Lafferty Equipment Manufacturing, LLC
Installation & Operation Instructions

Model # 989074 · 14 GPM Gemini High Flow Level Master™ System

REQUIREMENTS

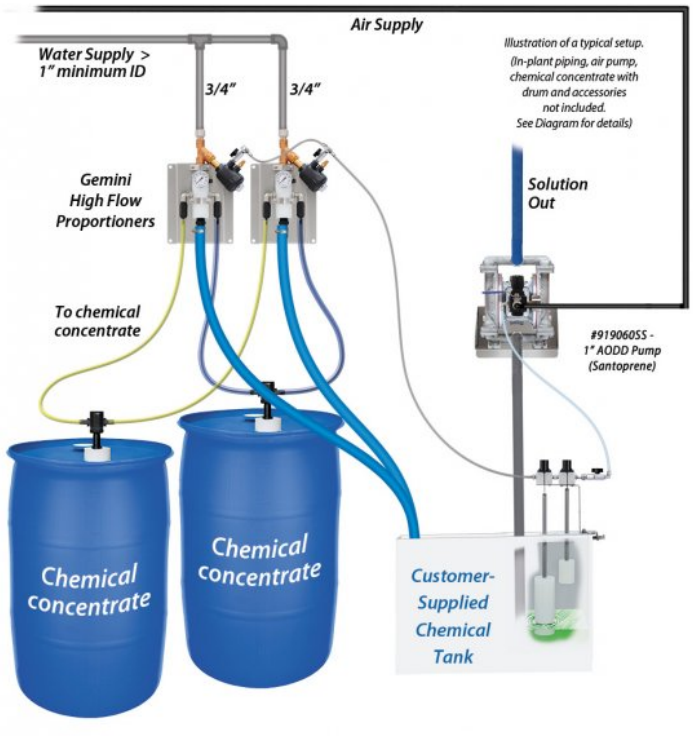
Chemical Concentrate	
Water	
Temperature	up to 160°F
Pressure	35-125 PSI
Flow	14 GPM @ 40 PSI
Supply Line	1" Minimum
Compressed Air	Up to 80 PSI

OPTIONS

Stainless Steel Central Pump System	
1" AODD Pump (Santoprene)	# 919060SS
Teflon Upgrade	# 710943
4-Way Drum & Tote Stick Lengths & Seal Materials	
4-Way Drum Stick, 33" (Viton or EPDM)	# 491644 / 491644-E
4-Way Drum Stick, 48" (Viton or EPDM)	# 491649 / 491649-E
4-Way Tote Stick, 54" (Viton or EPDM)	# 491657 / 491657-E
Alternate Check Valves - Viton Standard	
Check Valve, Chemical, PP(W), 1/4" (EPDM)	# 491401
Check Valve, Viscous Chemical, PP, 1/2" HB (EPDM)	# 491403

WEIGHT & DIMENSIONS

Single Package	
Shipping Weight	33 lbs.
Shipping Dimensions	27" x 19" x 9"



Lafferty EQUIPMENT MANUFACTURING LLC

CFS TECHNOLOGIES

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WARNING! READ ALL INSTRUCTIONS BEFORE USING EQUIPMENT!

OVERVIEW

The 14 GPM Gemini High Flow Level Master™ is a water driven chemical proportioner that will dilute and blend 2 chemicals and automatically refill a customer-supplied tank with ready-to-use chemical solution at 14 GPM @ 40 PSI. When the solution in the tank drops below a pre-set level, the float valve triggers an air-activated solenoid to start the water flow. The unique Gemini™ "double venturi" injection system combines two completely separated venturis in one injector body and uses city water pressure (35 - 125 PSI) to draw and blend 2 chemical concentrates into the water stream independently so that the chemicals never mix until they are diluted. The system cycles continuously and a secondary fail-safe float prevents overfilling.

SAFETY & OPERATIONAL PRECAUTIONS

- **When connecting to a potable water supply follow all local codes for backflow prevention.**
- For proper performance do NOT modify, substitute nozzle, hose diameter or length.
- Manufacturer assumes no liability for the use or misuse of this unit.
- Wear protective clothing, gloves and eye wear when working with chemicals.
- Always direct the discharge away from people and electrical devices.
- Follow the chemical manufacturer's safe handling instructions.
- NEVER mix chemicals without first consulting chemical manufacturer.

TO INSTALL (REFER TO DIAGRAM ON NEXT PAGE)

Backflow prevention: Follow all local codes for preventing backflow into the water supply before installing / operating equipment.

