



EASTERN INSTRUMENTS



# CentriFlow® Meter

*BWS METER MODULE  
INSTALLATION & OPERATION  
MANUAL*

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REV 02/17

ORIGINAL LANGUAGE

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**TABLE OF CONTENTS**

**Safe Operation**..... 3  
**Warnings and Cautions** ..... 3  
**Safety Placards** ..... 4  
**Installation Guidelines** ..... 5  
Requirements..... 5  
Special Requirements ..... 5  
**BWS Configuration** ..... 6  
**Mounting** ..... 7  
**Type II Mounting Procedures: To Various Feed Devices** ..... 8  
**Shipping Locks** ..... 9  
Removing the Shipping Locks ..... 9  
Reinstalling the Shipping Lock ..... 10  
**Grounding the CentriFlow Meter Module** ..... 11  
**Transducer Replacement** ..... 12  
Installing a Transducer ..... 12  
**Pan Arm Boot Replacement Procedure**..... 14  
**Certificate of Conformance**..... 16



## 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 mounted to the rear of the CentriFlow Meter 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.



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

## **SAFETY PLACARDS**

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



### **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.
- The mass of the mount should be at least two times the mass of the meter .
- The meter should be mounted using the mount inlet and bottom discharge only. The mounting method should minimize vibration and movement.
- 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.

