AFS Operator's Manual

AFS-4

AFS-2

AFS-1

AFS-4HS

AFS-2HS

AFS-1HS

Note: This manual contains photographs and screen shots of an AFS-4. This manual and all operator functions are applicable to: AFS-1, AFS-2, AFS-4, AFS-1HS, AFS-2HS, and AFS-4HS. All efforts have been made to cover all settings. Any changes to recommended settings should be fully understood by the operating facility.

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General Information

AFS gas filling machines replace the resident air in an insulating glass unit (IGU) with an insulating gas. AFS machines have an industry leading process that accurately balances in/out flowrates, which allows the process to be both fast and safe by reducing the breakage due to over pressurization or over-vacuum of the IGU. The AFS system does not use a vacuum pump to create the flow out of the IGU, so the loud noise, maintenance, and mess of a vacuum pump is not an issue. Each line has its own independent vacuum generator, ensuring consistent and repeatable flowrates.

Components

Contents:

- AFS Machine
    - Wall Mountable or factory mounted with AFS M-Cart option
- Power cord - attached
- Tubing set with vacuum line filter - color coded by line
- Probes and clamp assembly
- USB Flash Drive
    - Manual
    - Spreadsheets (for optional data collection packages)

Optional Contents: (*Options manual is a separate document)*

- PPB - Lighted Probe Push Button - Remote Start
    - Integral to the tubing set
- M-Cart - Moveable Cart
- Bar Code Scanner (wireless)
    - Line # Barcodes
    - Machine mounted charging base

Machine Set Up

1. Remove the AFS machine and components from the packaging.
2. The AFS machine must be securely mounted. If machine was ordered with the AFS M-Cart, the machine will be mounted at the AFS factory. Locate mounting holes in the back of the enclosure to ensure proper mounting to wall or customer supplied stand/cart.
3. Connect bulk plant air to the "AIR" port on the side of the AFS machine. Bulk plant air pressure >100 PSI (recommend minimum ½" feed line from main header).

Note: *To ensure enough plant air, minimum ½" line from main air manifold/header is recommended (one for each connection on an AFS-4HS).*

4. Connect bulk argon supply to the "ARGON" port on the side of the AFS machine. Bulk argon supply regulator set at ~100 psi.

Note: *To ensure enough plant air, we recommend at least ½" line from main air manifold/header (one for each connection on an AFS-4HS).*

Note: *Ensure the argon tank regulator/manifold and hose is capable of 200 lpm (400 lpm for AFS-4HS).*

5. Connect each tubing set to the corresponding "Line #" color on the side of the AFS Machine. Ensure the filter is properly installed on the vacuum tubing (as shown). An arrow on the filter housing indicates direction of flow (toward the AFS machine).
6. If Probe Push Button (PPB) option was purchased, connect the cable to the corresponding connection.
7. Connect power cord. The machine will start-up once power is connected.

Complete setup consists of the steps on pages 5-10

- System Pressure Set Points
- Flow Balance Settings
- Gas Sensor Calibration

System Pressure Set Points

The AFS system pressure regulators will be set at the factory prior to shipment. It is recommended that the pressure be double checked at initial set-up, and periodically during routine maintenance functions.

1. Open the AFS machine.
2. Note the pressure regulators on the left side.
3. Set pressure on both regulators to 80 PSI ± 2 PSI (0.55 MPa).

Note: *The precision of the pressure settings is not vital - but when set, they should not be changed.*

Pressures are also displayed on the AFS touchscreen in the "Flow Balance," "System Status," and "Line # Status" screens.

Flow Balance Setting (required for each line)

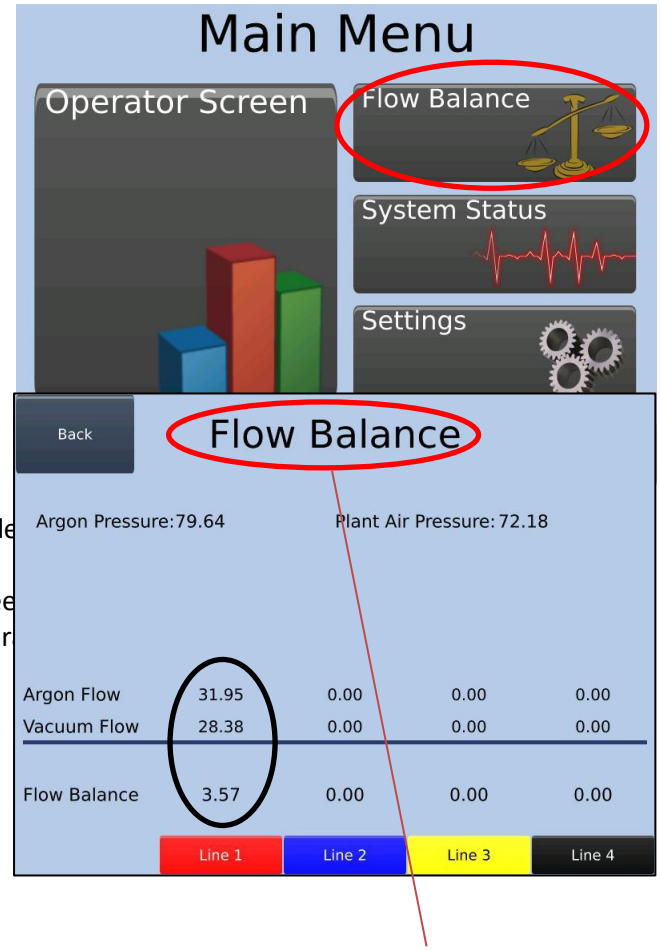
While the flow balance will be factory calibrated before shipment, it is required to balance the feed and vacuum flows for each line during installation. Balancing of each line is also advised on a periodic basis or when adjustments are made to argon feed level pressure or plant air pressure. Periodic balancing is required to allow the system to contend with variances in ongoing conditions including temperature, humidity, wear and tear of equipment, etc.

Balancing the line is achieved by the following procedures:

Note: When flow balancing, the tubing lines and probes must be connected - with argon and plant air turned on. **Probe(s) must be out of any IGU or calibration chamber.**

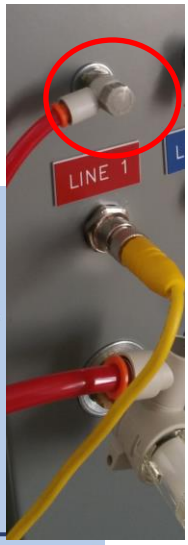
1. Ensure proper connection of the argon and vacuum tubing to the ports to be balanced as labeled on the right side of the enclosure (Line 1 – Red, Line 2 – Blue, Line 3 – Yellow, Line 4 – Black).
2. Make sure that the probe/clamp assembly is securely connected to the end of the tubing.
3. From the "Main Menu" screen, press the 'Flow Balance' button on the PLC touch screen. The "Flow Balance" screen will then appear.
4. This screen displays the '*Argon Flow*,' '*Vacuum Flow,'* and the '*Flow Balance'* between these flows for each line. Proper flow balancing provide *Flow.'*
5. With the probe left out of the IGU, press the gree for the line you are balancing. Observe the flow r Balance' value.

