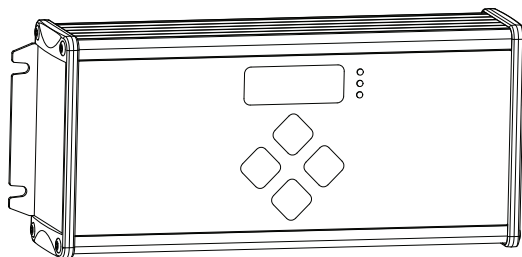


## EXTEND THE LIFE of MACHINE TOOL COOLANT

The ASF 100 combines an ultraviolet light with a customizable filter to control the spread of bacteria, mold, and fungi while removing unwanted particles from machine tool coolant. This prolongs fluid life leading to fewer change outs per year, lower disposal cost, and reduced machine downtime.



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## Safety Information

**Do NOT use the ASF 100 to treat flammable liquids.**

The ASF 100 system may not be compatible with all applications. It is the responsibility of the end-user to determine its compatibility with a particular system.

UV radiation can negatively impact the performance of certain fluids on a molecular level. It is the responsibility of the end-user to determine if UV sterilization is an acceptable technique to employ in their particular application.

Unprotected exposure to UV light radiation can cause skin burns and vision damage. Under normal operating conditions, the ASF 100 provides adequate shielding and no additional protection is required. If the unit becomes damaged or the safety interlock ceases to function properly, the unit must be removed from service immediately and repaired by Inauvate or replaced to prevent unprotected exposure.

The UV-emitting bulb inside the ASF 100 contains mercury. Follow proper procedures for disposal. In the case of a broken bulb, follow proper procedures for containment and disposal. Total mercury quantity is less than 15mg per bulb.

The ASF 100 control module contains a lithium metal battery. Transport and dispose of properly per local regulations.

The sump safety interlock is included for the safety of the user when servicing the unit. Purposely defeating the interlock feature may result in bodily harm or property damage and will void all warranties. Always disconnect the unit from power and verify that the interlock is functioning properly before servicing the unit. NEVER OPERATE THE UV BULB WITHOUT THE SUMP ATTACHED AND FILLED WITH FLUID.

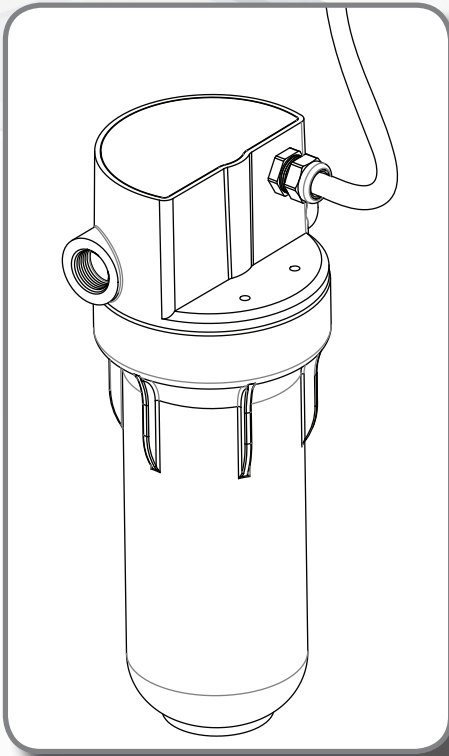
Do NOT open the control module or filter head electrical compartment, or alter either in any way. Doing so will void the warranty and could present unprotected hazards to the user.

## Symbols

⎓ Alternating (AC) or direct (DC) current

~ Alternating (AC) current

⚠ Caution - The ASF 100 filter contains fragile components and should be mounted in an area that limits impact or shock hazards and restricts access to personnel trained and authorized to service the unit. Impact testing performed at 2 Joule level per IEC61010-1 section 8.2.2.



# Inauvate

●●● WORK SOLUTIONS

*The **ASF 100** by Inauvate Work Solutions is the cutting edge solution for coolant and aqueous system maintenance, supported by a company that is committed to helping save valuable time and money in the manufacturing environment.*

## Why the **ASF 100**?

- Prolongs the life of water-based process fluids by sterilizing bacteria reducing the need for costly change outs.
- Pays for itself in months, not years.
- Chemical free UV cleaning system reduces environmental waste.
- Designed with a low profile and made specifically for the manufacturing industry.
- Available with normal bulb outputs for clear fluids and high bulb outputs for opaque fluids.
- Offered in 10" sumps for compact spaces and easier maintenance and 20" sumps for maximum effectiveness.
- Lower bacteria count promotes a cleaner and healthier working environment.
- Installation is quick and simple with options for permanent installation or portability.
- Utilizes a multi-pass recirculating configuration and directed flow through the filter to maximize UV exposure.
- System is offered with various filter sizes to remove small chips that cause tool wear.
- Built-in electronics allow for stand-alone use, external control, or time based scheduling.

# System Components

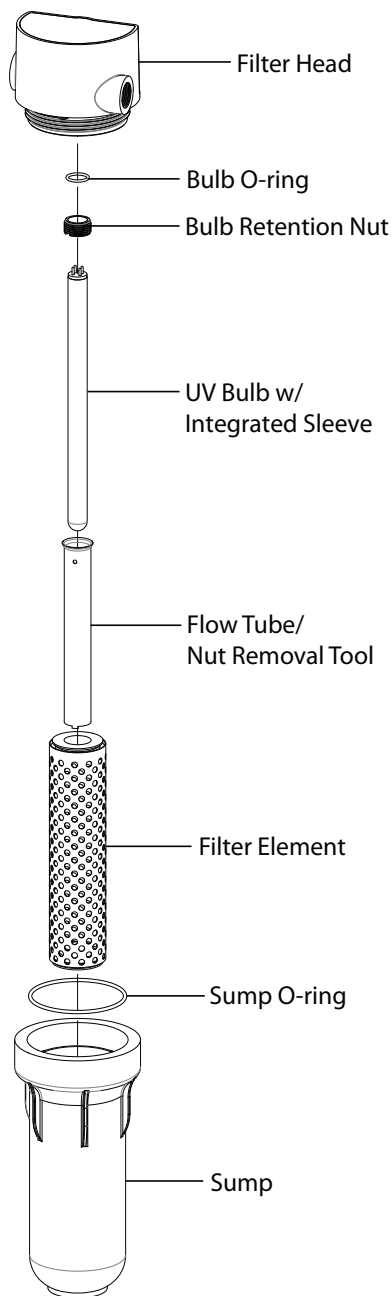
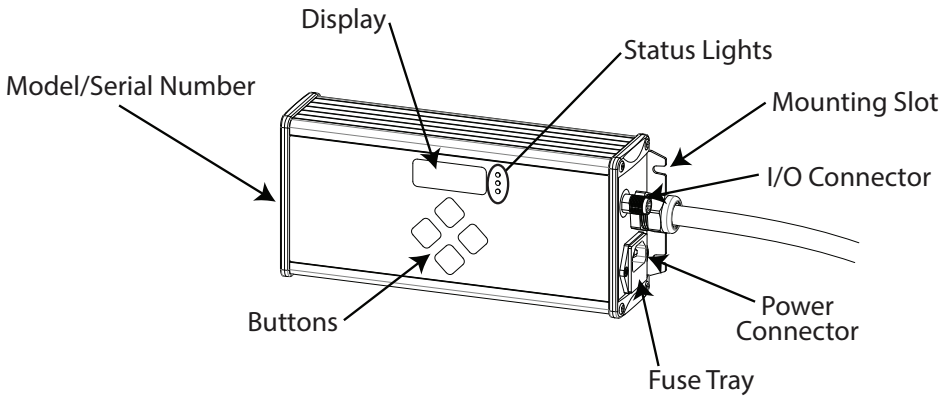
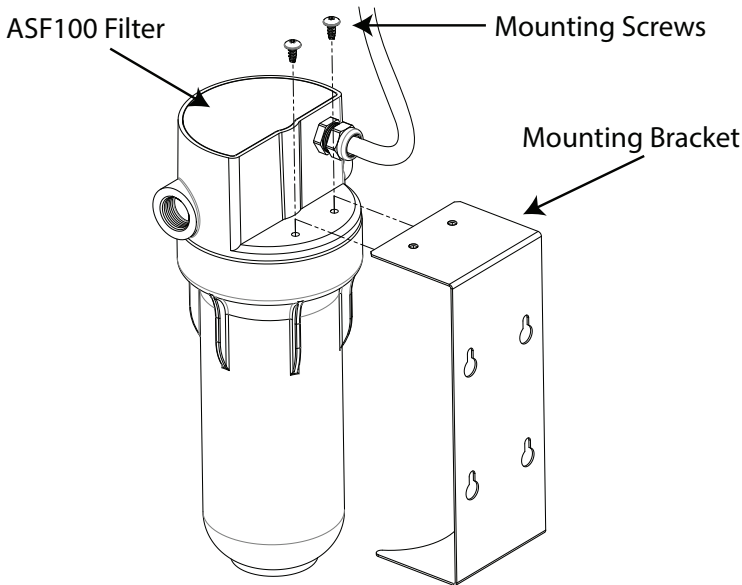


