

Brodie AddPak Additive Injection Block



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## 1 Read Me First

## Notice

Brodie International, a Brodie Meter Co., LLC Company ("Brodie") shall not be liable for technical or editorial errors in this manual or omissions from this manual.

Brodie makes no warranties, expressed 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. The contents of this publication are presented for informational purposes only, and while every effort has been made to ensure their accuracy, they are not to be construed as warranties or guarantees, expressed or implied, regarding the products or services described herein or their use or applicability. We reserve the right to modify or improve the designs or specifications of such products at any time.

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.

No part of this work may be reproduced or copied in any form or by any means - graphic, electronic or mechanical - without first receiving the written permission of Brodie International.

# 2 Essential Instructions

## General

Brodie International designs, manufactures and tests its products to meet many international standards. As the instruments are sophisticated technical products they must be installed, used and maintained properly to ensure they continue to operate within their normal specifications. The following instructions must be adhered to and incorporated into onsite safety programs where possible.

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 personnel 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 personnel, to prevent electrical shock and personal injury.

It is the customer's responsibility to provide fire prevention measures and equipment per local regulations.

Use of this equipment for any purpose other than its intended purpose may result in property damage and/or serious personal injury or death.

# Essential Instructions for Measuring Equipment, Including the European Union (Directive 2014/32/EU MID)

Although measurement transducers are not specifically included in the MID regulations as they do not form a complete measuring instrument system, in accordance with Article 1 and 4, Annex I and Annex VII, Brodie Meter Co., LLC implements the same stringent regulations for all products and tests to the same standards which are used for complete measuring instrument systems.

The complete system must contain all the necessary components to meet the requirements of the local regulations. These components may include pumps, air eliminators, strainers, valves, flow computers, etc. The unit must be sealed in accordance with the local regulations; it is the end user's responsibility to ensure this happens.

Flow measuring devices are provided with two labels which specify flow ranges. The name plate label, which includes the factory serial number, details the operating flow range. This is the flow range the device will operate within without causing damage. The custody transfer label details the working flow range associated with a particular weights and measures approval.

It should be noted that these may not be the same; therefore, in trade applications, the flow ranges specified on the custody transfer label should be followed.

# Essential Instructions for Electrical Equipment, Including the European Union (Directive 2014/30/EU and 2014/32/EU)

This unit contains Electrostatic sensitive circuit boards. Electrostatic safety precautions should be taken to prevent damage.

When connecting wiring it is good practice to use shielded cable. The shield should be connected to earth at the read out or control systems end of the cable; the other end of the shield should not be connected. This wiring practice is mandatory in order to comply with the requirements for electromagnetic compatibility as per the EMC directive 2014/30/EU and MID 2014/32/EU of the council of the European Union.

It is the end user's responsibility to ensure that all protective covers are in place to prevent electrical shock and/or personnel injury.

# Essential Instructions for Pressure Containing Equipment, Including the European Union (Directive 2014/68/EU)

When installing the equipment the bolting must conform to the requirements of ASME B16.5, paragraph 5.3, and to the material requirements of ASME B16.5, Table 1B. Gaskets must conform to the requirements of ASME B16.20.

Although it is not expected for the device to be used in a service where it would come in to contact with unstable fluids, it is the end user's responsibility to assess any risks and take any precautions necessary.

It is the end user's responsibility to ensure that piping and other attachments connected to the Brodie instrument do not place adverse stresses upon it, the design of the instrument has not been assessed for the effects of traffic, wind or earthquake loadings.

It is the end user's responsibility to ensure that the instrument is mounted when required on suitable supporting foundations.

It is the end user's responsibility to install the device in a well-designed system to avoid potential hazards such as water hammer, vacuum collapse or uncontrolled chemical reactions.

It is the end user's responsibility to provide fire protection measures and equipment in accordance with the local regulations. It is the end user's responsibility to install suitable straining and air/gas elimination systems.

The instrument has been designed without allowance for corrosion or other chemical attack. The end user should implement a periodic inspection and maintenance program to ensure that none of the instruments pressure containing components have been subject to any corrosion. It is possible to examine the instrument for evidence of corrosion through the inlet and the outlet.