1. Position empty RTU holding tank on a **level surface.**
2. Carefully unpack the bracket / float assembly and attach the bracket to the top rim of the tank using the set screws provided. Tighten the screws to prevent movement during operation.
3. Ensure that the float(s) are hanging freely in the tank.
4. Mount the High Flow Satellite Mixing Station unit(s) to a suitable surface above the chemical supply to prevent siphoning.
5. Connect the discharge hose(s) as shown in the diagram.
6. Flush any new plumbing of debris before connecting water. If water piping is older, or has known contaminants, install a water filter.
7. Connect the water supply to the Mixing Station unit(s).
8. Push lock 5/32 poly-flow tubing to the tube lock fitting on the Level Master and to the wall mount Mixing Station solenoid(s)
9. Connect a clean, dry compressed air supply to the Level Master unit.

Set the chemical dilution ratios by threading one of the color-coded metering tips into both chemical check valves. See chemical labels for dilution ratio recommendation or consult your chemical supplier.

- For the strongest dilution ratio do NOT install a colored metering tip in one or both check valves.
- The dilution ratios in the metering tip chart are based on water thin chemicals with a viscosity of 1CPS.
- Thicker chemicals will require a larger tip than the ratios shown in the chart.
- Application results will ultimately determine final tip color.
- Select the tip color that is closest to your desired chemical strength and thread it into each check valve. DO NOT OVER TIGHTEN.
- Push the chemical tubes over the check valve barbs and place the strainers in each chemical concentrate.
- **BOTH chemical suction tubes must be placed in chemical.** If one suction tube will not be used, plug the unused tube to prevent it from drawing in air.
- If necessary, cut suction tube(s) to length before attaching suction strainer.

TO OPERATE

1. With the Level Master assembly securely attached to an empty tank, push down on the secondary safety float valve wire hanger (see diagram) so that it sticks in the "down" position. Gravity will cause the primary float valve to automatically sit in the "down" position. Both float valves are now open.
2. Completely open the air inlet ball valve to activate the Satellite Mixing Station(s) and begin filling the tank with diluted solution.
3. When the solution in the tank reaches the fill level, the primary float will rise and shut off the air flow to the Satellite Mixing Station. This will cause the solenoid on the water inlet to close and deactivate the Satellite Mixing Station.

NOTE: The fill level and fail-safe shutoff level are pre-determined by the length of the "push rods" attached to the floats, which are intended to be used as provided. If necessary, floats can be lowered 1/2" by partially unscrewing them from the push rods.

4. System is now ready for use and will maintain the solution level until the inlet ball valve is manually closed.
5. Make final metering tip adjustments to the Satellite Mixing Station(s) based on application results.

Secondary Fail-Safe Valve Reset Procedure

- If the solution level in the tank rises above the normal fill level the secondary fail-safe float will rise and cause the secondary fail-safe float valve to close.
- This will shut-off the air supply to the Satellite Mixing Station water solenoid and deactivate the system to prevent overflow.
- The system will not operate until the secondary float valve is manually reset by pushing down on the float valve wire hanger (per operating instructions step 1, above).
- If the secondary fail-safe valve is triggered, refer to the Troubleshooting Guide to determine the cause before continuing operation.

METERING TIP SELECTION

METERING TIP COLOR	OZ/MIN	DILUTION RATIO @ 40 PSI
Brown	0.56	1600:1
Clear	0.88	1018:1
Bright Purple	1.38	649:1
White	2.15	417:1
Pink	2.93	306:1
Corn Yellow	3.84	233:1
Dark Green	4.88	184:1
Orange	5.77	155:1
Gray	6.01	149:1
Light Green	7.01	128:1
Med. Green	8.06	111:1
Clear Pink	9.43	95:1
Yellow Green	11.50	78:1
Burgundy	11.93	75:1
Pale Pink	13.87	65:1
Light Blue	15.14	59:1
Dark Purple	17.88	50:1
Navy Blue	25.36	35:1
Clear Aqua	28.60	31:1
Black	50.00	18:1
No Tip Ratio Up To:		8.5:1

The dilution ratios above are approximate values. Due to chemical viscosity, actual dilution ratios may vary.

