

FLEX-PROTM

Peristaltic Metering Pump



SERIES A3F

Operating Manual

Patents: 7,001,153 4,496,295
and other patents pending

Exclusive:



Patent No. 7,001,153



ProSeriesTM

by Blue-White Ind.

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1.0 Introduction

Congratulations on purchasing the A3 variable speed Peristaltic Metering Pump. A peristaltic pump is a type of positive displacement pump used for pumping a variety of fluids.

Your A3 pump is pre-configured for the tubing that shipped with your metering pump. The tubing assembly has an Identification number printed for easy re-order.

Please Note: Your new A3 pump has been pressure tested at the factory with clean water before shipping. You may notice trace amounts of clean water in the pre-installed tube assembly. This is part of our stringent quality assurance program at Blue-White Industries.

1.1 Unpacking

Check that all components are present. Inspect components for damage in transit. If anything is missing or damaged, contact your distributor immediately.

Your package should contain:

- 1 - Metering pump
- 2 - Pump tube assemblies (one is pre-installed at the factory)
- 1 - Tube Installation Tool
- 1 - Suction tube strainer Polypropylene
- 1 - Ceramic tubing weight
- 1 - 10' (3.05 meters) Length of clear PVC suction tubing
- 1 - 10' (3.05 meters) Length of opaque Polyethylene (LLDPE) high pressure discharge tubing
- 1 - Injection fitting with internal back-flow check valve
- 2 - Mounting hardware kit (Stainless Steel)

1.2 Available Models

| Norprene[®] A3F Tube Pumps | | | | | | | 125 PSIG (8.6 bar) | | |
|--|-------------|----------------|-----------|---------------------|-------------------|-----------|-------------------------------|--|--|
| Meets FDA criteria for food Superior chemical resistance Maximum 125 PSIG (8.6 bar) | | | | | | | | | |
| Feed Rate | | | Max Speed | Connection Type | A3F Model Numbers | | | | |
| GPH | LPH | ML/Min | RPM | Fittings | 115V AC | 230V AC | 220V AC | | |
| .01 - 1.0 | .03 - 3.9 | .63 - 63.1 | 62 | 3/8" OD Tube / PVDF | A3F14-SND | A3F15-SND | A3F16-SND | | |
| .02 - 2.1 | .07 - 7.8 | 1.32 - 132.5 | 125 | 3/8" OD Tube / PVDF | A3F24-SND | A3F25-SND | A3F26-SND | | |
| .04 - 4.0 | .15 - 15.0 | 2.52 - 252.4 | 62 | 3/8" OD Tube / PVDF | A3F14-SNF | A3F15-SNF | A3F16-SNF | | |
| .07 - 7.9 | .30 - 30.0 | 4.98 - 498.4 | 125 | 3/8" OD Tube / PVDF | A3F24-SNF | A3F25-SNF | A3F26-SNF | | |
| .09 - 9.0 | .34 - 34.1 | 5.67 - 567.8 | 62 | 3/8" OD Tube / PVDF | A3F14-SNH | A3F15-SNH | A3F16-SNH | | |
| .12 - 12.7 | .48 - 48.0 | 8.01 - 801.2 | 62 | 3/8" OD Tube / PVDF | A3F14-SNJ | A3F15-SNJ | A3F16-SNJ | | |
| .16 - 16.6 | .63 - 63.0 | 10.47 - 1047.3 | 125 | 3/8" OD Tube / PVDF | A3F24-SND | A3F25-SND | A3F26-SND | | |
| .17 - 17.4 | .66 - 66.0 | 10.97 - 1097.8 | 125 | 3/8" OD Tube / PVDF | A3F24-SNH | A3F25-SNH | A3F26-SNH | | |
| .25 - 25.3 | .96 - 96.0 | 15.96 - 1596.2 | 125 | 3/8" OD Tube / PVDF | A3F24-SNJ | A3F25-SNJ | A3F26-SNJ | | |
| .33 - 33.3 | 1.2 - 126.0 | 21.00 - 2100.9 | 125 | 3/8" OD Tube / PVDF | A3F24-SNK | A3F25-SNK | A3F26-SNK | | |

| Tygothane[®] A3F Tube Pumps | | | | | | | 65 PSIG (4.5 bar) | | |
|---|------------|----------------|-----------|---------------------|-------------------|-----------|------------------------------|--|--|
| Meets FDA criteria for food Resistant to oils, greases and fuels Maximum 65 PSIG (4.5 bar) | | | | | | | | | |
| Feed Rate | | | Max Speed | Connection Type | A3F Model Numbers | | | | |
| GPH | LPH | ML/Min | RPM | Fittings | 115V AC | 230V AC | 220V AC | | |
| .02 - 2.4 | .09 - 9.0 | 1.51 - 151.41 | 62 | 3/8" OD Tube / PVDF | A3F14-SGE | A3F15-SGE | A3F16-SGE | | |
| .04 - 4.6 | .17 - 17.4 | 2.90 - 290.2 | 125 | 3/8" OD Tube / PVDF | A3F24-SGE | A3F25-SGE | A3F26-SGE | | |
| .05 - 5.0 | .18 - 18.9 | 3.15 - 315.45 | 62 | 3/8" OD Tube / PVDF | A3F14-SGG | A3F15-SGG | A3F16-SGG | | |
| .10 - 10.1 | .38 - 38.4 | 6.37 - 637.2 | 125 | 3/8" OD Tube / PVDF | A3F24-SGG | A3F25-SGG | A3F26-SGG | | |
| .12 - 12.0 | .45 - 45.6 | 7.57 - 757.1 | 62 | 3/8" OD Tube / PVDF | A3F14-SGH | A3F15-SGH | A3F16-SGH | | |
| .24 - 24.9 | .94 - 94.2 | 15.70 - 1570.9 | 125 | 3/8" OD Tube / PVDF | A3F24-SGH | A3F25-SGH | A3F26-SGH | | |

2.0 Specifications

| | |
|--|---|
| Maximum Working Pressure | 125 psig (8.6 bar) Norprene tubing 65 psig (4.4 bar) Tygothane tubing |
| Maximum Fluid Temperature | 130° F / 54° C |
| Operating Temperature | 14°F to 115°F (-10°C to 46°C) |
| Storage Temperature .. | -40°F to 158°F (-40°C to 70°C) |
| Duty Cycle | Continuous |
| Operating Voltage (model Specific) | Voltage is automatically detected and adjusted by power supply. Input power range is 96VAC to 264VAC 50/60 Hz. |
| Amp Draw: | 2.5 amp @ 125V AC / 60Hz 1.4 amp @ 250V AC / 60Hz 1.4 amp @ 250V AC / 50Hz |
| Power Cord Plug Type (Model Specific) | 115V60Hz = NEMA 5/15 (USA) 230V60Hz = NEMA 6/15 (USA) 220V, 240V50Hz = CEE 7/VII (EU) |
| Accuracy | +/- 0.5% full scale (after calibration, pre calibrated @ factory with water) |
| Maximum Viscosity | 7,000 Centipoise |
| Maximum Suction Lift | 30 ft. water, 0psig (4.5 m, 0 bar) |
| Output Adjustment Range | 1-100% in 0.1% increments (resolution) |
| Display | VGA backlit LCD, UV resistant |
| Keypad | Six - Button positive action tactile switch keypad |
| Enclosure | NEMA 4x (Ip66), Powder coated aluminum |
| Dimensions | 8.00H x 10.50 W x 14.63 D inches (203H x 267W x 371D mm) |
| Approximate shipping wt | 32 lb. (14.5 Kg) |
| Approximate pump wt. | 27.5 lb. |
| Wetted Materials | tubing: Norprene or Tygothane (depending on model) Tube fittings: PVDF (Kynar®) |
| Wetted Material - Ancillary Items | Discharge tubing: Polyethylene tubing (3/8" O.D.) Suction tubing: PVC tubing (3/8: O.D.) Injection fitting: PVDF (Kynar®), Elastomers (o-rings) Viton / Aflas, Ceramic ball, Hastelloy spring Foot strainer (for suction end): Polypropylene Tube Weight (for suction end): Ceramic |

