

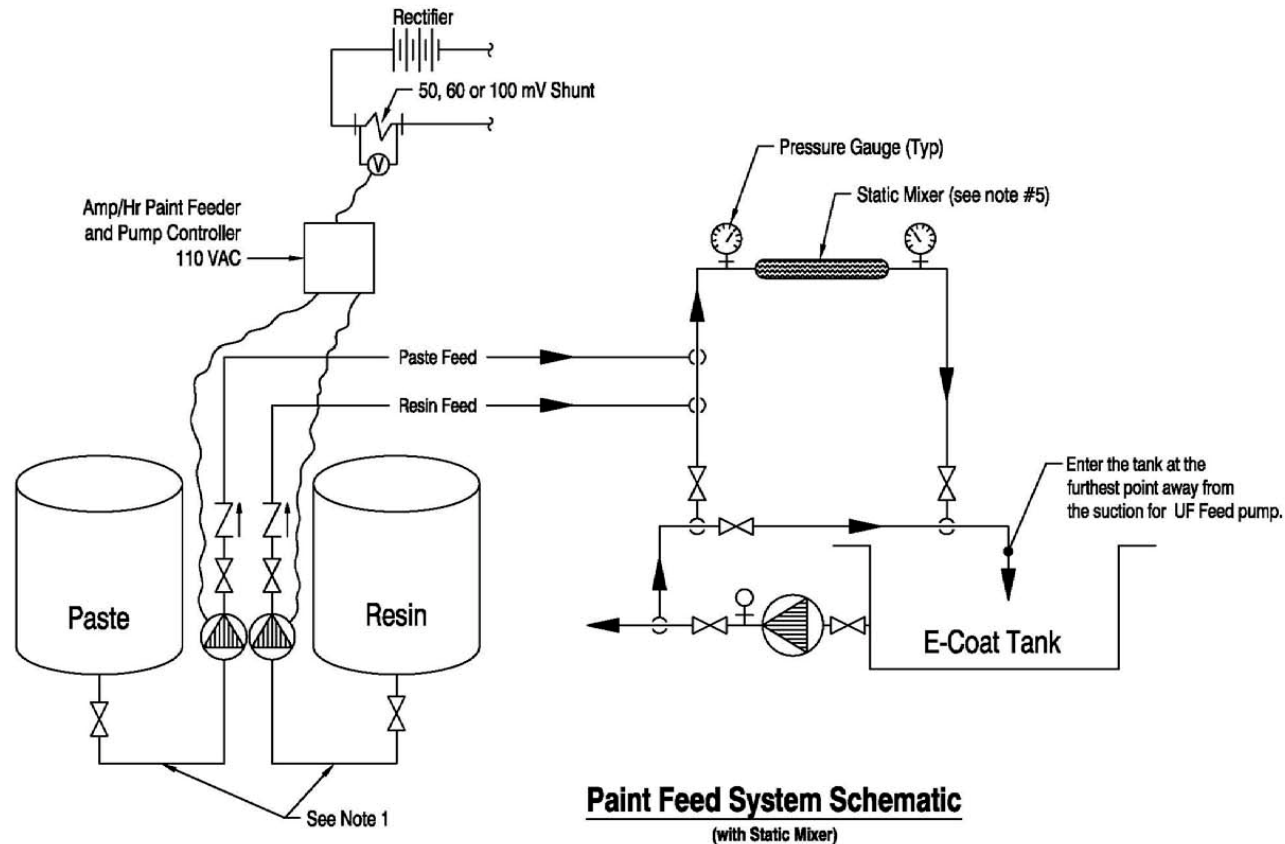


Replenishment E-coat Paint Feeder System

Quick Start Guide

Rev 0

Process Schematic



Notes:

1. If pulling from the bottom of a tote / paint container, limit pump suction piping to be no more than 36". A 2" or larger suction line is recommended. Only reduce down the pipe at pump inlet if necessary.
2. Limit flow through static mixer so pressure drop is ~3.5-4.0 PSI.
3. Do not exceed 8-12 ft/sec for paint velocity in any pipe line.
4. Total replenishment paint feed flow rate is 1-3 gpm max.
5. Actual flow rate will depend on static mixer model.



