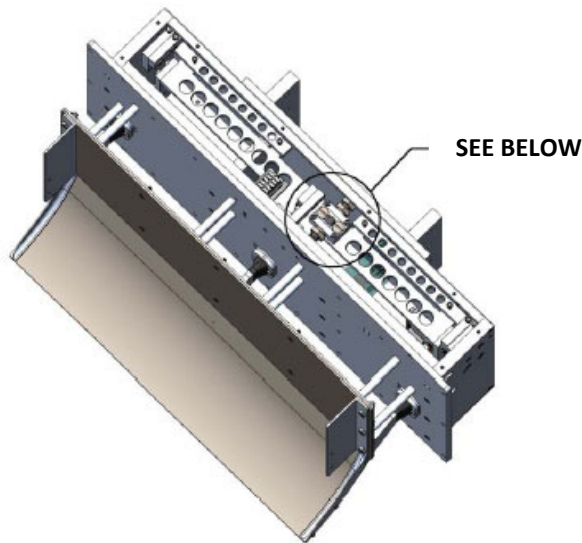
ADDITIONAL SHIPPING LOCK - (FOR CFM-24, CFM-36, CFM-48 ONLY)

USING THE ADDITIONAL SHIPPING LOCKS

Step 8. Using a 3/4" wrench remove the Front Acorn Nut and store for later use.

Step 9. Loosen the Rear Acorn Nut and tighten it to the back nut closest to the rear of the meter. Make sure that it is tight so that vibration won't allow it to move back up to the Shipping Block. Use Loctite 242 (Blue).

Step 10. Reinstall the Seal Top.





REINSTALLING THE SHIPPING LOCKS

The Additional Shipping Lock should be reinstalled before the standard Shipping Locks.

Installing the Additional Shipping Lock

The CentriFlow® Meter's additional Shipping Lock needs to be reinstalled very carefully so that the meter's Transducers are not damaged. If the Acorn Nuts aren't tightened evenly, they will push or pull on the Transducers. The leverage that the nuts could put onto the Transducers could cause the Transducers to fail or the Column Wires to break. Follow the directions below to ensure proper reinstallation.

- Step 1.** With power on the meter, read the mV between the red and white wires using your voltmeter. Do this by removing the red and white wires that are connected to the Transducer cable from the Wago terminal inside the Meter Module Casing leaving the power (black and green) connected. Insert your leads into the Wago terminal to read the mV .
- Step 2.** The mV reading should be less than 2.00 mV from zero once the Acorn Nuts are tightened.
- Step 3.** Loosely hand tighten the Rear Acorn Nut until you see the mV reading change.
- Step 4.** Reinstall the Front Acorn Nut and tighten until it is snug without changing the mV reading out of the parameter.
- Step 5.** Using a ¾" wrench, evenly tighten the Acorn Nuts. Once they are tight and the mV reading is within 2.00 mV of zero, the standard Shipping Locks can be installed.

Installing the Shipping Locks

- Step 1.** Remove the Seal Top.
- Step 2.** Remove the Shipping Lock Bolt stored in the Shipping Lock.
- Step 3.** Using a 3/16" hex key, loosen and remove the two Shipping Lock Mounting Bolts. Take care not to drop the bolts or the Lock.
- Step 4.** Rotate the Shipping Lock 180° and place the Shipping Lock Bolt in the hole from the top of the Shipping Lock.
- Step 5.** Start tightening the two Shipping Lock Mounting Bolts, but do not tighten them completely.
- Step 6.** Start the Shipping Lock Bolt and tighten securely.
- Step 7.** Tighten the two Shipping Lock Mounting Bolts securely.
- Step 8.** Reinstall the Seal Top.



Grounding the CentriFlow Meter Module

A separate Earth Ground Wire (14 gauge) is required to be connected to the meter module. This ground wire is required for operator safety and for proper operation. This ground must be supplied from the main plant ground at the service entrance.

PLEASE BE SURE TO GROUND THE CENTRIFLOW METER MODULE TO AN EARTH GROUND!





VibraWeigh®

- The VibraWeigh® option is factory tuned and should NOT be adjusted in the field unless a primary component is changed (e.g. VW coil or Electronics Control Board).

VibraWeigh
20 VA @ 120 VAC

VibraWeigh should be wired to a 15 A Circuit Breaker which is wired to a Junction Box using 18 Ga Wire.

All wires should be contained within metallic conduit.

VibraWeigh Supplied with a 10 ft Cable with Amphenol Connector.

120V AC POWER
FOR THE
VIBRAWEIGH

VIBRAWEIGH
ELECTRONICS
(OPTIONAL)

TRANSDUCER

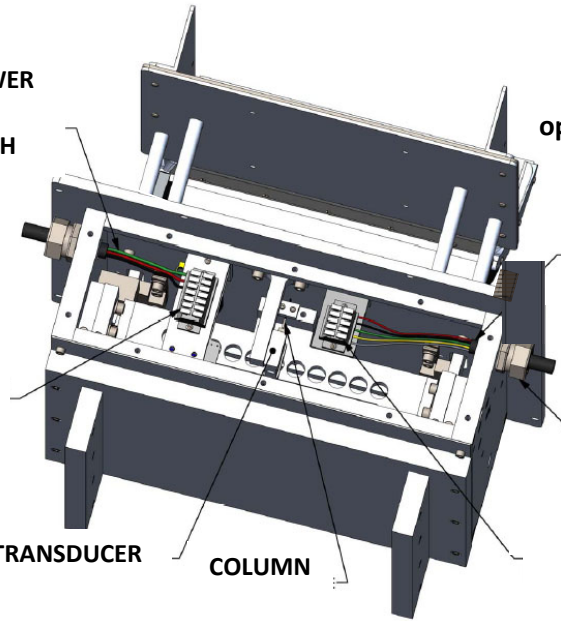
COLUMN

Please note that the VibraWeigh® has an operating power of 20 VA.

TRANSDUCER CABLE
(WITH SHIELD)

AMPHENOL
CONNECTOR

WAGO
CONNECTOR



PURPOSE:

The VibraWeigh® was designed to vibrate the Measurement Pan in a direction that is not in the plane of the product flow. The use of the VibraWeigh® is intended to aid in cleaning the Measurement Pan. Its continuous vibration should reduce buildup and assist in the flow of product over measurement pan without affecting accuracy.

FIELD ADJUSTMENT

1. For CentriFlow® Meters equipped with the optional VibraWeigh®, gain access by removing the Seal Top from the meter.
2. Adjust the Current/Rate Potentiometer clockwise to its maximum output. A click or pop from the Potentiometer will be felt or heard at its maximum output even though the Potentiometer will continue to turn after its maximum point has been reached).
3. While pouring a small amount of product onto the Measurement Pan, adjust the Frequency Potentiometer up or down so that the product moves away from the Pan Guides towards the middle of the Pan. This step can NOT be performed with process flow across the meter and needs to be small amounts of product so that interactions between the product and Pan resonance can be viewed.
4. With good movement of product away from the Pan Guides, adjust the Current/Rate Potentiometer counterclockwise two full turns. This will be your VibraWeigh's set point. Now, reinstall the Seal Top.



CURRENT/RATE
POTENTIOMETER

FREQUENCY
POTENTIOMETER



Integrated Air Entrainment System

IAE - 6, 12, 24, 36, 48 (Integrated Air Entrainment System)

If the CentriFlow[®] was shipped with the IAE option, please continue with the following directions.