2.1 Agency Listings

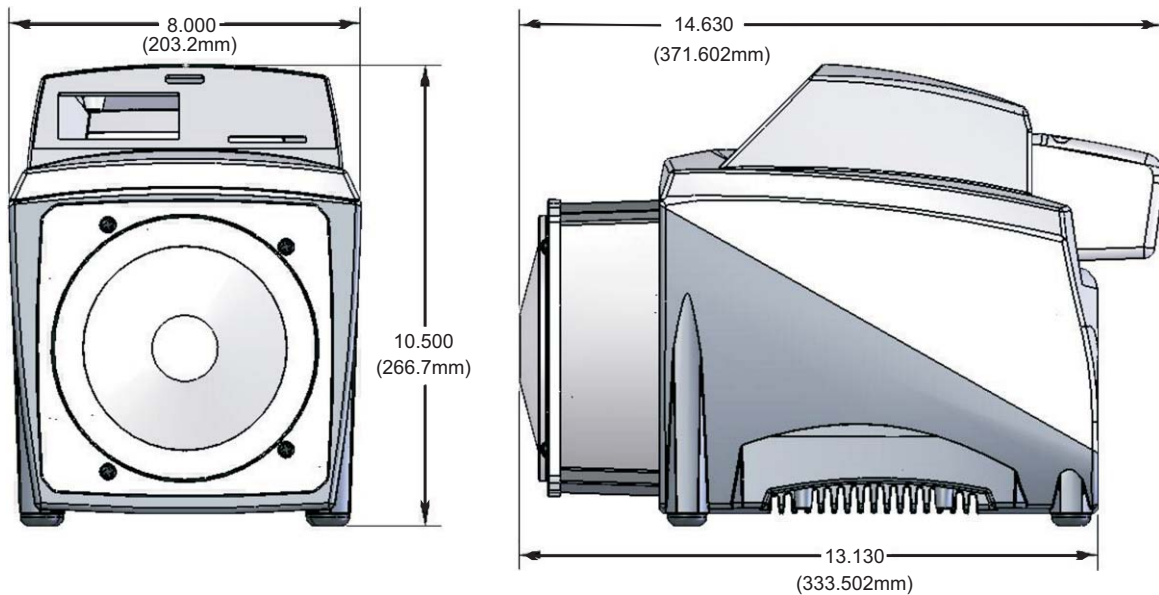


This pump is ETL listed to conforms to the following:
UL Standard 778 as a motor operated water pump
CSA Standard C22.2 as process control equipment



This pump complies to the Machinery Directive 98/37/EC, BS EN 60204-1, Low Voltage Directive 73/23/EC BS EN 61010-1, EMC Directive 89/336/EC, BS EN 50081-1/BS EN 50082-1.

| Symbol | Explanation |
|--------|---------------------------------------|
| | WARNING, risk of electric shock |
| | CAUTION, refer to users' guide |
| | GROUND, PROTECTIVE CONDUCTOR TERMINAL |



3.0 Features

- Peristaltic pump design does not have valves that can clog requiring maintenance.
- Self priming - even against maximum line pressure. By-pass valves are not required. Cannot vapor lock or lose prime.
- Output volume is not effected by changes in back pressure.
- Two pump tubes supplied with each pump. No extra tubing required. One tube is pre-installed for you convenience.
- Remote Start / Stop: 6 - 30 VDC contact closure or 0 VDC dry contact closure
- VGA Graphic backlit LCD - displays motor speed, RPM, service and alarm status assigned to monitor TFD +FVS
- Outputs include: One 10 amp relay assignable to monitor TFD and FVS.
- One button prime mode for easy priming.
- Output rates to: 33.3 GPH (126 LPH)@ 125 PSI (8.6 BAR)
- Zero maintenance brushless variable speed motor.
- Specially engineered tubing for long life at high pressures.
- Motor reverse feature to increase tube life.
- Pump head safety feature: When pump head cover is removed, pump automatically stops, and enters maintenance mode.
- Rotor design enables pump to handle same maximum pressure in either direction (clockwise and counter clockwise).
- Single piece rotor design means no flexing and increases accuracy (no springs or hinges in pump head).
- Annealed, clear acrylic pump head cover for added strength and chemical resistance.
- Patented Tube Failure Detection (TFD) system. Senses tube failure by detecting chemical in pump head.
- Compatible with Blue-White's output Flow Verification Sensor (FVS) system.
- 10 ft. PVC suction tube, 10 ft. PE discharge tubing, injection fitting, foot strainer, and mounting brackets supplied with each pump.
- Built - in tube timer (Timer starts when rotor is retaining and stops when rotor is idle)

Enclosure Rating:

NEMA 4X: Constructed for either indoor or outdoor use to provide a degree of protection to personnel against incidental contact with enclosed equipment; to provide a degree of protection against falling dirt, rain, sleet, snow, windblown dust, splashing water, and hose-directed water; and that will be undamaged by external formation of ice on enclosure.

Ip66: No ingress of dust; complete protection against contact. Water projected in powerful jets against enclosure from any direction shall have no harmful effects.

4.0 Installation

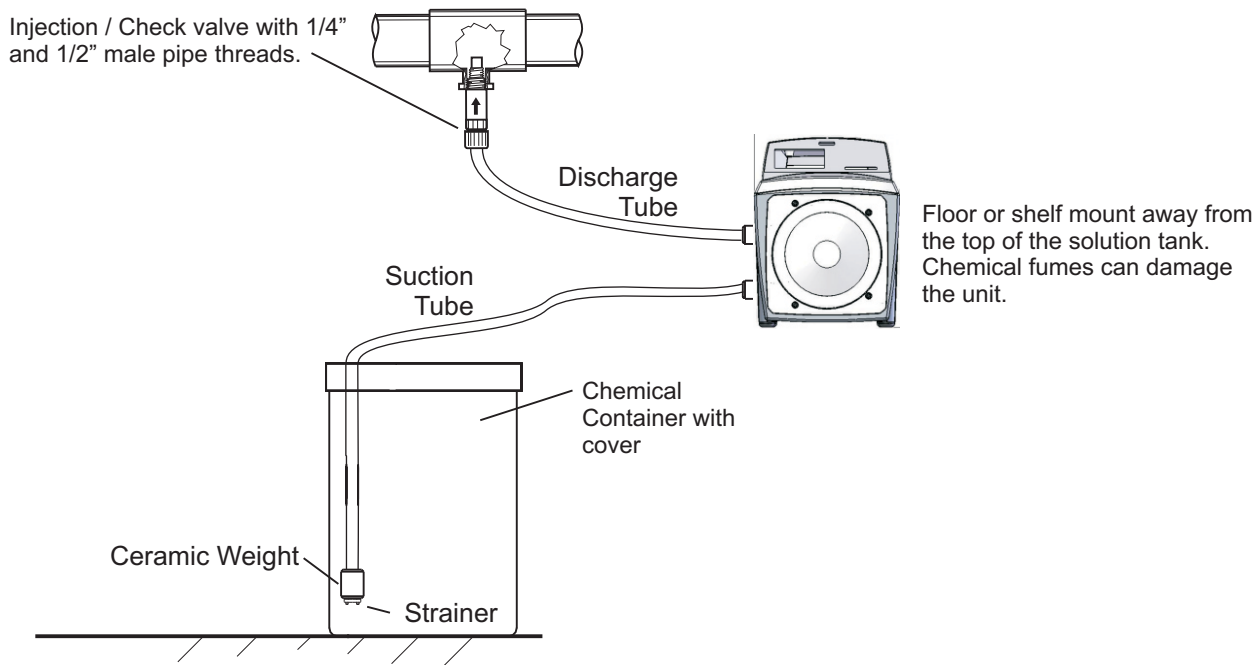
| | |
|---------------------|---|
| CAUTION ⚠ | Risk of chemical overdose. Be certain pump does not overdose chemical during backwash and periods of no flow in circulation system. |
| CAUTION ⚠ | Always wear protective clothing, face shield, safety glasses and gloves when working on or near your metering pump. Additional precautions should be taken depending on solution being pumped. Refer to MSDS precautions from your solution supplier. |
| CAUTION ⚠ | All diagrams are strictly for guideline purposes only. Always consult an expert before installing metering pump on specialized systems. Metering pump should be serviced by qualified persons only. |

4.1 Mounting Location

Choose an area located near chemical supply tank, chemical injection point, and electrical supply. Install pump where it can be easily serviced.