Space Planning

- Totes – make sure there is space for a fork truck to move a new one in and remove the old one
- Drums – hand truck or fork truck maneuvering room?
- Drums using diaphragm pumps should have two positions so pump suction & agitator can be removed and then quickly placed into waiting drum.



Paint Feeder Hardware

- JP Tech brand Amp Hr Controller receives current data from the DC rectifier's shunt and then controls one or two pumps
 - If using 2 rectifiers, order special option
- ARO brand 3" Air Motor 4:1 Ratio 2 Ball stainless steel piston pump, wall mounted, magnetic proximity sensor for stroke counting.
 - Use one pump per component
- KoFlo brand flanged 2" PVC static mixer, 12 mixing elements, 3.5 psi pressure drop at 25 gpm
 - 2" side stream is place to inject replenishment paint



ARO Piston Pump

- Model NM2304B-11-311
 - 8.2 in³ (134.3 ml) per stroke
 - 28.2 strokes per gallon (7.4 strokes/liter)
 - Max cycles per minute = 125
 - Flow rate at 60 strokes/min
 - 2.1 gpm
 - 8.0 l/min
 - 85 dBA @ 100 psi inlet pressure
 - Air inlet pressure: 0 – 150 psi (0 -10.3 bar)
 - Fluid pressure at discharge: 0 – 600 psi (0 – 41.4 bar)
- Use enough inlet air pressure to overcome pressure in side stream piping.



ARO Diaphragm Pump

- Model PD10P-APS-PAA
 - 1:1 ratio (discharge pressure = air line pressure)
 - 0.226 gal (0.86 liters)) per cycle
 - Pump weight 19.6 lbs (8.9 kg)
 - 60 cycles per minute @ 70 psi
 - Max Flow rate
 - 53 gpm
 - 200 liters/min
 - 79.9 dBA @ 70 psi inlet pressure
 - Air inlet pressure: 0 – 120 psi (0 – 8.3 bar)
- Important note - use enough inlet air pressure to overcome pressure inside stream piping.

