

XM Plural-Component Sprayers

312359D

ENG

For spraying two-component epoxy and urethane protective coatings in hazardous and non-hazardous locations.

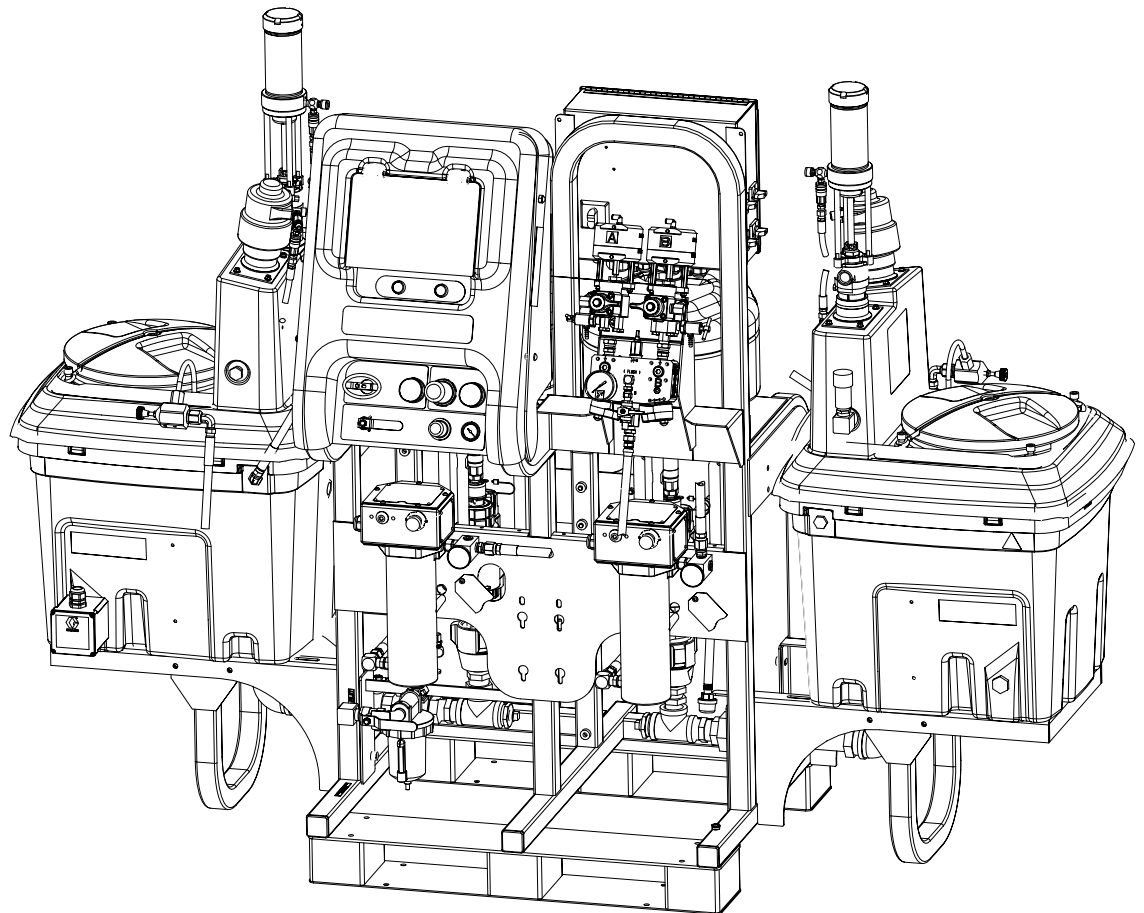
For professional use only.



Important Safety Instructions

Read all warnings and instructions in this manual. Save these instructions.

See page 7 for model information and agency approvals.
See page 81 for maximum working pressure.



HO03

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Related Manuals





Manuals are available at www.graco.com.

Component Manuals in U.S. English:





Manual	Description
313289	XM Plural-Component Sprayers Repair-Parts
313292	XM Plural-Component OEM Sprayers Instructions-Parts
311762	Xtreme® Displacement Pumps Instructions-Parts
311238	NXT™ Air Motor Instructions-Parts
312747	Double Wall Hopper Kit Instructions-Parts
309524	Viscon® HP Heater Instructions-Parts
312145	XTR™ 5 and XTR™ 7 Spray Guns Instructions-Parts
312769	Feed Pump and Agitator Kits Instructions-Parts
312794	Merkur® Pump Assembly Instructions-Parts
406699	7-Gallon Hopper Installation Kit Instructions-Parts
406739	Desiccant Kit Instructions-Parts
406690	Caster Kit Instructions-Parts
406691	Hose Rack Kit Instructions-Parts
406740	Level Sensor Adapter Kit Instructions-Parts
313258	Electric Heated Hose Power Supply Kit Instructions-Parts
313259	Hopper or Hose Heat Circulation Kit Instructions-Parts
312770	Lower Strainer and Valve Kit Instructions-Parts
312749	XM Mix Manifold Kit Instructions-Parts
313293	Alternator Conversion Kits Instructions-Parts
313342	Dosing Valve Repair Kit Instructions-Parts
313343	High Flow Severe Duty Shutoff Check Valve Repair Kit Instructions-Parts

Warnings





The following warnings are for the setup, use, grounding, maintenance, and repair of this equipment. The exclamation point symbol alerts you to a general warning and the hazard symbol refers to procedure-specific risk. Refer back to these warnings. Additional, product-specific warnings may be found throughout the body of this manual where applicable.

 WARNING	
	<p>FIRE AND EXPLOSION HAZARD</p> <p>Flammable fumes, such as solvent and paint fumes, in work area can ignite or explode. To help prevent fire and explosion:</p> <ul style="list-style-type: none"> • Use equipment only in well ventilated area. • Eliminate all ignition sources; such as pilot lights, cigarettes, portable electric lamps, and plastic drop cloths (potential static arc). • Keep work area free of debris, including solvent, rags and gasoline. • Do not plug or unplug power cords, or turn power or light switches on or off when flammable fumes are present. • Ground all equipment in the work area. See Grounding instructions. • Use only grounded hoses. • Hold gun firmly to side of grounded pail when triggering into pail. • If there is static sparking or you feel a shock, stop operation immediately. Do not use equipment until you identify and correct the problem. • Keep a working fire extinguisher in the work area. • Do not connect USB device in explosive atmospheres.
	<p>SPECIAL CONDITIONS FOR SAFE USE</p> <ul style="list-style-type: none"> • To prevent the risk of electrostatic sparking, the equipment's non-metallic parts must be cleaned with only a damp cloth. • Refer to the Viscon HP Heater manual for special conditions for safe use.
	<p>ELECTRIC SHOCK HAZARD</p> <p>Improper grounding, setup, or usage of the system can cause electric shock.</p> <ul style="list-style-type: none"> • Turn off and disconnect power at main switch before disconnecting any cables and before servicing equipment. • Connect only to grounded power source. • All electrical wiring must be done by a qualified electrician and comply with all local codes and regulations.