When the ambient temperature is below the minimum operating temperature specified on the device it is the end user's responsibility to ensure that the device is warmed to an appropriated temperature before being pressurized.

Do not exceed the operating pressure and temperature limits of the instrument as stamped on the nameplates.

It is the customer's responsibility to install this equipment in a system that provides adequate over-pressure protection and that limit pressure surges to 10% of the maximum allowable working pressure of the instrument.

It is the end user's responsibility to provide fire protection measures and equipment in accordance with the local regulations.

## Essential Instructions for Equipment to be Used in Hazardous Locations, Including the European Union (Directive 2014/34/EU)

Any Hazardous area approval applies to equipment without cable glands. When mounting the flameproof enclosure in a hazardous area only cable glands/conduit seals certified to meet or exceed the rating of the equipment should be used, refer to the type approval documentation for further details. Cable glands and cable must be suitable for the operating temperature of the device under its rated conditions, this is especially important if the device has an operating temperature above 1580F (700C). It is the end user's responsibility to ensure this happens.

The meter has been provided with an approved sealing device in one of the cable entries, the other entry has been closed with a plastic cap plug. It is the end user's responsibility to remove the cap plug and replace it with a suitable cable gland or conduit seal before the equipment is put into service.

It is the end user's responsibility to ensure, when the instrument is located in a hazardous area, that all cable glands and conduit seals are installed in accordance with all local codes and regulations.

It is the end user's responsibility to ensure that before opening an electronic enclosure in a flammable atmosphere that all the electrical circuits have been interrupted.

If replacement of the screws which secure the sensor housing, the UMB cover of the electronic register and its cover, are required, they must be replaced with either factory direct parts or M6-1x16 (6g) mm hex head socket screws of equal length. The screws must be made from stainless steel grade A1-70 or A2-70 and be torqued to a value of 55 inch lbs. upon installation. It is the end user's responsibility to ensure this happens.

It is the end user's responsibility to assess the maximum surface temperature of the device and

the equipment the device is attached to and located next to as this may exceed the temperature ratings of the device itself. If this happens, additional safety precautions will need to be implemented by the end user.

Flame proof housings contain Aluminum; although the composition of these enclosures is carefully maintained to prevent any risk of an ignition source it is the end users responsibility to ensure that the housing is not struck by rusty tools or objects.

If the equipment is to be installed in an area where dust deposits and build up are to be expected, a maintenance plan should be arranged to include regular removal of the dust build up. This will prevent the dust from forming a possible source of ignition.

The power supply requirements for this product are specified within the operating and maintenance manual, it is the end user's responsibility to operate the product within these specified limits.

The instrument may contain surfaces that constitute flames paths, these surfaces should not contain any mars or scratches. If any are present the factory or the local representative should be contacted immediately to obtain a new housing as the safety of the enclosure may be impaired. It is the end user's responsibility to inspect these surfaces every time the enclosure is opened.

When flanged flame paths are reassembled the gap between them should be less than 0.0015" (0.038 mm) such that a 1/2" (12.5mm) wide 0.0015" (0.038 mm) feeler gauge will not enter the gap more than 1/8" (3mm). It is the end user's responsibility to ensure this happens each time the enclosure is reassembled.

## 3 Warranty Claim Procedures

These terms and conditions, the attendant quotation or the acknowledgement, and all documents incorporated by reference therein, binds Brodie Meter Co., LLC, who issues the quotation or acknowledgment for the provision of services and/or the sale of goods (except as provided in Section 11), to be provided hereunder by seller (Brodie Meter Co., LLC) hereinafter Seller, and the buyer, hereinafter Buyer, and constitute the entire agreement (Agreement) between Buyer and Seller regarding such sale and/or provision. To the extent not in conflict with the superseding terms of the Sales Order, these terms and conditions will be in force.

1. PRICES: Unless otherwise specified by Seller, Seller's price for the Goods and/or Services shall remain in effect for thirty (30) days after the date of Seller's quotation or acceptance of the order for the Goods/Services, whichever is delivered first. provided an unconditional, complete authorization for the immediate manufacture and shipment of the Goods and/or provision of Services pursuant to Seller's standard order processing procedures is received and accepted by Seller within such time period. If such authorization is not received by Seller within such thirty (30) day period, Seller shall exercise the right to change the price for the Goods/Services to Seller's price in effect for the Goods/Services at the time the order is released to final manufacture. Notwithstanding any of the foregoing to the contrary, the price for Goods/Services sold by Seller, but manufactured by others, shall be Seller's price in effect at the time of shipment to Buyer.