- Mount pump to a secure surface using enclosed mounting hardware.
- Mount pump close to injection point. Keep inlet (suction) and outlet (discharge) tubing as short as possible. Longer discharge tubing increases back pressure at pump head.
- Your solution tank should be sturdy. Keep tank covered to reduce fumes. Do not mount pump directly over your tank. Chemical fumes may damage unit. Mount pump off to side or at a lower level than chemical container.

TYPICAL INSTALLATION



Extended Brackets Model Number 72000-380

Blue-White's Stainless Steel extended brackets allow pump to be securely mounted to most any surface; floor, shelf, or skid. Brackets lift pump up 4-1/2 inches (11.43 cm), for easy pump access in hard to reach areas.

- Raise metering pump 4-1/2 inches (11.43 cm) off ground or a surface.
- Made out of tough Stainless Steel.
- Provides a stable mounting surface.

| Model # | Description |
|-----------|--|
| 72000-380 | Extended Mounting Bracket, 1 Pair, SS, 4 SS Screws |



5.0 Input Power Connections

WARNING



Risk of electric shock – this pump is supplied with a grounding conductor and grounding-type attachment plug. To reduce risk of electric shock, be certain that it is connected only to a properly grounded, grounding-type receptacle.

WARNING

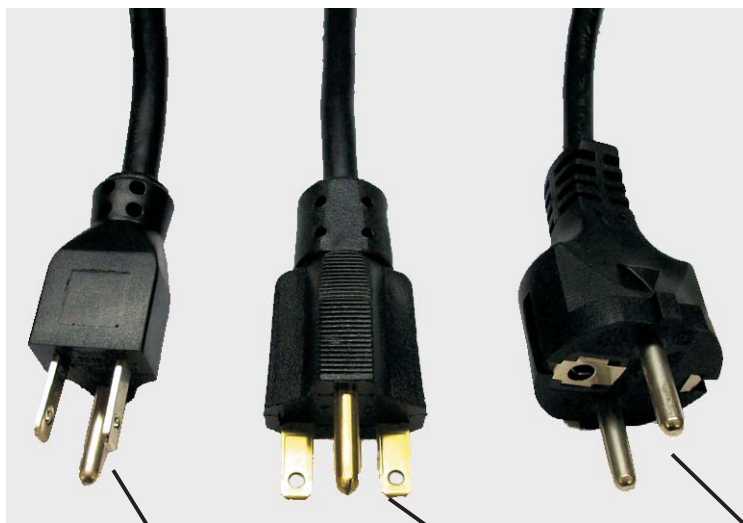


Electrical connections and grounding (earthing) must conform to local wiring codes.

- Be certain to connect pump to proper supply voltage. Using incorrect voltage will damage pump and may result in injury. Voltage requirement is printed on pump serial label.
- Input power range is 96VAC to 264VAC 50/60 Hz.
- Voltage Selection is automatically detected and adjusted by power supply. No mechanical switch necessary.
- Use voltage your power cord is rated for.
- Pump is supplied with a ground wire conductor and a grounding type attachment plug (power cord). To reduce risk of electric shock, be certain that power cord is connected only to a properly grounded, grounding type receptacle.
- Never strap control (input / output) cables and power cables together.
- **Power Interruption:** This pump has an auto-restart feature which will restore pump to operating state it was in when power was lost.

Note: When in doubt regarding your electrical installation, contact a licensed electrician.


Three power cord plug types available. Power cord length is 6 feet (3.83 meters)



115V 60Hz
NEMA 5/15 (USA)

230V 60Hz
NEMA 6/15 (USA)

240V 50Hz
CEE 7/VII (EU)

| Symbol | Explanation |
|---|---------------------------------------|
|  | GROUND, PROTECTIVE CONDUCTOR TERMINAL |

6.0 How To Install Pump Accessories

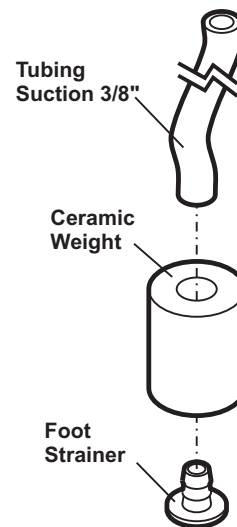
CAUTION Proper eye and skin protection must be worn when installing and servicing pump.

CAUTION This Pump Has Been Evaluated for Use with Water Only.

Pump accessories include: Suction tubing, discharge tubing, foot strainer, ceramic weight, injection fitting / quill
Accessories are provided for your convenience.

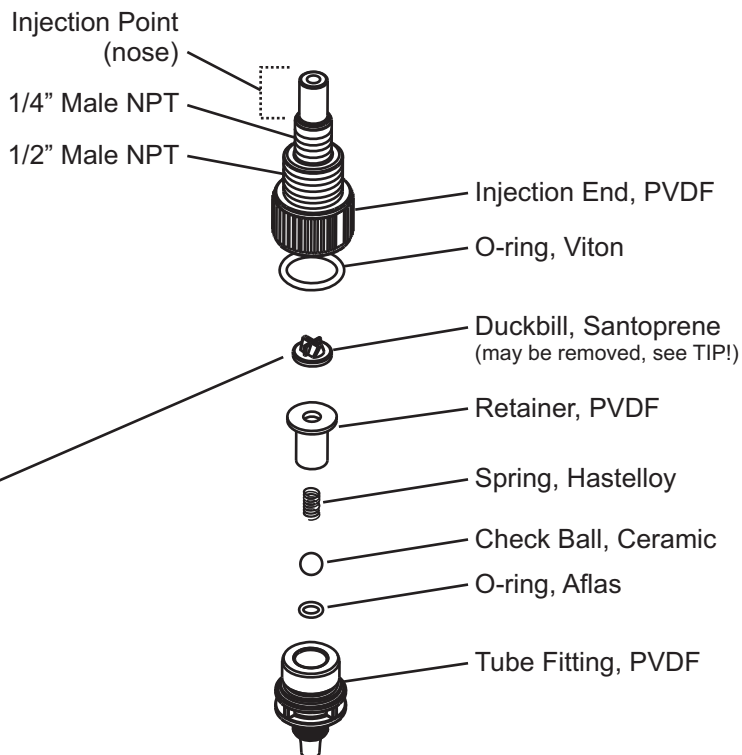
- Inlet Tubing (suction)** - Locate inlet fitting of Pump Tube. Remove tube nut. Slide tube nut onto tubing with threads facing pump head tube fitting. Push clear PVC suction tubing onto compression barb of fitting. Use tube nut to secure tube. Hand tighten only.
- Strainer (suction end)** - Trim inlet end of suction tubing so foot strainer will rest approximately two inches from bottom of solution tank. This will prevent sediment from clogging strainer. Slip ceramic weight over end of suction tube. Press strainer into end of tube. Secure ceramic weight to strainer. Drop foot strainer into solution tank.
- Outlet Tubing (discharge)** - Locate outlet fitting of Pump Tube. Remove tube nut. Push tube nut onto tubing with female threads facing pump head tube fitting. Push opaque outlet (discharge) tubing onto compression barb of the fitting. Use tube nut to secure tube. Hand tighten only.