! WARNING

	<p>INTRINSIC SAFETY</p> <p>Intrinsically safe equipment that is installed improperly or connected to non-intrinsically safe equipment will create a hazardous condition and can cause fire, explosion, or electric shock. Follow local regulations and the following safety requirements.</p> <ul style="list-style-type: none"> Only models with model number XM_D__ or XM_E__, and packaged models with part numbers ending in 00-13, 17-23, 27-29, 31, utilizing the air-driven alternator are approved for installation in a Hazardous (explosive atmosphere) Location - see Approvals, page 8. Only the models stated above meet all local safety fire codes including NFPA 33, NEC 500 and 516, and OSHA 1910.107. To help prevent fire and explosion: <ul style="list-style-type: none"> Do not install equipment approved only for a non-hazardous location in a hazardous location. See model ID label for intrinsic safety rating of your model. Do not substitute system components as this may impair intrinsic safety. Equipment that comes in contact with the intrinsically safe terminals must be rated for Intrinsic Safety. This includes DC voltage meters, ohmmeters, cables, and connections. Remove the unit from the hazardous area when troubleshooting. Do not connect, download, or remove USB device unless unit is removed from the hazardous (explosive atmosphere) location. If explosion-proof heaters are used, ensure wiring, wiring connections, switches, and electrical distribution panel all meet flame-proof (explosion-proof) requirements.
	<p>SKIN INJECTION HAZARD</p> <p>High-pressure fluid from gun, hose leaks, or ruptured components will pierce skin. This may look like just a cut, but it is a serious injury that can result in amputation. Get immediate surgical treatment.</p> <ul style="list-style-type: none"> Do not point gun at anyone or at any part of the body. Do not put your hand over the spray tip. Do not stop or deflect leaks with your hand, body, glove, or rag. Do not spray without tip guard and trigger guard installed. Engage trigger lock when not spraying. Follow Pressure Relief Procedure in this manual, when you stop spraying and before cleaning, checking, or servicing equipment.
	<p>PRESSURIZED EQUIPMENT HAZARD</p> <p>Fluid from the gun/dispense valve, leaks, or ruptured components can splash in the eyes or on skin and cause serious injury.</p> <ul style="list-style-type: none"> Follow Pressure Relief Procedure in this manual, when you stop spraying and before cleaning, checking, or servicing equipment. Tighten all fluid connections before operating the equipment. Check hoses, tubes, and couplings daily. Replace worn or damaged parts immediately.
	<p>MOVING PARTS HAZARD</p> <p>Moving parts can pinch or amputate fingers and other body parts.</p> <ul style="list-style-type: none"> Keep clear of moving parts. Do not operate equipment with protective guards or covers removed. Pressurized equipment can start without warning. Before checking, moving, or servicing equipment, follow the Pressure Relief Procedure in this manual. Disconnect power or air supply.

! WARNING

	<p>EQUIPMENT MISUSE HAZARD</p> <p>Misuse can cause death or serious injury.</p> <ul style="list-style-type: none"> • Do not operate the unit when fatigued or under the influence of drugs or alcohol. • Do not exceed the maximum working pressure or temperature rating of the lowest rated system component. See Technical Data in all equipment manuals. • Use fluids and solvents that are compatible with equipment wetted parts. See Technical Data in all equipment manuals. Read fluid and solvent manufacturer's warnings. For complete information about your material, request MSDS forms from distributor or retailer. • Check equipment daily. Repair or replace worn or damaged parts immediately with genuine manufacturer's replacement parts only. • Do not alter or modify equipment. • Use equipment only for its intended purpose. Call your distributor for information. • Route hoses and cables away from traffic areas, sharp edges, moving parts, and hot surfaces. • Do not kink or over bend hoses or use hoses to pull equipment. • Keep children and animals away from work area. • Comply with all applicable safety regulations.
	<p>TOXIC FLUID OR FUMES HAZARD</p> <p>Toxic fluids or fumes can cause serious injury or death if splashed in the eyes or on skin, inhaled, or swallowed.</p> <ul style="list-style-type: none"> • Read MSDS's to know the specific hazards of the fluids you are using. • Store hazardous fluid in approved containers, and dispose of it according to applicable guidelines. • Always wear impervious gloves when spraying or cleaning equipment.
	<p>BURN HAZARD</p> <p>Equipment surfaces and fluid that's heated can become very hot during operation. To avoid severe burns, do not touch hot fluid or equipment. Wait until equipment/fluid has cooled completely.</p>
	<p>PERSONAL PROTECTIVE EQUIPMENT</p> <p>You must wear appropriate protective equipment when operating, servicing, or when in the operating area of the equipment to help protect you from serious injury, including eye injury, inhalation of toxic fumes, burns, and hearing loss. This equipment includes but is not limited to:</p> <ul style="list-style-type: none"> • Protective eyewear • Clothing and respirator as recommended by the fluid and solvent manufacturer • Gloves • Hearing protection

Models

						
XM sprayers are not approved for use in hazardous locations unless the base model, all accessories, all kits, and all wiring meet local, state, and national codes.						

Check the identification plate (ID) for the 6-digit part number of the sprayer. Use the following matrix to define the construction of the sprayer, based on the six digits. For example, Part **XM1A00** represents an XM Plural-Component sprayer (**XM**); 5200 psi pump set with pump filters (**1**); wall power supply, no heaters, no junction box, and is not approved for hazardous areas (**A**); with no additional kits (**00**).

NOTE:

Some configurations in the following matrix cannot be built. See the Product Selection Guide for available systems. If option(s) for third, fourth, fifth, and sixth digits is blank, the option(s) is not included with that particular digit.

To order replacement parts, see **Parts** section the XM Plural-Component Sprayer Repair-Parts manual 313289. The digits in the matrix do not correspond to the Ref. Nos. in the Parts drawings and lists.

XM	1				A						00
First and Second Digits	Third Digit				Fourth Digit						Fifth and Sixth Digits
	System Choice (See Table 1 for lower models)				Kit Choice						Additional Kit
		Pump Set (hose/gun)	Pump Filters	Remote Manifold		Control Box	Fluid Heaters	Junction Box	Location Category	Approvals (see page 8 for approvals)	See Table 2 for selections
XM (plural component sprayer mounted on a frame)	1	5200 psi	✓		A	Wall Power Supply			NE	CE, FM, FMc	
	2	5200 psi			B	Wall Power Supply	✓	✓	NE	CE, FM, FMc	
	3	6300 psi	✓		D	IS/ Alternator			EH	CE, FM, FMc, Ex	
	4	6300 psi			E	IS/ Alternator	✓		EH	CE, FM, FMc, Ex	
	5	5200 psi	✓	✓							
	6	5200 psi		✓							
	7	6300 psi	✓	✓							
	8	6300 psi		✓							

Location Category Key:

NE Not for use in explosive atmospheres.