PURPOSE:

The IAE system was designed to deliver an even stream of air to the CentriFlow[®] Meter’s Measurement Pan. The use of this air is intended to aid in the cleaning of the Measurement Pan. Its continuous, dry air should reduce buildup and assist in the flow of product on the measurement surface without affecting the measurement readings.

REQUIREMENTS:

Included Components:

- Integrated Air Entrainment Device
- Pressure Regulator & Gauge
- Oil Removal Filter

Also Required, Not Supplied:

- ✦ Air Tubing (Metal or Plastic – see below)
- ✦ Air Fittings (based on table below) with ½” NPT thread
- ✦ Pipe Tape

COMPRESSED AIR LINE SIZES:

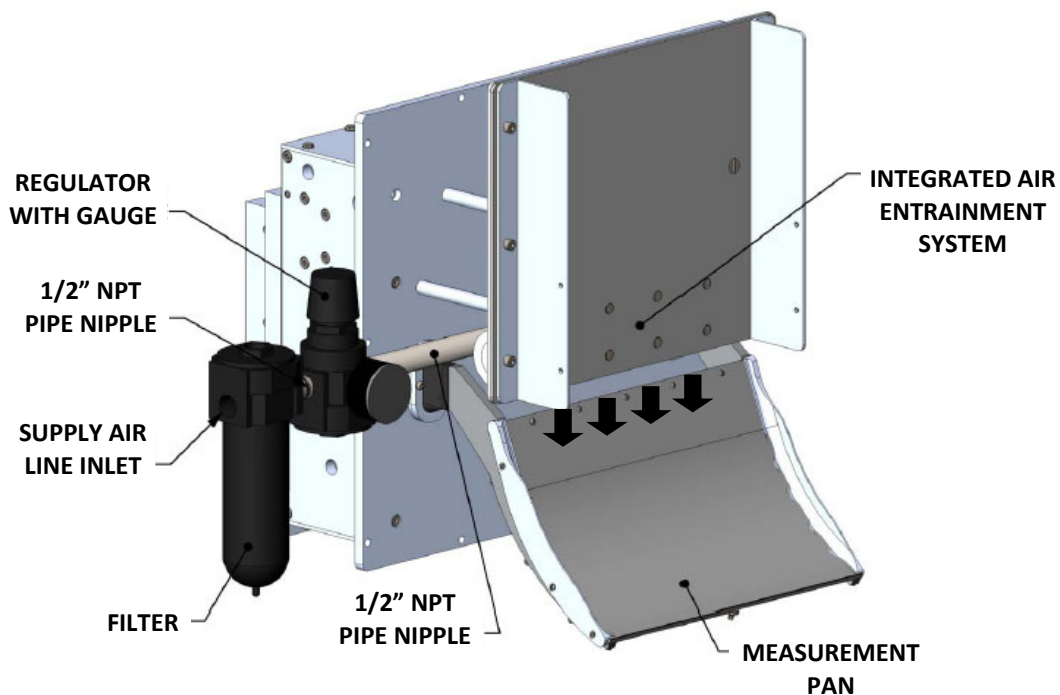
Compressed air lines should be sized to hold pressure drops to a minimum (see table below). Do not use restrictive fittings or undersized lines that can “starve” the Integrated Air Entrainment system by causing excessive line pressure drop. If compressed air hose is used, always go one size larger than the recommended pipe size due to the smaller I.D. of hose.

Recommended Infeed Pipe Sizes Single Installation			
IAE Length	Infeed Pipe Size/Length of Run		
	10'	50'	100'
6	1/4"	3/8"	1/2"
12	3/8"	1/2"	3/4"
24	1/2"	3/4"	1"
36	3/4"	1"	1-1/4"
48	3/4"	1"	1-1/4"



CONNECTING THE INTEGRATED AIR ENTRAINMENT SYSTEM

1. Connect the supplied regulator and filter to the pipe nipple. The air being supplied to the Integrated Air Entrainment system must be clean, dry, and debris free. The Regulator specified will accept 100 psi inlet pressure, is adjustable to 50 psi, and the filter is 10 micron. Connect the outlet from the regulator to the 1/2" NPT connection by screwing the regulator to the nipple. Connect the 2" long 1/2" NPT nipple to the inlet of the regulator and then screw the outlet of the filter to the other end of this nipple.
2. Connect the air supply to the Regulator and Filter Assembly. Use the table on page 16 to ensure that the correct supply pipe is being used.
3. Turn on the supply air to the Regulator and adjust the Regulator to 10 psi. Ensure that the air flow is felt at the exit of the Integrated Air Entrainment system, along the flow path of the Pan, and at the discharge of the Pan. If not, then contact Eastern Instruments. If the air exiting the Integrated Air Entrainment system is not enough to clear the Pan, then adjust the regulator. However, if adjustment still does not get the desired results, even after it reaches 20 psi, then contact Eastern Instruments.
4. With air flowing, ensure that the Manual Zero is adjusted correctly according to the Centri-Flow[®] Meter Electronics manual and follow the Static Calibration procedure. Be aware that if the inlet pressure to the Integrated Air Entrainment system changes, this requires that the Manual Zero be rechecked or adjusted.
5. After verifying that the Manual Zero is not changing due to the air flow, the system is ready for product.



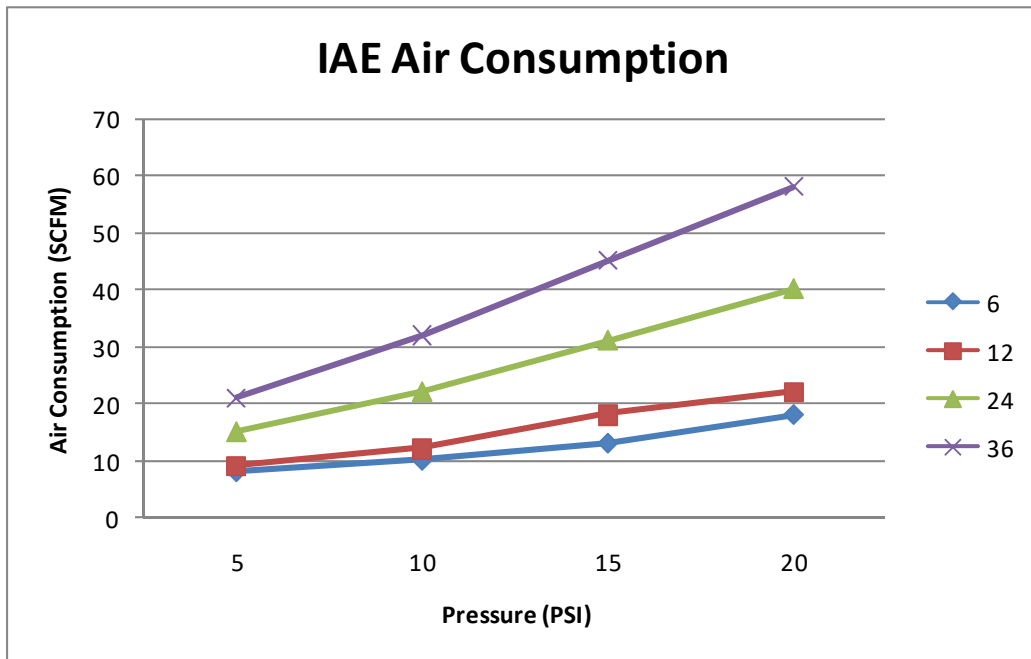


AIR CONSUMPTION:

The Integrated Air Entrainment system requires dry air and must remain clean to operate at peak levels. The purchased system doesn't contain an oil/water separator and the customer must ensure that the air is clean (provide their own separator). The supply line should be piped to a separator and then to the filter/regulator and then on to the IAE system. These should be installed as close to the IAE system as possible to reduce any condensation that could occur.