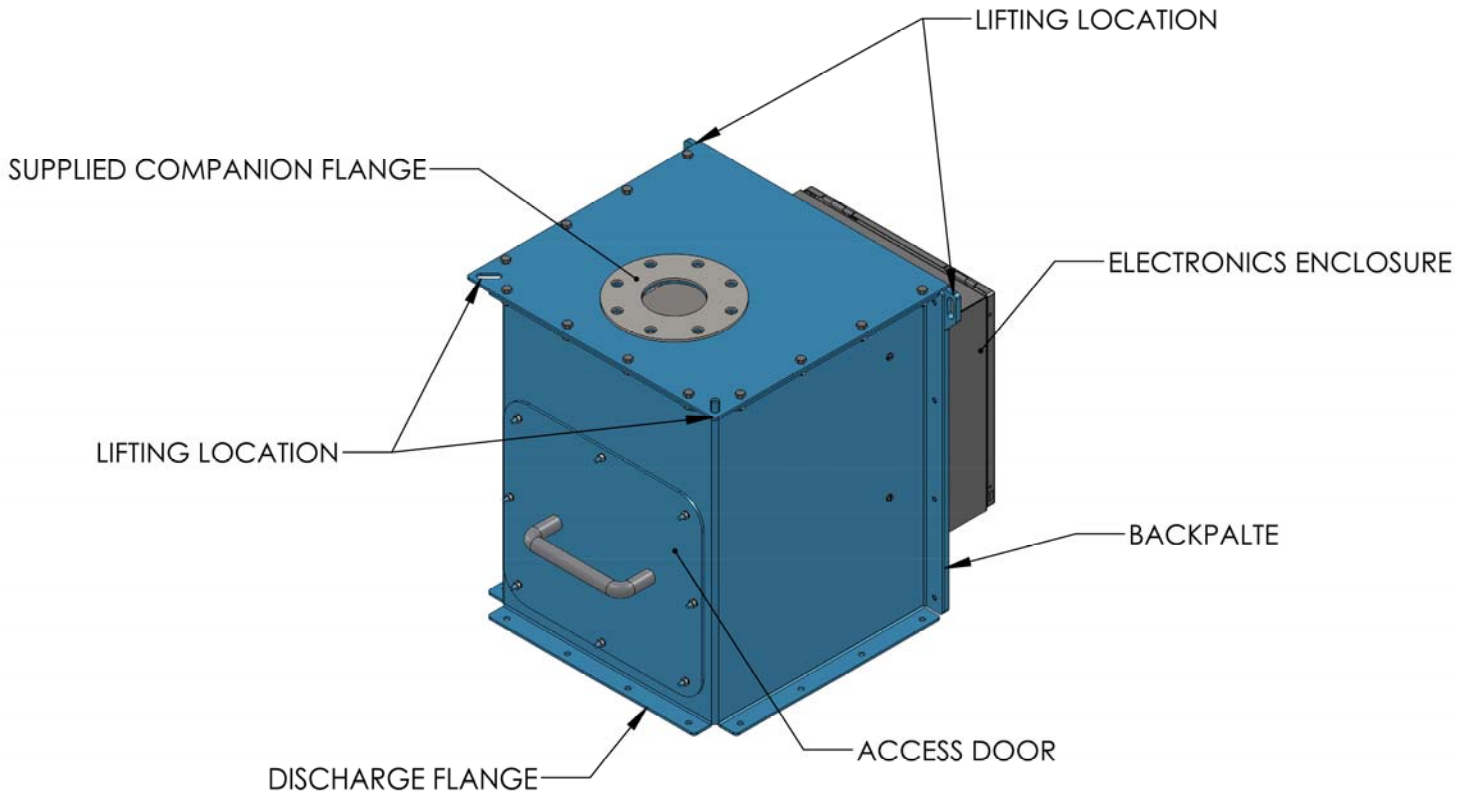
### SPECIAL REQUIREMENTS

- The CentriFlow® Meter is balanced at a specific angle and should not be subject to excess vibration or movement.
- The rear access panel should be closed 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.





**BWS CONFIGURATION**

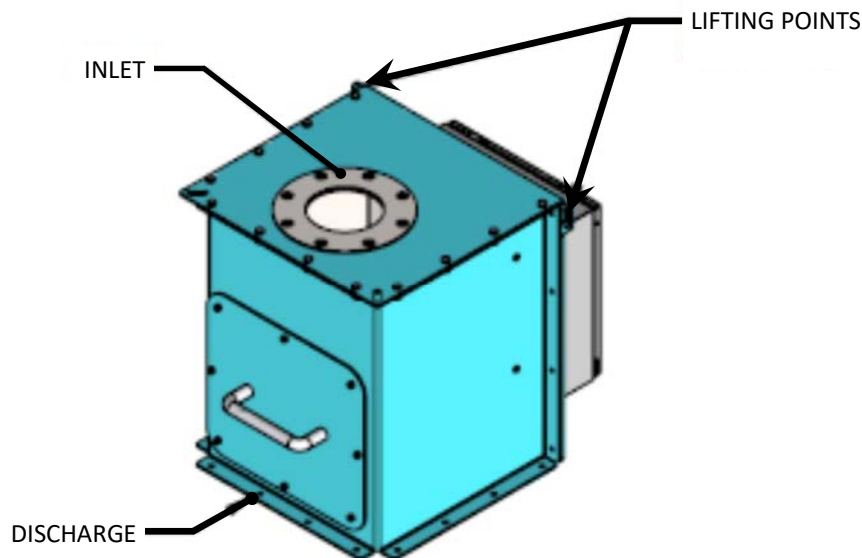




## Mounting

When installing the CentriFlow® Meter, great care should be taken as 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 buildup with product, resulting in output error.

When Mounting the CentriFlow® Meter, it is important that the meter should be held by means of the top inlet and the bottom discharge. These are a series of 3/4" through holes spaced evenly on the bolt circle. 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.



Because of the rugged construction of the meter's enclosure, it can be used as a means of supporting and mounting the meter. Again, the supplied Inlet Companion Flange should hold the meter in place and support the entire weight of the meter and the enclosure. The Discharge Flange on the top inlet should be used to support the weight of the CentriFlow Meter. There is an Access Door located on the front of the unit as well as an enclosure door on the rear of the meter. These access doors must not be blocked and must remain accessible at all times as they are used to gain access to the Meter Module and electrical assembly for cleaning, calibration, maintenance and wiring.



## 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.

### **Average Drop Height from Feed Device**

<b>AVERAGE DROP HEIGHT:</b>	<b>STANDARD:</b> 1" (25.4 mm)
	<b>PREFERRED:</b> 0.5" - 8.5" (12.7—215.9 mm)
	<b>MAXIMUM:</b> 0—32.5" (0—825.5 mm)