EH For use in explosive atmospheres and hazardous locations.

Approvals:



Intrinsically safe for Class I, Div 1, Group D, T2
Class I, Division 1, Group D, T2
Ta = 0°C to 54°C



FM09ATEX0015X
II 2 G
Ex d ia px IIA T2 Tamb = 0°C to 54°C

See Special Conditions for Safe Use in **Warnings**, page 4.

Table 1: Lower Models and Corresponding Identification Codes

Code	System Pressure (MPa, bar)	Pump Filters	A Lower (see manual 311762)	B Lower (see manual 311762)
1 or 5	5200 psi (35, 350)	✓	L250C4	L220C4
2 or 6	5200 psi (35, 350)		L250C3	L220C3
3 or 7	6300 psi (49, 490)	✓	L180C4	L145C4
4 or 8	6300 psi (49, 490)		L180C3	L145C3

Table 2: Additional Kits - Identification Code/Part No. Index

	20 Gal. Hopper Kit	Hopper Heater Kit 240V	Hopper Fluid Inlet Kit	Hopper Universal Mount Kit	Twistork Agitator Kit	T2 Pump Feed Kit (on hopper)	5:1 Pump Feed Kit (on hopper)	7 Gal. Hopper and Bracket Kit	Drum Feed Kit (Dual T2 and Agitator)	Drum Feed Kit (Dual 5:1 and Agitator)	Heated Hopper/ Hose Circulati on Kit
00											
11	1		1	1	1			1			
13	1			1	1		1	1			
14	1	1	1	1	1			1			
15	1	1		1	1	1		1			
16	1	1		1	1		1	1			
17	1		1	1	1			1			1
19	1			1	1		1	1			1
21	2		2	2	2						
23	2			2	2		2				
24	2	2	2	2	2						
25	2	2		2	2	2					
26	2	2		2	2		2				
27	2		2	2	2						1
29	2			2	2		2				1
30									2		
31										2	

NOTE:

See **Accessories and Kits**, page 57, for more information.





See **Related Manuals**, page 3, for kit manual numbers.

Overview






Usage

XM plural-component sprayers can mix and spray most two-component epoxy and urethane protective coatings. When using quick-setting materials (less than 10 minute pot life) a remote mix manifold must be used.






XM plural-component sprayers are operated via the user interface, air controls, and fluid controls.

						
<p>XM sprayers are not approved for use in hazardous locations unless the base model, all accessories, all kits, and all wiring meet local, state, and national codes. See ModelsModels, page 7, to determine the appropriate location for your particular sprayer model.</p>						

Isocyanate Hazard

						
<p>Spraying materials containing isocyanates creates potentially harmful mists, vapors, and atomized particulates.</p> <p>Read material manufacturer's warnings and material MSDS to know specific hazards and precautions related to isocyanates.</p> <p>Prevent inhalation of isocyanate mists, vapors, and atomized particulates by providing sufficient ventilation in the work area. If sufficient ventilation is not available, a supplied-air respirator is required for everyone in the work area.</p> <p>To prevent contact with isocyanates, appropriate personal protective equipment, including chemically impermeable gloves, boots, aprons, and goggles, is also required for everyone in the work area.</p>						

Material Self-Ignition

						
<p>Some materials may become self-igniting if applied too thick. Read material manufacturer's warnings and material MSDS.</p>						

Moisture Sensitivity of Isocyanates

Isocyanates (ISO) are catalysts used in two component urethane coatings. ISO will react with moisture (such as humidity) to form small, hard, abrasive crystals, which become suspended in the fluid. Eventually a film will form on the surface and the ISO will begin to gel, increasing in viscosity. If used, this partially cured ISO will reduce performance and the life of all wetted parts.

NOTE:

The amount of film formation and rate of crystallization varies depending on the blend of ISO, the humidity, and the temperature.

To prevent exposing ISO to moisture:

- Always use a sealed container with a desiccant dryer in the vent, or a nitrogen atmosphere. **Never** store ISO in an open container.
- Use moisture-proof hoses specifically designed for ISO, such as those supplied with your system.
- Never use reclaimed solvents, which may contain moisture. Always keep solvent containers closed when not in use.
- Never use solvent on one side if it has been contaminated from the other side.
- Always park pumps when you shutdown.
- Always lubricate threaded parts with Part 217374 ISO pump oil or grease when reassembling.

Components A and B

IMPORTANT!

Material suppliers can vary in how they refer to plural component materials.

Be aware that in this manual:

Component A refers to resin or major volume.

Component B refers to the hardener or minor volume.

NOTE:

This equipment doses the B component into the A component flow. An integration hose must always be used after the mix manifold and before the static mixer.

NOTE:

Follow these recommendations for setup:

- use at least a 3/8 in. (10 mm) x 25 ft. (7 m) hose as the integration hose.
- install a 24-element static mix tube after the integration hose.

Keep Components A and B Separate

NOTICE

To prevent cross-contamination of the equipment's wetted parts, **never** interchange component A (resin) and component B (hardener) parts.

Changing Materials

- When changing materials, flush the equipment multiple times to ensure it is thoroughly clean.
- Always clean the fluid inlet strainers and outlet filter after flushing, **Flush Mixed Material**, page 36.
- Check with your material manufacturer for chemical compatibility.
- Epoxies often have amines on the B (hardener) side. Polyureas often have amines on the A (resin) side.

NOTE:

If the amine will switch between the two sides, see **Flush Mixed Material**, page 36.

Location

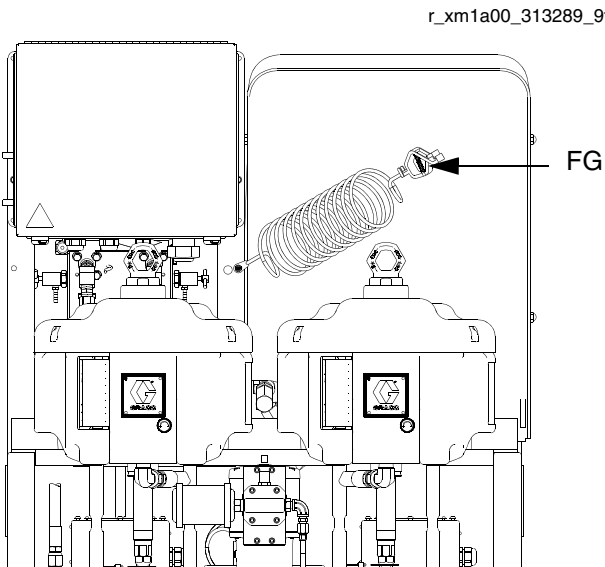
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XM sprayers are not approved for use in hazardous locations unless the base model, all accessories, all kits, and all wiring meet local, state, and national codes. See **ModelsModels**, page 7, to determine the appropriate location for your particular sprayer model.