Figure 1 – Filter assembly components



*Figure 2 – Electronic Control Module (ECM) components.*



*Figure 3 – Installation of optional mounting bracket.*

## Setup

The ASF 100 is suitable for in-line installation on systems meeting the following specifications:

- Pressure: 50 psi (400 kPa) max
- Vacuum: 25 in Hg (635 mm Hg) max
- Flow rate: 20 gpm (75 lpm) max
- Fluid temperature range: 40-125°F (5-50°C)
- Pressure differential: 4 psi (28 kPa) at 10 gpm (38 lpm)\*
- Ambient temperature range: 40-100°F (5-38°C)
- Environment: indoor use only, avoid exposing control module to liquids
- Humidity: 0 – 85%, non-condensing
- Altitude: sea level to 6,500 feet (2,000 meters)
- Usage: continuous or intermittent (cycle not to be less than 5 minutes, see *Off Delay* parameter description (pg. 18) for cycles shorter than 5 minutes)
- Power input: 110-240VAC, single phase, 0.5A, 50-60Hz

**Note: Use only three-conductor, grounded power cables with the ASF 100. Failure to provide proper grounding can result in an electrical shock hazard.**

- Fuse: 1.25A, 250V fast blow, UL listed or equivalent
- Control input: 12-24VAC/DC, 20mA max
- Control output: 12-24VAC/DC, 250mA max

**\* When used with a new filter and a fluid viscosity of 1 cP.**

The ASF 100 is suitable for use on systems using the following working fluids:

- Non-potable water
- Wash (soapy) water
- Water-based machine coolant
- Aqueous solutions not excluded below

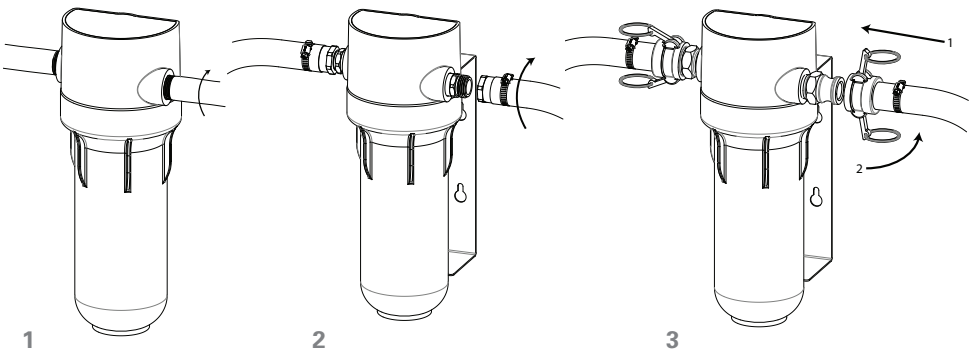
The ASF 100 is **NOT** compatible with systems containing the following:

- Flammable liquids
- Liquids over 125°F
- High concentrations of chlorine
- Strong acids or bases
- Drinking water
- Coolants intentionally containing beneficial bacteria

If unsure of compatibility with a specific application, contact Inauvate for assistance.

The ASF 100 is shipped partially assembled from the factory. To complete setup, take the following steps.

1. Inspect the ASF 100 packaging to ensure that all components are present and undamaged.
2. Select the mounting location for the unit. Depending on the options chosen, the ASF 100 can be mounted in a variety of ways. Always mount with the filter head towards the top to avoid damage to the electrical components. Leave sufficient space for removal of the sump when servicing the unit.



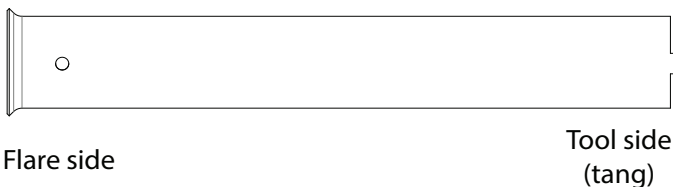
*Figure 4 – Various mounting options available on the ASF 100 line of filter units, including 1) hard-plumbed, 2) garden hose fittings (with optional mounting bracket), and 3) quick-connect fittings (with optional mounting bracket).*

3. Acquire suitable hose, pipe, or fittings for plumbing the ASF 100 into the system. Be sure to select hardware that is suitable for use with the fluids and pressures (50 psi (400 kPa) max) present in the system on which the ASF 100 is to be installed.
4. Disconnect all energy sources in the system, taking appropriate measures to lockout such sources, and bleed any residual pressure from the system.
5. Determine a suitable mounting location for the control module. A suitable location minimizes exposure to uncontained fluids, electrical noise, excessive temperatures and vibration while remaining visible and accessible for service. The mounting structure should be capable of safely supporting the module. Use #10 sheet metal screws or similar, as appropriate for the mounting surface, to secure the module using the four slots provided on either end of the control module.



**Note: Always check behind mounting locations for hoses, cables, electronics, etc. that may be damaged prior to drilling . Inauvate is not responsible for damage caused to other equipment during the installation of the ASF 100.**

6. If using the optional filter mounting bracket, determine a suitable location for the filter. The location should allow easy connection to the desired system, provide sufficient access for maintenance, minimize shock and vibration, and provide sufficient ventilation to avoid excessive temperatures. The mounting structure must be capable of safely supporting the weight of the filter and the volume of liquid contained inside. Use ¼" sheet metal screws or similar, as appropriate for the mounting surface, to secure the module using the four slots provided on the bracket.
7. Plumb the ASF 100 filter into the system in the desired location. Be sure to follow the flow direction as indicated on the top of the filter head. All plumbing work should be performed by a person qualified to perform such work in the jurisdiction of the installation.  
If using barb-style fittings and flexible hose, use a hose with an inside diameter of ¾" and a pressure rating of at least 50 psi.  
Use hose clamps to seal all barb connections and torque to the clamp manufacturer's specifications. Be sure to choose a hose material that is compatible with the working fluid.  
If using rigid pipe, use 3/4" NPT fittings with a pressure rating of at least 50 psi. Choose a pipe material that is compatible with the fluid being treated. Apply a thread sealant to all connections and torque per the sealant manufacturer's recommendation.
8. Unscrew the filter sump housing and remove from the filter head, along with the filter element and flow tube.
9. Use the tool (tang) end of the flow tube to remove, inspect, and lubricate the bulb retention nut and o-ring. See the Maintenance section (pg. 22) of this manual for detailed instructions.