Keep outlet tube as short as possible.



- Injection/Check Valve Fitting Installation (injection point)**- Injection/Check valve fitting is designed to install directly into either 1/4" or 1/2" female pipe threads. This fitting will require periodic cleaning, especially when injecting fluids that calcify such as sodium hypochlorite. Install Injection/Check valve directly into piping system. Use Teflon thread sealing tape on pipe threads. Push opaque outlet (discharge) tubing onto compression barb of Injection/Check valve fitting. Use tube nut to secure tube. Hand tighten only.

Injection Fitting - Exploded View



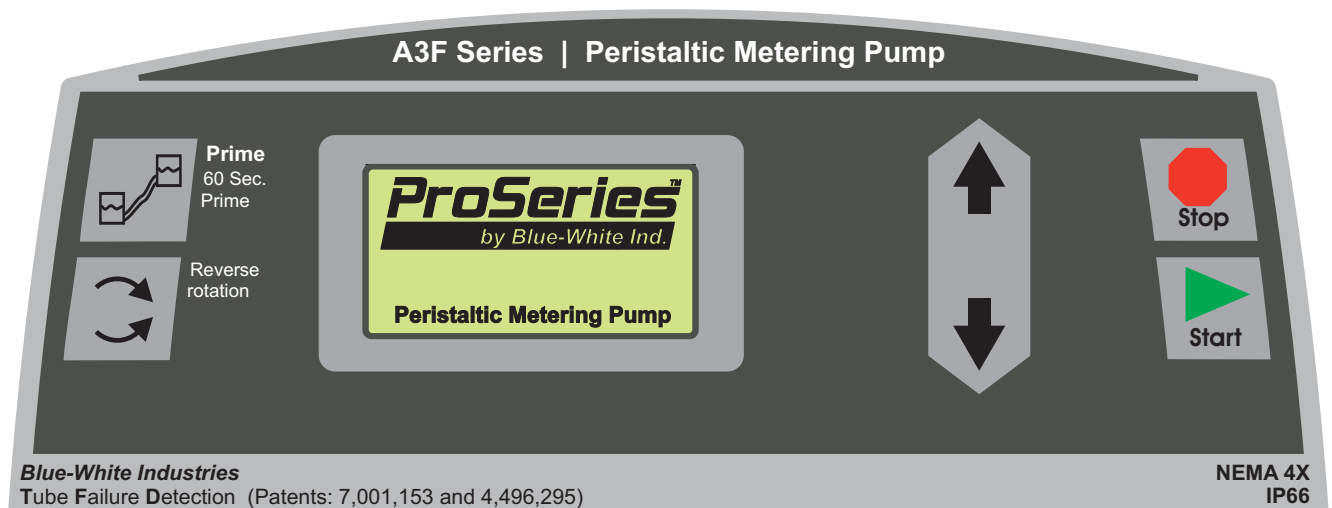
Tip!



Duckbill is used to help reduce calcium buildup when injecting chemicals that calcify (such as sodium hypochlorite). **Duckbill** may add additional back pressure to pump (up to 7 psi). **Duckbill** may be removed if desired. You may also want to remove **duckbill** when metering viscous fluids.

7.0 How To Operate The A3F

A3F Series, Control Panel - Button Operation



To STOP pump at any time

Pump can be stopped at any time by pressing STOP button. STOP button overrides all other controls and stops pump. Display will read OFF if pump has been stopped in this manner. Pump will not respond to incoming input signals while in OFF state. When START button is pressed, pump will start according to it's previous operating state.



To START pump

Press START button to start pump. If pump is configured to accept an incoming signal (via contact closure), pump will begin "listening" for incoming signal.



UP Arrow

UP arrow is used to increase feed rate (output). UP arrow is also used to navigate through menu structure of pump.



DOWN Arrow

DOWN arrow is used to decrease feed rate (output). DOWN arrow is also used to navigate through menu structure of pump.



To PRIME pump

Press PRIME button to start 60 second prime feature. Pump will run at full speed for 60 seconds or until STOP or START button is pressed. STOP button will stop pump and display will read OFF. START button will stop prime feature and jump back into previous operating state.



To REVERSE ROTATION of rotor

Press REVERSE ROTATION button to reverse flow. A3F pump display will guide you through reverse rotor rotation process.

Caution!

Discharge line is under pressure! Safely relieve discharge line pressure by using a pressure relief valve. REMOVE DISCHARGE LINE PRESSURE BEFORE DISCONNECTING TUBING.

8.0 Manual Adjust (manual speed adjust)

Used to manually control speed of pump. Use **UP** arrow to speed up pump. Use **DOWN** arrow to slow pump down.



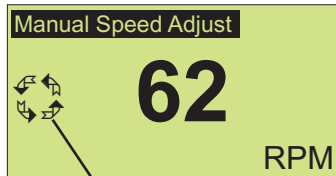
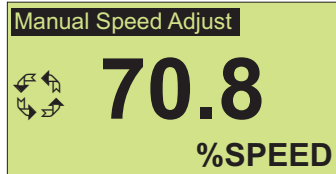
Tip! This feature can be combined with **Contact Input** feature to allow for remote Start and Stop of pump. Can be used with PLC, foot pedal, push button, backup pump, or other external controls.



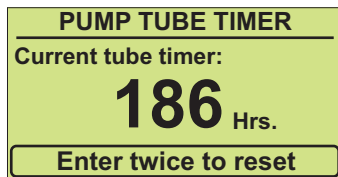
Tip!



You can view pump output by pressing START arrow (see screen shot). START arrow is a convenient way to scroll through multiple read-only screens during normal operating mode of pump.



Displays current rotor direction



Tube Timer Displays for 4 seconds.

9.0 External Communications

9.1 Contact Closure Input

Used to remotely start and stop pump using a close=stop or open=stop signal. If pump should start on an open, then select "Close: Stop Pump" option. Can be used with an external foot pedal, a PLC, contact closure, or other similar external devices.

Default settings: Disable

CC Input Range: 6 - 30 VDC
or
Dry Contact Closure (no voltage required)
[See section 14.0 for wire connections]

Navigate to **Contact Input** menu by holding the **START** button for 5 sec.

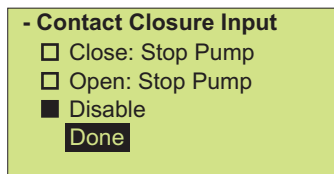
Press UP or DOWN arrow to scroll through your options.

Press START to make a selection. You will notice radio button (square box) is now filled in next to your selection.

Press DOWN arrow to scroll down to Done selection. Then press START.

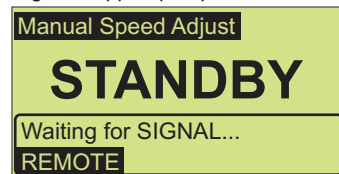
IMPORTANT: If Contact Closure Input is enabled, pump will display **STANDBY** if pump is in Stop mode via the Contact Closure. Please use caution in this mode. Pump can Start at anytime. If you must perform maintenance to the pump, Press **STOP** button.

When Contact Closure Input is enabled, the word **Remote** will be displayed on lower left side of screen at all times.

