Brodie Chemical Transfer Systems

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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.

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.

The injection block has been designed without allowance for corrosion. The customer should implement a periodic inspection and maintenance program to ensure that no part of the block's pressure retaining components has been subjected to corrosion.

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 Pressure Containing Equipment, Including the European Union (Directive 97/23/EC)

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.

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 Electrical Equipment, Including the European Union (Directive 2004/108/EC and 2004/22/EC)

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 2004/108/EC and MID 2004/22/EC 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.

3 Warranty Claim Procedures

3.1 - Limited Warranty

Subject to the limitations contained in Section 2 herein and except as otherwise expressly provided herein, Brodie Meter Co., LLC ("Brodie") warrants 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.

3.1 - Limited Warranty Continued

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.

3.2 - Limitation of Remedy and Liability

Brodie International, a Brodie Meter Co., LLC Company ("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.

Brodie International
P.O. Box 450 (30459-0450)
19267 Highway 301 North
Statesboro, GA 30461, USA

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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 theenvelope 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 connections 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 Brodie Chemical Transfer Systems

Typical Design & Description

The Brodie Chemical Transfer Systems are designed to operate in numerous additive, dye, and marker applications. Offered in both single or dual configurations and with Mag-Drive pumps as shown.

The Brodie Chemical Transfer Systems are completely assembled to include system piping, fittings, and isolation.valves with an inlet strainer and adjustable relief valve.

System Features & Design

Free-Standing Rack fabricated, sandblasted, and painted with Epoxy Base, Primer, and Topcoat

Single or Dual Systems equipped with Mag-Drive Viking Pumps

Pumps Flow Rates available from 1 - 16 GPM

System Fitting Package includes all necessary fittings and components

Explosion Proof Starter Breaker pre-wired and plumbed to Skid

Pump Sizes

Skids available in a variety of pump sizes and flow rates. Larger pumps available upon request.

Viking Pump Model #	Motor Size	Pump Size	Skid Size	Gallons Per Minute
525	1 HP	1/2"	3/4"	1
550	1 HP	1/2"	3/4"	2
510	1 HP	1/2"	3/4"	4
519	2 HP	3/4"	1"	7.6
528	2 HP	3/4"	1"	11.2
716	3 HP	3/4"	1"	16
1425 RPM @ 50HZ 1800 RPM @ 60HZ				