Grounding

--	--	--	--	--	--	--

Connect the XM sprayer ground wire clamp (FG) to a true earth ground. If wall power is used to power controls or heaters, ground electrical connection properly according to local codes.



Proper Lifting of Sprayer

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Follow instructions to avoid serious injury or damage to equipment. Never lift with the hopper(s) filled.

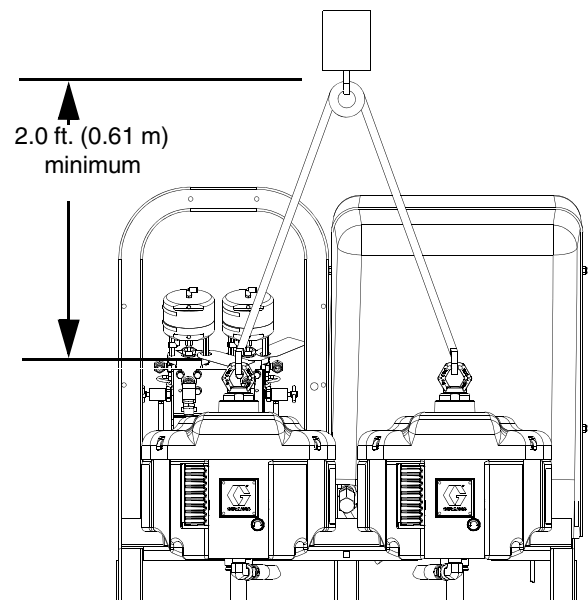
NOTICE
Drain all fluid prior to lifting sprayer.

Lift Using a Forklift

Power must be off. Sprayer can be raised and moved using a forklift. Carefully lift the sprayer; make sure it balances evenly.

Lift Using a Hoist

Sprayer can also be lifted and moved using a hoist. Connect a bridle swing, hooking an end to each of the air motor lift rings. Hook the center ring to a hoist. See the following figure. Carefully lift the sprayer; make sure it balances evenly.



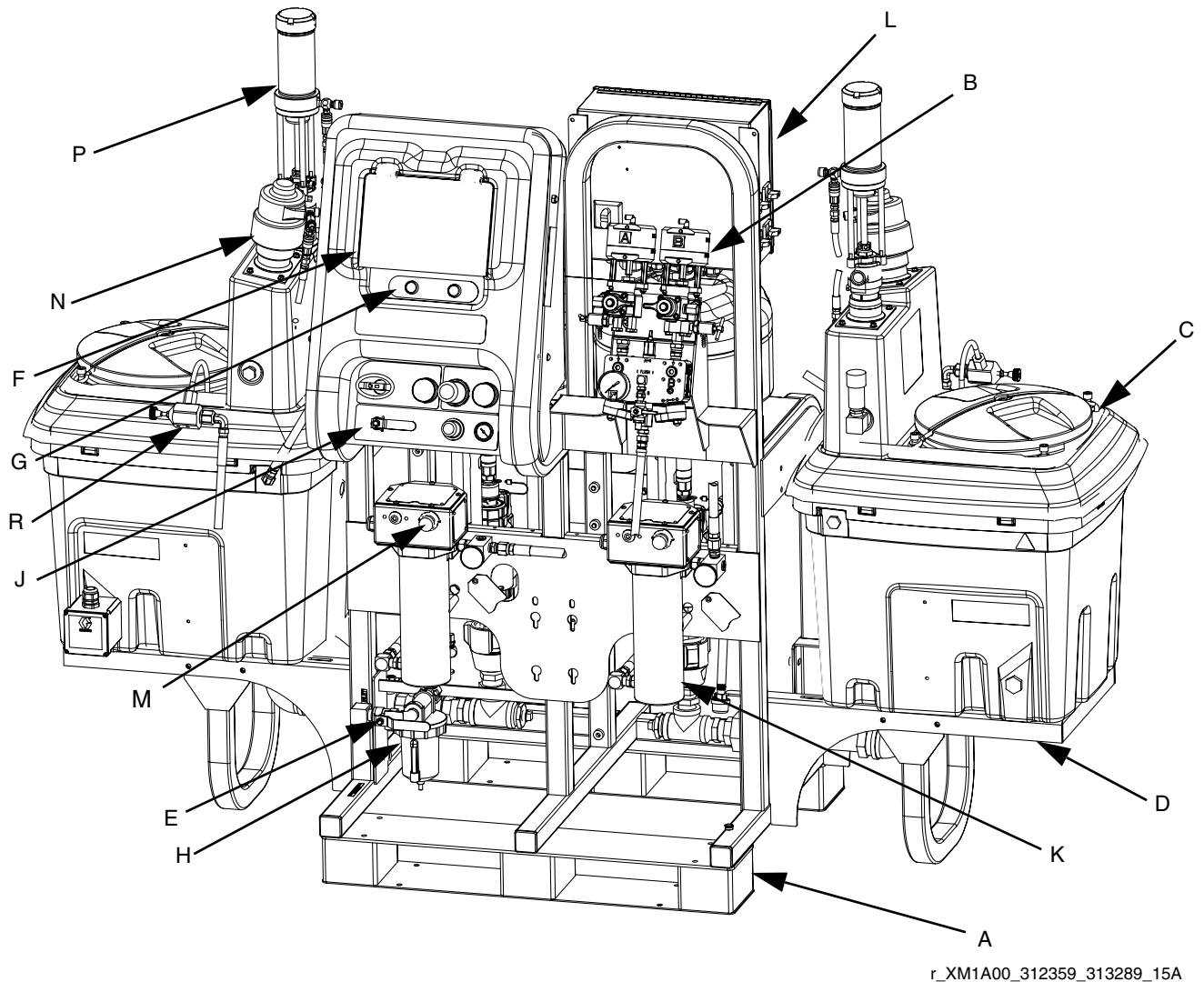
Initial System Setup

Complete the following steps in the order they are listed, as they apply to your specific system, for initial system setup.

1. Check your shipment for accuracy. Ensure you have received everything you ordered. See **Component Identification**, page 13, to familiarize yourself with typical system components.
2. Mount caster kit, if ordered. See manual 406690 for instructions.
3. Mount hopper brackets, if ordered. See manual 312747 for instructions.
4. Loosely mount hoppers, if ordered, on brackets. See manual 312747 for instructions.
5. Connect bottom hopper outlet if using a gravity feed pump. See manual 312747 for instructions.
6. Tighten hopper mounting bolts. See manual 312747 for instructions.
7. Mount and connect agitator(s) and feed pump(s), if ordered. See manual 312769 for instructions.
8. Mount and connect hopper immersion heater kit, if ordered. See manual 312747 for instructions.
9. Connect recirculation hose, restrictor valve (including knob and nipple), and recirculation tube. Place in hopper or drum. See manual 312747 for instructions.
10. Replace USB label (front of control panel) with correct language version, if needed.
11. Replace Alarms Codes label (under fluid control valves) with correct language version, if needed.
12. Install hopper/hose heated circulation kit, if ordered. See manual 313259 for instructions.
13. For non-hazardous location sprayers, connect power cord (not supplied). See **Connect Power Cord**, page 19, for instructions.
14. For non-hazardous location sprayers, connect junction box wiring for immersion or recirculation heaters. See manual 312747 for immersion heater instructions. See manual 309524 for recirculation heater instructions.
15. For hazardous location sprayers, connect explosion-proof heaters. See **Wire Sprayers with Explosion-Proof Heaters**, page 21, and manual 309524 for instructions and recommendations.
16. Connect air supply line. See **Connect Air Supply**, page 21, for instructions and recommendations.
17. Connect fluid hose assembly, including whip hose and gun. See **Connect Fluid Hose Assembly**, page 22, for instructions. Also connect remote mix manifold, if ordered. See manual 312749 for instructions.