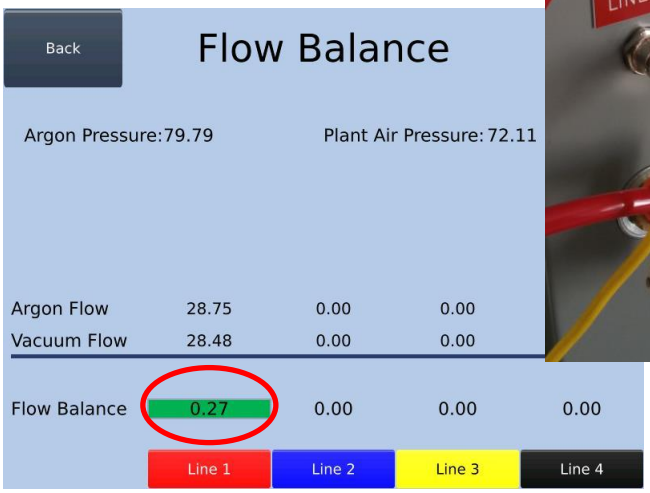
Note: *The values units are liters per minute (LPM).*



On-screen instructions with an option for instructional video will appear by pressing "Flow Balance" at the top of the "Main Menu."

6. Adjust the appropriate argon flow control valve located outside the AFS machine until the desired flow rate is achieved.
   a. *Pull the argon flow control valve knob out and turn to adjust.*
   b. *The 'Argon Flow' is the only adjustable parameter, which will in turn, adjust the 'Flow Balance.'*
7. A green box will appear around the 'Flow Balance' value when the desired range is achieved.
   a. *Push the argon flow control valve knob in to lock.*
   b. *The desired 'Flow Balance' is 0.10 to 1.00 LPM. The target value should be 0.50. It is normal for the value to slightly fluctuate – the precision of this value is not vital.*





GREEN BOX = Line is Balanced

8. Repeat steps 4-7 for each additional line.
9. Press 'Back' to return to the "Main Menu."

Note: *The 'Vacuum Flow' values on the 'Flow Balance' screen do not reflect correct values when filling IG units. Make sure probes are **out** of the IGU when performing a flow balance.*

Each line may have different flow rate values - this is normal and is determined by probe variances, tubing variances, etc. Each line is independent and operation will be determined by individual line setpoints.

Any negative flow differential will result in air entering the IG - continually diluting the argon. Ensure the 'Flow Balance' is positive.

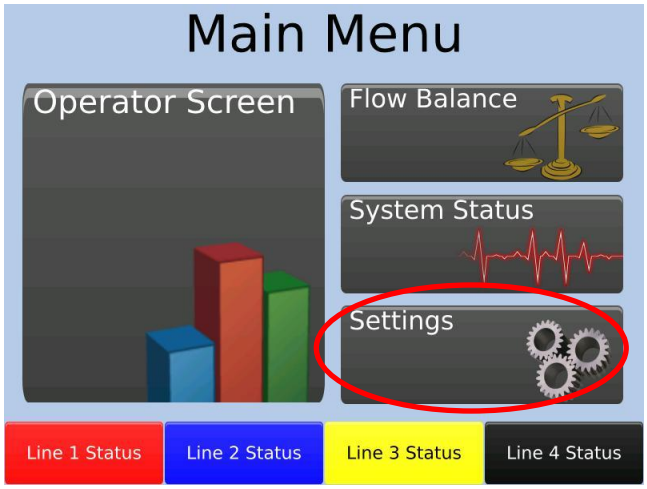
Pressing 'Back' while a line is running will cause the line to stop.

Gas Fill Settings (Argon Fill %)

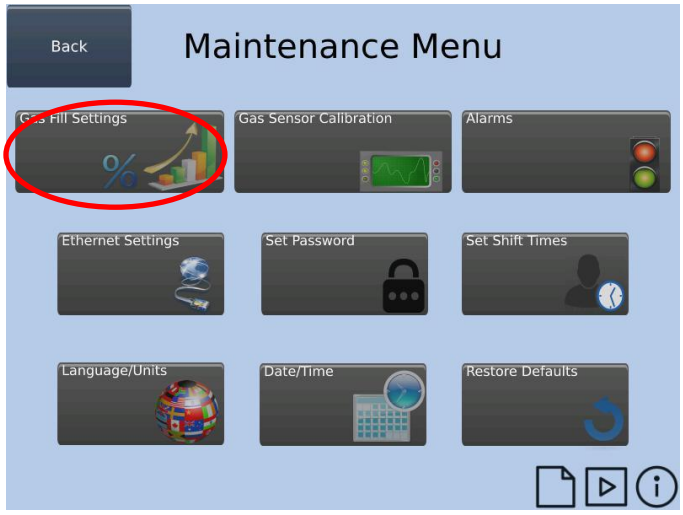
Each line on your AFS machine has independent setpoints to control the desired Gas Filling %. These setpoints include the 'Fill Percentage' and 'Over Fill Timer.'

1. To access/adjust these setpoints, press 'Settings' on the "Main Menu."
2. A password screen will appear.
3. Enter password and press the enter icon.

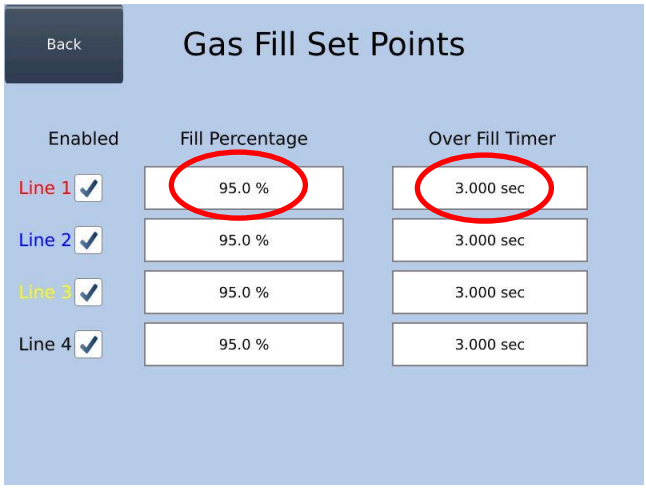
Note: *Factory default is no password (blank). A custom password can be assigned from the 'Maintenance Menu.'*



4. The 'Maintenance Menu' will appear.



5. Press 'Gas Fill Settings.'
6. On the "Gas Fill Set Points" screen, set the desired 'Fill Percentage' (%) by pressing the box relating to the line setpoint. A keypad will display. Enter the desire Argon fill level (in % fill) and press enter.