2. DELIVERY, PASSING OF RISK, RETENTION OF TITLE, AND DOCUMENTATION: All shipping dates are approximate and are based upon Seller's prompt receipt of all necessary information from Buyer to properly process the order. Any agreed

trade term shall be construed in accordance with the INCOTERMS® in force at the formulation of the contract. If no trade term has been specifically agreed, the delivery shall be F.O.B. Brodie Factory, FCA Brodie Factory, or EXWORKS Brodie Factory. Notwithstanding, any provisions to the contrary in this or other documents related to this transaction, the passing of risk of loss thereto shall transfer to Buyer upon delivery to the first freight carrier at the shipping point. The Goods shall remain the property of the Seller until paid for in full to the extent that such retention of title is valid under the relevant law. The retention of title shall not affect the passing of risk. The Seller shall provide Buyer with that data/documentation which is specifically identified in the contract. If additional copies of data / documentation or non-standard data/documentation are to be provided by Seller, they shall be provided to Buyer at Seller's price then in effect.

3. EXCUSE OF PERFORMANCE: Seller shall not be liable for delays in performance or for non-performance due to acts of God, war, riot, fire, labor trouble, unavailability of materials or components, explosion, accident, compliance with governmental requests, laws, regulations, orders or actions, or other unforeseen circumstances or causes beyond Seller's reasonable control.

4. CHANGE, CANCELLATION AND RESTOCKING CHARGES: Once an order has been acknowledged by the Seller, any changes requested by the Buyer must be communicated to the Seller. The Seller will notify the Buyer of any fees associated with the requested change. Buyer may terminate or suspend its non-shipped order for any or all of the Goods/Services covered by the Agreement, provided that Buyer gives Seller reasonable advance written notice of such termination or suspension and reimburses Seller accordingly: 25% of Net Order after Release to Engineering, 50% of Net Order after Release to Manufacturing, 75% of Net order after 50% Manufacture Complete and 100% of Net Order once Manufacturing is complete. Any request for return of product already shipped to Buyer will be at the discretion of Brodie. If so approved, a Return Authorization will be provided and a restocking fee assessed.

5. LIMITED WARRANTY: Subject to the limitations contained in Section 2 herein and except as otherwise expressly provided herein, Brodie Meter Co., LLC ("Brodie") warrants the Goods-manufactured 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 installation and 18 months from date of shipment, whichever occurs 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, repair or replace, that portion of the Goods 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. Brodie is not responsible for damages that incur during shipment to Buyer for shipments that are F.O.B. Brodie Factory, FCA Brodie Factory, or EXWORKS Brodie Factory. Shipping charges for goods returned to Brodie under warranty will be at Buyer's expense. Products found not to be warranted can be repaired and returned at Buyer's expense and return charges born by Brodie will be added to the cost of repair or returned to Buyer "as received" at Buyer's expense. Insurance for returned products will be at Buyer's expense. For all returned products please package to prevent damage, or future damage during shipment. Make sure the products are cleaned, free from grease oil, chemicals and other materials that may hamper defect detection and impede repair. All returned items must be accompanied with a MSDS for the products that have been in contact with the equipment, including cleaning agents. A decontamination statement, RMA, and Customer Problem Report must also accompany equipment returned. Product received in an unsuitable condition will be returned at Buyer's expense without being examined. 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, expressed or implied, as to merchantability, fitness for a 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 unless the Buyer has notified the Seller the product will be used in an environment conducive to corrosion and/or erosion and the product has been coated with Brodie's recommended method of protection against corrosion / erosion.

6. LIMITATION OF REMEDY AND LIABILTY: Brodie shall not be liable for damages caused in 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 5. 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.