Component Identification

Typical Setup: 20 Gallon Hoppers with Recirculation (Front View)

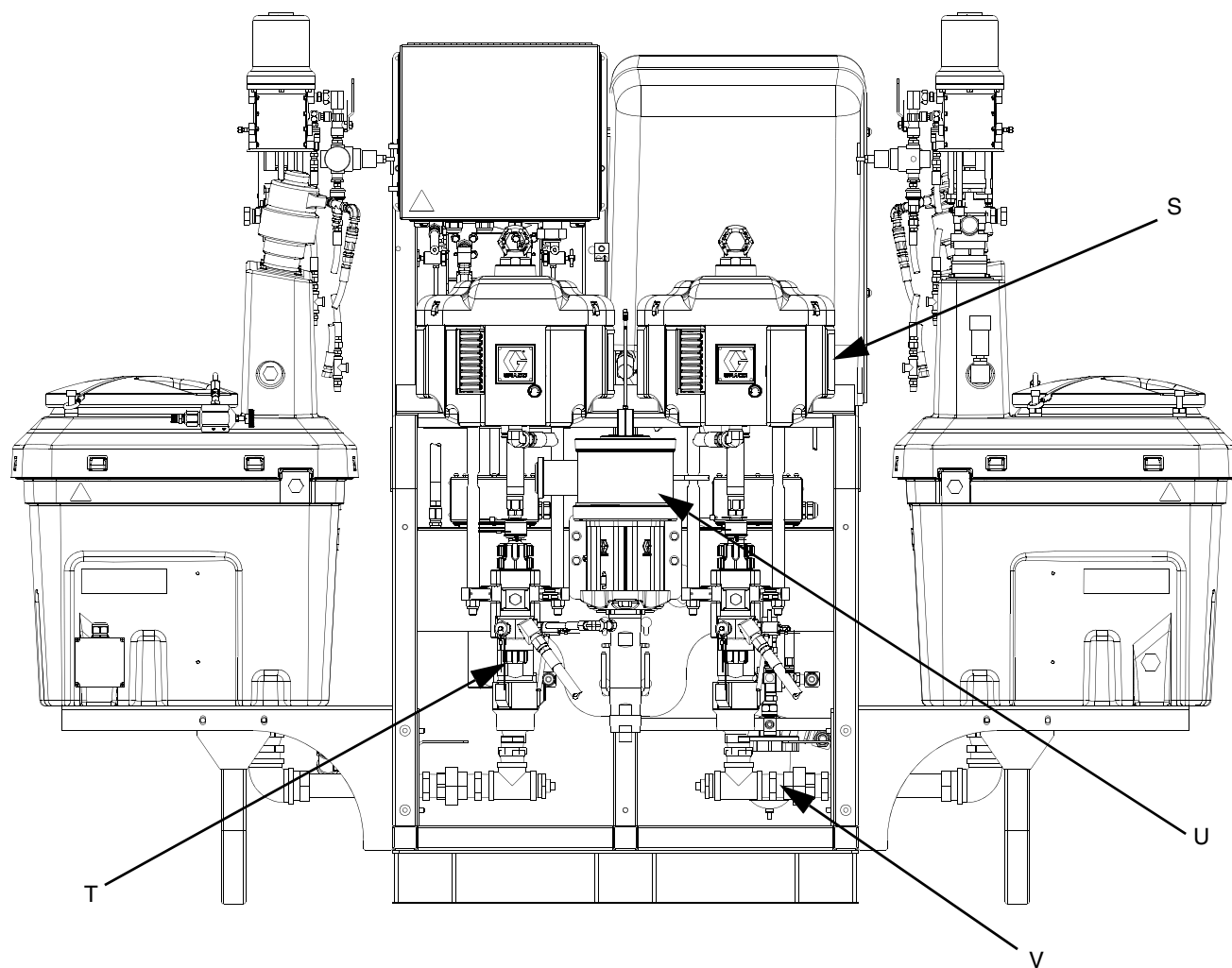


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FIG. 1: Typical Setup: 20 Gallon Hoppers with Recirculation (Front View)

- | | | | |
|---|--|---|--|
| A | Frame | G | Pump Control On and Off Buttons |
| B | Fluid Control Assembly (see Fluid Control Assembly , page 15) | H | Air Filter |
| C | 20 Gallon Hopper Assembly (see manual 312747) | J | Air Controls |
| D | 20 Gallon Hopper Bracket (see manual 312747) | K | Viscon HP Fluid Heater |
| E | Main Air Valve | L | Junction Box/Heater Controls (see Junction Box/Heater Controls , page 16) |
| F | GCA Control Display (see User Interface Display , page 18) | M | Inline Fluid Heater Control |
| | | N | Air Powered Agitator |
| | | P | Pressure Feed Pump |
| | | R | Recirculation Control Valve |

Typical Setup: 20 Gallon Hoppers with Recirculation (Back View)