7. To prevent a line from stopping at the displayed setpoints, uncheck the corresponding 'Enabled' check box (DISABLE THIS FEATURE ONLY FOR GAS SENSOR MAINTENACE OR REPLACEMENT).
8. Set desired 'Over Fill Timer' by pressing the box relating to the line setpoint. Enter the desired number of seconds to fill after 'Fill Percentage' value is reached. This feature allows for a timed "over-fill," increasing the level of the final fill. A three second delay is the factory default value.
9. Press 'Back' to return to the Maintenance Menu".

Note: *Factory default settings and Instructional video can be seen by pressing 'Gas Fill Set Points' at the top of the screen.*

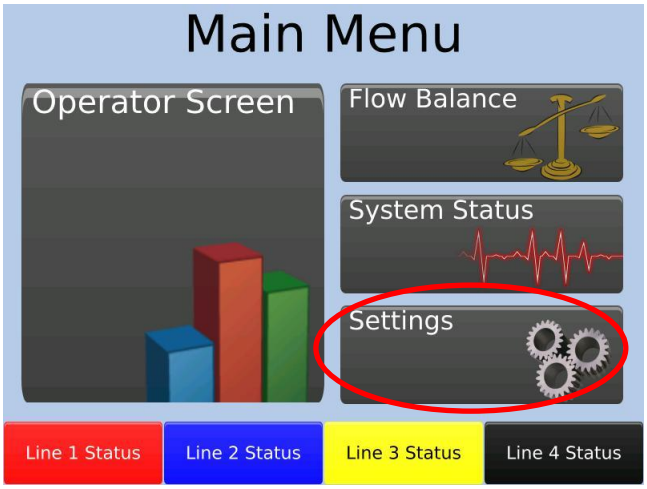
Gas Sensor Calibration

Initially, and as a **monthly maintenance function**, gas sensors should be calibrated.

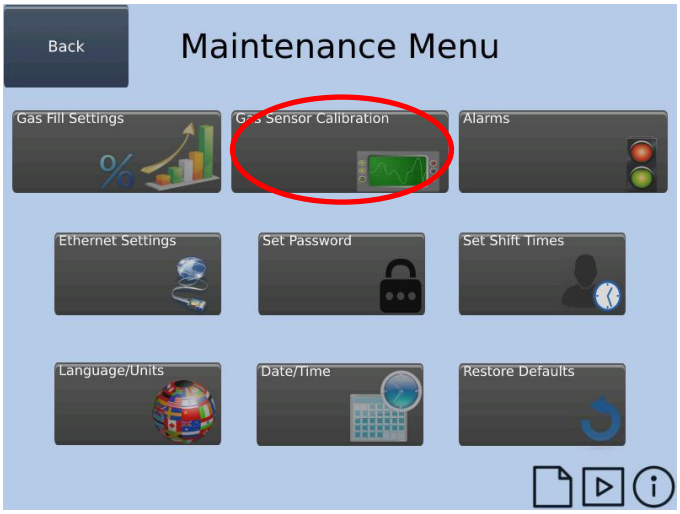
Warning: *Ensure flow balance is completed properly prior to performing any Gas Sensor Calibration procedure.*

1. From the "Main Menu," press 'Settings.'
2. A password screen will appear.
3. Enter password and press the enter icon.

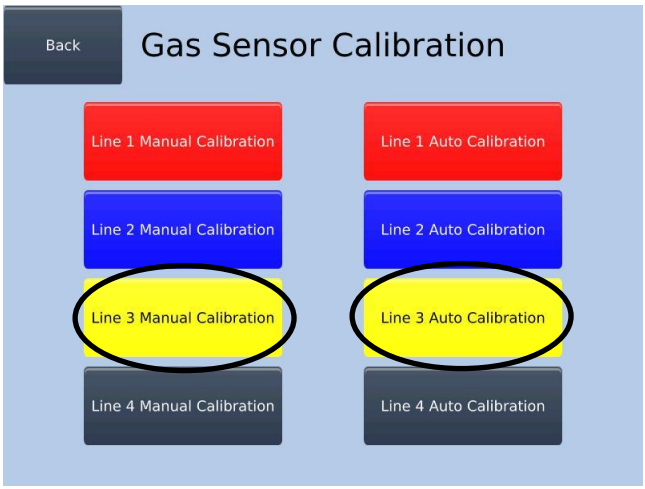
Note: *Factory default is no password (blank). A custom password can be assigned from the 'Maintenance Menu.'*



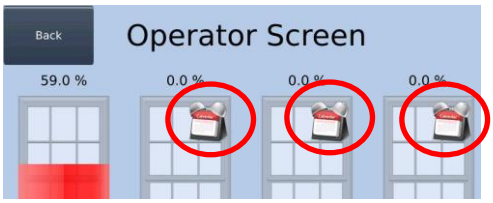
4. The 'Maintenance Menu' will appear.



5. Press 'Gas Sensor Calibration.'
6. "Gas Sensor Calibration" screen will appear.
7. Press the desired line and method of calibration.



Note: *Gas sensor calibration is strongly recommended every 30 days. A daily reminder (calendar icon) will appear on the 'Operator Screen' if the calibration is past due. The reminder can be bypassed, one day at a time, for 30 days. But, the line will not operate if the calibration is 60+ days past due.*



Press the calendar icon to see the calibration reminder and agree to bypass the warning.

Calibration information and calibration dates are shown on 'Line # Status' screen.

Gas Sensor calibration date (each line independent) is updated after every successful calibration.

Hint: *When calibrating multiple lines, use the same IGU to reduce the amount of Argon used and to speed up the calibration process.*

Auto Calibration Procedure

Auto Calibration simplifies the process of calibrating the gas sensors in the AFS systems. Appropriate alarms are controlled and provide a more consistent setting.

Ensure flow balance has been properly completed.

Follow steps 1-7 on page 9 'Gas Sensor Calibration,' select the line to be calibrated and press 'Line # Manual Calibration.'