*Figure 5 – Flow tube with bulb retention nut tangs. Turn tube upside down and slide over bulb to tighten and loosen the nut.*

10. Remove the bulb from its protective packaging and slide the bulb o-ring onto the bulb so that it is roughly aligned with the line at the top of the Inauvate logo.
  11. Follow the instructions in the Maintenance section (pg. 22) of this manual to install the bulb, retention nut, flow tube, filter, and sump.
  12. If equipped, make the desired I/O connections to the system's control box using the I/O cable (part # CBL-8Cx5M-M12-BARE) available from Inauvate. The cable shielding is terminated at the ASF 100 and should be left floating (unconnected) on the control end.
  13. Re-energize the pump system and check for leaks. Be sure the sump fills completely with fluid.
  14. Select a suitable power source for the ASF 100 based upon the specified ratings. A ground fault circuit interrupter (GFCI) plug is recommended. The power connection should be near the unit and easily accessible so that power can be disconnected during service or malfunction.
- Note: Use only the 3-conductor grounded power cord supplied with the ASF 100. Using another cord with insufficient ratings may pose a safety hazard.**
15. Plug in the unit and set up the desired parameters for operation as described in the Description of Parameters section (pg. 14).
  16. Verify that the unit is functioning as desired.

**Note: Do not run the ASF 100 UV system without fluid in the filter body. Running the system dry may damage the housing and shorten bulb life and will void the warranty.**

**Note: The ASF 100 has a number of safety features designed to protect users. Improper installation, use in a manner other than specified, or intentional efforts to bypass these features (including, but not limited to, the use of non-Inauvate branded components) may inhibit or disable the functionality of these devices and void the warranty. The safety features of the ASF 100 are not intended to provide any additional measure of safety for the system on which it is installed. The overall safety of the system on which the ASF 100 unit is installed is the responsibility of the installer.**

## I/O Functions

**Note: Use only the cable sold by Inauvate to access the I/O functionality. Using a different cable will void the warranty and may cause the ASF 100 to no longer be CE and TUV compliant.**

The ASF 100 features an I/O connection that can be used to integrate the filter with existing systems. The I/O's are accessed via the port on the side of the control module. An optional I/O Cable (part # CBL-8Cx5M-M12-BARE) is available at [Inauvate.com](http://Inauvate.com) for wiring into other systems.

The ASF100's I/O's are rated as follows:

### **Inputs**

- 12-24 volts, DC or 50-60Hz AC
- 20mA current draw, max

### **Outputs**

- 12-24 volts, DC or 50-60Hz AC
- 250mA max, resistive load

**Note:** The I/O connections do not have a required polarity. The two wires for a given feature can be connected in either orientation.

**Note:** Exceeding the rated voltages and currents can damage the I/O connection. Take care to ensure all loads are within the specified ranges. Damage to the I/O due to exceeding these limits will void the warranty. The use of a ¼ amp (250mA) fast-blow fuse is recommended on all outputs to protect against overcurrent conditions.

**Note:** Proper surge protection is required on all inputs and outputs attached to an inductive load. Failure to suppress surges from relay coils and other inductive loads attached to the ASF 100 will damage the unit and void the warranty.

FUNCTION	Control Input		Control Output		Auxiliary Input		Error Output	
	Brown	White	Blue	Black	Orange	Violet	Gray	Pink
<b>CONDUCTOR</b>								

### **Control Input**

When the ASF 100 is set to *External* mode, applying power to this input will activate the system. The *Off-Delay* parameter holds the system on after the signal is removed, see the *Description of Parameters* section (pg.14) for more information.

### **Control Output**

These contacts close whenever the UV system is active.

### **Auxiliary Input**

When active, this input will disable the UV system in any mode. Active logic can be set to either HIGH or LOW using the *Auxiliary Logic* parameter, see the *Description of Parameters* section (pg.14) for more information.

### **Error Output**

These contacts close whenever the system encounters a fault that generates a warning message. The output will not activate for notification messages. See *Notifications and Warnings* section (pg. 20) for more information.

The I/O system allows the ASF 100 to operate in a number of configurations. Two of the most common setups are demonstrated below.

**Note: Not all of the connections shown below are needed for operation. They are intended to show only the full extent of the ASF 100's I/O capabilities.**

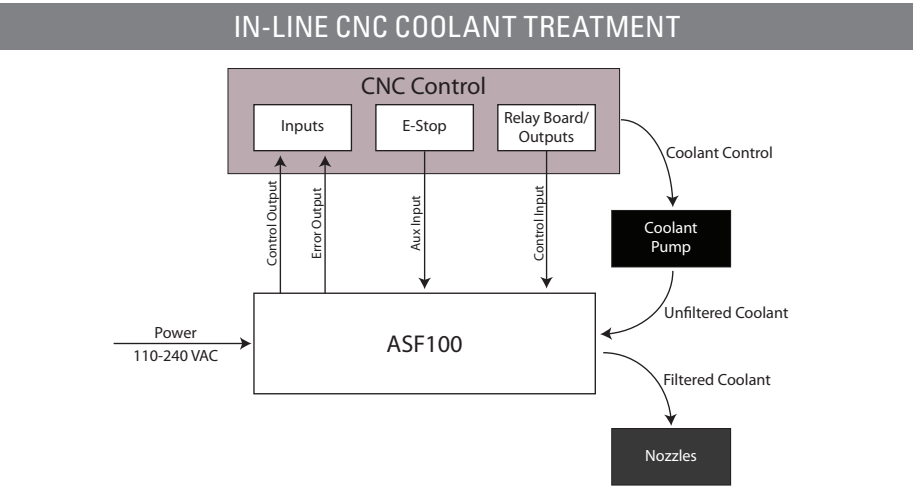


Figure 6 – A potential application on CNC machines where the CNC controls the ASF 100 via M-code relays.

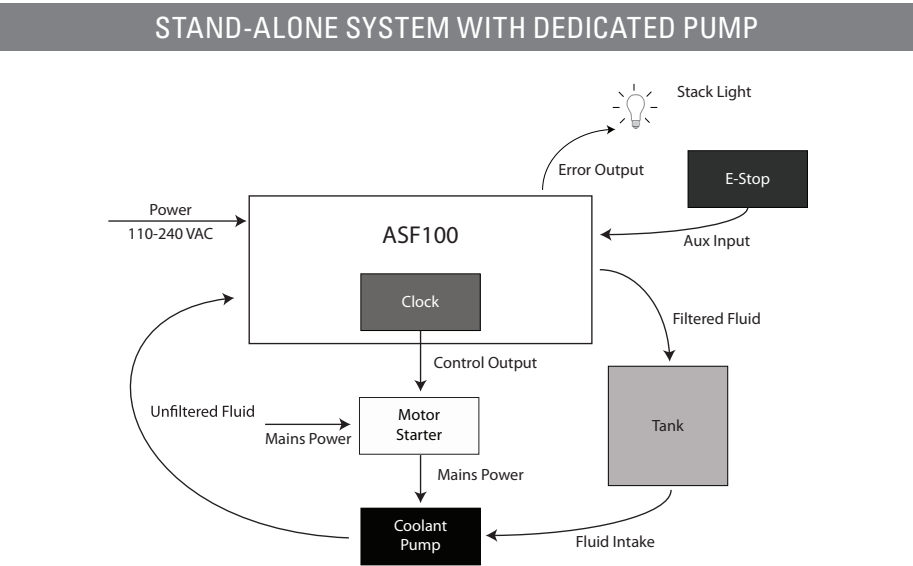


Figure 7 – A potential application having the ASF 100 run independently based on its internal clock while controlling a pump.

