

# Vane Meter

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## Installation and Operation Manual



## **Brodie Meter Co., LLC**

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## Essential Instructions

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Brodie Meter Co., LLC designs, manufactures and tests its products to meet many national and international standards. Because these instruments are sophisticated technical products, you must properly install, use and maintain them to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and integrated into your safety program when installing, using and maintaining Brodie Meter Co., LLC products.

- Read all instructions prior to installing, operating, and servicing the product. If this instruction manual is not the correct manual, telephone 1-912-489-0200 and the requested manual will be provided. Save this instruction manual for future reference.
- If you do not understand any of the instructions, contact your Brodie representative for clarification.
- Follow all warnings, cautions, and instructions marked on and supplied with the product.
- Inform and educate your personnel in the proper installation, operation, and maintenance of the product.
- Install your equipment as specified in the installation instructions of the appropriate instruction manual and per applicable local and national codes. Connect all products to the proper electrical and pressure sources.
- To ensure proper performance, use qualified personnel to install, operate, update, program, and maintain the product.
- When replacement parts are required, ensure that qualified people use replacement parts specified by the manufacturer. Unauthorized parts and procedures can affect the product's performance and place the safe operation of your process at risk. Look-alike substitutions may result in fire, electrical hazards, or improper operation.
- Ensure that all equipment doors are closed and protective covers are in place, except when maintenance is being performed by qualified persons, to prevent electrical shock and personal injury.

## Notice

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Brodie Meter Co., LLC ("Brodie") shall not be liable for technical or editorial errors in this manual or omissions from this manual. **Brodie makes no warranties, express or implied, including the implied warranties of merchantability and fitness for a particular purpose with respect to this manual and, in no event, shall Brodie be liable for any special or consequential damages including, but not limited to, loss of production, loss of profits, etc.**

**Product names used herein are for manufacturer or supplier identification only and may be trademarks/registered trademarks of these companies.**

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Brodie does not assume responsibility for the selection, use or maintenance of any product. Responsibility for proper selection, use and maintenance of any Brodie product remains solely with the purchaser and end-user.

**Brodie Meter Co., LLC  
Statesboro, Georgia, USA**

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## Warranty

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**1. LIMITED WARRANTY:** Subject to the limitations contained in Section 2 herein and except as otherwise expressly provided herein, Brodie Meter Co., LLC (“Brodie”) warrants that the firmware will execute the programming instructions provided by Brodie, and that the Goods-manufactured or Services provided by Brodie will be free from defects in materials or workmanship under normal use and care until the expiration of the applicable warranty period. Goods are warranted for twelve (12) months from the date of initial installation or eighteen (18) months from the date of shipment by Brodie, whichever period expires first. Consumables and Services are warranted for a period of 90 days from the date of shipment or completion of the Services. Products purchased by Brodie from a third party for resale to Buyer (“Resale Products”) shall carry only the warranty extended by the original manufacturer. Buyer agrees that Brodie has no liability for Resale Products beyond making a reasonable commercial effort to arrange for procurement and shipping of the Resale Products. If Buyer discovers any warranty defects and notifies Brodie thereof in writing during the applicable warranty period, Brodie shall, at its option, promptly correct any errors that are found by Brodie in the firmware or Services, or repair or replace F.O.B. point of manufacture that portion of the Goods or firmware found by Brodie to be defective, or refund the purchase price of the defective portion of the Goods/Services. All replacements or repairs necessitated by inadequate maintenance, normal wear and usage, unsuitable power sources, unsuitable environmental conditions, accident, misuse, improper installation, modification, repair, storage or handling, or any other cause not the fault of Brodie are not covered by this limited warranty, and shall be at Buyer’s expense. Brodie shall not be obligated to pay any costs or charges incurred by Buyer or any other party except as may be agreed upon in writing in advance by an authorized Brodie representative. All costs of dismantling, reinstallation and freight and the time and expenses of Brodie’s personnel for site travel and diagnosis under this warranty clause shall be borne by Buyer unless accepted in writing by Brodie. Goods repaired and parts replaced during the warranty period shall be in warranty for the remainder of the original warranty period or ninety (90) days, whichever is longer. This limited warranty is the only warranty made by Brodie and can be amended only in a writing signed by an authorized representative of Brodie. Except as otherwise expressly provided in the Agreement, THERE ARE NO REPRESENTATIONS OR WARRANTIES OF ANY KIND, EXPRESS OR IMPLIED, AS TO MERCHANTABILITY, FITNESS FOR PARTICULAR PURPOSE, OR ANY OTHER MATTER WITH RESPECT TO ANY OF THE GOODS OR SERVICES. **It is understood that - corrosion or erosion of materials is not covered by our guarantee.**