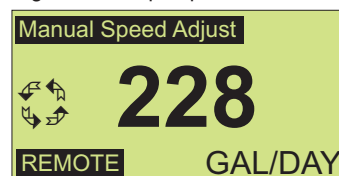


- Sample Screen Shots -

Signal stopped pump



Signal started pump

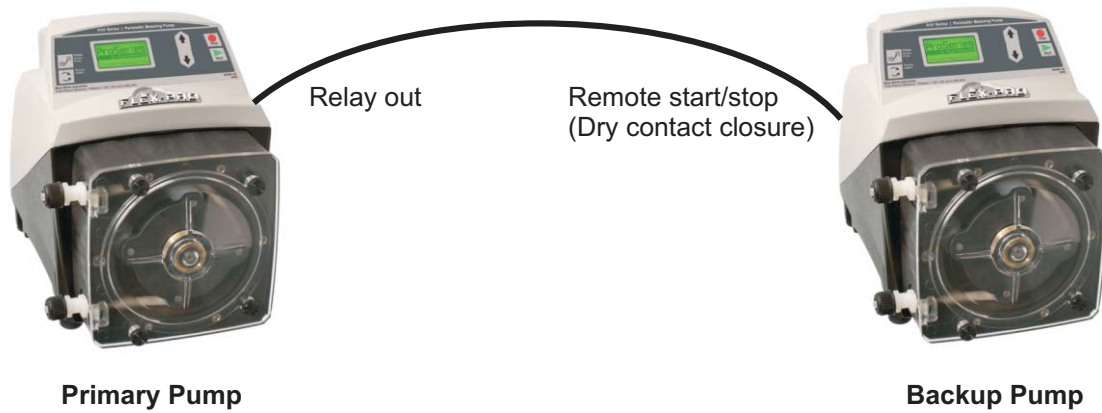


9.2 Alarm Relay (10amp max)

Pump has a built in 10 amp relay.

Relay is a pre-configured to trigger on tube failure detection (TFD) and on Flow Verification Sensor (FVS).
Flow Verification Sensor must be installed and configured for relay to trigger on no-flow conditions.

Backup Pump Example: To wire in a backup pump, connect the relay out wires from primary pump to input remote wires of the backup pump.



| Wiring Example | |
|---|--|
| Primary Pump | Backup Pump |
| Use relay out connect both wires (default is normally open) | Use input remote connect to red+bare wires (dry contact closure) |

11.3 Set FVS (Flow Verification System)

Used to monitor pump output. If pump does not dispense fluid when pump head rotor is turning, pump will go into an alarm mode and stop pump. Blue-White offers a flow verification sensor that can easily attach to fitting on pump.

Default settings: 000 (off)

Navigate to **Set FVS** menu by pressing **UP** and **DOWN** arrow at the same time, then selecting Input Setup, and then **Set FVS**.

Press UP or DOWN arrow to set the FVS.

Press START to save changes and exit FVS screen.

Flow Verification System (sensor sold separately)

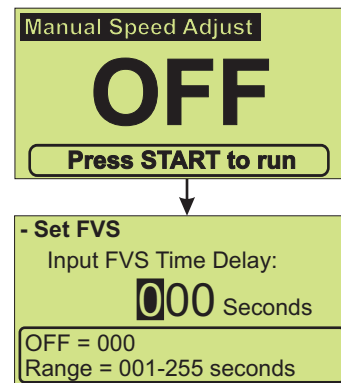
A3 is equipped with a *Flow Verification System* which is designed to stop pump and provide a contact closure output or 10 amp relay output (setup in software) in event sensor does not detect chemical during pump operation. This could indicate a clogged injection fitting, empty chemical solution tank, worn pump tube, loose tubing connection, etc.

To allow pump to clear any gasses that may have accumulated during stopper operation (such as with chlorine), an alarm delay time value from 1-255 seconds must be programmed (An alarm delay value of 000 seconds disables FVS system).

If FVS alarm occurs, pump will stop, send an external signal (if setup), and screen will flash FVS with an alarm icon.

To clear FVS alarm, you must press START button or re-cycle power (unplug power to pump, then plug back in).

Install FVS Flow Sensor - Flow Verification Sensor (FVS) should be installed on the inlet (suction) side of the pump tube. Sensor includes a PVC tubing insert, located inside sensors female thread connection, that is designed to seal sensor onto pump tube inlet adapter. Thread sensor onto pump tube until tubing insert is snug against pump tube inlet fitting - do not over-tighten.

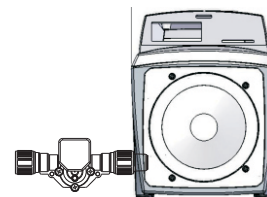


When a FVS alarm occurs



Confirm the FVS flow range - Flow Verification Sensor (FVS) will only function within its operating range. Sensor model FV-100-6V has an operating range of 30-300 ml/min (1-10 oz/min). If the pump's output is less than 30 ml/min (0.5 ml/sec), sensor will not detect chemical and a signal will not be sent to pump.

| SENSOR MODEL NUMBER | OPERATING FLOW RANGE (ml/min) |
|---------------------|-------------------------------|
| FV-200-6V | 100-1000 |
| FV-300-6V | 200-2000 |
| FV-400-6V | 300-3000 |
| FV-500-6V | 500-5000 |
| FV-600-6V | 700-7000 |



10.0 External Signal Connections

All wiring connections are to be made inside of the junction box located on back of the A3. Junction box cover is secured to junction box by four stainless steel 10-32 round head phillips screws. Liquid tight connectors are supplied and should be used for external signal cable.



Disconnect power from the pump before removing the junction box cover.

Signal wiring is color coded and/or printed to identify signal type.

Loosen cap end of liquid tight connector and remove plug that ships with pump. Feed input / output wires through liquid tight connector. Suitable cable must be passed into junction box through one or more liquid tight connectors and connected appropriately. Tighten liquid tight connectors to ensure a NEMA 4X seal.

For the large liquid-tight connector. The acceptable cable diameter is between .200 - .394 in (5.1 - 10.0 mm).
For the small liquid-tight connector. The acceptable cable diameter is between .118 - .255 in (3.0 - 6.5 mm).

Input - Flow Verification Sensor (FVS)

Used to monitor pump output (chemical feed).
FVS sensor sold separately.
Cable is labeled: **INPUT FVS**



FVS Input Wire Connections

RED / WHITE (+15 VDC)
BLACK (-)
YELLOW (signal)

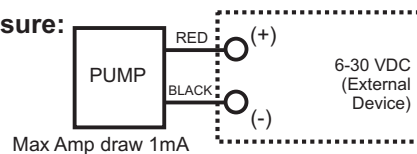
Input - Remote Start / Stop

Perfect for use with a PLC to control chemical feed.
Great for footswitch or similar remote input.
Cable is labeled: **INPUT REMOTE**



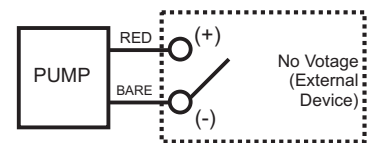
Powered Contact Closure:

RED (+)
BLACK (-)



Dry Contact Closure:

RED
BARE



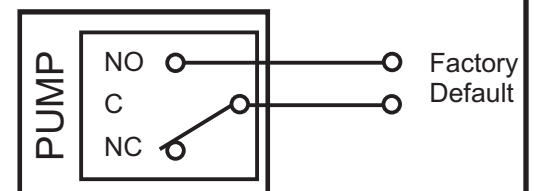
Output - Relay, 10 Amp

Used to switch up to a 10 Amp load.
Works with AC or DC devices (see below).
Cable is labeled: **OUTPUT RELAY**



10 Amp Relay Output

Normally Open (NO) [Factory Default] or Normally Closed (NC)
Max contact rating: 10 Amp max @ 250 VAC, 8 Amp maximum @ 30 VDC



Note: Use both wires.

11.0 Tube Replacement

For your safety, pump rotor will rotate at a maximum of 6 RPM while pump head cover is removed.