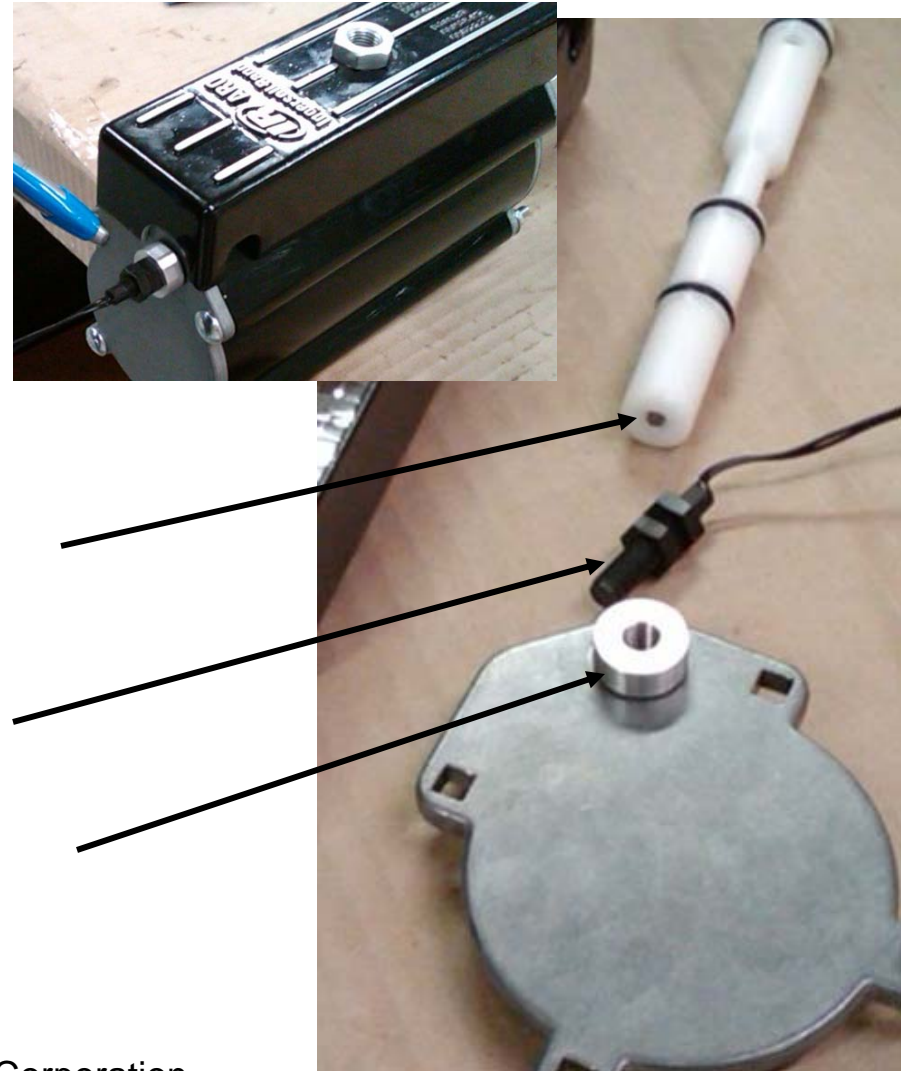


Pump Setup

- Install magnetic proximity sensor
- Install electric solenoid valve
- Install the air filter/regulator
- Add a high pressure line to the solenoid valve
- Set pump into its wall mount bracket
- Attach 2" suction line, limit length to 5 or 6'
- Attach appropriate discharge line

Piston Pump

- Stainless steel
- Solvent cup provided
- Magnet is inserted into the spool piece
- Magnetic proximity sensor is threaded into aluminum adapter in Top Cap



Tote/Piston Pump

- Note - customer made this frame from included wall mount adapter
- Pump discharge is $\frac{3}{4}$ NPT
- Reduce suction to 1-1/4 NPT at pump
- Keep pump suction same as tote discharge & about 3 ft long





Pump Suction Kit

- Attach fitting to pump suction
- Thread in male cam lock adapter
- Thread other male cam lock adapter to the discharge of the tote
- Measure the distance and cut 2" flex line allowing some slack.
- Use the band clamps to secure the flex line to the cam lock hose barb fittings



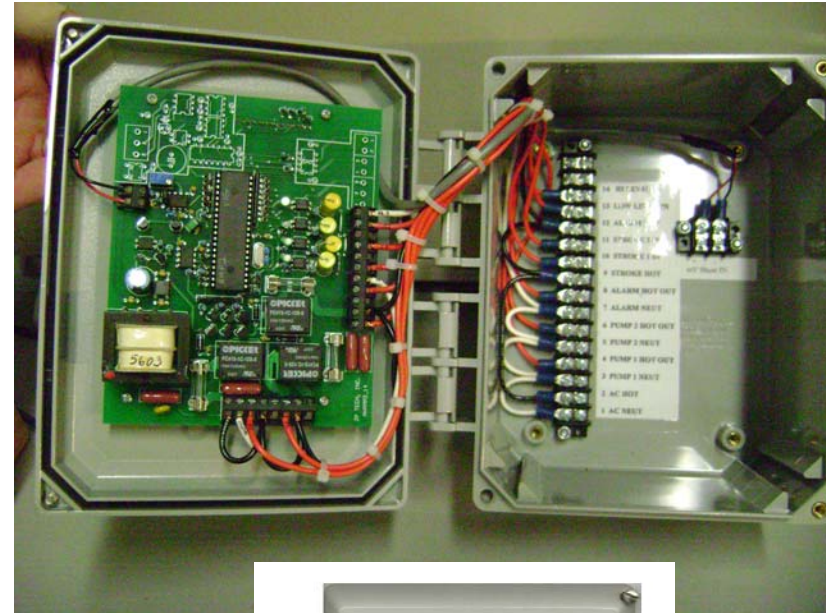


Test Pump

- Confirm discharge of paint per complete pump cycle
- Measure time required to add required # of strokes