7. PATENTS: Subject to the limitations contained in Section 6, Seller shall defend any suits brought against Buyer based on a claim that use of the Goods manufactured by Seller constitutes an infringement of a valid patent of the United States, and shall pay any damages awarded therein against Buyer, provided that Buyer: promptly notifies Seller in writing of the filing of such suit or the threat thereof; permits Seller to control completely the defense or compromise of such claim of infringement; and provides all reasonable assistance and cooperation requested by Seller for the defense of such suit. In the event that only the Goods manufactured by Seller are held to be infringing in such suit and their use is enjoined, Seller shall, at its sole option and expense, provide a commercially reasonable alternative, including, but not limited to, procuring for Buyer the right to continue using the Goods, replacing them with a non-infringing product or modifying them so they become non-infringing. Buyer agrees that Seller shall not be liable for infringement, and that Buyer shall fully indemnify Seller therefore, if infringement is based upon the use of Goods in connection with Goods not manufactured by Seller or in a manner for which the Goods were not designed by

the Seller or if the Goods were not designed by the Seller or if the Goods were designed by the Buyer or were modified by or for the Buyer in a manner to cause them to become infringing.

8. INSTALLATION: Buyer shall be responsible for receiving, storing, installing, starting up and maintaining all Goods. Seller shall provide a quotation for services to assist Buyer in these functions if requested.

9. TAXES: Any tax or governmental charge payable by the Seller because of the manufacture, sale or delivery of the Goods, or provision of Services, may at Seller's option be added to the price herein specified. The foregoing shall not apply to taxes based upon Seller's net income.

10. TERMS OF SHIPMENT AND PAYMENT: Subject to the approval of Seller's Credit Department, shipping terms are F.O.B. Brodie Factory, FCA Brodie Factory, or EXWORKS Brodie Factory. Payment terms are subject to the approval of Seller's Credit Department and may vary based on Buyer's creditworthiness. Payment is expected, in U.S. currency, as per the prearranged agreement between the Buyer and Seller stated on the sales order. In the absence of such agreement, payment, in U.S. currency, is due Net30 days from the date of invoice. If any payment owed to Seller hereunder is not paid when due, it shall bear interest, at a rate to be determined by Seller which shall not exceed the maximum rate permitted by law, from the date on which it is due until it is received. Seller shall have the right, among other remedies, either to terminate the Agreement or to suspend further deliveries under this and/or other agreements with Buyer in the event Buyer fails to make any payment hereunder when due. Buyer shall be liable for all expenses incurred for collection of past due amounts, including attorneys' fees.

## 11. STORAGE FEES

1. Per diem charges are applicable when equipment is held beyond the acknowledged ready for shipment date.

Per diem storage charges will be assessed on each calendar day excluding the date of readiness.

The customer shall indemnify and hold Brodie International harmless from any and all liability and expense for such damages that might result from extended storage beyond six months. Brodie may place the cargo in another warehouse facility with all charges associated with the transfer and storage to be paid by the customer.

12. SOFTWARE AND FIRMWARE: Notwithstanding any other provision herein to the contrary, Seller or applicable third-party owner shall retain all rights of ownership and title in its respective firmware and software, including all copyrights relating to such firmware and software and all copies of such firmware and software. Except as otherwise provided herein, Buyer is hereby granted a nonexclusive, royalty free license to use firmware and software, and copies of firmware and software, incorporated into the Goods only in conjunction with such Goods and only at the Buyer's plant site where the Goods are first used. Buyer may negotiate with Seller separate licenses to use such copies and firmware and software at other plant sites. Buyer's use of certain firmware (as specified by Seller) and all other software shall be governed exclusively by Seller's and/or third-party owner's applicable license terms.

13. BUYER SUPPLIED DATA: To the extent that Seller has relied upon any specifications, information, representation of operating conditions or other data or information supplied by Buyer to Seller in the selection or design of the Goods and/ or provision of the Services and the preparation of Seller's quotation, and in the event that the specifications or information is inaccurate or actual operating conditions differ, any warranties or other provisions contained herein which are affected by such conditions shall be null and void, unless otherwise mutually agreed upon in writing.