Mechanical

Pump Skids are prepiped

Ready to be installed

Required field connections are the inlet, outlet, and relief valve piping

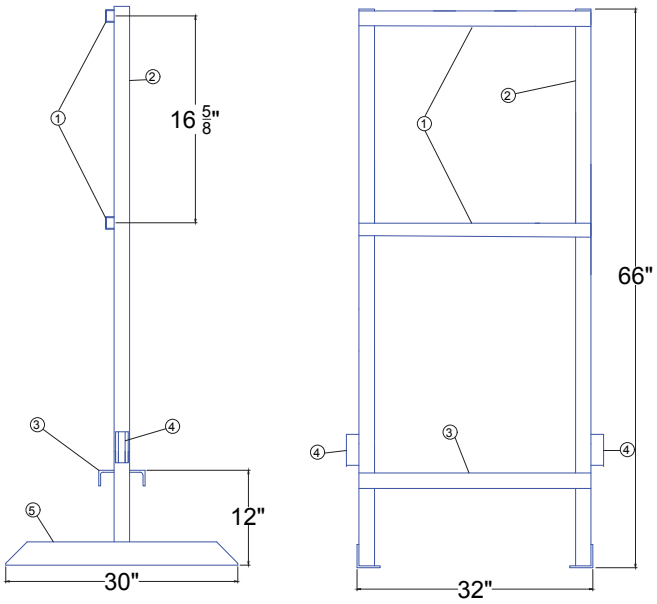
Electrical

Pump Skids are assembled with explosion proof starters

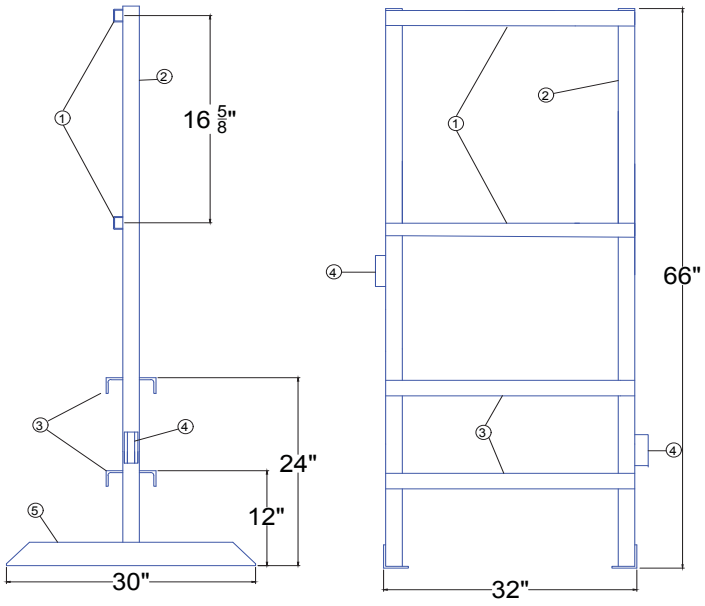
Field Connections are primary power for breaker and 120 VAC

Hand/Auto control from customer TAS

Dimensions



Single Pump configuration



Dual Pump configuration

7 Brodie Chemical Transfer Systems Components

Principle of Operation

Brodie Chemical Transfer Systems consist of either a dual or single pump skid. These are offered in various sizes depending on flow rate and pressure requirements. Our standard pump system consists of a Viking magnetic drive positive displacement pump connected to an exposion proof motor.

Field wiring should be provided to activate the pump control when any additive permissive is on.

Dual pump operation is equipped with two starters and two HOA switches. This operation requires manual switching to sequence from each pump. Optionally we can supply an alternating relay mounted in an explosion proof enclosure to alternate pumps automatically.

Materials of Construction

Pump

Brodie's standard offering is a Magnetic coupled drive. A magnetic drive pump has a magnet attached to the pump shaft. Enclosed in stainless steel housing, the pump is coupled to the motor by an external magnet attached to the motor shaft. In this design, there are no mechanical or dynamic seals, only a static seal on the stainless steel housing thus minimizing the potential for leaks. Mechanical seal pumps can be offered upon customer request, but Brodie will not warrant the pump for leaks from the mechanical seal.

Motor

Single phase and three phase HP dual voltage, 50 or 60 Hz. All pump systems are provided with an explosion proof motor sized to meet the requirements for a specific application. Explosion proof ratings for Class 1, Division 1, Group D Locations with other ratings also avaliable.
Please refer to pg. 9 for a listing of standard pump motors and sizes.

Valves

Carbon steel plated ball valves. Consult factory for other materials. Valves are configured to isolate pump.

By-pass Relief Valve

- External hydraulic system design
- Factory set to begin opening at 140 psi, and fully open at 175 psi
- Pressure setting is field adjustable
- Carbon steel body with stainless steel piston with cross slot and metal to metal seat

All pump skids are supplied with a by-pass relief valve. This valve is sized to by pass up to 100% of the pump's capacity when not needed for additive injection. It is the user's responsibility to pipe from the outlet of the by-pass valve back to the storage tank. **Do not pipe this back to the suction side of the pump as this will result in an increase of additive temperature and possible vapors occuring that may damage the pump.** This is not a thermal relief valve.

Pump Check Valve

An inline check valve is mounted on the discharge side of the pump upstream of the by-pass relief valve.

Isolation Valves

Each pump is equipped with an isolation 1/4 turn ball valve on the inlet and outlet of the pump skid. These valves are used to isolate the complete skid for service and maintenance. These valves should only be closed for service and maintenance. If these valves are closed for a long period of time a thermal build up can occur and damage components of the skid.

Materials of Construction continued

Discharge Check Valve

Normally a discharge check valve is not required. If the loading rack is substantially higher than the pump skid and there are times of no loading, then the additive can gravity flow back to the pump. A discharge check valve will prevent this. When required, this discharge check valve is installed downstream of the pump by-pass valve. With the discharge check valve installed it is necessary to thermal relieve back to the inlet side of the pump. Consult Brodie for recommendations for this.

Pressure Gauge/Gauges

Liquid filled 0 - 300 psi range pressue gauge installed in inlet piping.

Each pump is equipped with a pressure gauge and isolation valve. Upon completion of startup and setting of the by-pass valve the isolation valve just below the pressure gauge should be turned off. It is also recommended that the pressure gauge be removed, and a pipe plug be installed in its place. This will prevent thermal build up that could damage the pressure gauge.