The graph below shows the typical air consumption in SCFM vs. the inlet pressure in PSI into the Integrated Air Entrainment system. To determine the air consumption first look for the size of the Integrated Air Entrainment system in the legend, on the right side, and then follow the graph for the pressure setting on the regulator.



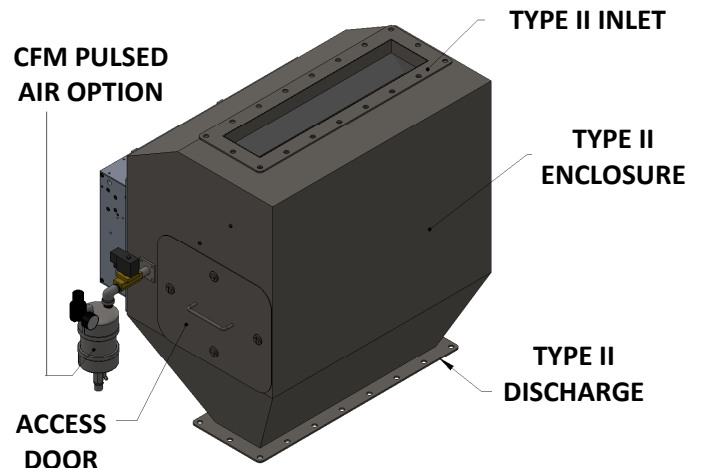


Pulsed Air System

If the CentriFlow[®] Meter was shipped with the Pulsed Air option please continue with the following directions.

PURPOSE:

The Pulsed Air System was designed to deliver a pulsed blast of air to the area in front of the Backplate and behind the Tangential Cover, as well as across the Measurement Pan. The use of this air is intended to aid in reducing product buildup on the Pan, Pan Arms, and behind the Tangential Plate. The blast of dry air should reduce buildup and greatly reduce miscalculations caused by buildup on and around the Pan without adversely affecting measurement.



REQUIREMENTS:

Included Components:

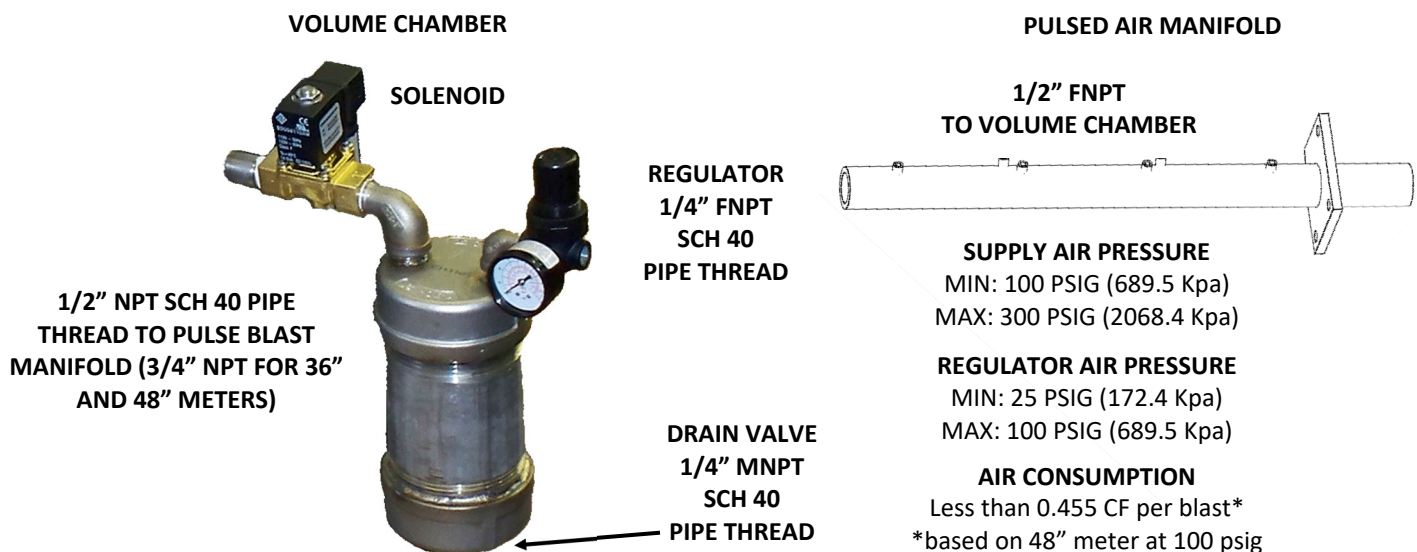
- Pulse Blast Manifold
- Pulsed Blast Air Chamber
- Pressure Regulator & Gauge

Also Required, Not Supplied:

- ✦ Air Tubing (Metal or Plastic – see below)
- ✦ Air Fittings with 1/4" NPT thread
- ✦ Pipe Thread Sealant

COMPRESSED AIR LINE SIZES:

All tubing should be Stainless Steel 3/4" Schedule 40 NPT whenever possible.





INSTALLATION DIRECTIONS

1. Install the Pulsed Air Manifold into the CentriFlow® Pan Cover so that the Flange on the Pulsed Air Manifold lines up with the Cut Out on the Pan Cover. If the meter was shipped with the Pulsed Air System, the Pulsed Air Manifold will already be installed.
2. Mount the Pulsed Air Volume Chamber to the Pulsed Air Manifold by connecting the 1/2" Male Pipe Thread Connection on the Volume Chamber to the 1/2" Female Pipe Thread Connection on the Pulsed Air Manifold. If the meter was shipped with the Pulsed Air System, the Pulsed Air Volume Chamber will already be installed.
3. Connect an air supply to your Pulsed Air System by tubing the regulator with clean dry instrument air of at least 25 psig (137.9 KPa). The inlet line can be ¼" tubing.
4. Run a power cable between the solenoid valve and the CFM Electronics. The normal operation of the solenoid valve is 24 VDC (some older models are 120 VAC or 240 VAC models). The valve is powered by the CentriFlow® Meter's electronics and does not need outside power, however a power cord to connect the solenoid valve to your digital electronics is required. The cord should be at least 18 Gauge, 2 Conductor Cable. Please see local requirements for whether Conduit or SO Cable is required. For normal use, do not exceed 250 ft of cable between the solenoid valve and your electronics enclosure.

OPERATION

1. The Pulsed Air duration, or time that each blast of air lasts, is a constant that is factory set at 100 ms and cannot be changed. The Pulsed Air Frequency, or the duration of time between pulsed blasts of air, can be changed, however. For more information on the Pulsed Air Frequency, please see the OPT. PULSEDAIR page in the HMI Screen Guide for more information.
2. The Lock Out Time, also found on the OPT.PULSEDAIR Page, is also factory set and should typically not be modified in the field. If modification is required, please contact Eastern Instruments.
3. Reduce the pressure on the regulator to the lowest pressure that will still ensure the proper cleaning of the measurement area. The lower the value of the pressure, the longer the life of the solenoid valve.

MAINTENANCE

1. Periodically check the operation by observing the pressure gauge located on the regulator. It will drop to ½ or more of the set pressure during the blast. If the pressure drop is not observed as the associated LED in the control box is lighting, then replace/clean the solenoid valve.
2. Drain the water from the Volume Chamber periodically until some pattern is established. If water is consistently found, consider adding an automatic drain to the volume chamber or improving the supply air quality. DO NOT allow water to fill the volume chamber and then spray into the meter measurement section.