**2. Limitation Of Remedy And Liability:** Brodie Shall Not Be Liable For Damages Caused By Delay In Performance. The Sole And Exclusive Remedy For Breach Of Warranty Hereunder Shall Be Limited To Repair, Correction, Replacement Or Refund Of Purchase Price Under The Limited Warranty Clause In Section 1 Herein. In No Event, Regardless Of The Form Of The Claim Or Cause Of Action (Whether Based In Contract, Infringement, Negligence, Strict Liability, Other Tort Or Otherwise), Shall Brodie’s Liability To Buyer And/Or Its Customers Exceed The Price To Buyer Of The Specific Goods Manufactured Or Services Provided By Brodie Giving Rise To The Claim Or Cause Of Action. Buyer Agrees That In No Event Shall Brodie’s Liability To Buyer And/Or Its Customers Extend To Include Incidental, Consequential Or Punitive Damages. The Term “Consequential Damages” Shall Include, But Not Be Limited To, Loss Of Anticipated Profits, Loss Of Use, Loss Of Revenue And Cost Of Capital.

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## 1.0 Introduction

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### 1.1 Meter Description

Brodie Meter Co., LLC manufactures two Model 790 Series Vane Meters:

- Model 792A
- Model 793A

All Brodie Vane Meters include the following features:

- Only one moving part
- Constructed of corrosion-resistant materials
- Hermetically sealed register with magnetic drive
- Teflon-coated magnets and select grade carbon bushings
- Separate stainless steel rotor shaft
- Permanent volume record via non-resettable totalizer
- Full range accuracy
- Register isolated from line pressure

### 1.2 Specifications

The following specifications apply to the meter unless otherwise noted.

#### Ratings

- Maximum Working Pressure: 5,000 psi; 34,500 kPa
- Maximum Working Temperature: 180 F, 82 C

#### Performance

- Accuracy: + or - 2.5% over 10 to 1 range
- Repeatability: + or - .1

#### Connections

- One-Inch FNPT Inlet and Outlet

#### Registration

- Units of Measure: Six-Digit Totalizer, Straight Reading Register in BBLs. or Cubic Meters.
- Smallest Division 1/100 BBL or 1/1000 Cubic Meters.

#### Pressure Drop

- Model 792A: 5 psi, 34.5 kPa at maximum flow
- Model 793A: 20 psi, 138 kPa at maximum flow

#### Flow Capacity

- Model 792A: 3 to 30 BPH (.45 to 4.5 M3/hr.)
- Model 793A: 7 to 75 BPH (1.1 to 11.9 M3/hr.)

#### Viscosity

220 S.S.U./40 CP/50 CST Maximum

#### Materials of Construction

- Upper Case: Ni-Resist/Ductile Iron
- Lower Case: Ni-Resist/Ductile Iron
- Rotor: Glass-Filled Polypropelene
- O-Rings: Buna N
- Rotor Shaft: 316 Stainless Steel
- Other Wetted Parts: 316 Stainless Steel

## 2.0 Receipt of Shipment

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When you receive your meter, inspect the outside of the packing case for damage which may have incurred during shipping. **Damage incurred during shipment is the responsibility of the carrier and is not part of the factory warranty.** If the package is in good condition remove the envelope containing the packing list and carefully remove the meter and all components included in the shipment from the packing case. Inspect for damaged or missing parts, referring to the packing list, and prior to discarding the packing material. If Items are missing from your shipment, contact your sales representative. Your sales order number will be required.

**If the packing case is damaged, notify the local carrier immediately.** If the meter must be returned to the factory for repair or replacement, a Returned Materials Report (RMR) must be included with the meter or components. RMR forms may be obtained from your sales representative, from the Product Service Department, or from [www.brodiemeter.com](http://www.brodiemeter.com). In addition to the RMR, a Material Safety Data Sheet and a Decontamination Statement must be included with Items being returned to the factory.