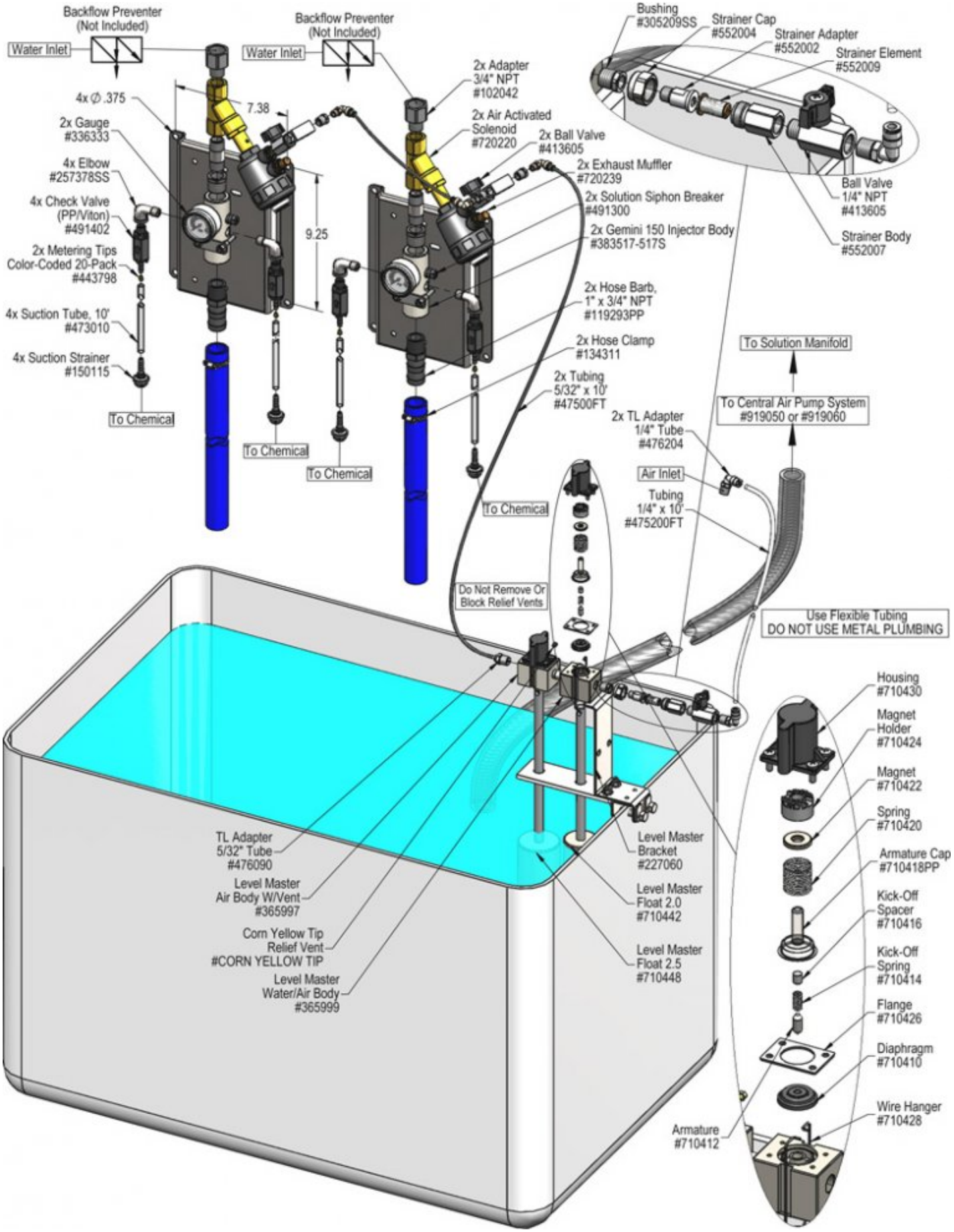
FORMULA

GPM × 128 ÷ Desired Dilution Ratio = oz/min

- *See Unit Flow Rates chart for GPM*
- *Use 20 for 20:1 dilution ratio, 30 for 30:1, etc.*
- *Match calculated ounces per minute (oz/min) to nearest oz/min in Metering Tip Selection chart.*