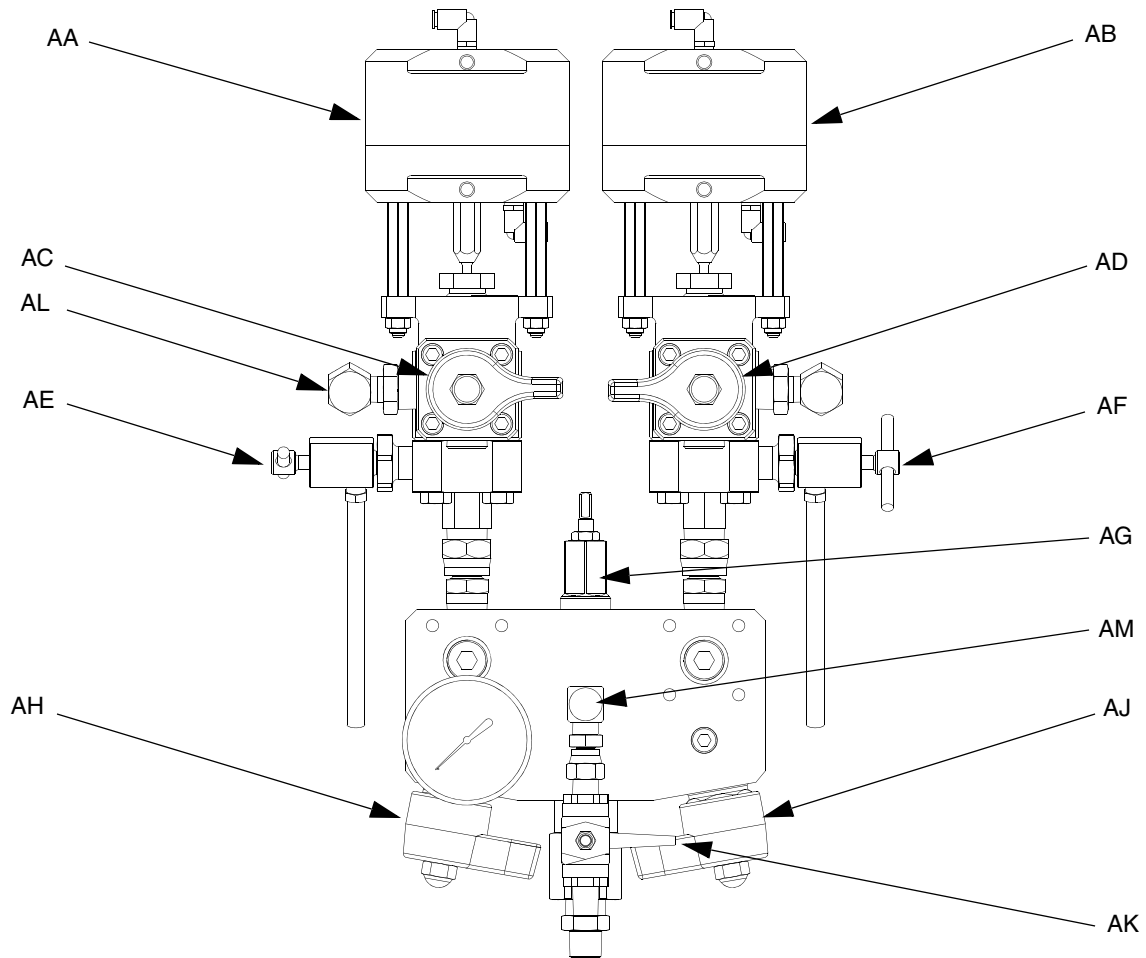


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FIG. 2: Typical Setup: 20 Gallon Hoppers with Recirculation (Back View)

- S Air Motor
- T High Pressure Fluid Pump
- U Solvent Flush Pump (Merkur® Pump)
- V Fluid Inlet Assembly

Fluid Control Assembly



r_XM1A00_312359_313289_18A

FIG. 3: Fluid Control Assembly

AA Dosing Valve A	AF Sampling Valve B
AB Dosing Valve B	AG Restriction Valve
AC Recirculation Valve A	AH Mix Manifold Shutoff / Check Valve A
AD Recirculation Valve B	AJ Mix Manifold Shutoff / Check Valve B
AE Sampling Valve A	AK Solvent Shutoff Valve
	AL Pressure Sensor
	AM Solvent Check Valve

Junction Box/Heater Controls

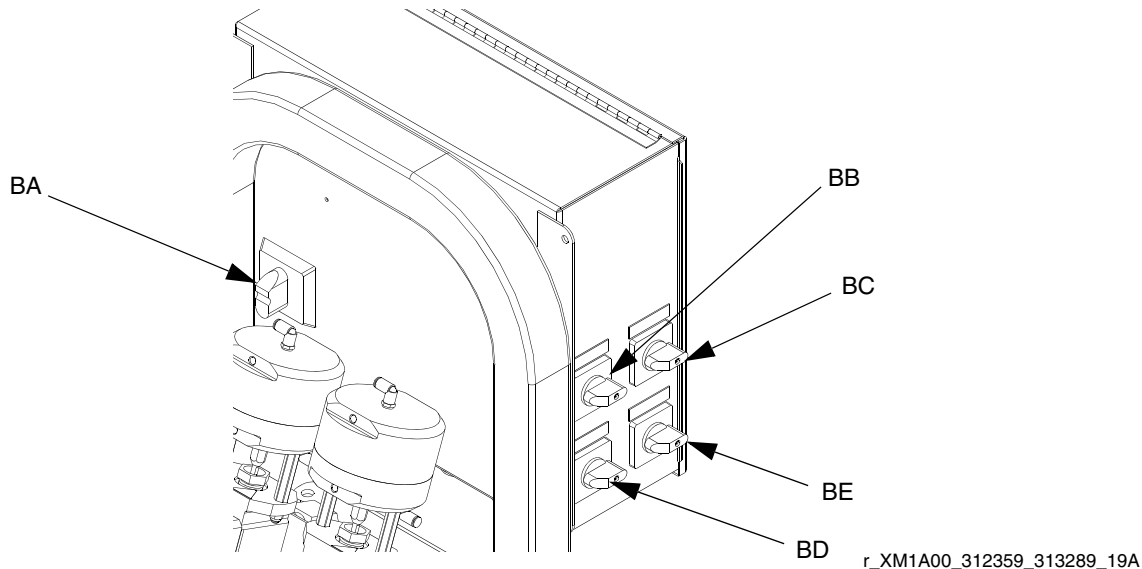


FIG. 4: Junction Box/Heater Controls

BA Main Power Disconnect Switch
 BB Fluid Heater A Control
 BC Fluid Heater B Control

BD Hopper Heater A Control
 BE Hopper Heater B Control

Air Controls

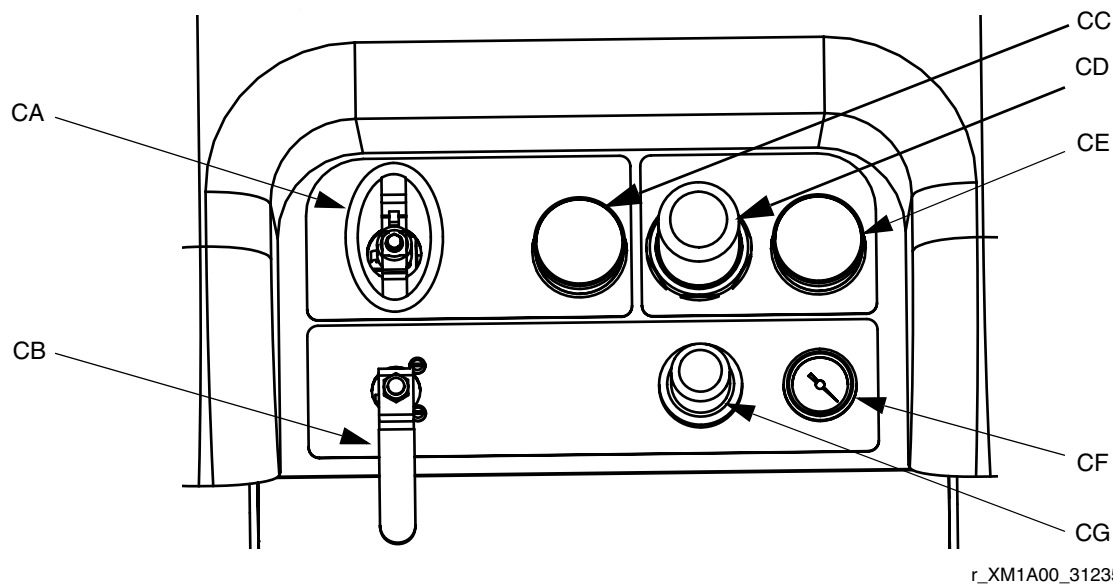


FIG. 5: Air Controls

CA Main Pump and Air On/Off Control
 CB Solvent Pump Air On/Off Control
 CC Inlet Air Pressure Gauge
 CD Main Pump Air Regulator