## Shipping Locks



### REMOVING THE SHIPPING LOCKS

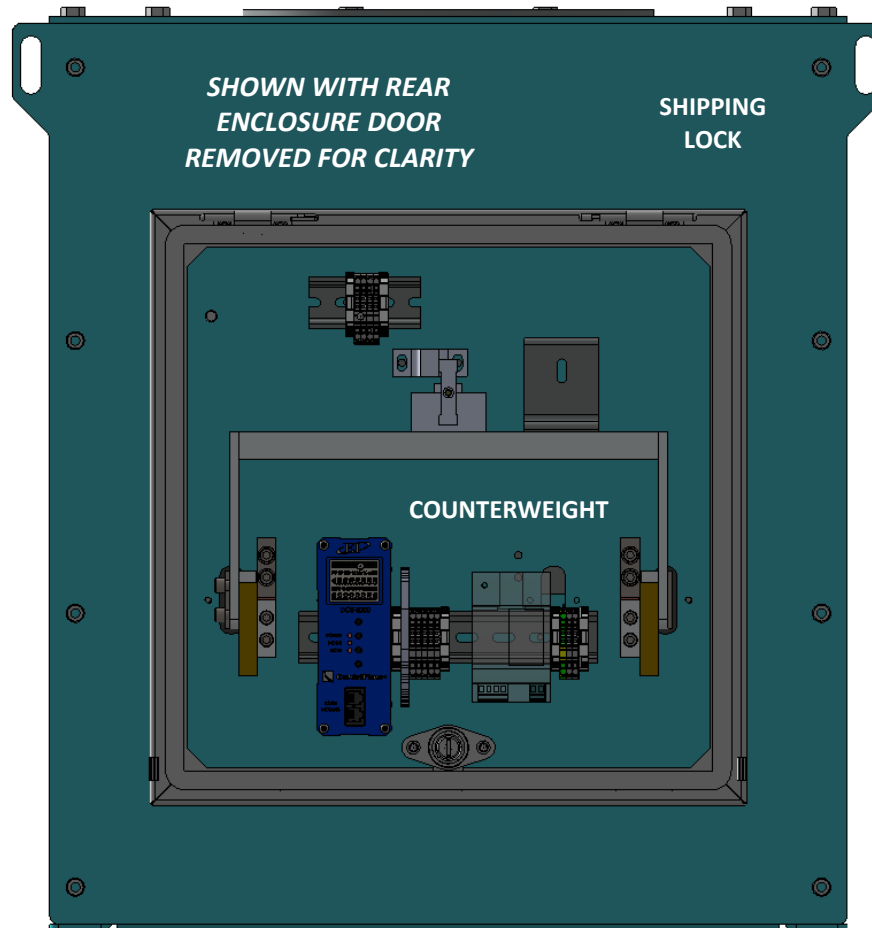
**NOTE:** Do not remove the shipping lock until the meter has been installed and you are ready to begin running product.

**Step 1.** Open the Rear Enclosure Door on the rear of the meter.

**Step 2.** Locate the Shipping Lock as per the above drawing.

**Step 3.** With a 3/16" hex key, loosen and remove the hex cap screw that attached the Shipping Lock to the CounterWeight.  
*Take care not to lose the bolt.*

**Step 4.** Loosen the screw that attaches the Shipping Lock to the backplate. With the screw loosened, push up on the shipping lock bracket as far as it will go and then retighten the screw. The shipping lock should not be touching the counterweight in any way.



### REINSTALLING THE SHIPPING LOCKS

- Step 1.** Open the Rear Enclosure Door on the rear of the meter.
- Step 2.** With a 3/16" hex key Loosen the screw that attaches the Shipping Lock to the backplate. With the screw loosened, push down on the shipping lock bracket as far as it will go. The shipping lock should now be touching the counterweight.
- Step 3.** Tighten the screw that attaches the Shipping Lock to the Counterweight.
- Step 4.** Now tighten the screw that attaches the Shipping Lock to the Backplate.



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## 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!