CAUTION

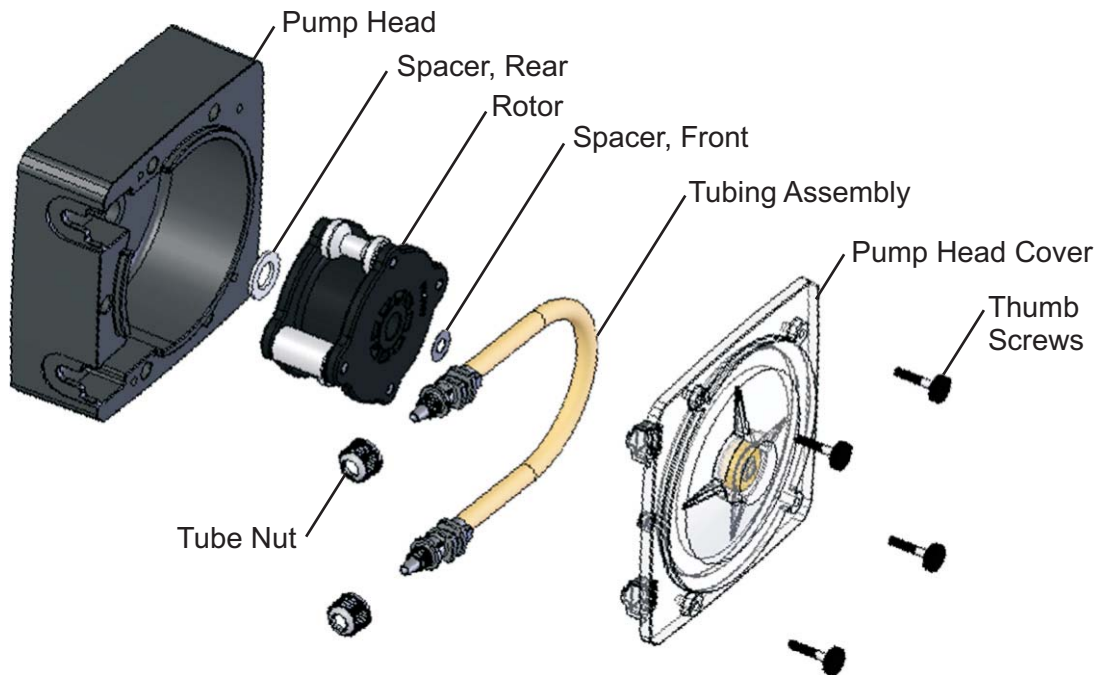


Prior to service, pump clean water through the pump and suction / discharge line to remove chemical.

CAUTION



Always wear protective clothing, face shield, safety glasses and gloves when working on or near your metering pump. Additional precautions should be taken depending on solution being pumped. Refer to MSDS precautions from your solution supplier.



Remove **Pump Head Cover** by unscrewing four **Thumb Screws**. Pull out **Pump Head Cover**.

Pump will detect **Pump Head Cover** is removed and enter MAINTENANCE MODE.

Rotor will rotate at a maximum of 6 RPM for your safety.

Pull out suction side of **Tubing Assembly**.

Press START button. While rotor is rotating, pull out old **Tube Assembly**.

TIP! Let pump do the work for you. Just guide tubing out between two rollers located on **Rotor**.

Press STOP button at any time to stop the pump.

Pull out suction line adapter from Pump Head. Pull out **Tubing Assembly** as the **Rotor** rotates around.

Stop pump by pressing STOP button.

Thoroughly clean **Pump Head** and **Rotor**. **Rotor** can be removed by pulling straight out. After cleaning process, push **Rotor** back on shaft. See drawing above for proper assembly. IMPORTANT! **Rotor** direction; the word "FRONT" on **Rotor** must face front of pump.

Locate your new tubing and Tube Installation Tool. Please see next page on how to install new **Tube Assembly** into **Pump Head**.

MAINTENANCE MODE

Pump Cover Removed!

MAINTENANCE MODE

- Cover was removed!
- Motor Speed = 6 RPM

Press START to run
Press STOP to stop

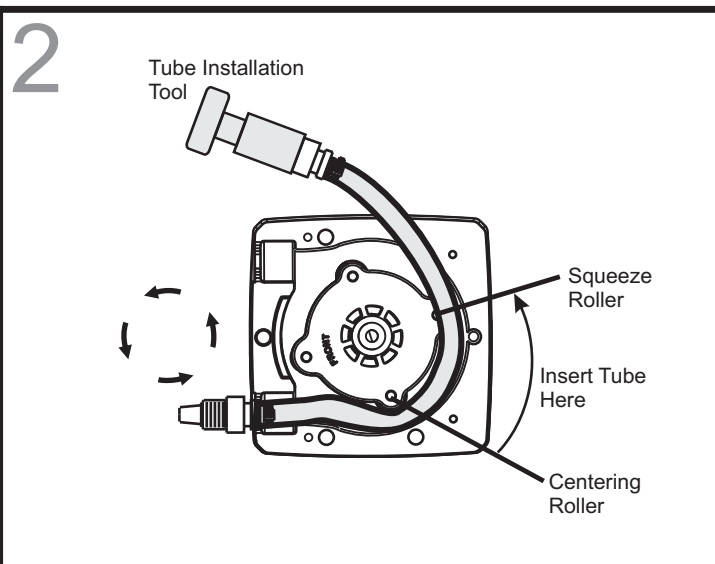
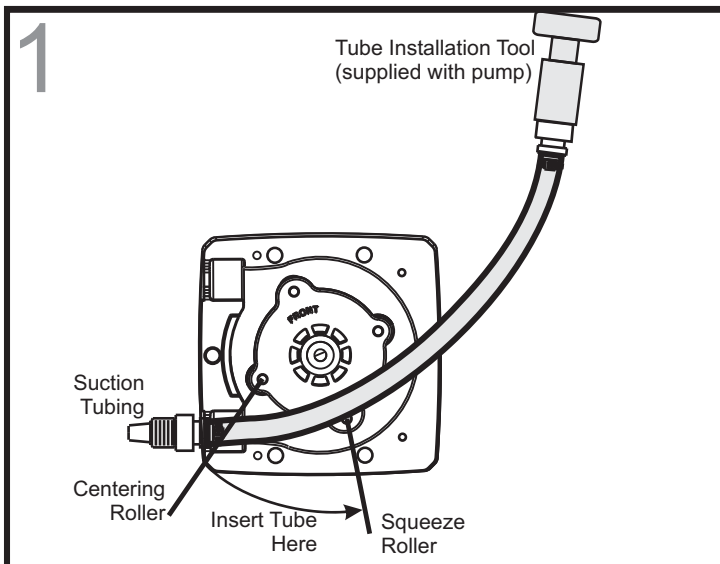
! Use provided Tube Installation Tool to leverage tubing into pump head, NOT YOUR FINGERS.

! Use extreme caution when replacing pump tube. Be careful of your fingers and DO NOT place fingers near rollers.

For your safety, pump rotor will rotate at a maximum of 6 RPM while pump head cover is removed.