1. The "Line # Gas Sensor Auto Calibration" screen will appear.

Note: *The setpoint numbers are current values and will be updated during this procedure.*

2. Press 'Start' button on the touch screen. The message on the bottom of the screen will change and guide you through the auto-calibration process.

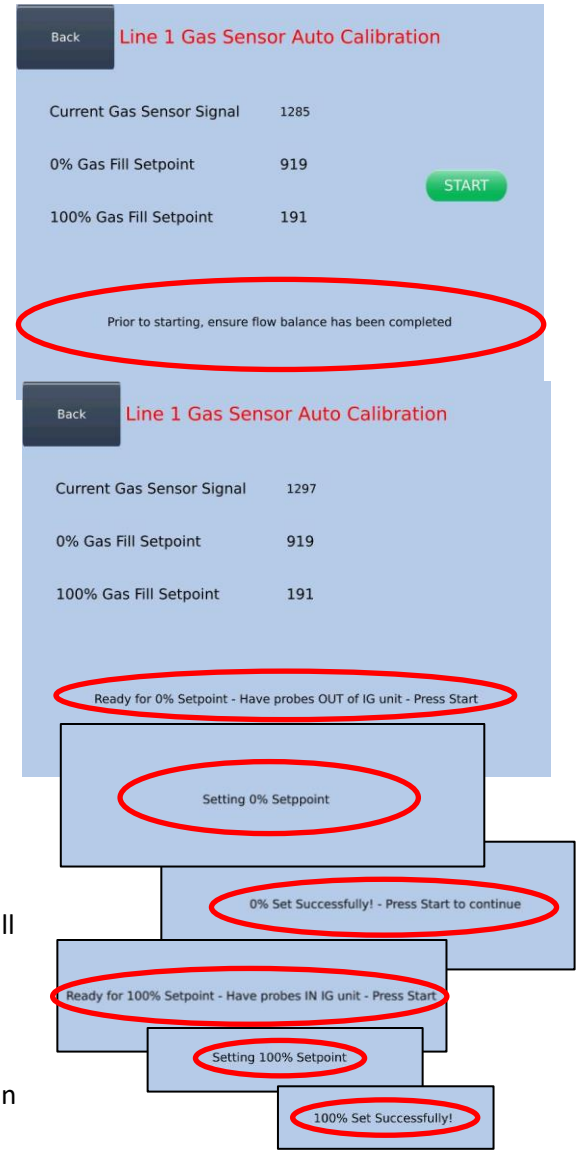
'Current Gas Sensor Signal' is the actual real-time analog reading from the gas sensor. This value will change during the calibration process and the corresponding value is stored to the '0% Gas Fill Setpoint' and '100% Gas Fill Setpoint' at the appropriate step in the process.

3. Following the instructions on the bottom of the screen. Step through the calibration process.

'Press Start' refers to the corresponding 'Line # Start' on the front of the AFS machine.

4. The line being calibrated will start. When the program parameters are met – the setpoint will be set and the line will stop.
5. Following the instructions on the screen, insert the probe(s) into a small IGU. Press 'Start.'
6. The system will again stop automatically and the 100% Gas Fill Setpoint will be set.
7. Press 'Back' to return to the 'Gas Sensor Calibration' screen.

Note: The calibration date is set to provide a reminder to perform a monthly calibration. This date is also used in the data collection options.

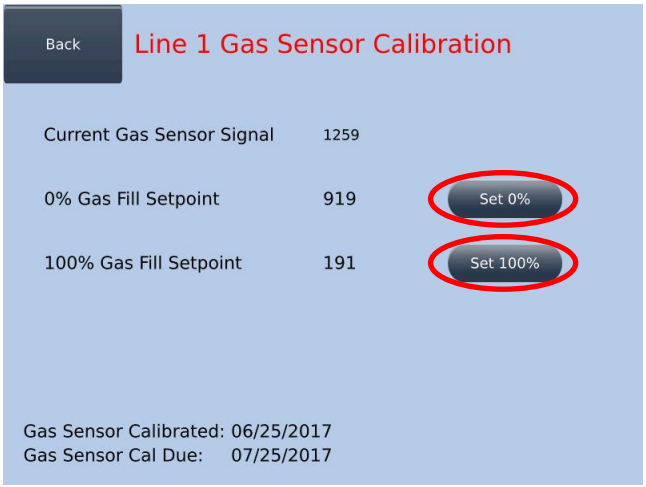


Manual Calibration Procedure (advanced users only)

Manual Calibration requires judgement to select the calibration setpoint at the appropriate time. Recommended for users with a full understating of the process.

Ensure flow balance has been properly completed.

Follow steps 1-7 on page 9 'Gas Sensor Calibration,' select the line to be calibrated and press 'Line # Manual Calibration.'



Set 0% Argon Setpoint

1. With the probe in ambient air and not in an IGU, start the line cycle by pressing the green start button.
2. Wait until the 'Current Gas Sensor Signal' remains nearly constant. Press 'Set 0%' to reset the 0% Gas Fill Setpoint of the sensor.
3. Stop the line by pressing the red stop button.

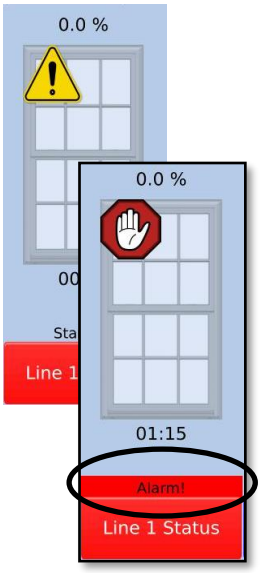
Set 100% Argon Setpoint

4. Place the probe in a small IGU.
5. Start the Argon filling cycle by pressing the green start button.
6. When the 'Current Gas Sensor Signal' remains nearly constant, press 'Set 100%' to reset the 100% Gas Fill setpoint of the gas sensor.
7. Press 'Back' to return to the 'Gas Sensor Calibration' screen.

Note: *The calibration date is set to provide a reminder to perform a monthly calibration. This date is also used in the data collection options.*

Gas Sensor Warning

A gas sensor warning icon will appear when it is time to order a new gas sensor. The line may still be used during this warning period after acknowledging the warning.