14. GENERAL PROVISIONS: (a) Buyer shall not assign its rights or obligations under the Agreement without Seller's prior written consent. (b) There are no understandings, agreements or representations, express or implied, not specified in the Agreement. (c) No action, regardless of form, arising out of transactions under the Agreement, may be brought by either party more than two (2) years after the cause of action has accrued. (d) Any modification of these terms and conditions must be set forth in a written instrument signed by a duly authorized representative of Seller. (e) The Agreement is formed and shall be construed, performed and enforced under the laws of the state of Georgia. However, Buyer and Seller agree that the proper venue for all actions arising under the Agreement shall be only in the State where the Goods involved in such actions were manufactured. (f) GOODS AND SERVICES PROVIDED HEREUNDER ARE NOT SOLD OR INTENDED FOR USE IN ANY NUCLEAR OR NUCLEAR RELATED APPLICATIONS. Buyer (i) accepts Goods and Services in accordance with the restriction set forth in the immediately preceding sentence, (ii) agrees to communicate such restriction in writing to any and all subsequent purchasers or users and (iii) agrees to defend, indemnify and hold harmless Seller from any and all claims, losses, liabilities, suits, judgments and damages, including incidental and consequential damages, arising from use of Goods and Services in any nuclear or nuclear related applications, whether the cause of action be based in tort, contract or otherwise, including allegations that the Seller's liability is based on negligence or strict liability. (g) The 1980 United Nations Convention on Contracts for the International Sale of Goods does not apply to this Agreement. (h) If any provision of the Agreement is invalid under any statute or rule of law, such provision, to that extent only, shall be deemed to be omitted without affecting the validity of the remainder of the Agreement.

# 4 Receipt of Shipment

When you receive your equipment 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 packing case is damaged, notify the local carrier immediately.

If the package is in good condition remove the en-

velope containing the packing list and carefully remove the equipment 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.

# 5 Return of Equipment

If the equipment must be returned to the factory for repair or replacement, a Returned Materials Authorization (RMA) must be included with the components.

RMA forms may be obtained from your sales representative or from the Product Service Department. In addition to the RMA, 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.

If the equipment 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 equipment is disposed of in accordance with all applicable local, state and federal regulations.

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 equipment should be securely mounted on a wooden skid for shipment. The original container or a solid wooden box should be used to protect the exterior of the components.

When packing the components for return to the factory, place the RMA and a copy of the packing list that was delivered with the equipment inside an envelope. Place the envelope inside the shipping container with the Item being returned and reference the RMA 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 Highway 301 North Statesboro, GA 30461, USA

Phone: +1 (912) 489-0200 Fax: +1 (912) 489-0294 service@brodieintl.com

## 6 Storage

Brodie International instruments are precision devices and should be handled and stored with care. They should not be subjected to rough or improper handling or stored in an environment where moisture, extreme temperatures, or foreign material can damage the meter.

The inlet and outlet flange covers should remain on the instrument until the unit is ready for installation.

If extended storage is required it is recommended that the instrument be placed in an environmentally controlled warehouse. If this is not possible the instrument should be stored in a waterproof lined wooden box. Desiccant packs should be taped to the inside of the instrument end connections before they are sealed to reduce the effect of humidity on the equipment and accessories. Caution must be used to ensure desiccant packs are removed prior to installation.

Depending on the storage time it may also be preferable to use a compatible corrosion inhibitor.

If the meter is removed from service for an extended period of time it should be flushed with a light oil before being placed into storage.

## 7 Standard Features

Brodie AddPak Injection Block



### General

Brodie's AddPak Chemical Injector offers a wide variety of service options. A complete stainless steel construction and extensive elastomer selection prove to be suitable in numerous chemical and industrial applications. The Injector is machined out of stainless steel bar stock which minimizes external leak points. The injector also incorporates an inlet machined basket strainer and an outlet check valve.

#### Installation

The Injector's slim footprint allows for easy installation with minimal space requirements. As a slave injector, the versatile AddPak Chemical Injector easily incorporates into numerous applications from PLC to TAS Systems.

## **Oval Gear Meter**

The Injector's oval gear meter allows a broad range of chemical use in additive and marker applications. The Brodie oval gear design produces a highly accurate measurement in single c/c units.