## System States

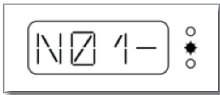
The ASF 100 controller has five operating states.



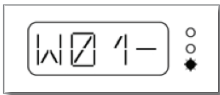
- Standby – The system is idle.



- Active – The UV system is actively treating.



- Notification – The ASF 100 system is alerting the operator of expiring life timers or other non-critical faults. Operation continues as normal.



- Warning – The ASF 100 has encountered a critical fault and stopped operation. Action is required



- Setup – Initiated by pressing the enter button while in any of the other states. Used to modify the parameters that control how the ASF 100 functions. The UV system is disabled when in this mode. If left unattended, the unit will revert back to its previously programmed mode.

## Software Setup

The following procedure describes how to set parameters to achieve the desired function from the ASF 100. Use the chart on the back cover of this manual to document customized settings for a quick reference.

**Note: As a safety feature, the UV system is deactivated whenever the control is in Setup mode.**

1. Ensure that the system is plugged in and powered.
2. Press "ENTER" to access the main menu. If Passcode Protection is activated, a prompt will request the correct passcode before allowing access to the system menus. See the *Description of Parameters* section (pg.14) for more information on *Passcode Protection*.
3. The display will scroll the current parameter or menu name.  
Use "UP" or "DOWN" to navigate to the desired menu or parameter.  
Press "ENTER" to select or "BACK" to return to the previous level.
4. Modify the selected parameter using the "UP" and "DOWN" keys.  
Press "ENTER" to save the new value or "BACK" to return to the previous menu without saving. The screen will flash "----" twice to confirm that the value has been saved when "ENTER" is pressed before returning to the previous menu.

The system will exit menu mode and resume normal operation after 15 seconds of inactivity. Any changes made without saving will be discarded.

## ASF 100 MENU TREE

Main Menu	Mode	Always On	
		Timer	
		External	
	Timer Setup	Current Time	
		Day of Week	
		On Time	
		Off Time	
		Active Days	ALL
			M-F
			M-TH
			Custom
	Maintenance	Sleeve	Remaining
			Interval
			Fluid Index
			Reset
		Bulb	Remaining
			Reset
		Filter	Remaining
			Interval
			Reset
	System Info	Off Delay	
		Scroll Speed	
		Auxiliary Logic	
		Show Clock	
		Passcode	
		Serial Number	
		Diagnostic Code	
		Version	
		Factory Reset	

# Description of Parameters

## MODE MENU

This menu controls how the ASF 100 functions.

### Timer

The system operates during the days and times specified by the *Active Days*, *On Time*, and *Off Time* parameters.

**Note:** For proper operation, ensure the *Time* and *Day of Week* parameters are set correctly when operating the system in *Timer Mode*. The ASF 100 is equipped with a battery-backup and will retain the current time even when external power is lost. This battery is designed to last the lifetime of the product and is not user-serviceable.

### External

The system is controlled via signals through the *Control Input*. See the *I/O Functions* section (pg. 8) for more information on the *Control Input*.

### Always On

The UV system operates continuously when powered, except when the *Auxiliary Input* is active. See the *I/O Functions* section (pg. 8) for more information on the *Auxiliary Input*.

## TIMER SETUP MENU

This menu contains the settings for configuring the system clock and timer. It is visible in *Timer* mode or when the *Show Clock* parameter is active. All clock settings are in 24-hour time format (i.e.: 1pm = 13).

When setting a time parameter, the hours will first begin blinking. Press "UP" or "DOWN" to reach the desired hour, then press "ENTER". The minutes will next begin blinking. Press "UP" or "DOWN" to set the minutes, then press "ENTER" to save the time.

### Current Time

Sets the current time of day.

### Day of Week

Sets the current day of the week to ensure that the system operates on the correct days specified in *Active Days* when in *Timer* mode.



**On Time**

Determines when the system will turn on when in *Timer* mode. *On Time* is set in 15 minute increments.

**Off Time**

Determines when the system will turn off when in *Timer* mode. *Off Time* is set in 15 minute increments.

**Active Days**

This setting determines which days of the week the system will operate when in *Timer* mode, and can be tailored to unique work schedules.

**- All**

The system will run every day between the times specified in *On Time* and *Off Time*.

**- M-F**

Run Monday through Friday between On Time and Off Time

**- M-TH**

Run Monday through Thursday between On Time and Off Time

**- Custom**

Use to manually select days of the week that the system will run. A prompt will ask to set each day of the week to either **Y** to have the system operate on that day or **N** to have the system skip that day. Press "UP" or "DOWN" to change the setting for the displayed day, press "ENTER" to advance to the next day of the week.

**Note: Setting Off Time to be earlier than On Time will cause the ASF 100 to run through midnight and into the next day. The ASF 100 will run partial cycles starting or ending at midnight if the previous or following day, respectively, is not set as active.**

## MAINTENANCE MENU

This menu contains the settings and information related to the maintenance activities that are required to maximize the life and effectiveness of the ASF 100.

### Sleeve Menu

Contains the settings and information relevant to the integral quartz sleeve attached to the UV bulb.

#### - Remaining

Displays the percentage of time, as set by *Interval*, remaining before the sleeve needs to be cleaned. When *Remaining* reaches 0%, notification *N02-Service Sleeve* (see *Notifications and Warnings* section (pg. 20)) is displayed on the screen, indicating that service is required. *Remaining* is reset after the sleeve is cleaned using the *Reset* parameter.

#### - Interval

This parameter is used to set the desired amount of time between sleeve maintenance reminders (see *N02-Service Sleeve* description in the *Notifications and Warnings* section (pg. 20)). The ASF 100 is pre-programmed to the recommended value of 150 hours from the factory. If the sleeve does not collect significant contaminants during this time, *Interval* can be increased. The value of *Interval* can be set between 0 and 2000 in increments of 50, representing the number of hours that the system is active between cleanings. Setting *Interval* to "OFF" will disable the sleeve maintenance reminders.

#### - Fluid Index

This setting helps tune the ASF 100 to work at peak efficiency with a given fluid type. *Fluid Index* is factory preset to a moderate value of 5 on a scale of 0 to 10, but may need to be adjusted to best match a given system. If the sleeve is quickly accumulating a layer of contaminants, especially with opaque fluids, reducing the *Fluid Index* can slow the rate of buildup. Increasing *Fluid Index* can reduce the frequency of the *N03-High Filter Temperature* notifications (see *Notifications and Warnings* section (pg. 20)). and maximize UV exposure with translucent fluids.

### - Reset

This parameter is used to reset the sleeve maintenance timer. When Reset is selected, the screen will flash "HOLD". While the screen is flashing, press and hold "ENTER" until the screen flashes "----" briefly to confirm that the timer has been reset.