**A Decontamination Statement is included in the back of this manual (see Appendix A).**

If the meter is removed from service it must be thoroughly drained and neutralized before it is packed for shipment. Care must be taken to ensure that product removed from the meter is disposed of in accordance with all applicable local, state and federal regulations. *Note: Place the meter with inlet in downward position to completely drain the meter of fluid.*

The flanges should be sealed to keep residual fluid from leaking out of the meter during transport. The type of flange seal required will vary with the form of transportation used. Contact the carrier for specific instructions.

The meter should be packaged securely for shipment. The original container or a solid wooden box should be used to protect the exterior of the meter.

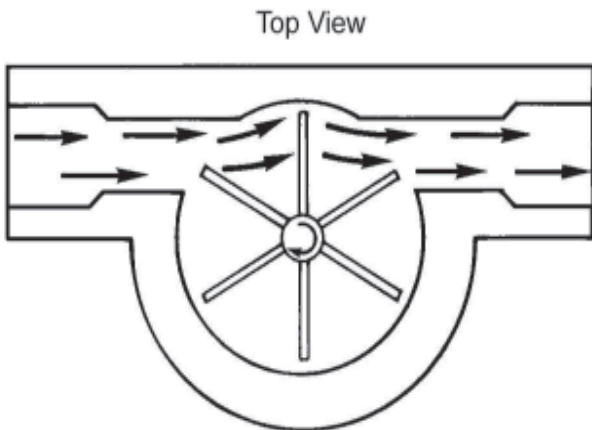
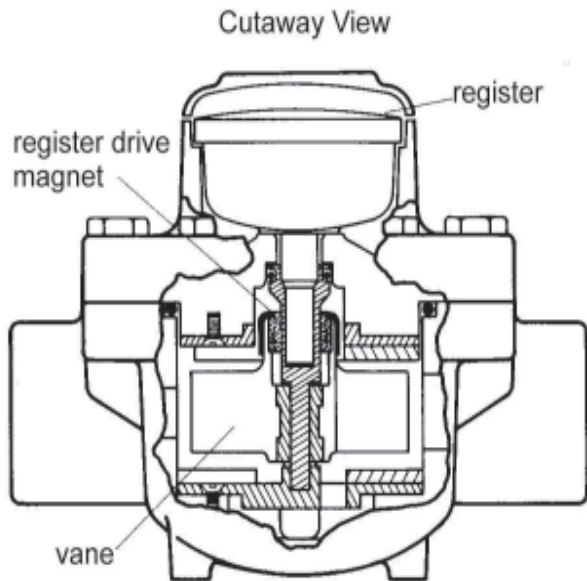
When packing the meter or components for return to the factory, place the RMR and a copy of the packing list that was delivered with the meter inside an envelope. Place the envelope inside the shipping container with the Item being returned and reference the RMR number on the outside of the shipping container.

*Equipment returned to the factory without the proper documentation will be returned to sender at their expense.*

### **Ship the container to:**

Brodie Meter Co., LLC  
Product Service Department  
19267 Hwy. 301 North  
Statesboro, GA 30461  
Phone: 912-489-0200  
Fax: 912-489-0294  
[service@brodiemeter.com](mailto:service@brodiemeter.com)

### 3.0 Principle of Operation



Fluid is directed to the vane off-center causing the vane to rotate. A magnet affixed to the vane drives the register by means of a magnetic coupling.

### 4.0 Installation, Maintenance, and Troubleshooting

Your Vane Meter should be installed by qualified service personnel. After installing your Vane Meter and prior to operation, purge any air that may have accumulated in the pipeline. During meter operation, if the register is not working, either the register is broken or the rotor is broken. Section 7 provides information for ordering spare parts for your Vane Meter.

If you have questions or need more information about installing or operating your valve, contact the Product Service Department at 1-912-489-0200.

### 5.0 Disassembly and Reassembly

Following are the instructions for disassembling and reassembling your Vane Meter. The numbers in parentheses correspond with the item numbers in Figure 6.1.