### Mechanical

- Available in 1-6 Pack Configuration
- 303 Stainless Steel Machined Block
- Inlet & Outlet Isolation Valves
- Inlet & Outlet Connections 3/8" FNPT
- Valved Calibration Port with Dust Cap
- Strainer (100 Mesh)
- Check Valve
- Elastomers: Teflon or Teflon Encapsulated Material
- Optional Elastomer: Kalrez or Chemrez

- Standard: Ryton Oval Gears
- Optional: Stainless Steel Oval Gears
- Flow Range: 0.05 3 GPM
- Accuracy: 0.5%
- Repeatability: 0.25%
- Nominal Oval Gear Meter K-Factor: 5200 PPG
- Process Connections 3/8" FNPT
- Max Viscosity 300 Centistokes
- Max Working Pressure 400 PSI
- Ambient Temperature Range: -40 to 140 Deg F

## Electrical

- ASCO Explosion Proof Solenoid or Encapsulation Protection Solenoid for ATEX
- 120VAC 60HZ Standard, Other Voltage Options Available
- Oval Gear Meter Sensor 5 27 VDC, Supply Open Collector High Speed Pulses
- 4 wire sensor type
- Common Pulse Signal and Earth Ground Connections

## **Optional Accesories**

- Calibration Kit, including quick-coupler (female), cylinder, back pressure check valve, and spout.
- 6 (maximum) slave injection blocks can be mounted, pumped, and wired for A/C + D/C on mounting back board

- Suitable for Hazardous Area
- FM Approvals for use in Class I, DIV I Areas
- ATEX/CE Approval Optional

## 8 Functional Operation

The Brodie Addpak injector block consists of a 303 stainless steel block machined and assembled with a positive displacement oval gear meter, Asco solenoid, isolation and control needle valves on the inlet and outlet, a strainer, and check valve. Additionally, a quick coupler is included for calibration. Compact design and low cost provide the ideal solution for chemical additive injection regarding petroleum terminals and pipelines. Compared to other types of injectors, Brodie's AddPak Injector Block minimizes leak points; All components are built and assembled into the bloc. The AddPak injector block is a slave injector, typically controlled from a PLC, Terminal Automation System or Electronic Preset. If the application requires a smart controller, please consult the factory. The AddPak as standard does not include the necessary electronics to pace the injector, accumulate totals, or provide alarms.

## Controller

The controller as referenced above will send AC voltage to the solenoid. This will energize the coil and allow flow through the block. As flow passes thru the block, the oval meter will send pulses proportional to flow volume back to the controller. When the preset volume is met, the controller will terminate AC voltage to the solenoid, the valve will close, and flow will cease. This cycle is repeated every time the controller sends AC voltage to the solenoid.

Standard AC voltage is 115 VAC with options for 230 VAC or 24VDC solenoids available. The User should select a controller with alarms for conditions with excess additive or no additive flow. The controller should discontinue loading until the problem is resolved and the alarm has been reset. The user can consult Brodie for assistance in selecting the appropriate controller.

# 9 Mounting

The AddPak Injection block can be mounted in any orientation provided the oval gears remain in a horizontal position. The inlet and outlet connections can be vertical, horizontal, or inclined. To ensure the gears are in a horizontal position, the sensor and solenoid should be facing the installer, rather than facing up or down. Note: Flamepaths are NOT intended for repair

## **Technical Configuration**



## 10 Specifications

Coil Data	
Power Requirements:	17.1 Watts @ 120 VAC
Certifications:	NEMA Type 3, 35, 4, 4X, 6, 6P, 7, & 9 Explosion Proof

Fluid Metering Gears:	
Nominal Pulse Resolution	5200 PPG in Mineral Spirits
Material (Gears)	Standard: Ryton Optional: Stainless Steel

Sensor: Electrical	
Sensor Power	5vdc to 27vdc, 15mA max- imun
Open Collector Output	5vdc to 27 vdc 25 mA maxi- mum (unsourced
4 Wire Connection	Function:
Red Wire	Sensor Power
Black Wire	Sensor Power Common & Emitter (signal common)
White Wire	Sensor Signal, Open Collector (un-sourced)
Green Wire	Earth Ground