**Note: Failing to keep the sleeve free of contaminants may degrade system performance and cause premature failure of the bulb. Replacement bulbs are available from Inauvate.**

### Bulb Menu

Contains the settings and information relevant to the UV bulb inside the ASF 100.

### - Remaining

Displays the percentage of bulb life remaining. When *Remaining* reaches 0% (indicated by the *W03-Replace Bulb* warning), the bulb must be replaced to maintain the effectiveness of the ASF 100. Under typical use, a bulb may last between 2-4 years, but many factors can affect its effective lifespan. Notification *N01-Low Bulb* will activate when *Remaining* is under 5% to signal that a required bulb change is approaching. *Remaining* is reset with the *Reset* parameter after the bulb has been replaced.

**Note: The UV bulb should always be replaced when the *Remaining* parameter reaches zero. However, it is also possible for a bulb to lose effectiveness sooner. If decreased UV performance is suspected prior to receiving an alarm, replace the bulb with the correct model from Inauvate and reset counter.**

### - Reset

This parameter is used to reset the bulb life counter. When Reset is selected, the screen will flash "HOLD". While the screen is flashing, press and hold "ENTER" until the screen flashes "----" briefly to confirm that the timer has been reset.

**Note: Failure to replace the UV bulb when the *Remaining* parameter reaches 0% will significantly reduce system performance.**

## Filter Menu

Contains the settings and information relevant to the filter element of the ASF 100.

### - Remaining

Displays the percentage of time, as set by *Interval*, remaining before the filter needs to be inspected. When *Remaining* reaches 0%, notification *N04-Check Filter* is displayed on the screen, indicating that service is required. *Remaining* is reset after the filter is cleaned using the *Reset* parameter.

### - Interval

This parameter is used to set the desired amount of time between filter maintenance reminders (*N04-Check Filter*). Due to the large variance in filter performance based on the selected mesh size and fluid contamination level of a particular system, the filter reminder is disabled by default. It is recommended to start with a small interval between cleanings and, if the filter does not collect significant contaminants, *Interval* can be increased as suitable. The value of *Interval* can be set between 0 and 2000 in increments of 50, representing the number of hours that the system is active between cleanings. Setting *Interval* to "OFF" will disable the filter maintenance reminders.

### - Reset

This parameter is used to reset the "filter" maintenance timer once the "filter" has been cleaned. When *Reset* is selected, the screen will flash "HOLD". While the screen is flashing, press and hold "ENTER" until the screen flashes "----" briefly to confirm that the timer has been reset.

**Note: The filter reminder logs time based on how long the ASF 100 UV system is on, not how long fluid is flowing through it. Pumping large quantities of fluid through the ASF 100 while the system is not active may cause the filter to clog before the reminder is activated.**

## SYSTEM INFO MENU

This menu contains settings and information regarding the overall operation and system information.

### Off Delay

This parameter determines how long the ASF 100 UV system will stay active after the input signal is removed while in *External* mode. Bulb life is negatively impacted each time the bulb cycles on and off.

Setting an appropriate **Off Delay** on machines with quick cycle times can prolong bulb life by keeping the bulb on in-between cycles, but will then automatically shut the system off if the machine is inactive for an extended period. **Off Delay** is in units of minutes and can be set from 0 to 60 in increments of 5 minutes. Setting **Off Delay** to 0 will disable the feature. The default value for **Off Delay** is 10 minutes.

### **Scroll Speed**

**Scroll Speed** sets how quickly the text will travel across the ASF 100 screen. **Slow**, **Medium** (default), and **Fast** options are available, with each speed being demonstrated while cycling through the options.

### **Auxiliary Logic**

This setting determines the behavior of the **Auxiliary Input**. When set to **High** (default), the ASF 100 will be disabled when power is applied to the **Auxiliary Input**. When set to **Low**, the ASF 100 will be disabled whenever power is removed from the **Auxiliary Input**, such as is common with emergency stop loops. See the **I/O Functions** section (pg. 8) for more information on the **Auxiliary Input ratings**.

### **Show Clock**

When set to **On**, the ASF 100 will display the system clock on the screen when in idle state. Default is **Off**.

### **Passcode**

Use this setting to prevent unwanted changes from being made to the ASF 100 settings. When set to **On**, a prompt will request a 4-digit passcode. After being set, the passcode must be entered before accessing the main menu to change parameters. Once the passcode is entered, the menus will remain unlocked for 3 minutes after the last user activity before relocking. To lock the screen immediately after exiting setup mode and returning to the idle or run screen, press "UP" three times. "LOCK" will be displayed briefly on the screen to confirm. Turning the **Passcode** feature **Off** will unlock all menus and allow parameters to be freely changed.

Write the passcode in the space provided on the back cover as a reminder.

**Note: Forgot the passcode? Contact Inauvate for assistance in resetting it.**

### **Serial Number**

Accesses the serial number of the ASF 100, which is also printed on the side label.

Write the serial number of the ASF 100 in the space on the back cover of this booklet for a quick reference.

## **Diagnostic Code**

This code contains information about the ASF 100's performance that can help Inauvate assist in troubleshooting problems with the system. Have this number, along with the serial number, handy when contacting Inauvate technical support. Prior to contacting Inauvate, it is important to retrieve this number from the trouble unit every time, so that the information reflects the most recent state of the ASF 100.

## **Version**

Displays the firmware version currently installed on the unit.

## **Factory Reset**

This parameter is used to reset the ASF 100 to the original factory settings. When selected, the screen will flash "HOLD". While the screen is flashing, press and hold "ENTER" until the screen flashes "----" briefly to confirm the reset. Bulb, sleeve, and filter usage information will not be affected, but intervals will be reset to their default values. See the back page of this manual for a list of all default values.

# **Notifications and Warnings**

Below is a description of the various warnings and notifications that the ASF 100 may display. See the ***Troubleshooting*** section (pg. 27) for additional assistance in clearing certain errors. For technical assistance with the ASF 100 or other Inauvate products, contact Inauvate.

## **Warnings**

Warnings should be addressed immediately as they indicate conditions that could potentially damage the unit, result in unexpected behavior, or possibly cause harm to the operator or bystanders. Warnings are indicated by a red status light to the right of the screen. The UV system will be disabled whenever a warning is present.

### **W01 – Control Over-Temperature Fault**

Temperature within the control module is above a safe operating range and the system has gone into thermal shutdown. Unplug the system and allow it to cool. Ensure that the control module is situated in a location with sufficient ventilation and is within the rated ambient temperature range (40-100°F/5-38°C).

### **W02 – Filter Over-Temperature Fault**

Fluid temperature is above the maximum rated range within the filter unit and gone into thermal shutdown. Unplug the system and allow it to cool. Ensure that the fluid is within the rated temperature range (40-125°F/5-50°C) of the system and that the filter unit has sufficient ventilation.

**W03 – Replace Bulb**

The bulb has reached the end of its effective lifespan. Replace the bulb with a new one from Inauvate and reset the bulb life timer using the **Reset** function in the bulb maintenance menu. See **Maintenance** section (pg. 22) for bulb change procedure and **Replacement Parts** section (pg. 31) for bulb part numbers.

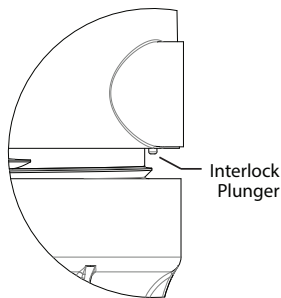
**W04 – Safety Fault**

The system has detected a fault in one of its safety mechanisms. Remove the system from service and contact Inauvate.