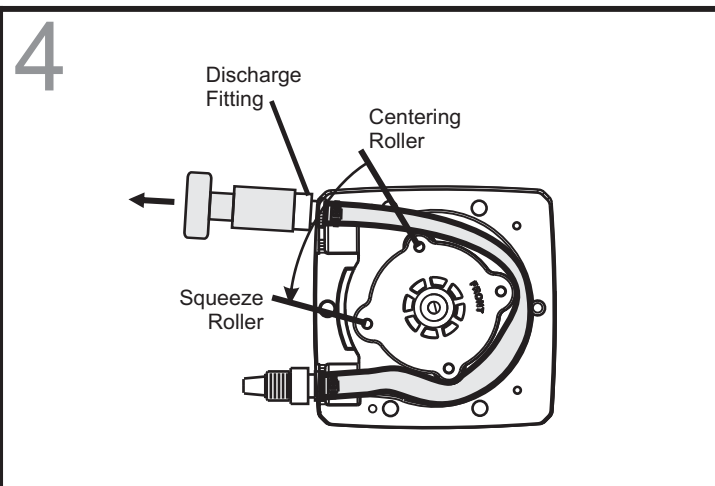
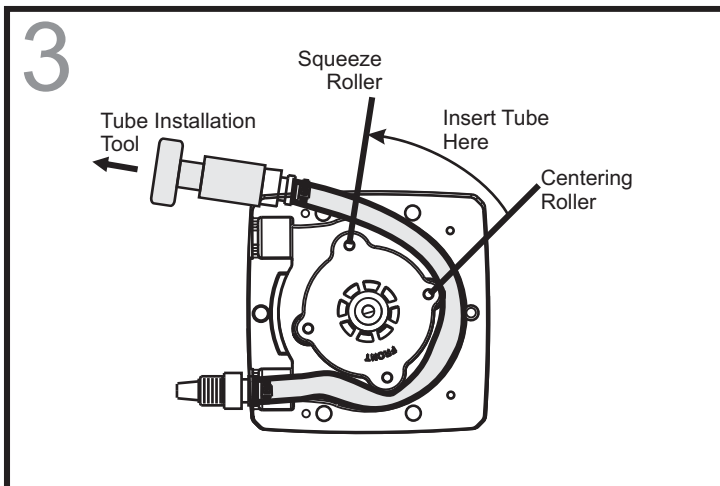


90002-267



Use provided Tube Installation Tool.
First, position rotor so tubing will enter between a centering roller and squeeze roller. Insert suction fitting into pump head. Remove your fingers from pump head. Hold on to Tube Installation Tool. Start pump by pressing START button. Introduce tubing into pump head after a squeeze roller and before centering roller.

Use provided Tube Installation Tool.
While rotor is rotating, insert tubing between squeeze roller and centering roller. Continue this while rotor is rotating. Stop pump at anytime by pressing STOP button. Start pump by pressing START button.



Use provided Tube Installation Tool.
Continue to follow rotation of rotor while directing tube into pump head. At this point, you may need to pull Tube Installation Tool to stretch tubing into position. Tube may not be stretched enough to insert discharge fitting. Let rotor spin a few rotations while pulling Installation tool so fitting can be properly installed.

Continue to pull Tube Installation Tool to allow enough room to slide discharge fitting into pump head tongue and groove. Once discharge fitting is secured in pump head, stop pump by pressing STOP button. Pump will ask you if you'd like to reset tube timer. If you choose **yes**, current tube time will display for 5 seconds before resetting to zero. Make note of your displayed tube life, then select **yes**. This will reset tube timer to zero.

Re-attach **Pump Head Cover** using the four **Thumb Screws**.

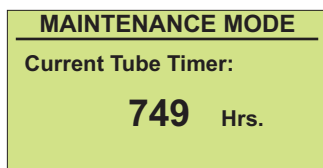
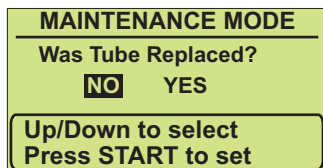
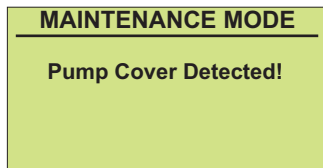
Pump will detect **Pump Head Cover** is installed and begin to exit MAINTENANCE MODE.

Pump will ask you if Tube was replaced. Yes / No

If Yes is selected, pump ask you to reset Tube Timer. Yes / No

If Yes is selected, pump will display Current Tube Timer briefly (5 seconds) before resetting to zero.

The pump can now begin normal operation.



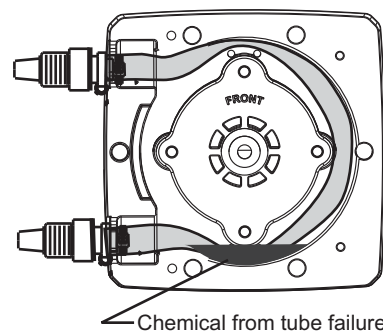
12.0 TFD (Tube Failure Detection)

A3F is equipped with a *Tube Failure Detection* System which is designed to stop pump and provide a contact closure output, 10 amp relay output, or both (see Output menu) in the event pump tube should rupture and chemical enters pump head. This patented system is capable of detecting presence of a large number of chemicals including Sodium Hypochlorite (Chlorine), Hydrochloric (muriatic) Acid, Sodium Hydroxide, and many others. System will not be triggered by water (rain, condensation, etc.) or silicone oil (roller and tubing lubricant).

If system has detected chemical, pump tube must be replaced and pump head and roller assembly must be thoroughly cleaned.

If TFD alarm occurs, pump will stop, send an external signal (if setup), and screen will flash TFD with an alarm icon.

To see total pump run time on your tubing, press and hold START button. This will display hours of run time with your currently installed tubing. You can use this feature to check your current tube run time at any time of normal pump operation.



When a TFD alarm occurs



For instruction on how to remove ruptured tubing - Please see **section 15.0**

Confirm Chemical Detection - To determine if your chemical will be detected by system, remove pump tube and roller assembly. Place a small amount of chemical in bottom of pump head - just enough to cover sensors. Turn on pump. If TFD system detects chemical, pump will stop after a two second confirmation period and TFD Alarm screen will display. If TFD system does not detect chemical, pump will continue to run after confirmation period. Carefully clean chemical out of pump head being sure to remove all traces of chemical from sensor probes. Press START button to clear alarm condition and restart pump

13.0 Pump Tube Timer

A3F has a built in Pump Tube Timer. Timer starts when rotor is rotating and stops when rotor is idle.

To view current Pump Tube Timer, press START button repeatedly until Tube Timer screen displays.

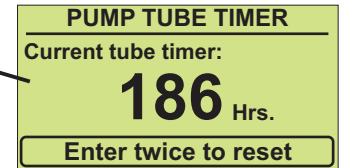
Note: Pump Tube Timer screen will display for 4 seconds.

Screen will display current Pump Tube Time in run-time hours.

Pump Tube Timer will display for 4 seconds, then switch back to previous operating screen.



Caution: Press DOWN button twice to reset Pump Tube Timer to zero.

When replacing pump tube, pump will ask you if you'd like to reset Pump Tube Timer. If you choose YES, screen will display current Pump Tube Time for 5 seconds before timer is reset to zero.



14.0 Reverse Rotor Rotation


Increase tube life with this feature!

| | |
|---|---|
| CAUTION  | Prior to service, pump clean water through the pump and suction / discharge line to remove chemical. |
| CAUTION  | Always wear protective clothing, face shield, safety glasses and gloves when working on or near your metering pump. Additional precautions should be taken depending on solution being pumped. Refer to MSDS precautions from your solution supplier. |

Pump rotor can reverse rotation by pressing REVERSE ROTATION button. This process can be used for many reasons throughout various industries.

Two reasons for reversing current rotor rotation; to purge chemical from tubing and to extend tube life.

Plan ahead before reversing rotor rotation. If checkvalves are installed, make necessary arrangements to allow back flow.

| | |
|---|---|
| CAUTION  | Failure to install checkvalves in their proper flow direction can cause excess pressure (PSIg) build up in system and can result in tube rupture. Always use extreme caution and ensure proper connections when using this feature. |
|---|---|

If your desire is to simply extend tube life:

Typically tubing fails on outlet side (pressure side) of tube assembly in pump head.

Reversing rotation, moves outlet side (pressure side) to opposite side of tube assembly, greatly increasing tube life.