## 10.1 Part List

Item	Description	Model	Qty
1	Additive Injection Block Machined	AB1001-100	1
2	Needle Valve Assembly	AB1002	2
3	Cap 15/16 - 28 UN Threads	AB1003	2
4	O-Ring Encapsulated Teflon	AB1004	2
5	O-Ring (included with solenoid)		1
6	Strainer Basket	AB1006	1
7	Solenoid 15/16 - 26 UNS-2A	AB1027	1
8	Poppet (included with solenoid)		1
9	Gear Post*	AB1015	2
10	Gear Set*	AB1009	1
11	O-Ring - Teflon - Sensor	AB1010	1
12	Mounting Plate - Sensor	AB1011-100	1
13	Screws - Socket Head Cap 151098-419   10 - 32 x 3/8" Long 316 SS 151098-419		6
14	Sensor	AB1012	1
15	Screws- Socket Head Cap 6-32 x 1/2'' Long 316 SS	151086	4
16	Quick Connect - Stem- Swagelok P/N: SS-QC6-D-6PM	1501146	1
17	Quick Connect Stem Protector O Swagelok P/N: SS-QC6-SP	: 1501145	
18	Poppet - Check Valve	AB1014	1
19	Spring - Check Valve - Century Spring Corp. P/N: 150114 72017S		1
20	PLUG-PIPE HEX SOCKET HEAD, 316 SS, 1/8 NPT	1501245	7

Elastomers	
Needle Valve	FKM
Calibration Port	FKM
Solenoid	Chemraz
All Other Elastomers	Teflon or Encapsulated Teflon



# 11 Special Conditions of Use for ATEX

- The solenoids shall be connected to a supply protected by a fuse capable of interrupting the prospective short circuit current.
- For solenoid operators fitted to valves used in vapor recovery systems where a Zone O exists within the valve and pipework, the solenoid operators or valves fitted with solenoid operators shall be subject to the routine test in accordance with PAS O22:1997 Clause 4.8 Annex 1 using air as test media and a test pressure of 15bar (+0.1), (0). The pipework is limited to a maximum diameter of 15mm with pipe runs not exceeding 3 m in length.
- When installed, the free end of the permanently connected, integral cable shall be suitably terminated. The leads of solenoids that are supplied with an integral cable that does not have the additional cable glanding feature shall also be suitably protected from mechanical damage.
- The EMXX & EMS Solenoids are only suitable for use within liquid fuel metering pumps, dispensers, and remote pumping units when they are fitted with cables that marked with eitherH05V2V2-F or H05V2V5-F.
- This equipment does not offer external grounding provisions and must be mounted as part of a bonded structure.
- Wiring shall be mechanically protected as required by the applicable area electrical code and shall be terminated in a suitable terminal or junction facility.
- All sealing devices including cable glands, blanking elements, thread adapters and stopping plugs are required to be certified to type of protection Ex db, be suitable for use in an ambient temperature range of -40°C to 60°C, be suitable for use in Group IIC Gb and be suitably sized for the cabling which is carried.

# 12 ATEX Standards

The following are the standards use to evaluate for ATEX certification.

IEC EN 60079-0:2018 IEC EN 60079-1:2014 IEC EN 60079-18:2015+A1

## 13 ATEX Sensor and Solenoid

The sensor and solenoids approved for ATEX certification are as follows.

Solenoid ASCO, EMXX series Catalog number : X003533837001FT (115/50 VAC) or X003533837001F8 (230/50 VAC)

Sensor Spectec, model number XP2-MF-1

## 14 ATEX Markings

The marketing label added to the Additive Injection Block to designate ATEX compliance are as follows.



\*Refer to manual section 15 for full list of family models

\*\* Serial Number is based on Customer Order Number

# 15 Model Code



# 16 Solenoid Input

The AddPak Injection Block has a single control input. The single input is connected to the coil of the solenoid valve. The solenoid valve is normally closed and when powered the coil is energized and the valve opens and remains opened until power is solenoid coil is 115VAC. Optionally the solenoid coils with 230VAC or 24VDC can be supplied.

# 17 Sensor Output

The AddPak Injection Block is equipped with a Hall-Effect pickoff. It is mounted in close proximity to the oval gears. Each oval gear has two rare earth magnets embedded and sealed on the face of the gear. As flow passes through the block, the oval gears rotate in direct proportion to the volume, and the sensor changes state as each magnet passes the sensor. When the gear and magnet are directly in line, the pickoff changes from off, to on, momentarily, then back off. This operation occurs as each magnet passes the sensor. The K Factor for the meter is approximately 5400 pulses per gallon. This K factor is the starting point in the field. Field calibration is necessary to calculate the true K factor under specific process conditions which depend on required flow rate and chemical in use. K factor data is transmitted into the control device. Brodie offers a calibration kit with dry break quick connections and a graduated cylinder. The customer is responsible for performing calibration.