**W05 – Interlock Open**

The bulb cannot be turned on because the safety interlock is open. Ensure that the sump is fully threaded and tightened onto the filter head. Contact Inauvate if the problem persists.

**Note: Do not attempt to override the safety interlock. Doing so will void the warranty and may result in bodily harm or property damage. All power sources should be locked out and the safety interlock is to remain operational during all services that require removing the filter sump.**



*Figure 10 – The interlock plunger is located on the right side of the filter head, near the input port.*

**W06 – Clock Not Set**

The clock is needed for operation but has not been set. Set the clock to the proper time, see **Setup** menu description (pg. 14).

**W07 – Ballast Fault**

The UV ballast has detected a fault and has not been able to correct itself. Ensure that the bulb is fully seated and functional. See **Troubleshooting** section (pg. 27) for additional causes. Contact Inauvate if the problem persists.

## Notifications

Notifications are less severe than warnings and are shown with a yellow status light. Notifications convey information about unusual states or reminders for service.

### **N01 – Low Bulb Life Reminder**

There is less than 5% bulb life remaining. The system will continue running normally until the bulb life reaches 0%.

### **N02 – Service Sleeve Reminder**

The sleeve maintenance timer is at 0%. The UV bulb's integrated sleeve should be serviced. The system will continue running normally, but with reduced effectiveness if the sleeve is clouded with contaminants.

### **N03 – High Filter Temperature**

Fluid in the filter is above the optimal range for UV treatment. The system has temporarily gone into standby to allow the system to cool and will resume operation once the temperature is within the operating range. This is often caused by the system being activated while fluid is not flowing through the filter and no action is required if this is the case.

### **N04 – Check Filter**

The filter maintenance timer is at 0% and the filter should be serviced. The system will continue running normally, but with reduced efficiency and flow may stop altogether if the filter becomes clogged.

### **N05 – Disabled**

This notification appears whenever the ASF 100 is disabled via the *Auxiliary Input*.

## Maintenance

Properly maintaining the ASF 100 system is key to its effectiveness and longevity. All of the components requiring regular maintenance are located within the filter assembly sump.

**Note:** The UV bulb generates heat while operating. Let the system cool to room temperature for 30 minutes before servicing.

**Note:** Residual pressure in the fluid lines can cause a hazard when removing the sump. Ensure all residual pressure is relieved from the system prior to servicing the ASF 100.

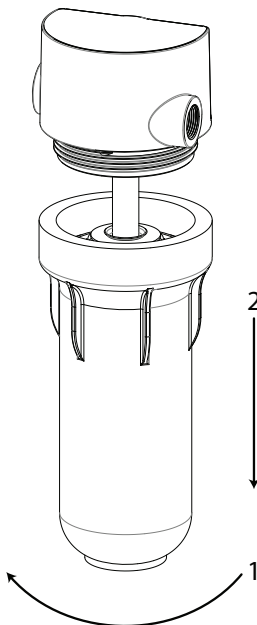
**Note:** Use only Inauvate brand bulbs in the ASF 100. Use of improper bulb model or manufacturer will void the warranty and may result in damage to the unit or present a hazard to operators.



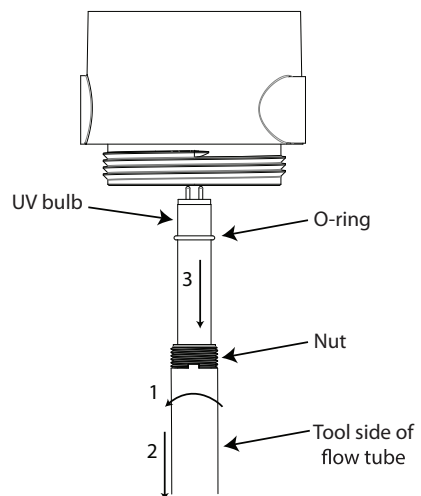
**Note: UV bulbs are made of glass and can shatter if not handled properly. Always use care when handling. Inauvate recommends using proper Personal Protective Equipment (PPE), including gloves and eye protection, whenever working with bulbs. If the inner bulb glass is cracked or broken, follow procedures for containing and cleaning a mercury spill.**

## Sump Removal

1. Remove and lockout the power source for the ASF 100 per OSHA (or other applicable agency) guidelines, as well as any pump(s) or other connected equipment. Relieve any residual pressure from the system.
2. Take appropriate measures to contain any liquid that may be spilled during removal.
3. Unscrew the sump from the filter head. A filter wrench (part # WRENCH-SUMP) is available from Inauvate to aid in removal. The filter element and flow tube will release from the head and remain in the sump while the bulb/sleeve assembly remains connected to the head. Lower the sump straight down to avoid damaging the bulb during removal.



*Figure 11 – Sump removal. Note: The bulb will remain attached to the filter head*



*Figure 12 – Removal of the bulb retention nut, o-ring, and bulb using the flow tube tool.*

4. Slide the flow tube element out of the filter element. Flip the tube over so that the tangs are pointing up and the flared end is down. Gently slide the flow tube over the bulb sleeve so that the tangs engage the slots on the bulb retention nut (it may be necessary to remove any particle build up from the slots in order to engage properly).
5. While supporting the bottom of the bulb assembly with one hand, use the other to gently twist the flow tube to loosen the bulb retention nut. Slide tube and nut down and off the bottom of the bulb.
6. Gently pull straight down on the bulb sleeve to release it from the filter head. Remove the bulb o-ring from the filter head if it does not come out with the bulb.
7. Do not invert the filter head with the bulb, o-ring or nut removed, as this can cause contaminants to enter the bulb socket and potentially cause a short circuit.

## Cleaning

1. Filter elements can typically be cleaned with running water or compressed air to remove trapped particles. Replacement filter elements are available through Inauvate in a variety of micron ratings.
2. In most applications, the bulb sleeve is most easily cleaned by soaking in an industrial-grade cleanser and then wiping clean with a rag.

**Note: The top of the bulb with the exposed pins is not waterproof – the bulb must NOT be fully submerged when cleaning. Abrasive cleaning techniques that may scratch the sleeve should be avoided, as imperfections in the surface will reduce performance.**

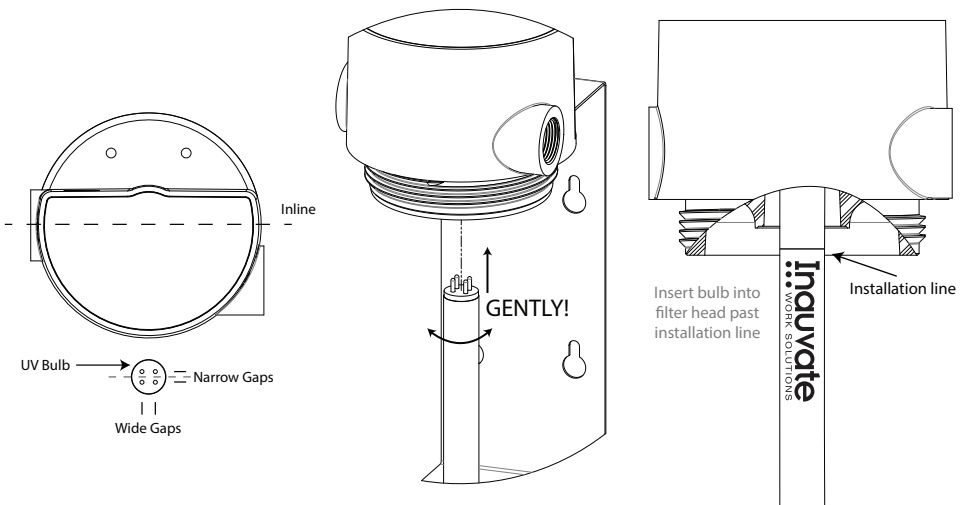
3. The flow tube can be cleaned in a similar manner to the bulb.
4. Remove the large o-ring from the sump and inspect for tears or signs of wear and replace if necessary. Rinse out the sump and make sure the o-ring groove is free of any chips or other debris that may damage the o-ring. Check the flat o-ring sealing surface on the bottom of the filter head for any damage.
5. Inspect the bulb socket and o-ring sealing surface to be sure that they are free of any foreign debris. Check the bulb o-ring for tearing or signs of wear and replace if necessary. Lubricate the o-ring with an o-ring lubricant or light oil that is compatible with Viton seals before reinserting the bulb.