Transducer Replacement

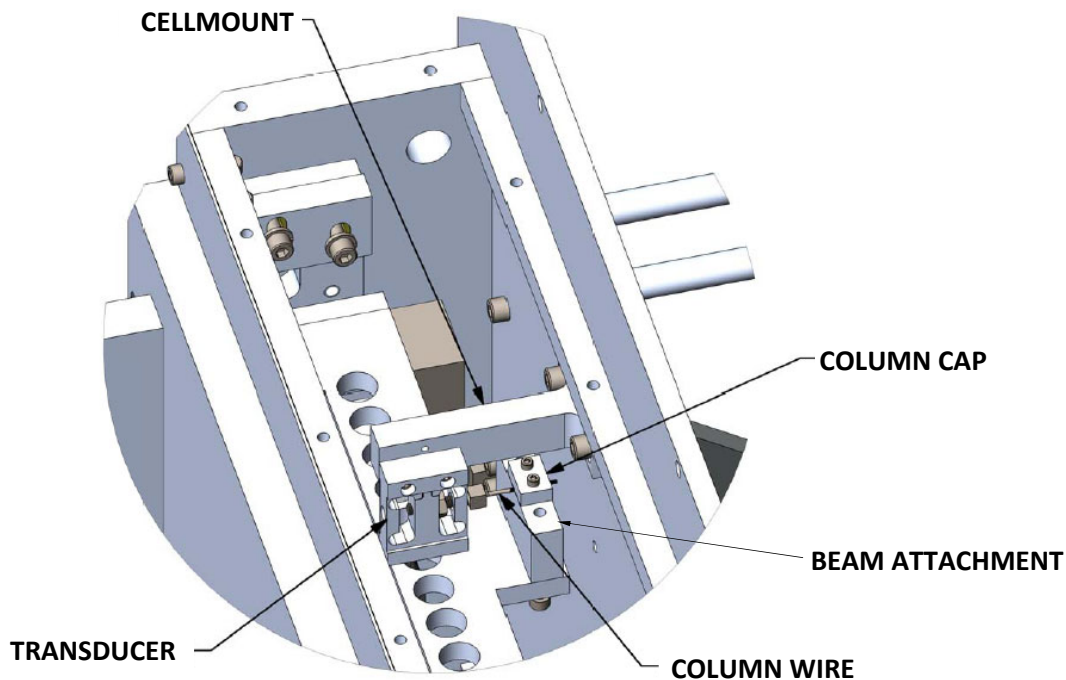
1. Disconnect power to the CentriFlow® Meter.
2. Remove the Seal Top.
3. Disconnect the leads from the Transducer to the Wago connector.
4. Remove the Column Cap holding the Transducer wire.
5. Remove the Transducer.
6. Make sure the Shipping Locks are not “Locked” when beginning the replacement. If the Transducer is being replaced at a location other than the installation point, the Shipping Locks should be locked while the meter is being moved.
7. Make sure that there is no product flowing through the system.

Installing a Transducer

1. Make sure that the CentriFlow® Meter is installed properly and securely. If the Transducer is being replaced in another location other than the installation point, set the meter at the exact same level so that the balance of the Pan is correct.
2. Fasten the Transducer, using the original screws with Removable Loctite 242 (Blue), to the Beam Attachment.
3. Connect the thin wires from the Transducer to the Wago connector putting them into their color-coded slots. Note: White and Red are mV output, Green and Black are 5.0Vdc input (10.0 Vdc for analog electronics with potentiometers).
4. Place a 0.010” (brown) shim (0.015” pink shim for meters with S/N prior to S/N 965) between the Upper Overtravel Screw and the Extra Weight on both sides. See diagram on page 23 for part identification.
5. Hang the calibration weight from the stud under the Pan.
6. Check that the Column Wire lies flat on the Beam Attachment and is perpendicular to the Backplate. If the wire does not sit flat or is not parallel to its surface, adjust the beam attachment to correct this. When the correct position is obtained, tighten the screws holding the Beam Attachment.
7. Install the new Column Cap over the Column Wire. Use Loctite 242 (Blue) on screws. Tighten the screws evenly and very slowly so as not to distort Column Wire. Tighten equally in steps until tightly torqued.
8. Remove the calibration weight(s) and shims.
9. Use a voltage meter to observe the output of the Transducer. Read between the red and white wires. An ideal installation will result in a 0.00 mV output; however, the meter will work within ± 0.35 mV (± 0.7 mV for analog) of 0.00 mV.
 - A. Retighten the Column Cap screws while monitoring the mV output from the Transducer. Adjusting the screws may help to counteract the force exerted on the Transducer during the tightening process.
 - B. If the output is not within the parameters, contact Eastern Instruments’ Technical Service Department at (910) 392-2490.



10. Check the gap between the Overtravels and the Counterweight by sliding the shims between them. The shims should fit under the Overtravel with very, very light friction. Be sure that the calibration weight is off the Pan and that the Pan is in a static state. This gap is the full motion of the Pan and needs to be as precise as possible.
11. Remove all the shims and the calibration weight.
12. Check the output for a 0 ± 0.35 mV (± 0.7 mV for analog) reading.
13. Reinstall the Shipping Locks (for transport purposes) if the meter is not at its installation point. If the meter is at its installation point, make sure that the Shipping Locks are not installed and that the Seal Top has been installed.