CE Main Pump Air Regulator Gauge
 CF Solvent Pump Air Gauge
 CG Solvent Pump Air Regulator

User Interface

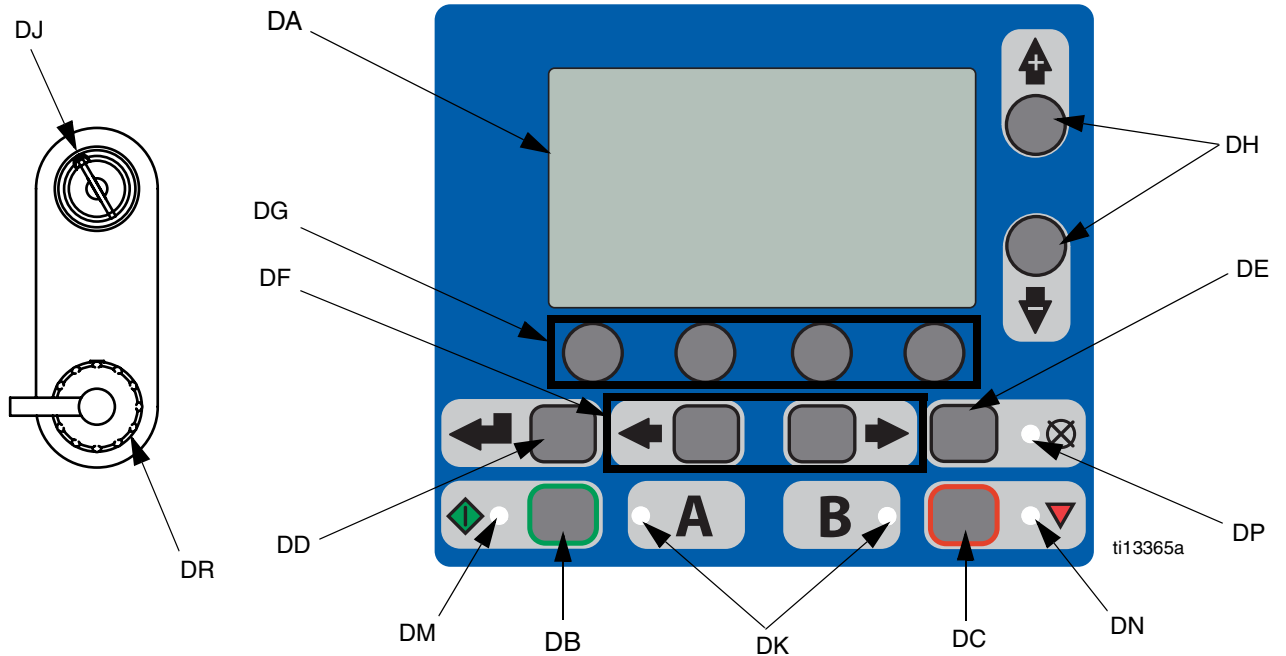


FIG. 6: User Interface

Buttons

Call out	Button	Function
DA	Display Screen	Use to view Ratio, Mode Selection, Error Conditions, Totalizers, System Information.
DB	Start	Initiates Active Run Mode function currently selected in Run Screen.
DC	Stop	Terminates Active Run Mode function currently selected.
DD	Enter	Press to open drop-down fields, selection options, and save values.
DE	Alarm Reset	Resets alarms.
DF	Left/Right	Move between screens in run or setup modes.
DG	Function	Activates mode or action represented by the icon above each of the four buttons in the LCD.
DH	Up/Down	Move between selection boxes, drop-down fields, and selectable values within Setup screens.
DJ	Setup Key Lock	Change ratio or enter Setup mode.
DR	USB Port	Connection for data download. Use only in non-hazardous locations.

LEDs

There are four types of LEDs on the display.

Call out	LED	Function
DK	Blue	Pump active <ul style="list-style-type: none"> on - pump is active; dosing valve on off - pump is not active
DM	Green	Spray mode active <ul style="list-style-type: none"> spray mode is on (active) spray mode is off (inactive)
DN	Red	Alarm <ul style="list-style-type: none"> on - alarm is present off - no alarm
DP	Yellow	Warning <ul style="list-style-type: none"> on - warning is active. Can be overridden when key is present and turned. off - no warning indicated. Ratio and setup fields are not changeable. flashing - key is present and turned. Ratio and setup fields are changeable.

User Interface Display

NOTE:

For details regarding the user interface display see **User Interface Display**, page 59.

Main Display Screen Components

The following figure calls out the navigational, status, and general informational components of each display screen.