## Transducer Replacement

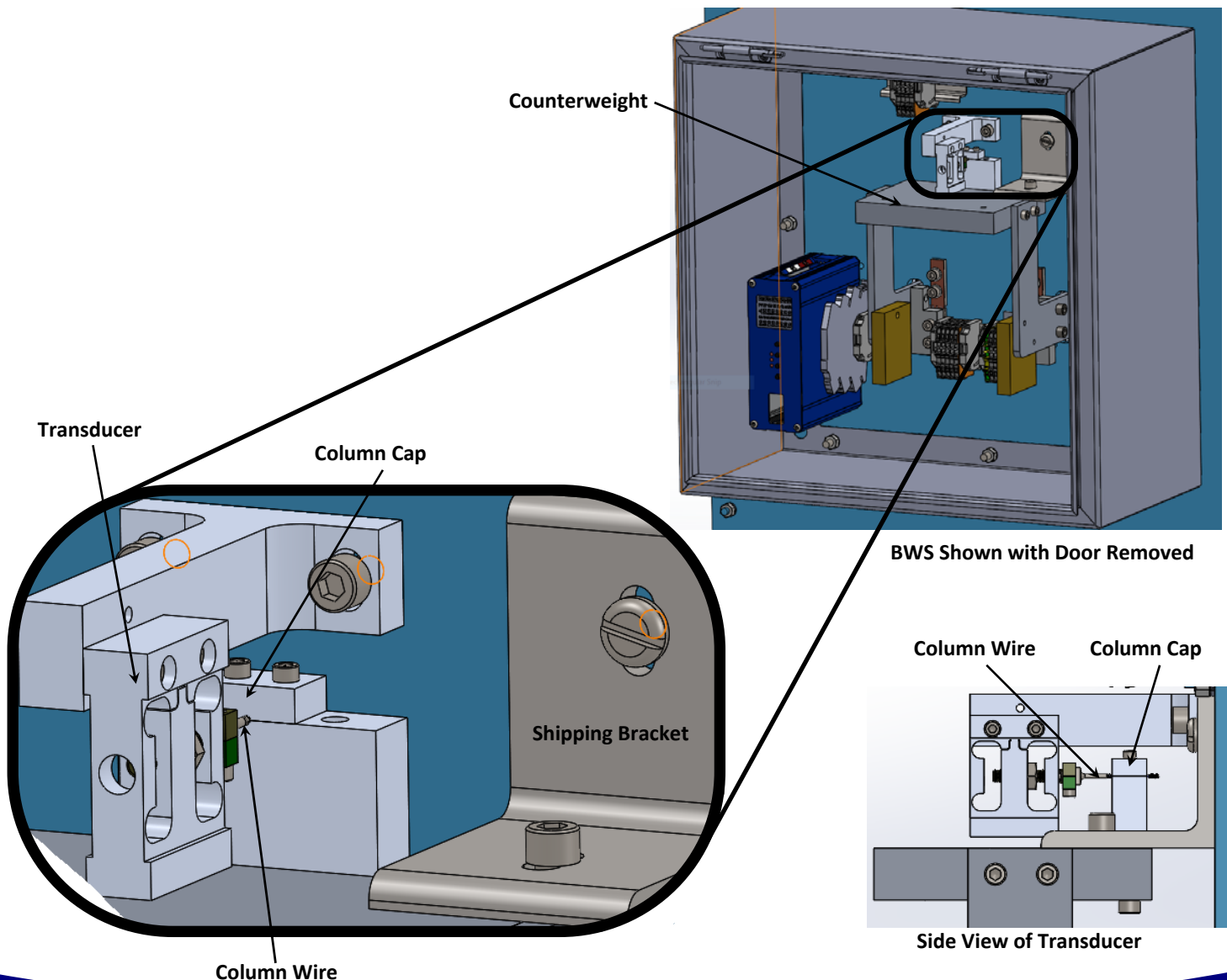
1. Disconnect power to the CentriFlow® Meter.
2. Make sure that there is no product flowing through the system.
3. Make sure the Shipping Lock is not “Locked” when beginning the replacement. If the Transducer is being replaced at a location other than the installation point, the Shipping Locks should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

### **Installing a Transducer**

1. Make sure that the CentriFlow® Meter BWS 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. Check that the Column Wire lays 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. Normally in a replacement scenario, no adjustment should be needed.
5. Install the new Column Cap over the Column Wire. Note: Column Caps can be flipped over once to use a fresh clamping surface. Before tightening screws, be sure to use Loctite 242 (Blue) on the screws.
6. Use a small square on the backplate and slide it up to the bottom of the counterweight to ensure that the backplate and the counterweight are perpendicular to each other.
7. Very lightly tighten the Column Cap screws evenly and very slowly so as not to distort the Column Wire. Tighten just enough to hold the counterweight in place.
8. Install the shipping lock to prevent the mechanism from moving during the tightening of the Column Cap screws. *Please note that it is important not to bump the mechanism or apply too much force when replacing the Shipping Lock at this step to prevent damage to the new Transducer Assembly or Column Wire.*
9. Tighten the screws evenly and very slowly so as not to distort the Column Wire or move the assembly. Tighten equally in steps until tightly torqued.
10. Remove Shipping Lock once Column Cap screws are tightened completely.



11. Use a voltage meter to observe the output of the Transducer. Read between the red and white wires. The desirable installation would result in a 0.00 mV output; however, the meter will work within  $\pm 0.35$  mV ( $\pm 0.7$  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. Loosen the Column Cap screws and repeat steps 6—11.
  - B. If the output is not within the parameters, contact Eastern Instruments' Technical Service Department at (910) 392-2490.
12. 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 Rear Enclosure Door has been closed.