#### To disassemble your vane meter:

1. Place the meter in an upright position.
2. Remove the six hex screws (4) that secure the upper shell (10) to the lower shell (18).
3. Remove the upper shell from the lower shell, and place the upper shell aside.
4. Remove the rotor assembly (22) and washer (16) taking care not to misplace the washer.
5. You may remove the lower vane plate (15) if it is necessary, but it is unlikely that the lower vane plate will need to be removed.
6. Remove the three flat head screws (14) that secure the upper vane plate (1) to the upper shell.
7. Remove the upper vane plate.
8. Remove the rotor shaft (21). Check the O-ring (11) on the rotor shaft and replace if necessary.
9. Remove the retaining ring (3) that secures the register assembly (6) in the upper vane plate.



Remove the register assembly, and replace it if necessary.

**To reassemble your vane meter:**

1. Replace the register assembly (6) in the upper shell (10) and secure it with the retaining ring (3).
2. Replace the upper vane plate (1), and secure it with the flat head screws (14).
3. Replace the lower vane plate (15), and insert the flat head screws (14).
4. Insert the large O-ring (12) into the lip of the lower shell.
5. Lubricate the small O-ring (11) with a suitable grease and place it on the rotor shaft.
6. Turning the shaft so the O-ring is on the bottom, place the rotor assembly (22) and the washer (16) (in that order) on the shaft.
7. Invert the components assembled in step five, and insert the shaft in the lower vane plate.
8. Place the upper shell (10) on top of the lower shell (18), align the holes in the upper and lower shells, and insert the hex screws (4).

the date of original shipment of the product to destinations outside of the United States. The Purchaser must prepay any shipping charges. In addition, the Purchaser is responsible for insuring any product shipped for return, and assumes the risk of loss or damage of the product during shipment.

3. To obtain Warranty service or to locate the nearest Brodie office, sales, or service center call (912) 489-0200.
4. When contacting Brodie for product service, the purchaser is asked to provide information as indicated on the following page entitled "Customer Problem Report" (Appendix B).

## **6.0 Parts List**

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This section contains the necessary parts required for routine maintenance and service of the Vane Meter. Each parts list also contains the recommended spare and replacement parts denoted by an asterisk. For Items not listed, or additional information, consult factory. When ordering, the following information must be furnished:

1. Part Number.
2. Model Number of the Flow Meter.
3. Serial Number.
4. Quantity required.

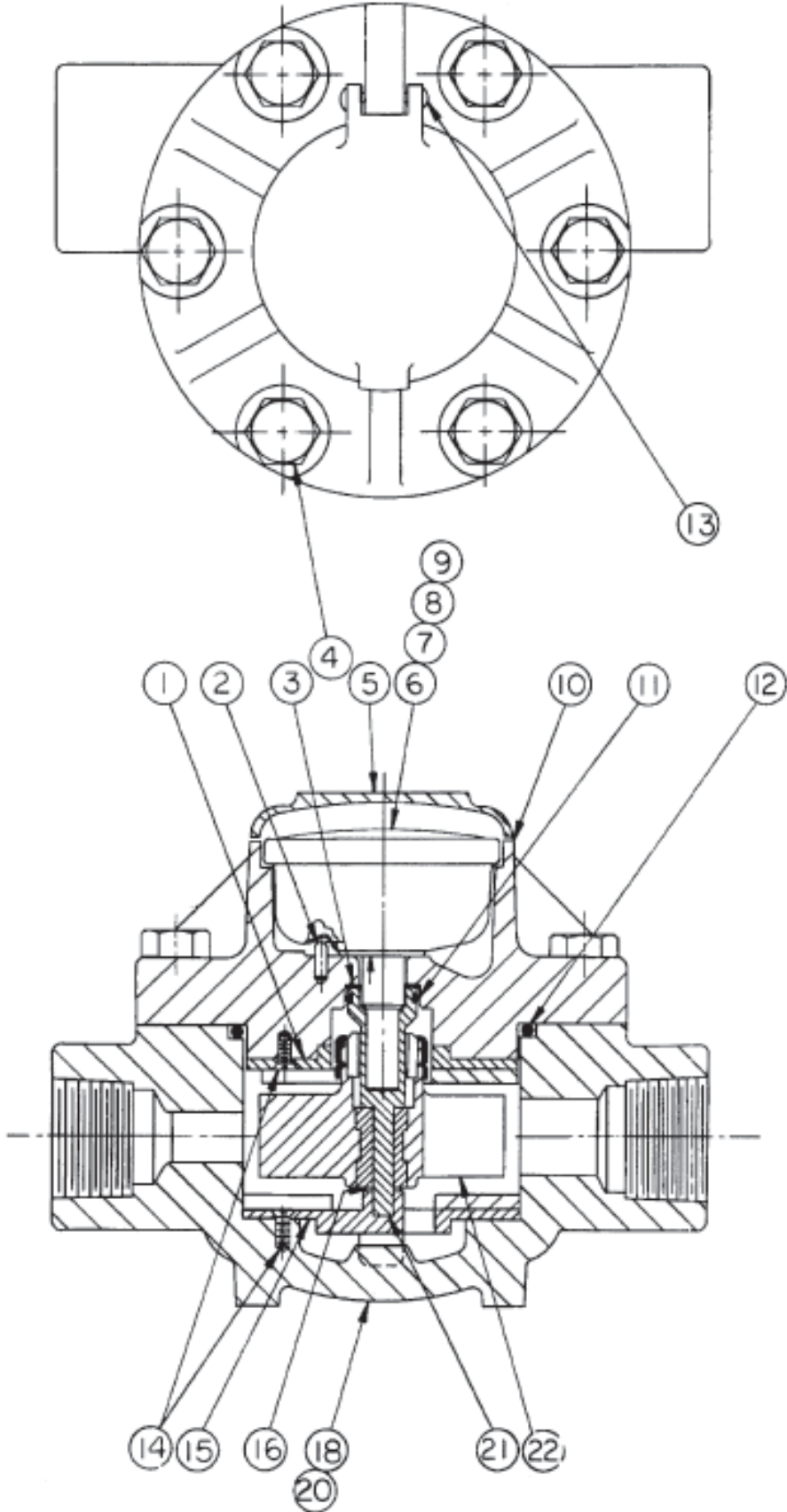
## **7.0 Warranty Claim Procedures**

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To make a warranty claim, you, the Purchaser, must:

1. Provide Brodie with proof of the Date of Purchase and proof of the Date of Shipment of the product in question.
2. Return the product to Brodie within twelve (12) months of the date of original shipment of the product, or within eighteen (18) months of

Figure 6.1 Exploded View of Parts



**Table 6.1 Spare Parts List**

Item	Description	Model 793A		Model 792A		Qty
		793-10-990-06	793-10-990-09	792-10-990-06	792-10-990-09	
1	upper vane plate	793-10-050-00	793-10-050-00	793-10-050-00	793-10-050-00	1
2	roll pin	153530	153530	153530	153530	1
3	retaining ring	SP20270	SP20270	SP20270	SP20270	1
4	hex head cap screw	150806	150806	150806	150806	6
5	sealed register cover	793-10-003-00	793-10-003-00	793-10-003-00	793-10-003-00	1
6	register assembly	793-10-921-03	793-10-921-06	792-10-921-03	792-10-921-06	1
10	upper shell	793-10-022-02	793-10-022-02	793-10-022-02	793-10-022-02	1
11	O-ring	157093	157093	157093	157093	1
12	O-ring	152077	152077	152077	152077	1
13	hinge pin	595-05-035-06	595-05-035-06	595-05-035-06	595-05-035-06	1
14	flat head screw	150333	150333	150333	150333	6
15	lower vane plate	793-10-050-01	793-10-050-01	793-10-050-01	793-10-050-01	1
16	washer	793-10-004-01	793-10-004-01	793-10-004-01	793-10-004-01	1
18	lower shell 792A	792-10-001-03	793-10-001-03	792-10-001-03	792-10-001-03	1
21	rotor shaft	793-10-044-00	793-10-044-00	793-10-044-00	793-10-044-00	1
22	rotor assembly 793A	793-10-439-03	793-10-439-03	793-10-439-03	793-10-439-03	1
	cotter pin	—	—	—	—	1
	stat-o-seal	—	—	—	—	1