6. The exterior surfaces of the ASF 100 can be cleaned with a damp rag containing mild detergent. Do not submerge or subject to direct spray.

## Reassembly

**Note: Failing to clean and inspect the bulb o-rings and/or insert the bulb fully into the socket can lead to fluid and contaminants entering the electrical socket, which can result in a short that may damage the electronics unit.**

1. Slide the lubricated bulb o-ring onto the bulb so that it is approximately aligned with the line at the top of the Inauvate label.
2. Reinstall the bulb assembly into the filter head by aligning the label towards the front of the filter head (such that the widely spaced pins are facing towards the front of the head) and pushing gently straight upwards. Gentle twisting may be required to properly line up the pins with the socket. The bulb is fully seated when the line at the top of the Inauvate label is aligned with the bottom surface of the filter head.



*Figure 13 – Bulb installation. Align the pins on the top of the bulb as shown before inserting into the filter head. The bulb is fully inserted into the filter head when the installation line is no longer visible under the bottom of the filter head.*

3. Slide the bulb retention nut and flow tube (tang side up) onto the bulb, pushing the o-ring into its seated position.

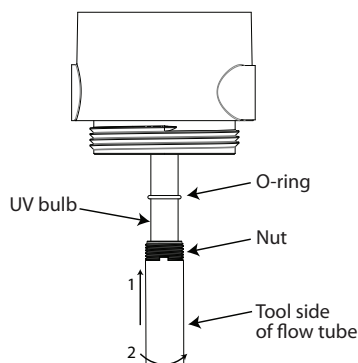


Figure 14 – Installation of the bulb o-ring and retention nut using the flow tube tool.

4. Twist the flow tube until the retention nut is hand-tight.  
Over-tightening the nut may damage the unit or break the bulb.
5. Place the filter element into the sump such that it fits around the boss at the bottom of the sump.
6. Insert the flow tube into the filter such that the flared top rests on the rubber seal of the filter element.

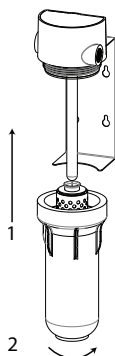


Figure 15– Align the filter and bulb to reinstall sump, then tighten.

7. Gently align the flow tube with the bulb and slide the sump back into position. Thread the filter head and sump together until fully tightened.
8. Re-energize the pump and ensure that the sump fills completely with fluid, then restore power to the ASF 100.  
Reset the appropriate reminders via the **Maintenance Menu** (pg. 16) for the work that was performed.
9. Start the pump and check for leaks.

While the ASF 100 does track bulb life, it is possible that external conditions, such as excessive vibration, may cause the bulb to fail prematurely. A functional bulb will produce a purple glow when used with a transparent fluid while a failed bulb will not produce any visible light.

## Troubleshooting

Problem	Possible Cause	Solution
UV bulb is not producing light	Blown bulb	Replace with a new bulb from Inauvate.
	Bulb not inserted into base correctly	Verify that the bulb is properly aligned and fully inserted into the socket.
	Bulb has reached end of life (W03 displayed)	Replace with a new bulb from Inauvate. Reset bulb life timer in <i>Maintenance Menu</i> (pg. 16).
	Ballast fault (W07 displayed)	See Ballast fault section below.
	Unit not powered	Plug into an appropriate 110-240VAC socket that is known to work properly.
	Blown fuse	Replace with a fuse meeting the same rating. The fuse is located in the power entry receptacle on the right side of the control unit. Replacements are available from Inauvate.
	Unit is disabled (N05 is showing)	Check that the <i>Auxiliary Input</i> (pg. 9) is wired correctly and that the <i>Auxiliary Logic</i> (pg. 19) parameter is set properly for the desired functionality.
	Timer not set properly	If unit is in <i>Timer Mode</i> , ensure that <i>Current Time</i> , <i>Day of Week</i> , <i>On Time</i> , <i>Off Time</i> , and <i>Active Days</i> are correctly set. See page 14.
	No control signal	If unit is in <i>External</i> mode (pg. 14), ensure the appropriate signal voltage is reaching the I/O port (pg. 8).

## Troubleshooting

Problem	Possible Cause	Solution
Bulb will not shut off	Unit not in correct mode	Check that the unit is in the correct operating mode (pg. 14) for the desired operation.
	Timer not set properly	If unit is in <i>Timer</i> mode, ensure that <i>Current Time</i> , <i>Day of Week</i> , <i>On Time</i> , <i>Off Time</i> , and <i>Active Days</i> are correctly set. See page 14.
	Control signal stuck on	If unit is in <i>External</i> mode, check that the signal source is properly producing the control signal.
	Off delay not set properly	If unit is in <i>External</i> mode (pg. 14), check that Off Delay (pg. 18) is set properly. Set the Off Delay parameter to 0 in order to have the bulb turn off as soon as the control signal is removed.
Ballast fault (W07 displayed)	Bulb not installed properly	Ensure that bulb is squarely and fully seated into the filter head socket.
	Bad/blown bulb	Replace the bulb with a new one from Inauvate.
	Electrical/RF noise	Try relocating the unit to an area with less electrical noise.
Air is trapped inside the filter and it is not filling fully.	Clogged breather vent	Remove any debris that may be blocking the small breather hole located near the top of the flow tube. A small pocket of air may remain immediately after servicing and will slowly dissipate.
Fluid leaking from unit	Fittings not properly tightened	Ensure the fittings used are coated with sealing tape or compound and are tightened properly. If used, check that all hose clamps are tightened.
	Sump not properly tightened	Tighten sump.
	Sump o-ring dirty or damaged	Remove the o-ring, clean, and inspect for damage. If damaged, order a new one from Inauvate. Ensure that no foreign particles are in the o-ring groove or sealing face and reassemble.
	Bulb o-ring dirty or damaged	Contact Inauvate for repairs as fluid may have seeped into the electronics cavity. Do NOT power the unit, as electrical damage is possible.

## Troubleshooting

Problem	Possible Cause	Solution
Moisture inside bulb	Improper bulb o-ring seal	Check bulb o-ring for damage and replace if necessary. Ensure o-ring is properly lubricated. Replace bulb – do not reuse old bulb. Thoroughly dry any moisture that may have entered bulb socket and remove any contaminants that could cause a malfunction before reapplying power to the unit. Ensure that the bulb is fully seated in the socket and that retaining nut is properly tightened.
Excessive film buildup on bulb sleeve	Fluid index is not set properly	Reduce the <i>Fluid Index</i> setting (pg. 16).
	Sleeve is not serviced often enough	Set the sleeve service <i>Interval</i> (pg. 16) for more frequent servicing.
	Too many dissolved contaminants in fluid	Remove excess contaminants from the fluid and prevent reentry.
Interlock warning will not shut off	Sump is not fully tightened onto the filter head	Ensure that there are no contaminants on the sump o-ring or sealing surfaces that would prevent the sump from fully seating. Fully tighten the sump back onto the filter head.
	Failed interlock mechanism	Contact Inauvate for service.
Little or no flow when pump is on	Clogged filter	Remove the filter and clean. If a replacement is needed, contact Inauvate.
	Damaged hose	Check for clogged hoses and fittings. If flexible hose is used, check for kinks.