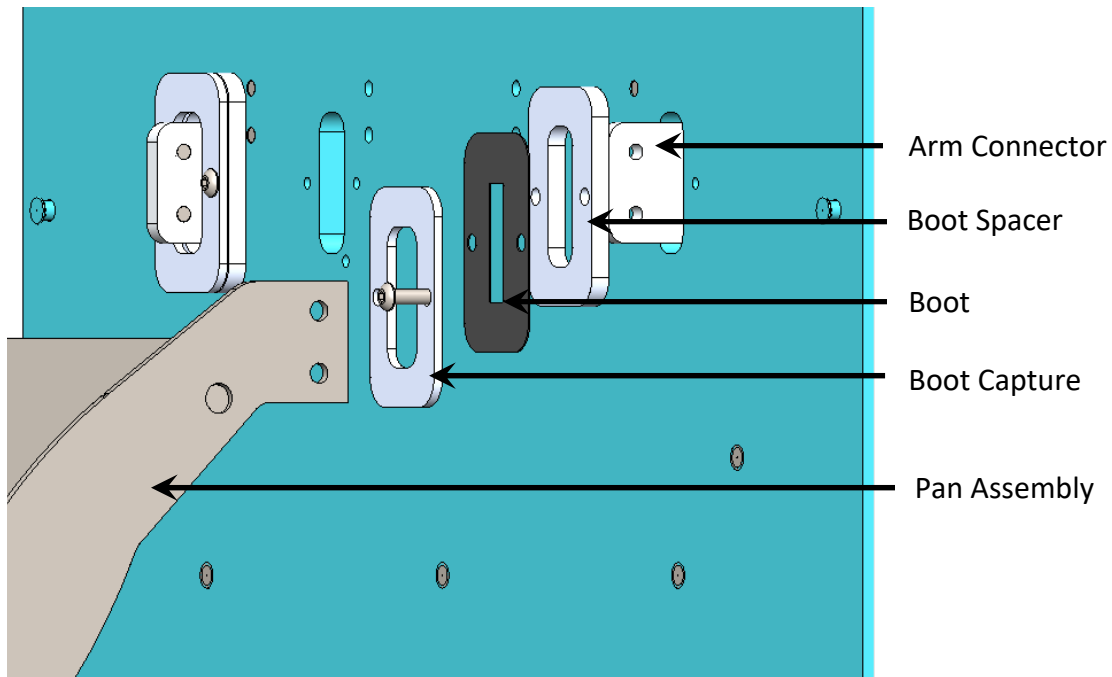
## Pan Arm Boot Replacement Procedure

Before replacing the Pan Arm Boots, be sure that the Shipping Locks are installed and are in the locked position in order to protect the Transducer from damage. For proper Shipping Lock installation, please see the Shipping Lock section within this manual.

1. Remove the two Socket Button Head Cap Screws from the Boot Capture. You will need an 1/8" Hex Key.
2. Slide the Boot Capture, Boot and Boot Spacer towards the Pan Section.
3. Repeat Steps (1 and 2) for each Pan Arm.
4. Before the Pan Arm assembly bolts are removed, ensure that the weight of the Pan is supported.
5. Remove the bolt and special nut that holds the Pan Arm to the Arm Connector. 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.
6. Disconnect the Pan Arms from the Arm Connector.
7. Once the Pan is removed from the Arm Connector, remove the Boot Capture and the Boot from each Pan Arm, leaving the Boot Spacer in place.
8. Ensure there is no debris or product in or around Arm Connector in the area where it protrudes through the Backplate.
9. Clean as needed.
10. Slip the new Boots over the Pan Arms.
11. Place the Boot Captures and the Boots on to the Pan Arms with the lip of the Boot Capture facing the Boot on the Pan Arm.
12. Ensure all Boot Captures, Boots, and Boot Spacers are correctly orientated on the Pan Arms before reinstalling the Pan Arms to the Pan Arm Extension. Refer to the photograph below.
13. All bolts need to have Loctite 242 (Blue) applied to them.
14. Reinstall all bolts and nuts in the same orientation that they were removed to reattach the Pan Arms to the Pan Arm Connectors.

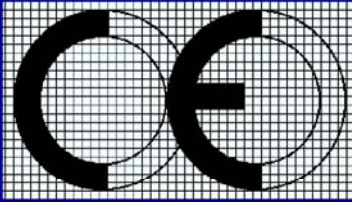


13. Make sure all bolts and nuts are tight before proceeding to the next step.
14. Slide the Boot Spacer back against the Backplate then carefully slide the Boot back against the Boot Spacer ensuring not to rip or tear the Boot.
15. Ensure the Boot is properly seated on the Boot Spacer with no folds or gathers in the Boot material.
16. Slip the Boot Capture back against the Boot and the Boot Spacer and install the two bolts in the Boot Capture. Ensure bolts have Loctite 242 (Blue) on them.
17. 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.
18. Return Shipping Locks to the unlocked position.





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**Barclay-Phelps**

CE MARKING SPECIALISTS

Hoi Yuen Road, Kwun Tong, Kowloon, Hong Kong

## 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