## 18 Wiring

## Solenoid

The solenoid wiring from the controller to the coil should be a minimum of #18AWG. The AC and DC wiring should run in separate conduit. It is highly recommended that the user contract a local certified electrician to run and terminate the wiring in accordance with all governmental codes for the area.

The solenoid coil produces and inductive load to the controlling device. Please consult with the manufacture of the controller regarding this.

#### Meter Sensor

The sensor wiring can be either a three or four conductor, #18-22 AWG shielded instrument cable. Use the Belden number 6502FE or similar. Shield should terminate at the controller to a DC common or a specifically assigned termination.

Do not terminate shields wires to an AC earth ground. Do not terminate shield at sensor. Isolate the shield at Meter Sensor and tape off.

#### Meter Sensor: Pulse Signal Output

The AddPak Injection Block meter sensor output is an un-sourced, open collector, transistor output. The white sensor wire is connected to the transistor collector. The emitter of the transistor is connected to the black wire, or DC COMMON connection; The term "un-sourced" means that no voltage is applied to the output from within the sensor. It must be pulled to a "high" or "on" or "true" state by voltage supplied from an external source. The sensor electronics then drives the collector "low" or "off" or "false" with each pulse transmitted. The output is NOT driven high internally with the sensor.

The industry common scheme allows the sensor to drive external equipment supplied by its own internal transmitter power. There must be a common connection between the DC negative of the sensor supply and the DC COMMON of the signal pulse counter. Refer to the wiring diagram at the end of this manual for specific connection details.

# 19 Process Fluid Connections

### General

The process fluid inlet and outlet connections are 3/8" FNPT. The inlet and outlet are marked in the front of the AddPak. The inlet pressure must be higher than the outlet to ensure proper injection.

## Fluid Inlet and Outlet Piping

The piping from the additive pump to the AddPak must be sized to ensure adequate flow to meet the demand for injection. Remember to consider how many injectors will be operating and the total flow required to meet that demand. Distance from the additive pump and the injectors is another thing to consider when determining the pipe size. The minimum tubing size to reach the maximum flow of 3 GPM is typical 1/2". Larger tubing or pipe may be required based on the viscosity of the additive. The outlet tubing from the AddPak to the point of injection is 1/2". We recommend using stainless steel tubing. A check valve and isolation valve is recommended at the point of injection into the process line. This will prevent product flow from contaminating the additive when the injector is in the idle state. The check valve should be a positive shutoff spring close check. The check valve should be selected to open with positive pressure of 1 to 10 PSI. If you have multiple injectors piped to one injection point then a check valve and isolation valve should be installed for each injector.

# 20 Thermal Relief

Brodie offers both an injection point kit with a blocking solenoid and thermal relief kit for application where no contamination is required. This is normally used for dyes and markers. Since the injector block has a blocking solenoid and the injection point kit has a blocking solenoid it is necessary to relieve any thermal pressure build up between them. The thermal relief kit is installed on the inlet and outlet of the injector block. The injection point kit is installed in the field by the user or their contractor.

## 20.1 AddPak Wiring Diagram



20.2 Process and Instrumentation Diagram (P&ID)



## 20.3 AddPak Illustration



# Appendix A

## **Decontamination Statement**

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

Item Being Returned:

List all chemicals, 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:\_\_\_\_\_

L	none	number.	•		

Fax:	 	

E-mail:	•		

|--|

#### REMINDER

Phone Number

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.

# Appendix B

### **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. If you require technical assistance, please contact the Product Service Department at the phone number listed below.

Company Name:	Phone:	
Technical Contact:		
Repair PO#:		
Invoice Address:		
Shipping Address:		
Return Shipping Method:	S/N:	
Equipment Model #:	Failure Date:	
Description of Problem:		
What was happening at time of failure:		
Additional Comments:		
Report Prepared by:	Title:	