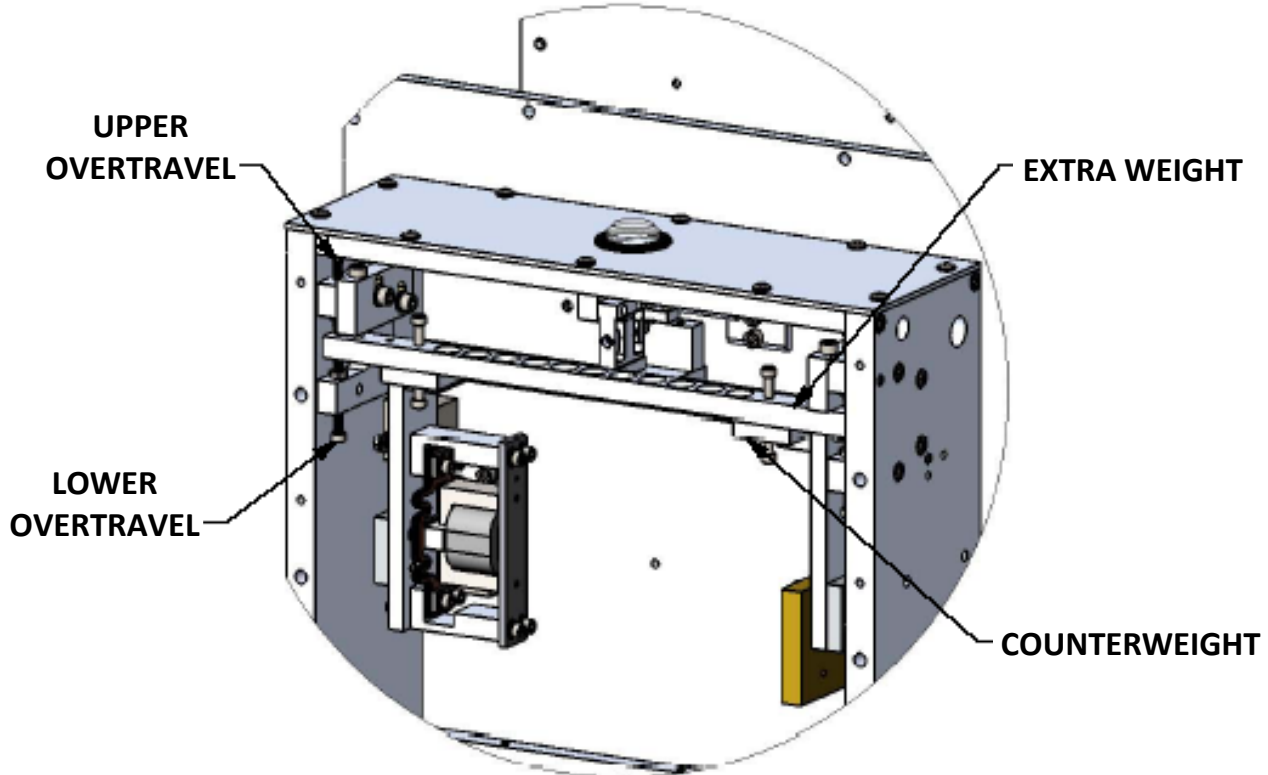
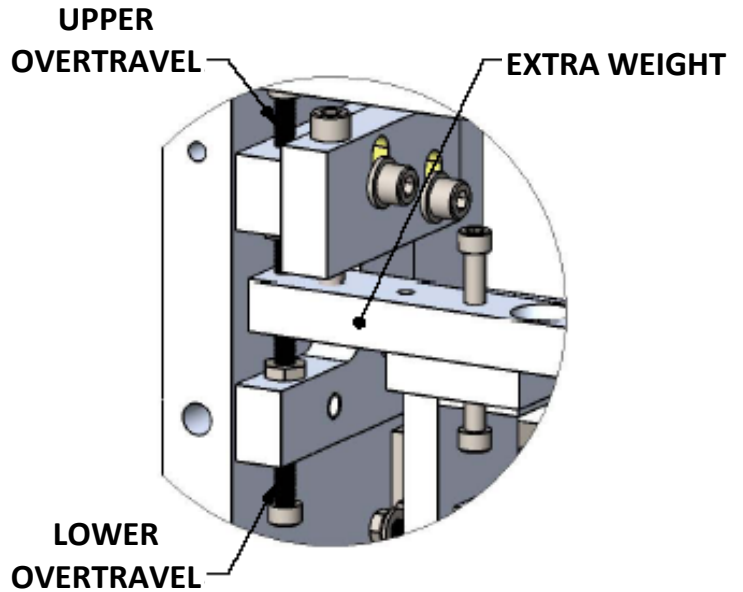
CFM-12 SHOWN WITH PARTS REMOVED FOR CLARITY



Overtravel and Counterweight Components

Drawing

CFM-12 SHOWN WITH PARTS
REMOVED FOR CLARITY





Flexure Replacement

PROTECTING THE TRANSDUCER

1. Power down the electronics and VibraWeigh® (if equipped). Then, Lock and Tag the electronics for safety.
2. Remove the Seal Top from the meter and install the Shipping Locks.
3. It is recommended that the Transducer be removed in order to protect the Transducer from being pulled or pushed as the meter is being moved.

REMOVING THE METER FROM THE INSTALLATION POINT (TYPE I OR II)

1. Disconnect the Transducer Cable & other power connections from their Wagos (connection terminals). Note: Take notes on the connections to help with reinstallation. There should be nothing connected to the meter that could hinder the removal of the meter from its installation point.
2. Unscrew the 8 screws holding the meter to the customer's installation location. When moving the meter, try to keep the Measurement Pan from coming into contact with anything.

Note: NEVER SUPPORT THE METER BY THE MEASUREMENT PAN!

3. Place the CentriFlow® Meter on a stable surface for repairs.
4. Remove the 6 Socket Head Cap Screws holding the Mount Assembly to the Meter Casing and remove the Mount Assembly.
5. Remove the Socket Head Cap Screws holding the Seal Plate to the Meter Casing.
6. Remove the Seal Plate from the casing, exposing the inner components of the meter.
7. Remove any silicone from the Meter Casing to prepare it for later reinstallation.

PREPARING THE METER FOR FLEXURE REPLACEMENT

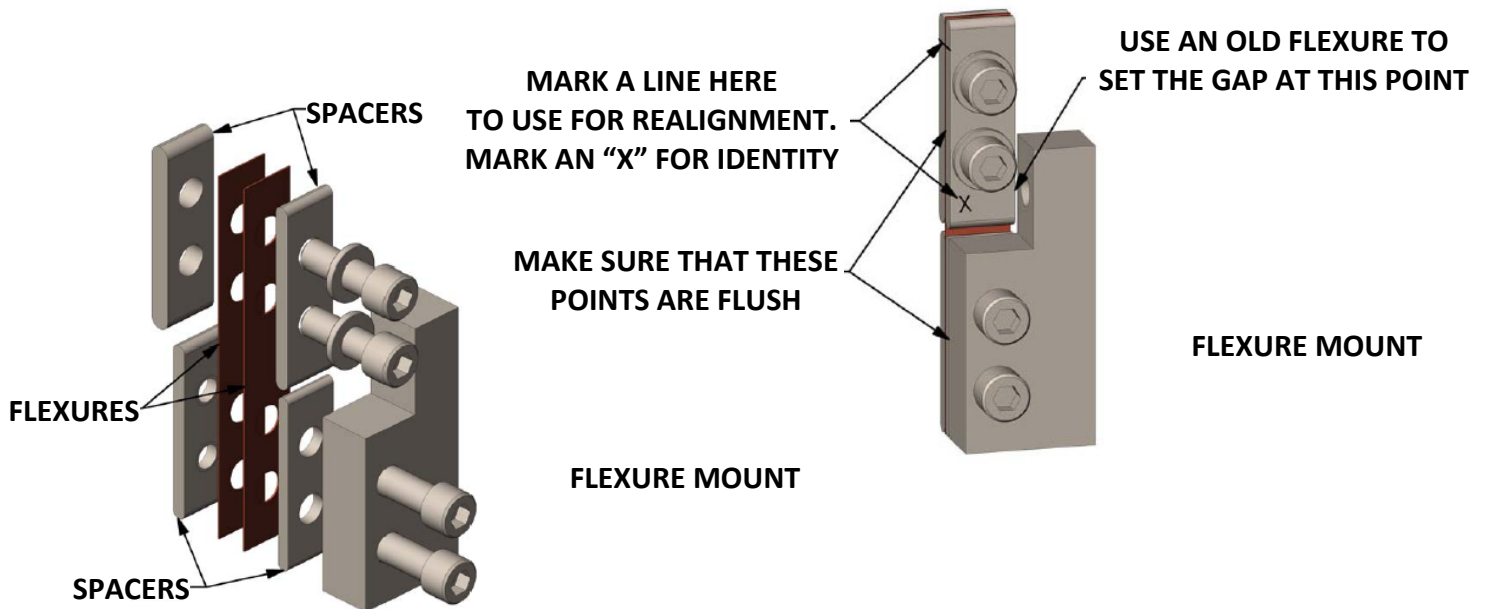
1. Remove the Shipping Locks.
2. Locate the Overtravel stops that encompass the Counterweight arm.
3. Place the 0.015" (brown) shims provided in the kit, on the top of the Counterweight. Slide these shims between the Counterweight and the Overtravel screws.
4. Push up on the Counterweight and place the 0.010" (brown) shims between the bottom of the Counterweight and the Lower Overtravel screws. This should be a good fit.
5. Using a marker, mark the Spacers beside the top screw of each Flexure assembly as seen in the picture. Also, put an "X" on the top Spacer for identification. This will allow you to line up the Spacers correctly in the next few steps.