Amp Hour Controller

- Input from rectifier shunt
- 110 VAC power input
- Output to control pump via air solenoid valve
- Input from pump to count strokes via magnetic proximity sensor





Amp-Hr Controller

- Mount it at eye level
- Requires 110 V AC power input
- 110 AC voltage is also used to control operation of the pumps via solenoid valve(s) via wire from the solenoid valve(s) to the terminal strip
- Wire the magnetic proximity switch(s) to the terminal strip



Alt Amp Hr Calculation

- What is typical SF of ware per hour?
 - What is the annual production?
 - How many days per year?
 - How many hours per day?
- What is theoretical volume of paint at required film thickness?
 - How many SF will one gallon cover at 1 mil?
 - How many amp hours are used to coat 1 gal of paint?
- What is discharge of piston pump?
 - How many pump cycles are required?
 - At a given supply air pressure, what is the elapsed time to deliver all the strokes?

Replenishment Paint Feeder Worksheet and Data Form			
Customer:			
City:		Paint Code/Resin:	xxxxx
E-coat Line: E-coat		Paint Code/Paste:	xxxxx
Date:			
Production Data		Units	Units
Annual Coated Surface Area:	4,400,000 SF	Estimated Coating Rate:	1250.00 SF/Hr
Annual Production Days:	220 Days/Yr		
Daily Hours of Operation:	16 Hrs/Day		
Paint Coverage Data @ 1.0 mil Thickness			
Estimated Volume/SF:	626 Gal/SF	Estimated Hourly Paint Vol	2.00 Gal/Hr
Amp-hrs/Gal of Feed:	13.76	Est Amp hour per 60 minutes:	27.48 Amp-hr/Hr
Replenishment Paint Feeder Pump Data			
		in ³ /cycle	Gal/Cycle
ARO #NM2304B-11-311:		8.2	0.035498
# Pump cycles to equal Cell #17:	56.25147		
Amp-Hr Meter Input Data			
Shunt size:	mV at Max amps		
Max Amps:	Amps (out from rectifier)		
Amp-hour trigger:	27 Amp-hrs (enter interger values only)		
Reduce the Theoretical # of Pump Cycles by 5% so not too much is added.			
This will partially compenstate for the fewer # of amp hours since we round down.			
95% of # Cycles	54 # Pump cycles (i.e. discharge 'Strokes') rounding up		