***Replacement parts for Model 793V meter previously manufactured.***

Item	Description	Part Number	Qty
	Repair Kit	793-10-700-01	1
<i>Kit Includes:</i>			
11	O-ring	157093	1
16	washer	793-10-004-01	1
21	rotor shaft	793-10-044-00	1
22	rotor assembly 793	793-10-439-03	1
23	cotter pin	153904-419	1

***Replacement parts for Model 793A and 792A meter.***

Item	Description	Part Number	Qty
	Repair Kit	793-10-700-00	1
<i>Kit Includes:</i>			
3	retaining ring	SP20270	1
11	O-ring	157093	1
15	lower vane plate	793-10-050-01	1
16	washer	793-10-004-01	1
21	rotor shaft	793-10-044-00	1
22	rotor assembly 793	793-10-439-03	1

5. For product returns from locations outside the United States, it will be necessary for you to obtain the import consignment address so that Brodie's customs broker can handle the importation with the U.S. Customs Service.
6. Brodie Measurement Services offers both on call and contract maintenance service designed to afford single source responsibility for all its products.
7. Brodie reserves the right to make changes at any time to any product to improve its design and to insure the best available product.

## **Appendix A - Decontamination Statement**

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## **Appendix B - Customer Problem Report**

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## Brodie Meter Co., LLC

19267 Highway 301 North (30461)  
PO Box 450  
Statesboro, GA 30459-0450

Phone: (912) 489-0200  
Fax: (912) 489-0294  
www.brodiemeter.com

### Decontamination Statement

RMA Number: \_\_\_\_\_

Item Being Returned: \_\_\_\_\_

List all chemicals and process fluids and gases that have come in contact with the equipment, including cleaning agents. Attach additional pages of information if necessary. A Material Safety Data Sheet (MSDS) is required if non-food grade products have been used with the item being returned.

Information Required	Product 1	Product 2
Chemical Name		
Health and Safety Hazards		
Precautions, First-Aid		

I hereby certify the equipment being returned has been cleaned and decontaminated in accordance with good industrial practices and in compliance with OSHA and DOT regulations. This equipment poses no health or safety risks due to contamination.

Signature: \_\_\_\_\_

Name (Please Print): \_\_\_\_\_

Title: \_\_\_\_\_

Company Name: \_\_\_\_\_

Phone Number: \_\_\_\_\_

Fax: \_\_\_\_\_

E-mail: \_\_\_\_\_

Reason for Return: \_\_\_\_\_

**Reminder:**

All items being returned must be packaged separately. This decontamination statement and the MSDS sheet(s) must be placed on the outside of the shipping container.

*Brodie Meter Co., LLC: Manufacturers of BiRotors, Oval Gear Meters, and Control Valves*

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## Brodie Meter Co., LLC

19267 Highway 301 North (30461)  
PO Box 450  
Statesboro, GA 30459-0450

Phone: (912) 489-0200  
Fax: (912) 489-0294  
[www.brodiemeter.com](http://www.brodiemeter.com)

### Customer Problem Report

*For faster service, complete this form and return it along with the affected equipment to customer service at the address indicated below.*

Company Name: \_\_\_\_\_

Technical Contact: \_\_\_\_\_ Phone: \_\_\_\_\_

Repair PO#: \_\_\_\_\_ If Warranty, Unit S/N: \_\_\_\_\_

Invoice Address: \_\_\_\_\_

Shipping Address: \_\_\_\_\_

Return Shipping Method: \_\_\_\_\_

Equipment Model #: \_\_\_\_\_ S/N: \_\_\_\_\_ Failure Date: \_\_\_\_\_

Description of Problem: \_\_\_\_\_

What was happening at time of failure? \_\_\_\_\_

Additional Comments: \_\_\_\_\_

Report Prepared By: \_\_\_\_\_ Title: \_\_\_\_\_

If you require technical assistance, please contact the Product Service Department at:

Phone: (912) 489-0200

Fax: (912) 489-0294

[service@brodiemeter.com](mailto:service@brodiemeter.com)

**Reminder:**

All items being returned must be packaged separately. A decontamination statement and the MSDS sheet(s) must be placed on the outside of the shipping container.

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