Electrical Controls and Options

Each pump is supplied with a single motor starter, Hand-Off-Auto (HOA) switch and run light in an explosion-proof enclosure. Dual pump skids are supplied with two motor starters, two Hand-Off-Auto switches and two run lights all packaged in a single enclosure. To run pump A set its Hand-Off-Auto switch to the Auto position and set pump B's Hand-Off-Auto switch to the off position. Connect the permissive from the control device to both HOA switches. A wiring diagram will be provided with the pump skid for this termination. To operate pump B set it's HOA to Auto and pump A's HOA to Off. If desired, Brodie can provide an alternating relay mounted in an explosion proof enclosure on the skid that will automatically switch between pumps each time a permissive is applied.

Optional Rack

- Galvanized, fabricated steel
- Pump assembly is mounted on the rack base
- Rack has space for the motor controller and a limited number of injectors

O-Rings

Viton Standard
(Other Elastomers Available)

Other Internal Parts

Stainless Steel

Tubings and Pipings

- Stainless steel tubing and carbon steel tube fittings or carbon steel pipe with carbon steel threaded fitting
- Schedule 80 steel piping
- Optional socket welded systems are available

Strainer

- Y-pattern ductile iron with a 20 mesh stainless steel basket
- Installed in inlet piping.

Mounting

Galvanized, steel channel base

Style

Positive displacement pumps are recommended for additive injection applications to provide sufficient pressure under varying hydraulic conditions. Magnetic drive pump assemblies with no dynamic seals are strongly recommended.

8 Pump Skid Start Up Guide:

Pump Skid Start Up Guide:

Additive systems contain additive chemicals under high pressure.

To prevent injury or chemical spills take precaution when working on these systems.

Wear safety equipment as required by your company or local codes.

Most additives contain chemicals that may cause health issues.

Obtain and read all MSDS information for the additive before performing any service on the system.

Note: For this document, (additive) is the chemical that is being injected thru the injection block. (Product) is the liquid that the additive is being injected into.

Initial Start Up

Make sure the additive storage tank has been inspected and filled with additive.

Inspect all piping and make sure all connections and assemblies meet the design specs in accordance with company and governmental codes.

Please contact Brodie regarding any questions and assistance.

All Brodie pump skids contain a Fulflo by-pass relief valve. This valve does not have a positive shutoff and is not inteneded to hold pressure on the line. Therefore, if the product loading area is located at a higher elevation than the pump skid, an additional spring-loaded check valve and thermal relief valve must be added on the main additive line downstream of the pump skid.

Next check that all fittings are tight, and all strainer baskets are installed.

Close the valve on the inlet of the injector to prevent additive from entering the injector. Close the outlet isolation valve on the pump skid.

By-pass Relief Valve Setting

The bypass relief valve is factory set between 140 to 175 PSI. Any setting between this range can be accomplished by adjusting the relief setting screw on the valve.

To adjust the pressure setting turn the pump off, turn the adjustment screw clockwise to increase the pressure and counter clockwise to decrease the pressure.

Make note of the amount of adjustment change then restart the pump and observe the new pressure.

Repeat this process until the desired pressure is obtained. For pressure settings outside the range listed above consult Brodie for different springs to be installed in the valve.

Removal of Air and Vapors From the System

After the desired pressure setting is accomplished and the pump has been running for a period of time, make sure all air has been eliminated

Next, it is time to allow product to fill the additive lines up to the AddPak.

Slowly open the outlet isolation valve on the pump. Do not open the inlet needle valve on the AddPak until the line is filled with additive and all air has been bled from the line.

Note any air or vapor in the lines can damage the injector and calibration cannot be accomplished. Additionally, even small amounts of air or vapors left in the lines will compress and decompress as pump pressures change. This will result in causing the oval meter to move and provide false counts indicating flow or a leaking solenoid alarm.

It is recommended that a bleed point be installed at the highest point in the additive line to simplify and ensure all air and vapors are eliminated.

After this process is complete, the injector must be filled and flushed. Open the inlet needle valve a small amount on the injector

Leave the outlet needle valve closed. The fill and flush process will occur thru the calibration port on the AddPak.

Set the injection volume on the controller to a high value. This may be 500 to 1000 cc's.

Install the calibration kit to the calibration port on the AddPak.