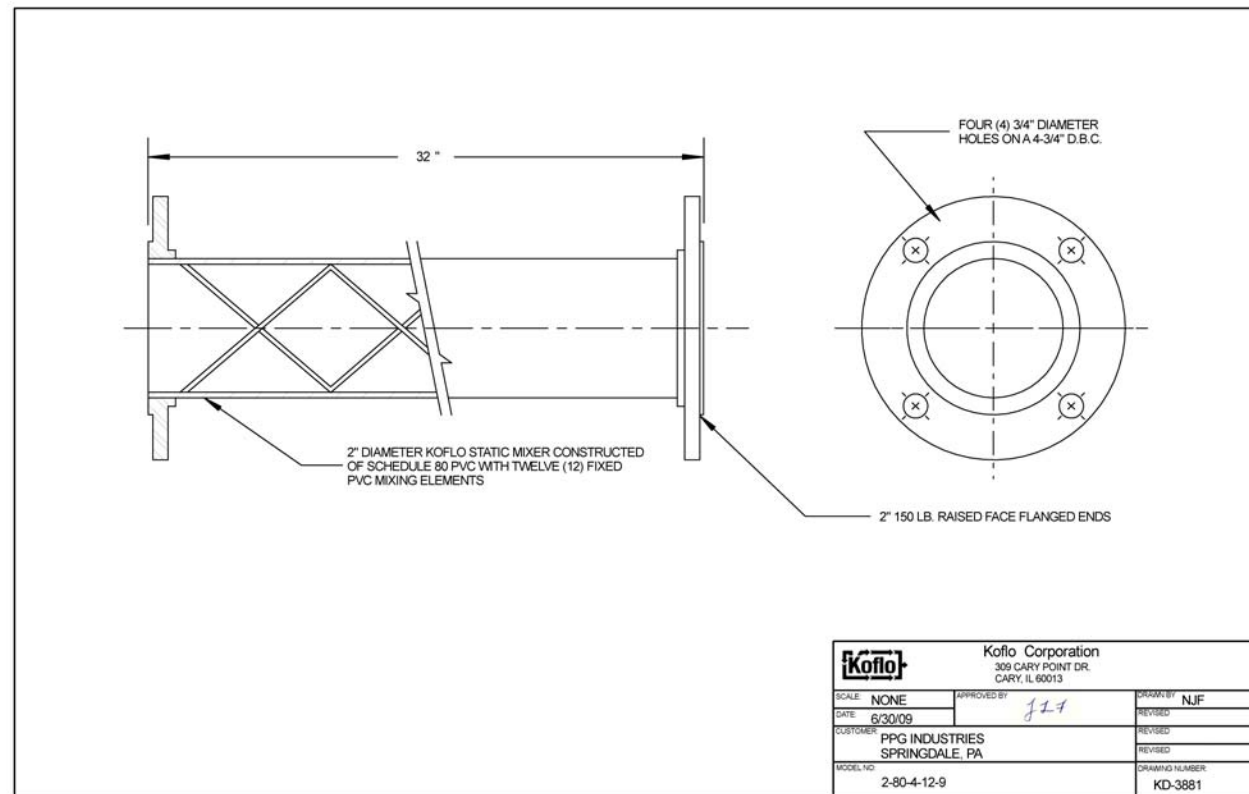
Amp-hr Controller Set-up

- Shunt size and maximum amps of each rectifier
- # Amp hours where paint will be added
- # Strokes (i.e # of pump cycles required)
- Enter time required to add the necessary # of strokes (this is used by the controller if the stroke count sensor fails)



Static Mixer

- 2" pipe size
- Limit flow rate through static mixer so delta P does not exceed 4 or 5 psi





Not Included

- Wiring, conduit, fittings of Amp hour controller and air solenoid valves
- Air supply lines to air motor
- Floor mount if wall mount is not suitable
- Suction piping from tote
- Discharge piping from pump to side stream piping
- 2" side stream piping, valves, check valves, pressure gauges, fittings, etc



Start up

- Review paint feeder worksheet with your paint company & UFS
- Verify volume discharge per stroke
- Confirm programming of Amp Hour controller
 - Tell controller the size of the shunt (i.e. milliVolts at max amps) & max amps
 - Input the number of strokes required for the # amp hours desired (the fewer the # amp hours desired the more often the pump will operate)
- Measure the time required for the pump to operate the requested # of strokes
 - Input this into the Amp Hour controller as a fail safe in the event the stroke count suffers a sensor failure and pump is then controlled on a time basis
- Measure %NV twice a shift for first week of operation and verify the # strokes and adjust as required.
- Use a portable flow meter to verify 25 gpm in the side stream and mark the pressure gauges for normal operation



Maintenance

- Air operated pumps have moving parts, so inspect & be prepared to replace per manufacturer's PM recommendations
 - Air motor replacement parts kit included
 - Pump end replacement parts kit included
- Calibrate pressure gauges in the side stream and verify flow once a year with portable flow meter