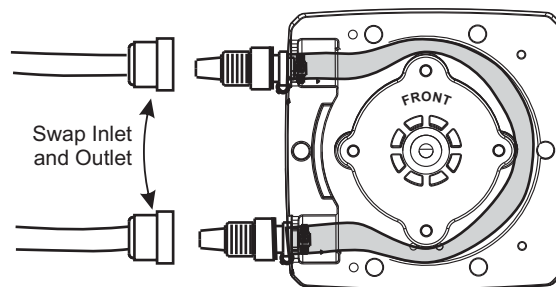
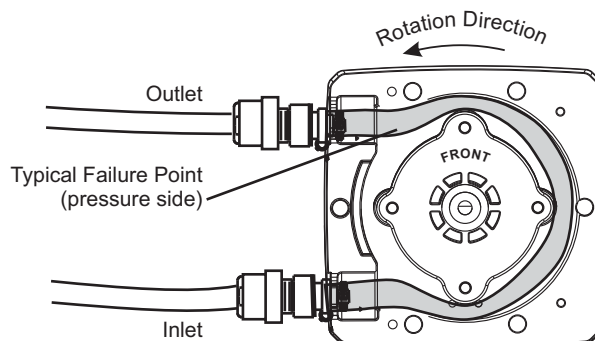
Stop pump before tube failure occurs.



Disconnect power from pump. Carefully purge any pressure in discharge line of pump. Disconnect suction end tubing and discharge end tubing from pump head tubing.

IMPORTANT! Swap sides of suction (inlet) and discharge (outlet) tubing. No need to remove Pump Head Cover.

Double check all connections before starting pump.



15.0 How to Maintain Pump

CAUTION: Proper eye and skin protection must be worn when installing and servicing the pump.

Routine Inspection and Maintenance

Pump requires very little maintenance. However, pump and all accessories should be checked weekly. This is especially important when pumping chemicals. Inspect all components for signs of leaking, swelling, cracking, discoloration or corrosion. Replace worn or damaged components immediately.

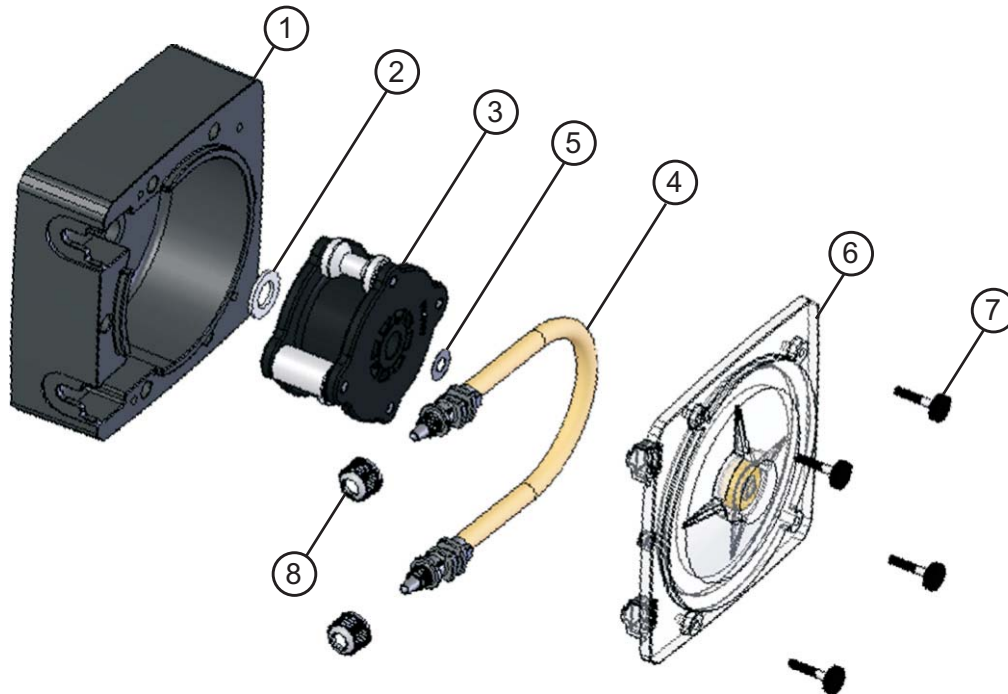
Cracking, crazing, discoloration and the like during first week of operation are signs of severe chemical attack. If this occurs, immediately remove chemical from pump. Determine which parts are being attacked and replace them with parts that have been manufactured using more suitable materials. Manufacturer does not assume responsibility for damage to pump that has been caused by chemical attack.

How to Clean and Lubricate Pump

Pump will require occasional cleaning. The amount will depend on severity of service.

- ☒ When changing pump tube assembly, pump head chamber, roller assembly and pump head cover should be wiped free of any dirt and debris.
- ☒ Pump head cover bearing may require grease periodically. Apply a small amount of grease (Aeroshell aviation grease #5 or equivalent) when necessary.
- ☒ Although not necessary, 100% silicon lubrication may be used on the roller assembly and tube assembly.
- ☒ Periodically clean injection/check valve assembly, especially when injecting fluids that calcify such as sodium hypochlorite. These lime deposits and other build ups can clog fitting, increase the back pressure and interfere with check valve operation.
- ☒ Periodically clean suction strainer.

16.0 Pump Head - Exploded View and Part Numbers



| Item | Description | Part Number | Quantity |
|------|--------------|-------------|----------|
| 1 | Pump Head | A3-SXX-H | 1 |
| 2 | Spacer, Back | 90011-184 | 1 |

| | | | | | |
|--------------|---|---|--|----------|---|
| Group | All roller assemblies (rotors) in this group are same size. Tubing in this group are interchangeable. | 3 | Roller Assembly Complete (Rotor) | A3-SND-R | 1 |
| | | 4 | Tube Assembly, Norprene (.075 ID), printed with ND | A3-SND-T | 1 |
| | | 3 | Roller Assembly Complete (Rotor) | A3-SNF-R | 1 |
| | | 4 | Tube Assembly, Norprene (.155 ID), printed with NF | A3-SNF-T | 1 |

| | | | | | |
|--------------|---|---|--|----------|---|
| Group | All roller assemblies (rotors) in this group are same size. Tubing in this group are interchangeable. | 3 | Roller Assembly Complete (Rotor) | A3-SNH-R | 1 |
| | | 4 | Tube Assembly, Norprene (.250 ID), printed with NH | A3-SNH-T | 1 |
| | | 3 | Roller Assembly Complete (Rotor) | A3-SNJ-R | 1 |
| | | 4 | Tube Assembly, Norprene (.312 ID), printed with NJ | A3-SNJ-T | 1 |
| | | 3 | Roller Assembly Complete (Rotor) | A3-SNK-R | 1 |
| | | 4 | Tube Assembly, Norprene (.375 ID), Printed with NK | A3-SNK-T | 1 |

| | | | | | |
|--------------|---|---|---|----------|---|
| Group | All roller assemblies (rotors) in this group are same size. Tubing in this group are interchangeable. | 3 | Roller Assembly Complete (Rotor) | A3-SGE-R | 1 |
| | | 4 | Tube Assembly, Tygothane (.125 ID), printed with GE | A3-SGE-T | 1 |
| | | 3 | Roller Assembly Complete (Rotor) | A3-SGG-R | 1 |
| | | 4 | Tube Assembly, Tygothane (.187 ID), printed with GG | A3-SGG-T | 1 |
| | | 3 | Roller Assembly Complete (Rotor) | A3-SGH-R | 1 |
| | | 4 | Tube Assembly, Tygothane (.250 ID), printed with GH | A3-SGH-T | 1 |

| | | | |
|---|--|-----------|---|
| 5 | Spacer, Front | A-031 | 1 |
| 6 | Pump Head Cover, Annealed Acrylic | A3-SXX-C | 1 |
| 7 | Thumb Screw | 90011-183 | 4 |
| 8 | Tube Nut, Compression, For 3/8" Tubing | C-330-6 | 2 |

Note: All Tube Assemblies have identification number printed directly on tubing.

Example: Printed NH, replacement Tube Assembly = A3-SNH-T, replacement Roller Assembly = A3-SNH-R

Replacement Tube Assembly and Roller Assembly (Rotor) part number explained:

Example Tube Assembly with "NH" printed on tubing:

N = Norprene
H = Tubing ID

Example Tube Assembly reorder number with NH printing:

A3-SNH-T