Note: *Press the warning icon on the screen to display information on the warning.*

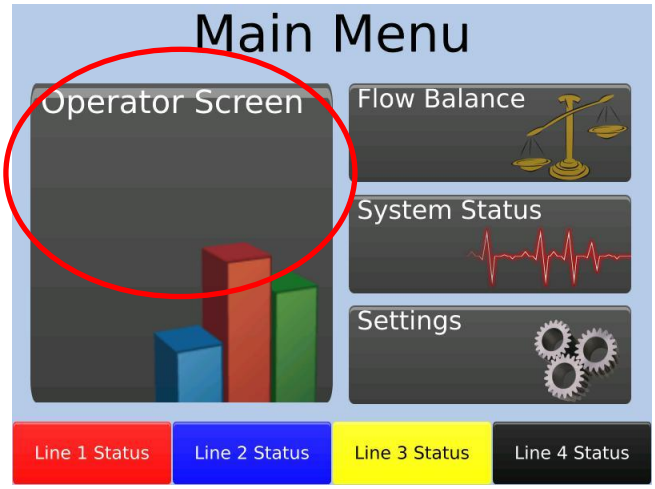
Gas Sensor Alarm

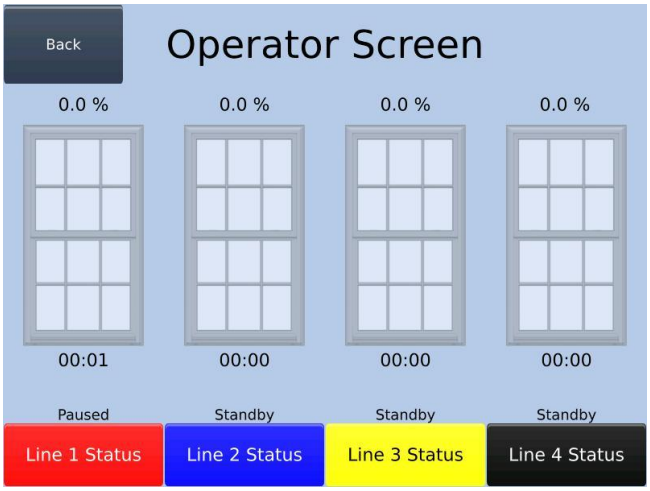
The gas senor alarm will sound and an alarm icon will appear when the gas sensor resolution is too low to provide an accurate gas fill reading. The line will not run while alarm is active. A new gas sensor must be installed and calibrated.

NORMAL OPERATION ------- THE 'OPERATOR SCREEN.'

Access the "Operator Screen"

Press the 'Operator Screen' button the "Main Menu" – the "Operator Screen" will appear.





Information on the "Operator Screen" (for each line):

1. Fill Percent numerical display.
    a. This number is dynamic when the line is in the 'Running' mode.
    b. Displays the last fill % value when a line goes into 'Alarm!,' 'Paused,' or 'Finished!' mode.
2. Fill percent bar graph.
3. Fill timer – MM:SS.
4. Line # Status buttons – press to open the "Line # Status" screen.
5. Line Status – mode indication.
    a. **'Standby'** – Line is ready to fill IGU.
        i. Press green 'Start' button to Start the line – start 'Running' mode.
    b. **'Running'** – Line is currently filling IGU.
        i. Press red 'Stop' button to send the line to the 'Paused' mode.
    c. **'Paused'** – Line was intentionally stopped during a fill cycle.
        i. Press green 'Start' button to return to 'Running' mode.
        ii. Press the red 'Stop' button two times to return to 'Standby' mode.
    d. **'Finished!'** – Line has successfully completed a fill cycle of an IGU.
        i. Press the red 'Start' button to return to 'Standby' mode.
        ii. Press the green 'Stop' button to return to 'Standby' mode.
    e. **'Alarm!'** – an alarm condition has been triggered.
        i. The line cannot run while in an alarm condition.
        ii. Active alarm screen will appear when an alarm condition is reached.
        iii. The red 'Stop' or green 'Start' button will silence the alarm.

Filling an IGU

During normal operation, the operator will have open the “Operator Screen” when filling IGUs. The normal procedure is as follows:

Note: *Ensure Flow Balance and gas sensor calibration have been completed successfully.*

1. Insert the probe(s) into the IGU.
2. Press green ‘Start’ button on the front of the machine (or the ‘Start’ button near the probe assembly).
    a. Green button light will remain on while filling IGU.
3. Once the filling process starts, the argon percentage will begin to rise on the PLC screen.
4. The line will continue until fill percentage reaches the preselected setpoint and the ‘Over Fill Timer’ has expired.
    a. The green button will turn off and the red button will turn on, indicating the cycle is ‘Finished.’
    b. The PLC screen displays the maximum fill percentage reached by the gas sensor.
5. Remove the probe(s) from the IGU.
6. Close and seal the filing hole as quickly as possible.
7. Repeat for the next IGU.

Any number of lines in any combination may be used simultaneously.

If for any reason the ‘Gas Fill Setting(s)’ are not Enabled (See ‘Gas Fill Settings’ in the “Maintenance Menu”), the argon filling process will continue until the operator pushes the ‘Stop’ push button for that line.

Light Indications

Green Light	Red Light	Mode	Description	Green Button Action	Red Button Action
Off	Off	Standby	Ready to start filling	To ‘Running’	-
On	Off	Running	Filling in process	-	To ‘Paused’
Flashing	Off	Paused	Operator paused line	To ‘Running’	***
Off	On	Finished	Filling completed successfully	To ‘Standby’	To ‘Standby’
Off	Flashing	Alarm	Line in alarm	Silence Alarm	Silence Alarm

*** Press twice to go back to ‘Standby’ mode

Note: *The green light on the probe ‘Start’ button operates the same as the green light on the front of the machine.*

System Warnings and System Alarms

A warning will provide an alert to a potential issue. The line (system) will continue to operate during a 'Warning.' This warning system is exclusive to AFS machines and provides information on potential issues that may cause improper filling.

An alarm is an indication that a parameter is out of normal operating conditions, which may result in a pressure imbalance in the IGU or an improper fill indication. The alarm condition must be resolved prior to operation of the line (system). If there is an alarm condition that affects a single line, the other lines will continue to operate as normal. System Alarms (see page 16) will shut down the entire system until the alarm condition is resolved.

System Warnings

All warnings will be indicated on the "Operators Screen" with an icon on the affected line. When an icon appears, press on the icon to see a description and potential resolution.