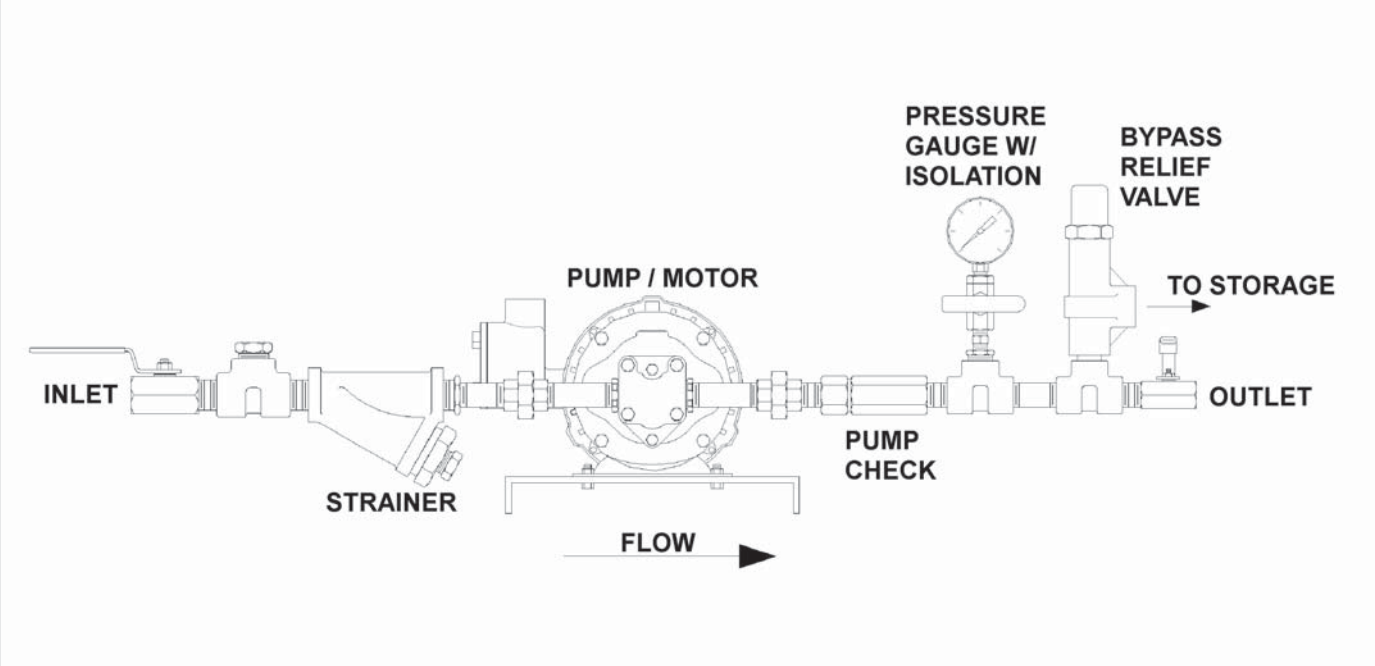
Set a large container under the calibration kit outlet.

Next, cycle the injector using the controller. After a few injections, slowly open the inlet needle valve, while cycling the injector, until there is a solid stream from the test port. Caution, wear eye protection and appropriate clothing as splattering may occur during this process. Also, this process will need to be repeated if air is introduced into the lines later. This can occur from cleaning strainer screens or from running out of additive.