REPLACING THE FLEXURES

1. Unscrew the 4 Socket Head Cap Screws that hold the Flexure Assembly together. Note: Replace only one side at a time, broken ones first. Generally, all the Flexures are replaced to ensure meter integrity even if they aren't broken.
2. Remove the old Flexure and reassemble with the new Flexure. Using the markings that you created on the Spacers, line up the Spacers in their original state. Replace the screws using Removable Loctite 242 (Blue), but do not tighten.
3. The Flexure Assembly needs to be flush on the sides so that the Spacers have equal pressure on the Flexure. Also, there needs to be a gap on the inside of the Flexure Mount assembly between the top Spacers and the Flexure Mount. To create this gap and to keep the sides flush, use the old Flexure. Run the old Flexure down the side of the assembly to ensure that the Spacers and the new Flexure are flush. Then, wedge the old Flexure into the space between the Flexure Mount and the top Spacer Assembly to establish a gap in which the Flexure Mount will be able to move. Tighten the screws when the gap is set and the assembly is flush on both sides. Remove the old Flexure shim for making the gap.
(Please see the illustrations below)
4. Repeat the replacement steps for all other Flexure Assemblies one at a time.

FLEXURE MOUNT ASSEMBLY





REBALANCING AND MOUNTING OF THE CENTRIFLOW® METER

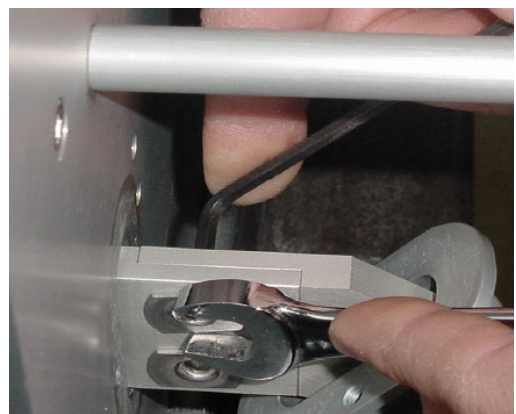
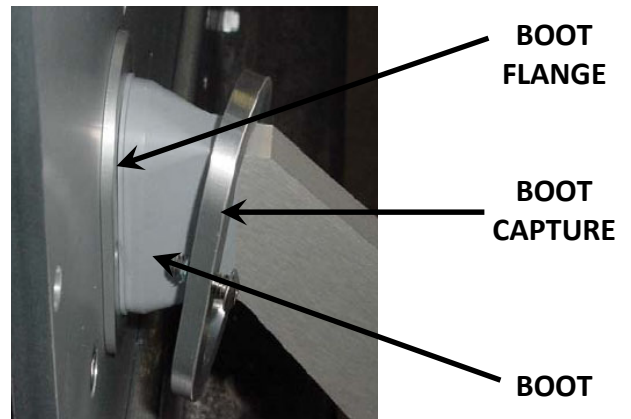
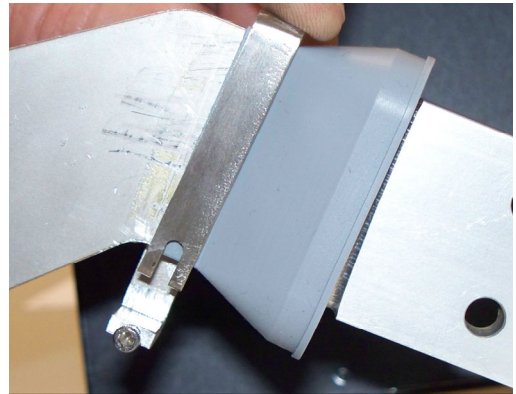
1. First, visually inspect the inner components to make sure all of the Flexure assemblies look correct and there is no debris left in the casing.
2. Put the meter at the installed angle 0°, 10°, or 20° (this is crucial).
3. Since the Transducer is not attached at the Column, the Pan Assembly should be free floating. The meter is a perfectly balanced system and must be mechanically balanced at the Overtravels. There must be a 0.015" gap on the Upper Overtravels and 0.010" on the Lower Overtravels.
4. Adjust the Overtravels to the correct gaps and test by lightly touching the Pan. You will see the meter's Pan Assembly and Counterweight move freely and balanced to those gaps. If they don't balance or move freely, find the rubbing spot and fix. If the Overtravels have to be changed significantly, check the angle that the meter is at and make sure you are at the factory angle of installation. Call the factory for questions.
6. Reinstall the Shipping Locks.
7. Reapply silicone to the entire Meter Casing perimeter neatly. This seal is important to keep out dust or any other particles that may affect the meter's performance. Make sure you don't get silicone on the Counterweight or Extra Weight.
8. Realign the Meter Casing and the Seal Plate and tighten in place with the original screws.
9. Wipe the excess silicone from the sides after the Seal Plate is tightened.
10. Reattach the Mount Assembly using the original screws and Removable Loctite 242 (Blue).
11. Reattach the Transducer Cable and Power Supply to their original positions.
12. Now the meter is ready for the Transducer to be reattached. See the Transducer Replacement Procedure (p. 21) to reinstall the Transducer or to replace it.



Pan Arm Boot Replacement Procedure

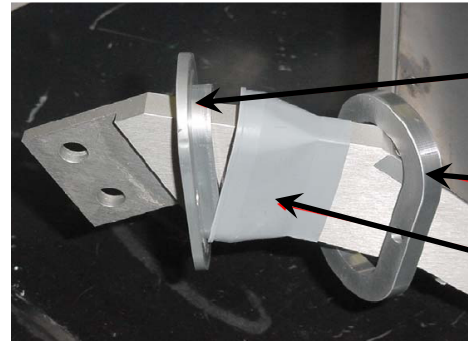
Before replacing the Pan Arm Boots, be sure that the Shipping Locks are installed and are in the locked position to protect the Transducer from damage. For proper Shipping Lock installation, please see pages 10-13.

1. If your meter has optional Boot Clamps as shown in the photograph (top), loosen the screws and remove them.
2. As shown in the photograph (center), remove the two Socket Button Head Cap Screws from the Boot Capture. You will need an 1/8" Hex Key.
3. Slide the Boot Capture, Boot and Boot Flange towards the Pan Section.
4. Repeat Steps 1 and 2 for each Pan Arm.
5. Before the Pan Arm assembly bolts are removed, ensure that the weight of the Pan is supported.
6. Remove the bolt and special nut that hold the Pan Arm to the Counterweight Arm as shown in the photo (bottom). To do this you will need a 1/2" open end wrench and a 5/32" Hex Key. Repeat this step for each Pan Arm.
7. Disconnect the Pan Arms from the Pan Arm Extension.
8. Once the Pan is removed from the Pan Arm Extension, remove the Boot Flange and the Boot from each Pan Arm, leaving the Boot Capture in place.
9. Ensure there is no debris or product in or around the Pan Arm Extension in the area where it protrudes through the Backplate.
10. Clean as needed.
11. Slip the new Boots over the Pan Arms.
12. Replace the Boot Flanges back onto the Pan Arms with the lip of the Boot Flange facing the Boot on the Pan Arm.