Warning Indications

Warning/Alarm	Indication	Potential Issue/Resolution
Negative Flow Warning		The system has indicated more vacuum flow than argon flow for a line. This can cause ambient air to be drawn into the airspace, prevent proper fill. Recheck the flow balance for that line.
Leak Detection Warning		The system recognizes a lack of continuing gas concentration as a potential leak in the vacuum side tubing/probes or an unsealed IGU. This warning may also appear while filling very large volumes or when slow filling a unit (as with Krypton). Ensure all tubing/probes/filters are fully and properly connected and ensure the integrity of the IGU seal. Check all tubing, filters, and fittings. This warning appears after 12 seconds of gas fill % not increasing.
Thermal Verification Warning		See page 15 for description. Ensure proper flow balance and gas sensor calibration procedures have been followed. Check the gas sensor alarm settings for the replacement setpoints. This warning may regularly appear when filing very small units, or if refilling units.
Gas Sensor Resolution		The resolution of the gas sensor is getting low. Time to order a new gas sensor.
Gas Sensor Calibration Reminder		After 30 days, a line will provide a reminder to calibrate the gas sensors. Calibrate the sensor as per instructions on page ten and 11. Press on the icon to acknowledge and continue operating. It is highly recommended to calibrate every 30 days.

Thermal Verification Warning

Note: This feature is exclusive to AFS machines. This feature provides a secondary source of gas concentration to improve overall confidence in the proper fill level and operation of the machine.

Thermal verification of argon concentration is an inherent measurement feature with the High-Speed and Ultra-High-Speed series machines. It is important that a proper flow balance is performed to ensure thermal verification is working correctly.

THIS IS A WARNING SCREEN ONLY – NOT AN ALARM. THE SYSTEM WILL KEEP OPERATING AND GAS LEVELS WILL STILL BE DETERMINED BY THE GAS SENSOR.

Warning may indicate the need for a gas sensor calibration or replacement. This is a secondary sensor to ensure proper gas filling is achieved.

The thermal verification process occurs in the built in thermal sensors in the AFS system. The thermal sensors indicate the inherent change in observed flow rate based on the properties of the gas passing through the sensor. If the sensor does not determine the proper change in thermal properties has been observed, then a thermal verification warning screen will appear for the associated line.

Gas Sensor Calibration Log

All AFS machines contain a log of gas sensor calibration history. This information is useful to comply with manufacturing and quality standards. To write the calibration data to the file, the calibration procedure needs to be properly completed as outlined in this manual (pages 9-11).

The data file resides on the microSD card inserted into the PLC. To obtain the data without the Ethernet/Email Option, the microSD card needs to be removed from the PLC and properly inserted into a PC via an appropriate adapter.

The data can also be obtained via email with the available Ethernet/Email Option. See AFS Options Manual for more information.

Gas Sensor Calibration Data (GSCALLOG.csv)

The data file contains all critical data for each calibration.

Line #	0% setpoint	100% setpoint	Resolution	YR/MO/DY HR:MM:SS	Calibration Type

Line #: 1,2,3,4 – indentifies the calibrated line.

Resolution: Difference between the transducer setpoints
"0% setpoint" - "100% setpoint" = Resolution.

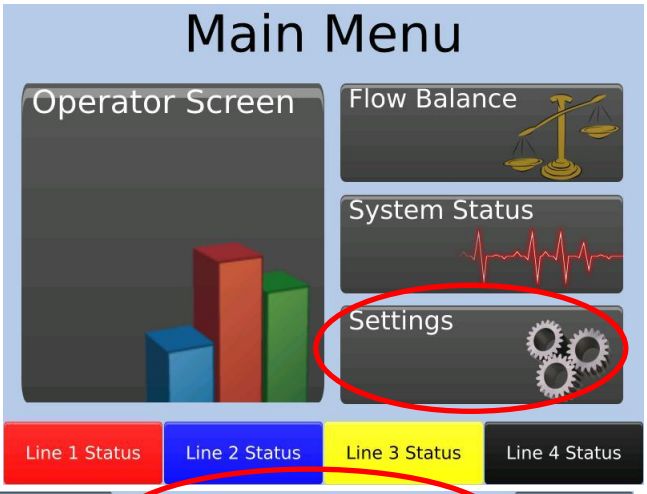
YR/MO/DY HR:MM:SS: Date and Time calibration was completed and written to the data file.

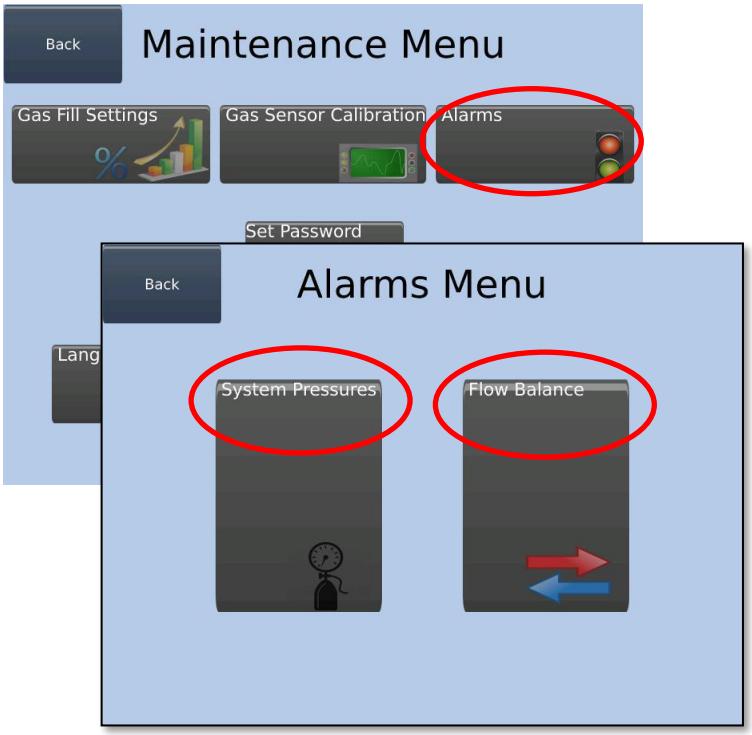
Calibration Type: "Manual" or "Auto" – defines the calibration method used.