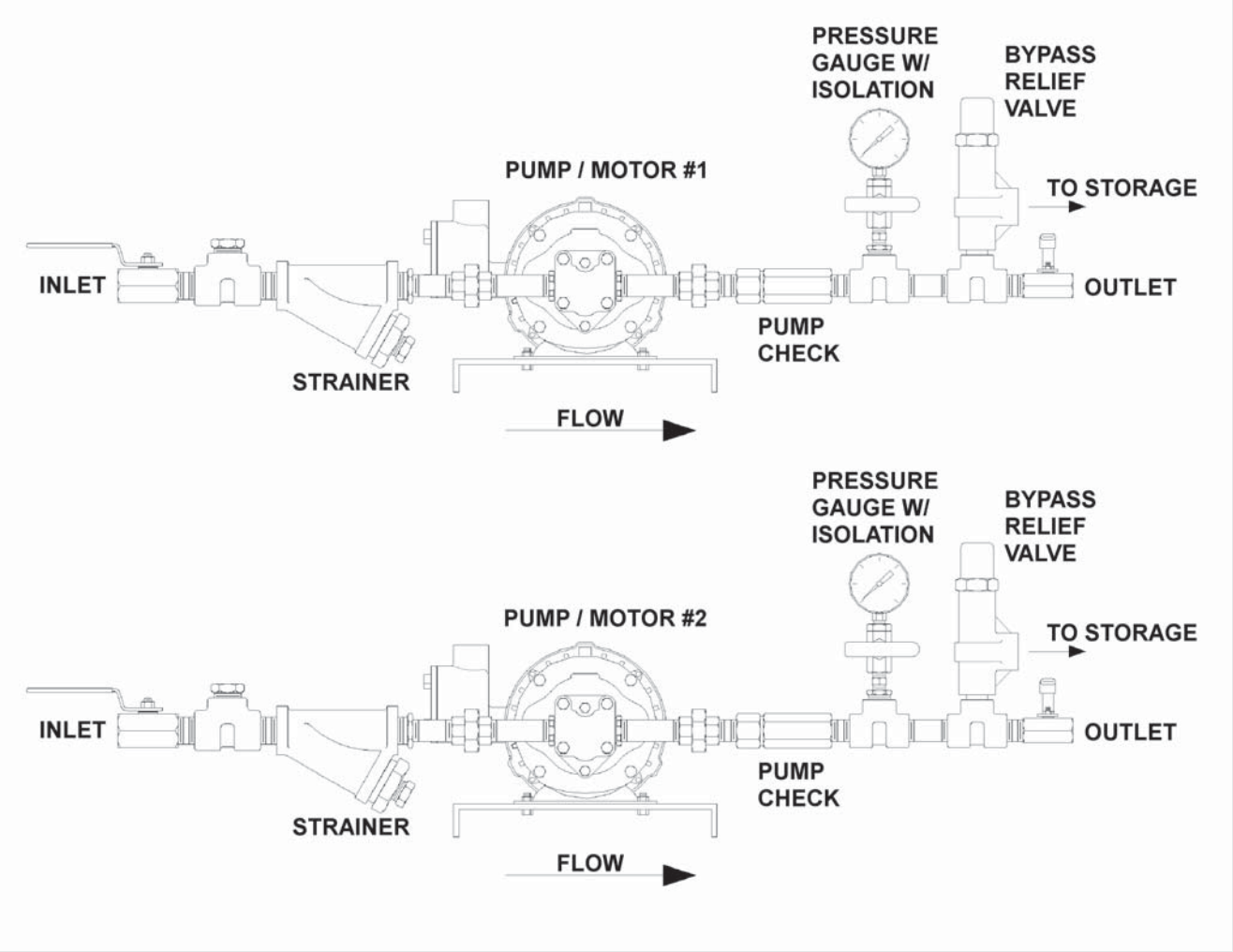
Next, open the outlet needle valve on the injector to introduce additive to the product line. If the additive line from the injector to the product line is a long distance it will be necessary to bleed this line before loading of trucks.