13. Ensure all Boot Captures, Boots, and Boot Flanges are correctly orientated on the Pan Arms before reinstalling the Pan Arms to the Pan Arm Extension. Refer to the photograph below.
14. All bolts need to have Loctite 242 (Blue) applied to them.
15. Reinstall all bolts and nuts in the same orientation that they were removed to reattach the Pan Arms to the Pan Arm Extension.
16. Make sure all bolts and nuts are tight before proceeding to the next step.
17. Slide the Boot Flange back against the Backplate then carefully slide the Boot back against the Boot Flange ensuring not to rip or tear the Boot.
18. Then make sure the Boot is properly seated on the Boot Flange with no folds or gathers in the Boot material.
19. Slip the Boot Capture back against the Boot and the Boot Flange and install the two bolts in the Boot Capture. Ensure bolts have Loctite 242 (Blue) on them.
20. Tighten the Boot Flange bolts on both sides of the Boot Capture until there is equal spacing between the Boot Flange and the Boot Capture. This gap should be approximately 0.015". Be sure not to over tighten.
21. Return Shipping Locks to the unlocked position.



**BOOT
FLANGE**

**BOOT
CAPTURE**

BOOT





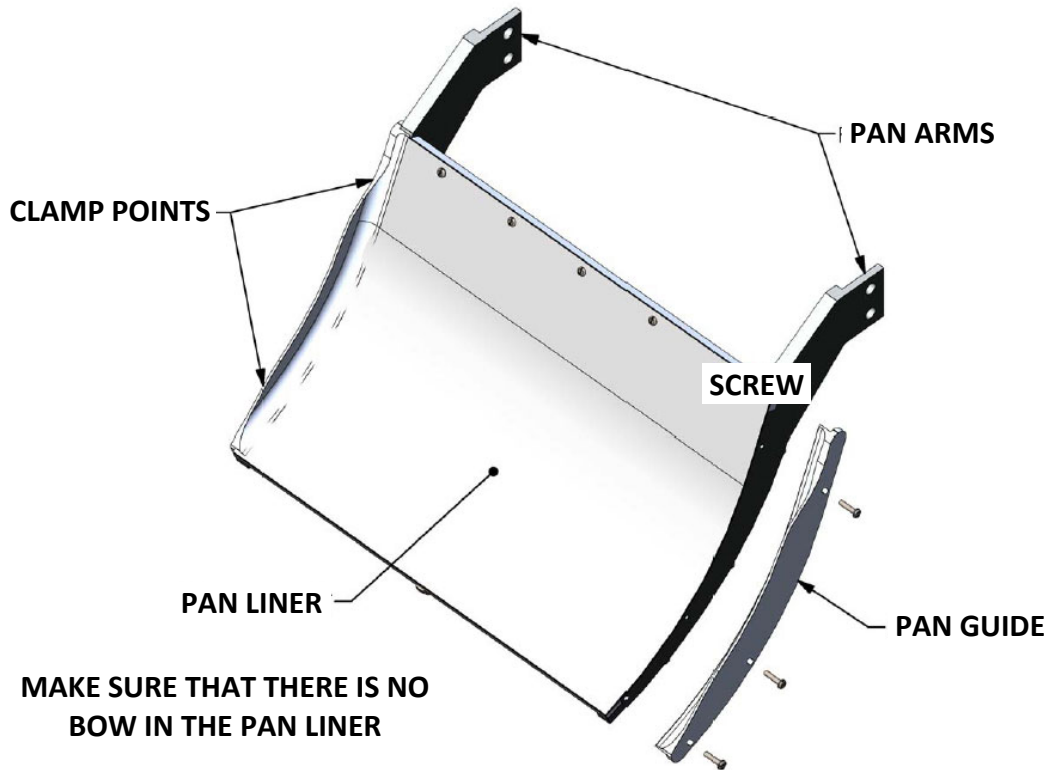
Pan Liner Replacement Procedure

Before any work is done on the meter, the Shipping Locks must be installed to protect the Transducer. A procedure for installing the Shipping Locks can be found on pages 12 and 13. Whether or not you are changing the Pan Liner with the meter in its installation point, the Shipping Locks must be put on. If the unit is a Type II meter and has only one Access Door, the unit must be removed from its enclosure to replace the Pan Liner. Once you have the Centri-Flow® Meter where you can work on it and the Shipping Locks are in place, follow the instructions below.

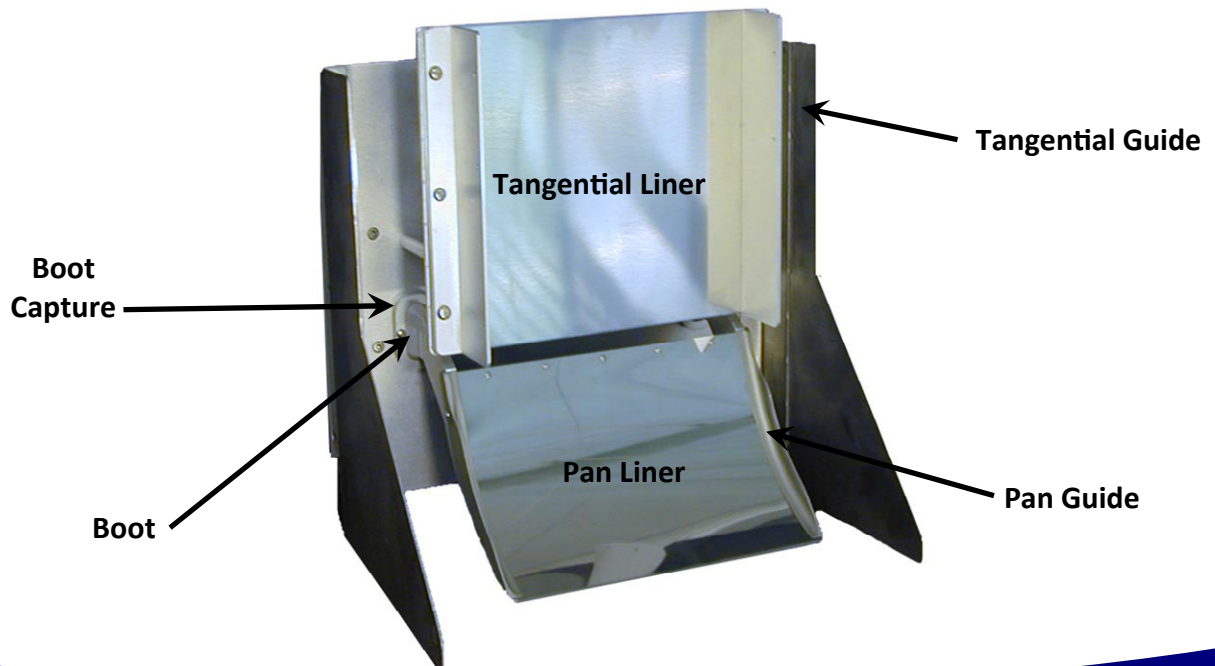
1. Take notice of the Pan Guides and which side they are on. They must be reattached in the exact same format. You may want to designate a left and right by marking a small L & R with a felt tip pen on the side of the Pan Guides. Make sure to use something that will not scratch them.
2. Remove the screws on the sides of the Pan Guides.
3. Remove the screws along the top of the Pan Liner and remove the old Pan Liner.
4. Clean any surfaces that may have collected product, including under the Pan Liner.
5. Realign the new Pan Liner with the polished surface up.
6. Using new screws with a small amount of removable Loctite 242 (Blue), reattach the Pan Liner along the top. Do not tighten.
7. Realign the proper Pan Guide to its original position and hold in place with small clamps (with rubber stops). If available, use a clamp with rubber stoppers on the Pan Guides. The clamp should have a piece of rubber or some other protective material between it and the Pan Guides. The Pan Liner should curve to fit the Pan Arm without gaps and without bowing the Pan in the middle.
8. Tighten the Pan Guides using new screws and lock washers.
9. Reinstall the other Pan Guide in the same way and be sure that the Pan Liner has no bow in the middle. If it does, loosen the Pan Guides and press down on the Pan Liner again while tightening the Pan Guides.
10. Tighten the screws along the top of the Pan Liner and make sure that the Pan Liner is flush on all Pan Arms.
11. Reinstall the meter if necessary and remove the Shipping Locks only after the meter is completely reinstalled. Check your Manual Zero and Static Calibration to make sure that no damage has been incurred during the procedure. These procedures are in the Electronics Installation and Operations Manual.