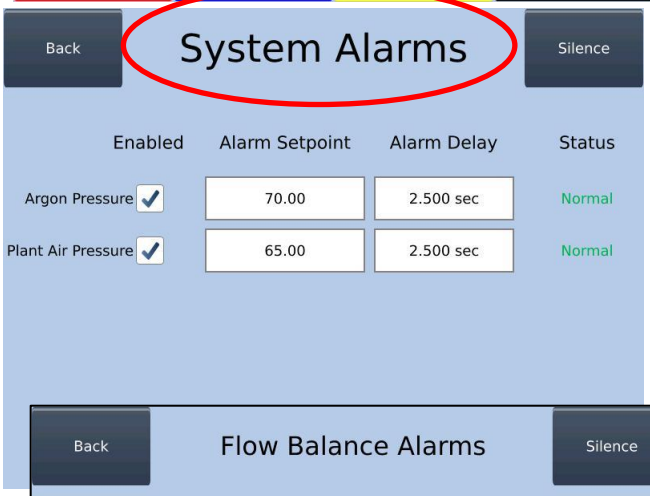
System Alarms

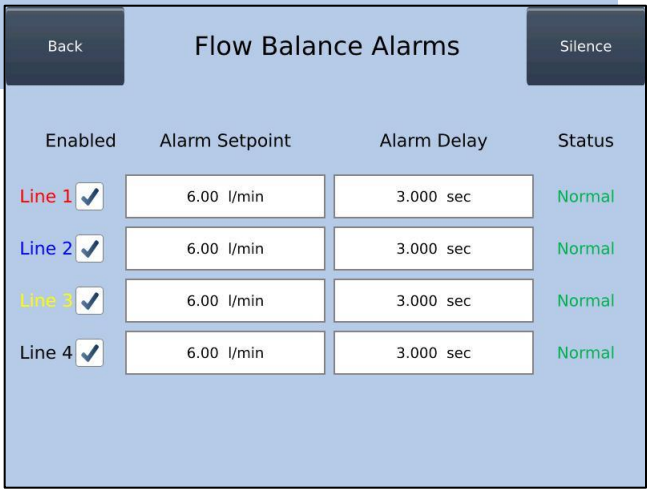
Alarms indicate a machine condition or parameter may cause improper filing conditions. All alarms will need to be addressed prior to continuing operation.

Some Alarm Setpoints can be adjusted and even disabled. DIASABLING ALARMS IS NOT RECOMMENDED!



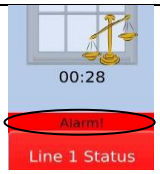
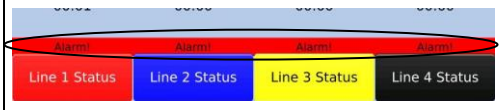
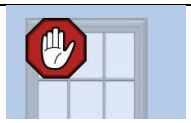






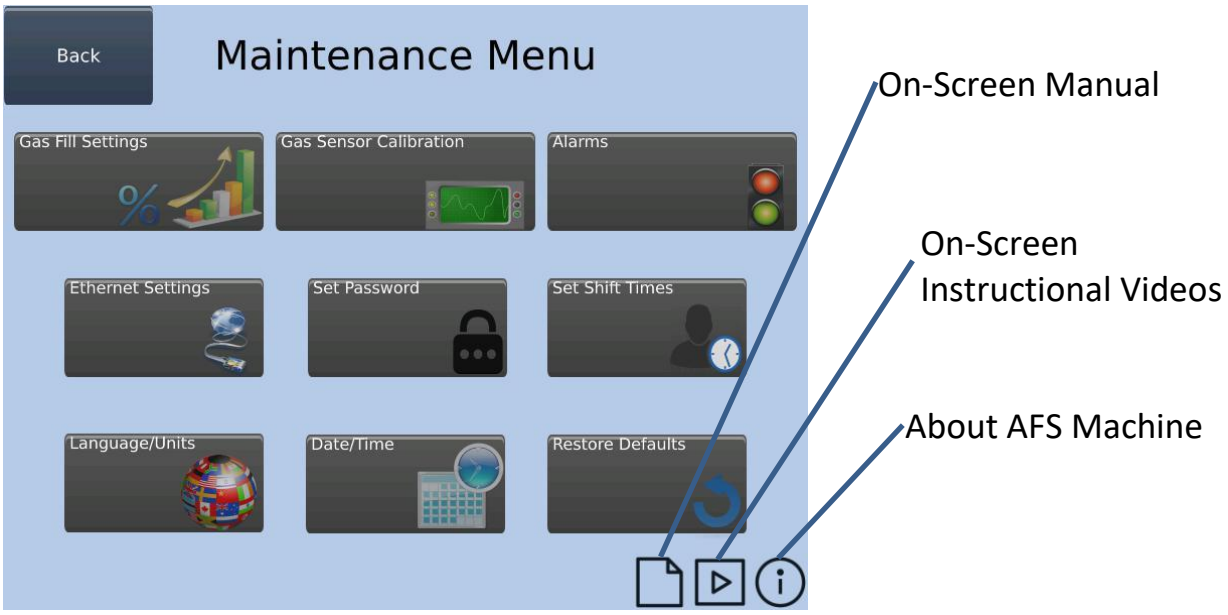
1. From the “Main Menu,” press ‘Settings.’
2. A password screen will appear.
3. Enter password and press the enter icon.
4. On the “Maintenance Menu” screen, press ‘Alarms.’
5. The “Alarms” screen will appear.
6. Press the button for the alarms to be viewed.
7. The alarm settings screen appears.
8. Touch the screen title (e.g. “System Alarms”) to see a pop-up window with the factory default settings.
9. Press the numeric values to view a keypad for changing the desired value.

Alarm Indications

Alarm	Indication***	Potential Issue/Resolution
Flow Balance Alarm		The system has indicated a condition where the flow balance is beyond the setpoints in the “Flow Balance Alarms” screen. Remove the probe(s) from the IGU and perform the flow balance.
Plant Air Pressure Argon Pressure Alarms		The system relies on consistent plant air and argon pressure to obtain steady operating flowrates for the proper filling of IGU(s). Check the parameters on the “System Alarms” screen and check the pressures as indicated on any “Status” screen. Resolve the issue causing the alarm.
Gas Sensor Resolution		The resolution of the gas sensor is getting low. Time to order a new gas sensor.
Gas Sensor Calibration Reminder		After 60 days, the line will not operate until a gas sensor calibration is completed. Calibrate the sensor as per instructions on page ten and 11.

*** The red button(s) lights will flash during an alarm condition. A system alarm will cause all red lights to flash simultaneously.
*** At the time the alarm occurs, the screen will display the triggered alarm screen.