## Troubleshooting

Problem	Possible Cause	Solution
Control unit not responding	Unit not powered	Plug into an appropriate 110-240VAC socket that is known to work.
	Blown fuse	Replace with a fuse meeting the same rating. Replacements are available from Inauvate.
	Electrical noise	Move the control unit away from other electrical components. Power cycle.
I/O's not functioning properly	Wrong mode	Set unit to <i>External</i> mode (pg. 14) if using the control input.
	Incorrect wiring	Check that the correct wires are used for the desired I/O and that all connections are sound. See page 9.
	Power not supplied	The ASF 100 I/O's must be externally supplied with power.
	Incorrect power supplied	Check that the power supplied is within the rated limits. See page 8.
	Damaged electronics	Contact Inauvate for repairs. Verify that power supply is within rated limits. See page 8.
Unit behaving strangely	Corrupted parameter setting	Utilize the <i>Factory Reset</i> function (pg. 20) in the system info menu. If unable or unsuccessful, contact Inauvate for repairs.
Passcode will not unlock	Incorrect passcode entered ("XXXX" briefly displayed on screen after pressing enter)	Ensure that the <i>Passcode</i> (pg. 19) was entered correctly. Contact Inauvate if the <i>Passcode</i> must be reset.



## Replacement Parts

Inauvate offers a full line of replacement parts for its ASF 100 series of filters, including bulbs, filters, and o-rings. To place an order, visit [www.inauvate.com](http://www.inauvate.com) or call 1-800-225-4234/508-485-1000.

Item	Model			
	ASF100-10N	ASF100-10H	ASF100-20N	ASF100-20H
Bulb	BLB-#10-17W	BLB-#10-29W	BLB-#20-26W	BLB-#20-54W
Bulb O-ring	ORNG-20MMX2.5MM-V75			
Filter	FLTR-#10-xxx-SS*		FLTR-#20-xxx-SS*	
Flow Tube	FLTUBE-#10-SS		FLTUBE-#20-SS	
I/O Cable	CBL-8Cx5M-M12-BARE			
Sump	SUMP-#10-BT-SAN		SUMP-#20-BT-SAN	
Sump O-ring	ORNG-241-V75			

*\* Replace xxx with desired mesh size, in microns*

**Note: Use only the designated Inauvate bulb listed for the specific ASF 100 model in use. Use of improper bulbs will void the warranty and may result in damage to the unit or present a hazard to operators.**

## Custom Applications

Have an application that requires special modifications or an idea for a new feature on the ASF 100? Contact Inauvate at [techsupport@inauvate.com](mailto:techsupport@inauvate.com).

## Contact Us

Inauvate Work Solutions can be contacted in the following manners:

Website: [www.inauvate.com](http://www.inauvate.com)

Sales E-mail: [sales@inauvate.com](mailto:sales@inauvate.com)

Technical Support E-mail: [techsupport@inauvate.com](mailto:techsupport@inauvate.com)

Phone: 1-800-225-4234/508-485-1000

Mail: Inauvate Work Solutions  
 c/o Ruland Manufacturing Co.  
 6 Hayes Memorial Drive  
 Marlborough, MA 01752

## Warranty

### WARRANTY/ DISCLAIMER OF IMPLIED WARRANTIES/ LIMITATIONS OF LIABILITY

**EXPRESS WARRANTY** - Ruland expressly warrants that products sold meet Ruland's specifications as set forth on its website at <http://www.inauvate.com>. Products not meeting Ruland's specifications or containing defective parts or labor will, at Ruland's option, be replaced, or the purchase price will be refunded upon purchaser's written request made within 12 months following sale. The remedy of refund or replacement is the sole and exclusive remedy provided. This warranty does not cover damage caused by installation, accident, incorrect handling, improper use, or normal wear and tear. User is responsible to read and follow product manual, specifications, instructions, and warnings carefully.

**Disclaimer of Implied Warranties.** THE WARRANTY PRINTED ABOVE IS THE ONLY APPLICABLE WARRANTY TO THESE PRODUCTS. ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE DISCLAIMED. It is the responsibility of the user to determine the suitability of Ruland products for a specific application. No person, including employees of Ruland or agents in the company's channels of distribution are authorized to offer any other warranty or represent on Ruland's behalf the suitability of Ruland products for a specific purpose.

**Limitation of Liability.** IF SELLER IS LIABLE FOR ANY CLAIMS – WHETHER BASED ON A STATUTE, CONTRACT, WARRANTY, OR TORT (FOR DAMAGE TO PROPERTY) IT IS UNDERSTOOD AND AGREED THAT SELLER'S LIABILITY SHALL NOT EXCEED THE AMOUNT OF THE PURCHASE PRICE. SELLER SHALL NOT BE LIABLE FOR SPECIAL, INDIRECT OR CONSEQUENTIAL DAMAGES, LOST PROFITS OR REVENUES, INDEMNITY, OR ATTORNEYS' FEES. THE PRICE STATED FOR THE PRODUCT IS A CONSIDERATION IN LIMITING RULAND'S LIABILITY.

## Return Policy

Parts to be returned for credit must be in original condition and in the original packaging. Only standard price list items can be returned. Parts not meeting the above requirements may be subject to a rework fee or returned and no credit will be issued. Non-standard or special order parts are non-returnable.

A valid invoice number is required in order to receive full credit, otherwise we will only issue credit up to the amount of current price less a 25% restocking fee for standard items.

A valid RGA/RMA number is required before returning any items to Ruland. To obtain a RGA/RMA number, please contact customer service by phone at 1-800-225-4234 or email at [sales@inauvate.com](mailto:sales@inauvate.com)

THE FOREGOING WARRANTY DOES NOT COVER REPAIR, REFUND, OR REPLACEMENT OF PARTS THAT DEGRADE OR FAIL AS A RESULT OF NORMAL WEAR AND TEAR OR IMPROPER INSTALLATION, INCLUDING, BUT NOT LIMITED TO, O-RINGS, UV BULBS, FILTERS, FUSES, CABLES.

Passcode

Serial Number

ASF 100 Default Parameters

Main Menu	ASF 100 Menu Tree		Range	Default	User	Unit
	Mode		Always On / Timer / External	Always On		—
	Timer	On Time	00:00 - 23:45	00:00		Time (24hr)
		Off Time	00:00 - 23:45	00:00		Time (24hr)
		Active Days	All / M-F / M-Th/ Custom	All		—
	Maintenance	Sleeve	Interval	0 (Off) - 2,000	150	Hours
			Fluid Index	0 - 10	5	—
		Filter	Interval	0 (Off) - 2,000	0 (Off)	Hours
	System Info	Off Delay		0 (Off) - 60	10	Minutes
		Scroll Speed		Slow / Medium / Fast	Medium	—
		Disable Logic		High / Low	High	—
		Show Clock		Off / On	Off	—
		Passcode		Off / On	Off	—



Ruland Manufacturing Co., Inc.  
6 Hayes Memorial Drive  
Marlborough, MA 01752