UNIT FLOW RATES

PSI	GPM
35	6.55
40	7.00
50	7.83
60	8.57
70	9.26
80	9.90
90	10.50
100	11.07
110	11.61
120	12.12
125	12.37


Backflow Preventer (Not Included)
Water Inlet
Backflow Preventer (Not Included)
Water Inlet
4x Ø .375
7.38
2x Gauge #336333
4x Elbow #257378SS
4x Check Valve (PP/Viton) #491402
2x Metering Tips Color-Coded 20-Pack #443798
4x Suction Tube, 10' #473010
4x Suction Strainer #150115
To Chemical
9.25
To Chemical
To Chemical
2x Adapter 3/4" NPT #102042
2x Air Activated Solenoid #720220
2x Ball Valve #413605
2x Exhaust Muffler #720239
2x Solution Siphon Breaker #491300
2x Gemini 150 Injector Body #383517-517S
2x Hose Barb, 1" x 3/4" NPT #119293PP
2x Hose Clamp #134311
2x Tubing 5/32" x 10' #47500FT
To Chemical
Do Not Remove Or Block Relief Vents
Bushing #305209SS
Strainer Cap #552004
Strainer Adapter #552002
Strainer Element #552009
Ball Valve 1/4" NPT #413605
Strainer Body #552007
To Solution Manifold
To Central Air Pump System #919050 or #919060
2x TL Adapter 1/4" Tube #476204
Air Inlet
Tubing 1/4" x 10' #475200FT
Use Flexible Tubing DO NOT USE METAL PLUMBING
TL Adapter 5/32" Tube #476090
Level Master Air Body W/Vent #365997
Corn Yellow Tip Relief Vent #CORN YELLOW TIP
Level Master Water/Air Body #365999
Level Master Bracket #227060
Level Master Float 2.0 #710442
Level Master Float 2.5 #710448
Housing #710430
Magnet Holder #710424
Magnet #710422
Spring #710420
Armature Cap #710418PP
Kick-Off Spacer #710416
Kick-Off Spring #710414
Flange #710426
Diaphragm #710410
Wire Hanger #710428
Armature #710412

Troubleshooting Guide

Problem	Possible Cause / Solution	
	Startup	Maintenance
A) Mixing station will not draw chemical.	1, 4, 5	9, 10, 11, 12, 16, 17
B) Dilution too strong.	2	
C) Dilution too weak.	3, 4, 5	9, 10, 11, 12, 16, 17
D) Primary float will not activate (does not fill)	7, 9	13, 14, 15, 18
E) Primary float valve will not turn off (overfills or triggers secondary fail-safe float valve on double-float models)	6, 7, 8	13, 14, 15, 18
NOTE: This guide is for Air Level Masters used with High Flow Satellite Mixing Stations		

Possible Cause / Solution

Startup

1. **Air inlet ball valve not completely open**
   - Completely open air inlet ball valve.
2. **Metering tip too large or no tip installed**
   - Install smaller metering tip.
3. **Not enough chemical**
   - Install a larger metering tip.
4. **Chemical tube not immersed in chemical or chemical depleted.**
   - Immerse tube or replenish.
5. **Water pressure too low or water temperature too high**
   - Mixing station requires 25 PSI water pressure, see requirements.
6. **Air pressure to Level Master too high**
   - Install an air pressure regulator in-line before the Level Master if air pressure exceeds 80 PSI.
7. **Level Master body is not level**
   - Install the Level Master on an even surface where the body (injector) is level to the horizon. Ensure that the Level Master will not become unbalanced as it fills.
8. **Secondary fail-safe float has been triggered *(double-float models only)***
   - Manually reset the secondary fail-safe float valve (refer to operation instructions)
   - Inspect the primary float assembly before resetting the secondary float valve. If necessary, troubleshoot the primary float assembly.

Float hanger seated correctly

Maintenance

9. **Chemical strainer or metering tip blocked**
   - Clean or replace chemical strainer and/or metering tip.
10. **Chemical tube stretched where tube slides over metering tip holder or pin hole/cut in tube (sucking air)**
    - Cut off end of tube or replace tube.
11. **Vacuum leak in chemical pick-up connections**
    - Tighten the connection.
12. **Water strainer screen clogged**
    - Clean the water strainer screen.
13. **Physical blockage or interference is preventing the float from rising or falling**
    - Ensure that the tank is on a level surface.
    - Ensure that the float, push rods, and metal clips are hanging freely without any interference.
    - Do not modify the float assemblies.
14. **Float valve parts are dirty or defective**
    - Clean or replace the affected parts (may require careful disassembly, refer to parts diagram).
    - Ensure that all parts are free of rust, grease, etc.
    - Depending on the chemical and on-site variables, regular cleaning and/or replacement may be required.
15. **Float valve diaphragm stretched out or damaged**
    - Replace the float valve diaphragm.
16. **Chemical build-up or scale may have formed in the injector body causing poor or no chemical pick-up**
    - Follow Preventive Maintenance instructions below, using hot water and/or descaling acid. When there is no draw at all, carefully remove fittings and soak entire body in descaling acid.
17. **Water solenoid failed or air is turned off**
    - Replace solenoid
    - Ensure air inlet ball valve is completely open
18. **Upward force has unclipped hanger from magnet holder**
    - *Carefully* remove float housing and align wire hanger to grooves in magnet holder.
    - Pull down on wire hanger until you hear a sharp 'click' after the normal activation sound.
    - Wire hanger must be *fully* seated in magnet holder grooves, as shown on LEFT.

PREVENTIVE MAINTENANCE: When the unit will be out of service for extended periods, place chemical tube(s) in water and flush the chemical out of the unit to help prevent chemical from drying out and causing build-up. Periodically check and clean chemical strainer and replace if missing.