Pan Assembly Drawing



Meter Assembly Drawing





Frequently Asked Questions

1. I don't have any output from the meter, why?

- A. No power
 - i. Check the power supply.
 - ii. Make sure the four Electronics Panel interface connectors are firmly attached.
 - iii. Check the fuse on the back of the Electronics Panel.
- B. Analog or frequency signal not interfaced to the PLC
- C. Transducer problems
 - i. Make sure that the wire insulation is not pinched at the terminations.
 - ii. Check for 10.00Vdc (5.00 Vdc for digital) at the Transducer on the black and green wires.
 - iii. Inspect the Column Wire and the security of the Column Cap.
- D. MRT problems
 - i. Check the programming for errors.
 - ii. Check the input and output connections.
 - iii. Make sure you are not in the programming mode.
 - iv. Check optional relay status to make sure that you don't have an open contact. This is an option and the relays will be closed if the programming is set up correctly.
- E. Obstructions
 - i. The meter's Pan Assembly is unable to move because of product or other obstruction making contact.
 - ii. Inspect the Flexures.
 - iii. Make sure the Overtravel gaps are properly set.
 - iv. Make sure that there is nothing between the Extra Weight(s) and the back Seal Plate.
 - v. Shipping Locks are locked.
- F. Calibration issues
 - i. Check the Manual Zero and Static Calibration.
 - ii. Check the inhibit level.
 - iii. Check the optional Auto-Zero circuit for sampling mode.

2. Why can't I get a stable Manual Zero at 0.00V?

- A. The zero balance method is not complete
- B. Pan obstructions
 - i. Check for Pan obstructions.
 - ii. Check for product buildup on the Pan Assembly.
 - iii. Make sure the Overtravel gaps are properly set.
 - iv. Make sure that there is nothing between the Extra Weight(s) and the back Seal Plate.



- C. Inspect the Flexures
- D. Transducer problems
 - i. Make sure that the wire insulation is not pinched at the terminations.
 - ii. Check for 10.00Vdc at the Transducer on the black and green wires.
 - iii. Inspect the Column Wire and the security of the Column Cap.
 - iv. Ensure that the Transducer Cable is not coiled up in the Meter Casing, applying pressure on the Counterweight.
 - v. Ensure that the Transducer Cable runs inside conduit from the meter to the electronics.
- E. Electrical noise
 - i. Make sure that all connections are tight.
 - ii. Make sure all components are grounded properly.
 - iii. Isolate the power and output lines from all other devices and each other.
 - iv. Find the source of noise and remove/filter/suppress it.
- F. Air movement around the Pan
 - i. Shield the meter from air blowing directly on the Pan Assembly. (Air is mass and the CentriFlow® Meter will weigh it.)
- G. VibraWeigh® Calibration (Option)
 - i. Check to make sure the optional VibraWeigh® is turned on and operating with a smooth and constant vibration.

3. Why does the meter show output when there is no product flow?

- A. Manual Zero
 - i. Check the Manual Zero and Static Calibration to ensure proper setup.
- B. Transducer problems
 - i. Inspect the Column Wire.
- C. Electrical noise
 - i. Make sure all components are grounded properly.
 - ii. Isolate the power and output lines from all other devices and each other.
 - iii. Find the source of noise and remove/filter/suppress it.
- D. Air movement around the Pan
 - i. Shield the meter from air blowing directly on the Pan Assembly. (Air is mass and the CentriFlow® Meter will weigh it.)
- E. VibraWeigh® Calibration (Option)
 - i. Check to make sure the optional VibraWeigh® is turned on and operating with a smooth and constant side-to-side vibration.
- F. Pan obstructions
 - i. Look for product buildup on the Pan Assembly.
 - ii. Make sure the Overtravel gaps are properly set.
 - iii. Make sure that there is nothing between the Extra Weight(s) and the back Seal Plate.
 - iv. Shipping Locks are locked.
 - v. Eliminate vibration from other areas.



4. Why is my accuracy not to specification?

- A. Incorrect site calibration
 - i. Perform Static Calibration and site calibration methods.
- B. Manual Zero shift
 - i. Check for buildup on the Pan Assembly.
- C. Check for electrical noise
 - i. Make sure all components are grounded properly.
 - ii. Isolate the power and output lines from all other devices and each other.
 - iii. Find the source of noise and remove/filter/suppress it.
- D. Check for air movement around the Pan
 - i. Shield the meter from air blowing directly on the Pan Assembly. (Air is mass and the CentriFlow® Meter will weigh it.)
- E. Check the flowability of your product to make sure that it is not varying
 - i. Decrease pulsations and give the meter a continuous product presentation.
 - ii. Use optional liners for decreased product resistance.
- F. Check for physical damage on the meter

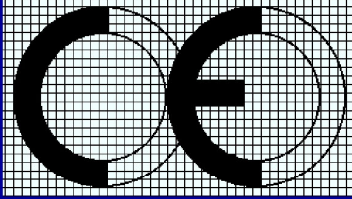
5. Why do the CentriFlow® Meter Electronics and the PLC rates not agree?

- A. MRT programming
 - i. Check the programming for errors.
 - ii. Check the wiring for good connections.
 - iii. Check to make sure that the electronic full scale, proportional to the 4-20mA signal, is set up the same in the PLC.
- B. Loop power
 - i. The CentriFlow® Meter provides its own power and should not have loop power coming from the PLC .
- C. Analog signal is not calibrated
 - i. Contact the factory for assistance.
- D. The PLC scan time is too slow
 - i. If the scan time of the PLC is more than 50ms, it may lose too many data points.
 - 1. Use the optional MRT's output and increase the normalizing factor, averaging function, to smooth the 4-20mA signal.
 - 2. Increase the scan time.
 - 3. Switch to the frequency output and use a counter card in the PLC.
- E. Wiring
 - i. Check all wiring from the meter to the PLC.

** Always disconnect the power and inspect for visible physical damage before servicing.



E A S T E R N I N S T R U M E N T S



Barclay-Phelps

CE MARKING SPECIALISTS

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CERTIFICATE & DECLARATION OF CONFORMITY FOR CE MARKING

Company contact details:

Eastern Instruments
416 Landmark Drive, Wilmington, NC 28412, USA

Eastern Instruments declares under their sole responsibility that their:

CFM - CentriFlow Meter Series
CFL - CentriFlow Low Flow Rate Meter Series
LDM - Low Density Meter Series
HDM - High Density Meter Series

comply with the Essential Requirements of the following EU Directives:

Machinery Directive 2006/42/EC
Low Voltage Directive 2006/95/EC
Electromagnetic Compatibility Directive 2004/108/EC
RoHS 2 Directive 2011/65/EU

and further conform with the following EU Harmonized Standards as applicable:

EN 61010-1:2010
EN 61326-1:2013
EN ISO 4414:2010

Dated: 13 November 2015

Position of signatory: Technical Director

Name of Signatory: Robert Otto Brandt, Jr.

Signed below:

on behalf of Eastern Instruments