9 Chemical Transfer Illustrations

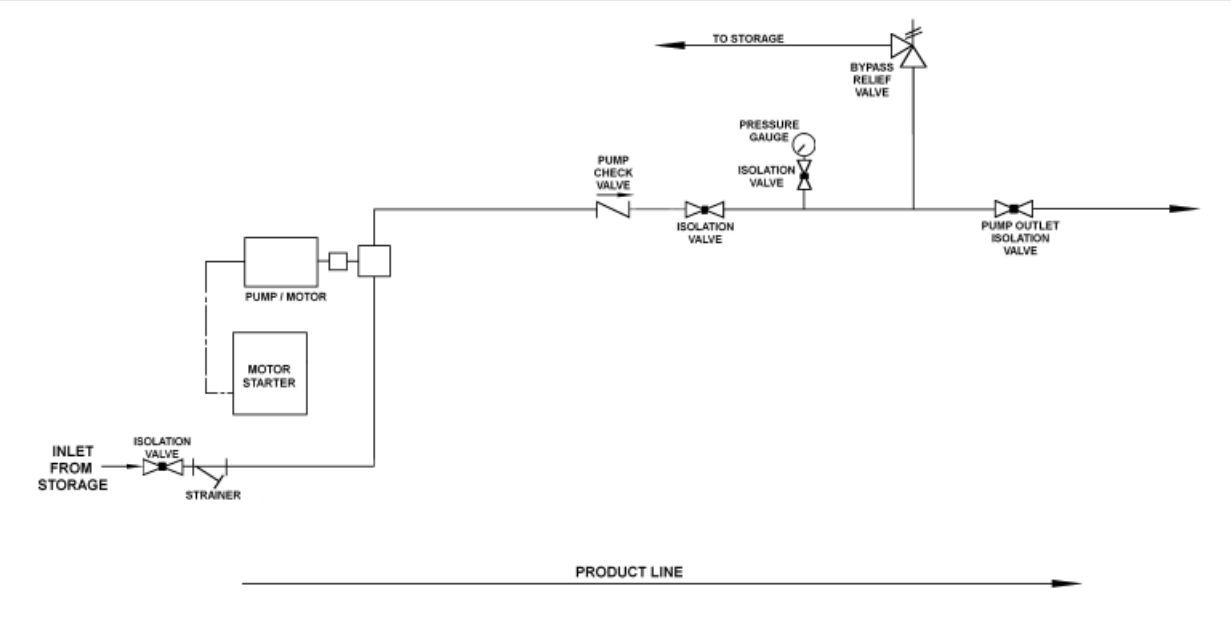
9.1 Single Pump Technical Configuration



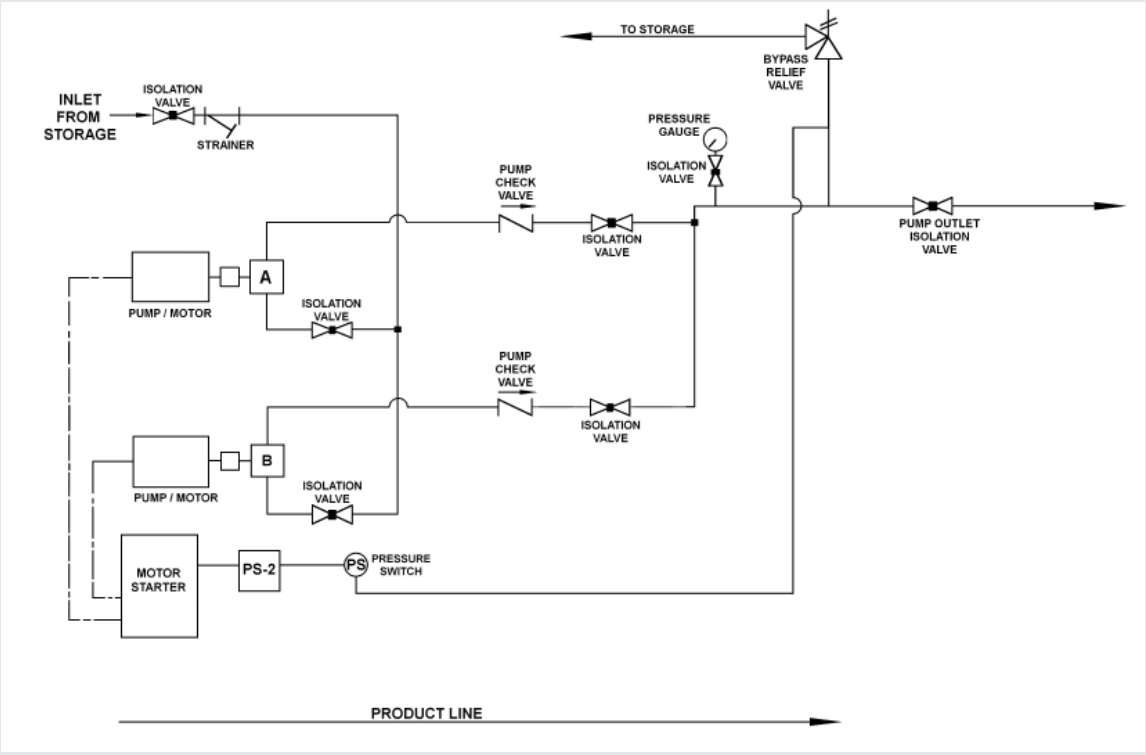
9.2 Dual Pump Technical Configuration



9.3 Single Pump P&ID



9.4 Dual Pump P&ID



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:_____

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 International
A Brodie Meter Co. LLC Company
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19267 Highway 301 North
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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: _____

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