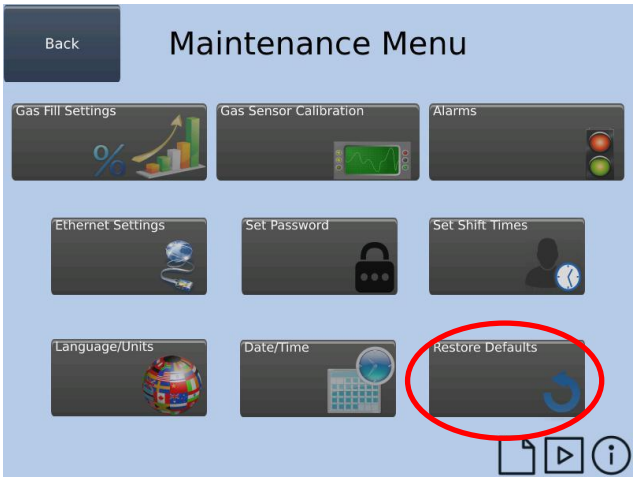
On-Screen Video Instruction, Information and Manual

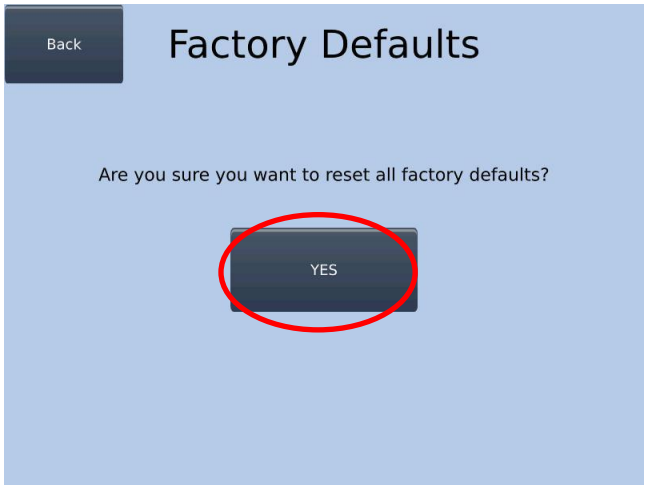


RESTORE FACTORY DEFAULTS

Select Restore Defaults

1. From the “Main Menu, press ‘Settings.’
2. A password screen will appear.
3. Enter password and press the enter icon.
4. “Maintenance Menu” will appear.
5. Press ‘Restore Defaults.’
6. The “Factory Defaults” screen will appear.
7. Select ‘Yes.’





Factory Default parameters and their set values:

Parameter	Value	Delay
Argon Feed Pressure Alarm	65	2.5
Plant Air Pressure Alarm	65	2.5
Flow Balance Alarm	6.0	3.0

Gas Fill Setpoints		
Fill Percent (%)	95 %	
Over Fill Timer	3.0	seconds

Troubleshooting

Issue	Solution
Line will not flow balance or remain balanced	Plant air supply: • Ensure tubing is properly connected • Ensure adequate pressure and tubing size for required flow-rate Argon supply: • Ensure tubing is properly connected • Ensure adequate pressure and tubing size for required flow-rate Tubing to IG: • Check to ensure probe(s) are properly attached and not clogged • Ensure filter is clean, cover properly installed and not broken • Check all fittings to ensure tight fit • Ensure probe is not in any IG or test chamber during flow balancing Inside AFS machine: • Ensure regulators are set at proper pressure • Check for debris in any components: venturis, flow meters, flow needle valves, etc. Remove tubing and clean as needed • Check all fittings to ensure tight fit • Ensure jam nuts are tightened on regulators and needle valves
Line starts but argon filling process does not complete	Ensure Gas Fill Setting is Enabled (see page 8) and fill % is properly set Check vacuum line probe, filter and tubing to ensure no leaks
Breaking Glass	Ensure Flow balance is completed properly Ensure no plugs in vacuum or argon lines and probes Ensure all alarms are properly set and enabled *(note the flow differential alarm)*
Line does not start	Check flow differential alarm setting – make sure value is > 0 lpm Ensure solenoid valve wires are connected Ensure solenoid valves are opening *(push button on side of vale to manually cycle)*

Recommended Maintenance Schedule

Maintenance Procedure	Frequency
Check lines and probes for plugs/cracks/breaks	On-going / daily
Flow Balance	Weekly EVERY PROBE CHANGE
Gas Sensor Calibration	Monthly
Clean vacuum line filters	Monthly/As Needed

System Requirements

	AFS-1	AFS-2	AFS-4	AFS-1HS	AFS-2HS	AFS-4HS
Power	**110-250 VAC 50-60 HZ**					
Plant Air Pressure	**100 PSI** – minimum ½" supply line recommended to ensure adequate flowrate					
Argon Supply Pressure	**100 PSI** – ensure line and manifold are capable of minimum flowrate					
	50 lpm 110 scfm	100 lpm 215 scfm	200 lpm 425 scfm	100 lpm 215 scfm	200 lpm 425 scfm	400 lpm 850 scfm

Spare Parts

All spare parts are pictured on the AFS website https://www.argonfillingsystems.com/parts.

Part & Description	Part Number
Argon Lances	
Argon Lance - 0.0625" O.D.	p/n 00-0031
Argon Lance w/ 90° Elbow - 0.0625" O.D.	p/n 00-0031E
Vacuum Lances	
Vacuum Lance - 0.125" O.D.	p/n 00-0032
Vacuum Lance - 0.156" O.D.	p/n 00-0034
Vacuum Lance - 0.188" O.D.	p/n 00-0036
Vacuum Lance - 0.218" O.D.	p/n 00-0038
Fittings	
⅜" Plug for filling "T"	p/n 24-0001
⅜" 90° Street elbow	p/n 24-0002
¼" tubing to $^{3}/_{8}$" tubing reducer	p/n 24-0004
¼" tubing to $^{3}/_{8}$" tubing reducer 90° Elbow	p/n 24-0004E
⅜" "T" fitting	p/n 24-0010
½" to ⅜" tubing reducer	p/n 24-0011
Clamps *(No Probes included)*	
Needle Nose Clamp Assembly • Needle nose clamp w/attached fitting	p/n 24-0024
Two-hole/Single-hole Probe Assembly • Dipped, 2" spring clamp w/attached fitting	p/n 24-0100
Gas Sensor	
AFS Gas Sensor, Aluminum body style	p/n 00-0006
Tubing Kits	
AFS-S Tubing Kit, 15' wrapped ¼" and ⅜" tubing	p/n 00-0011
AFS-S Probe Push Button Tubing kit	p/n 00-0012
AFS HS-Tubing Kit, 15' wrapped ¼" and ½' tubing	p/n 00-0221
AFS-HS Probe Push Button Tubing kit	p/n 00-0222
Filters	
In-line straight filter, ⅜" tubing filter	p/n 00-0090
In-line Filter, ½" tubing filter	p/n 00-0091

Spare parts may be ordered using the order form on the "PARTS" page of the AFS website: https://www.argonfillingsystems.com/parts

You may also order by emailing parts@argonfillingsystems.com

Argon Filling Systems, Inc.
1000 Westgate Drive, Suite 151
St. Paul, MN 55114
Phone: 651-757-3472
Fax: 651-305-5154

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