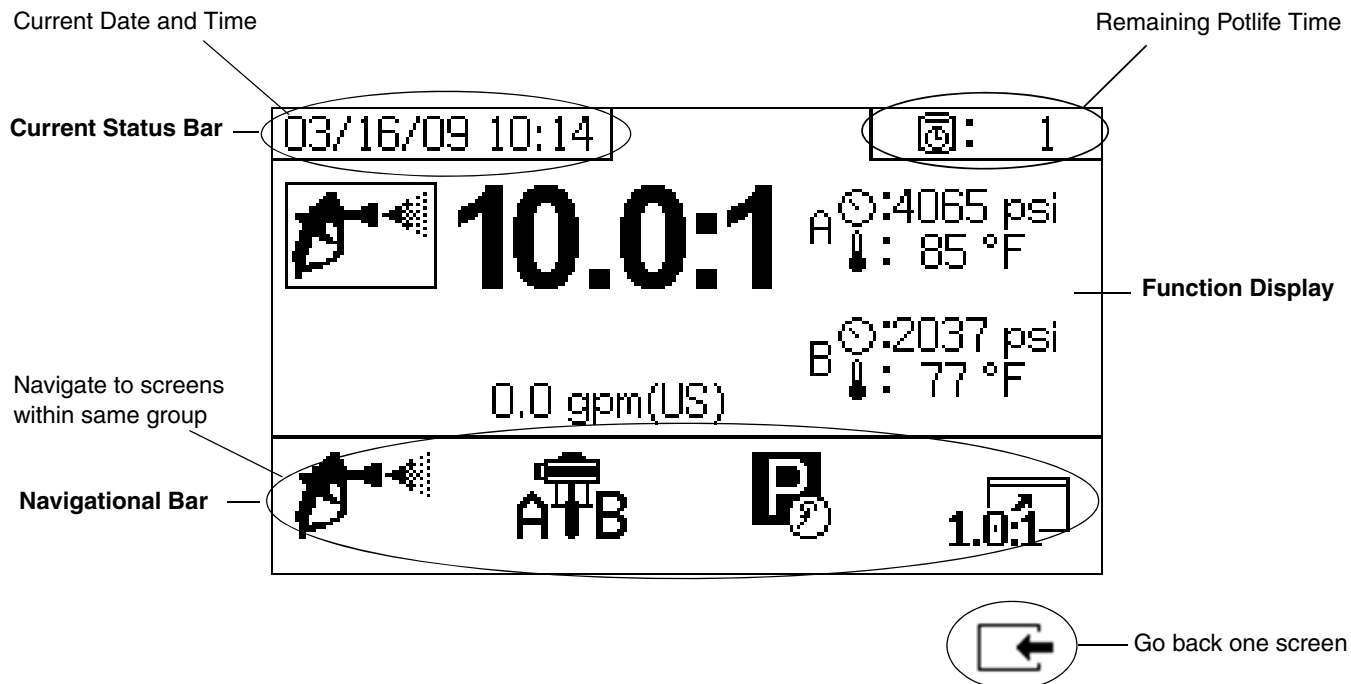


FIG. 7: Main Display Screen Components (shown with all display features enabled)

NOTICE

To prevent damage to soft key buttons, do not press the buttons with sharp objects such as pens, plastic cards, or fingernails.

Setup

Connect Power Cord

(For sprayers with heater junction boxes.
Non-hazardous location sprayers only.)



Graco does not supply heater junction box power cords. Use the following chart to determine which power cord your specific model requires.

Power Cord Requirements

Voltage	Cord Specification AWG (mm ²)
240V, 1 PH	4 (21.2) 2 wire + ground
240V, 3 PH	6 (13.3) 3 wire + ground
380V, 3 PH	6 (13.3) 4 wire + ground

NOTE:

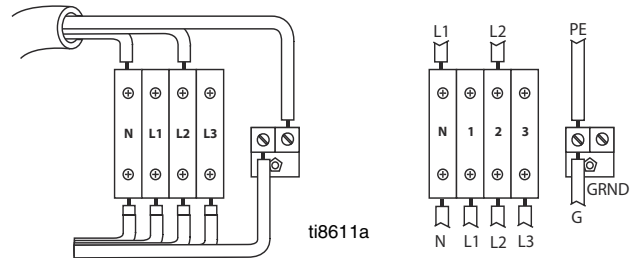
Sprayers without heaters for non-hazardous locations include a U.S. style NEMA 5-15 power cord and an IEC-320 power cord. (European and Australian adapters are also included.) These power cords are rated for 90-240 Vac, 47-63 Hz. See the XM Plural-Component Sprayers Repair-Parts manual or the XM Plural-Component OEM Sprayers Instructions-Parts manual for part numbers.

NOTE:

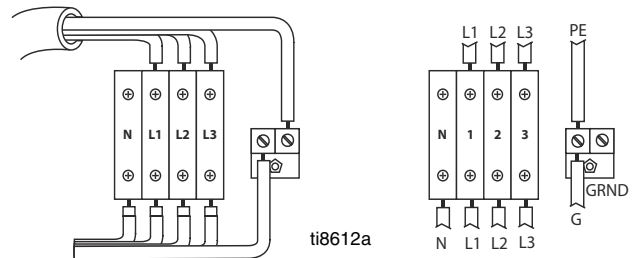
Disregard terminal numbers on disconnect switch blocks. Wire to positions shown.

1. Open junction box cover.
2. Connect electrical cord as follows.

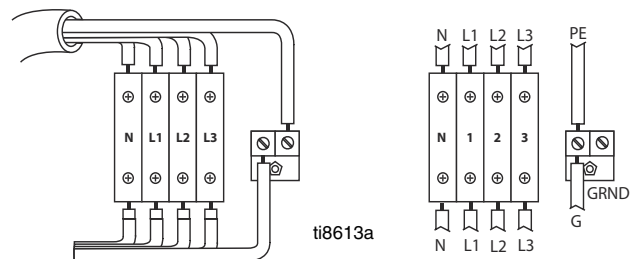
230V, 1 Phase: Use a screwdriver to connect two power leads to the top terminals N and L2 positions. Connect green to ground (GND).



230V, 3 Phase Delta: Use a screwdriver to connect three power leads to top terminals L1, L2, and L3. Connect green to ground (GND).

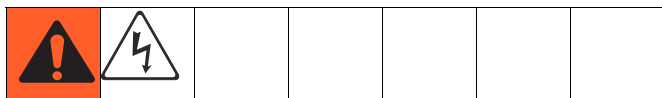


380V, 3 Phase WYE: Use a screwdriver to connect three power leads to the top terminals L1, L2, and L3. Connect neutral to N. Connect green to ground (GND).



Configure to Supply Power

(Non-hazardous location sprayers only.)



NOTE:

Disregard terminal numbers on disconnect switch blocks. Wire to positions shown.

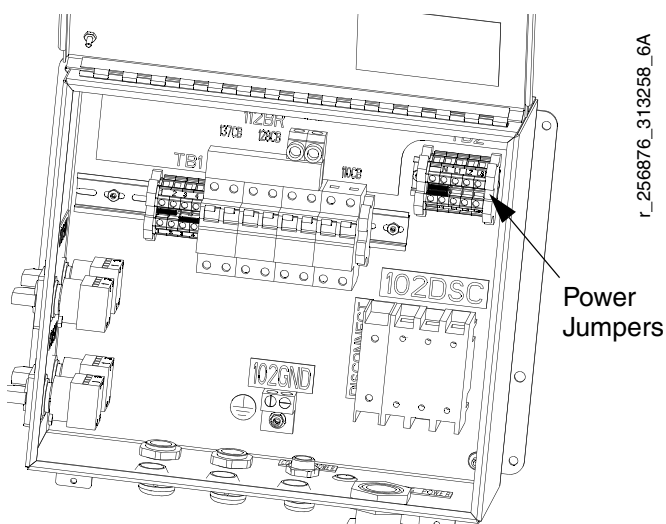
2. Use a flat-blade screwdriver to move red jumpers from storage positions to positions for your power as shown below. Push jumpers firmly into new position.

NOTE:

For 230V, 1 Phase and 230V, 3 Phase Installations, change jumper positions as shown below. Machine is shipped with jumpers in the fail-safe 380 3Ø position.

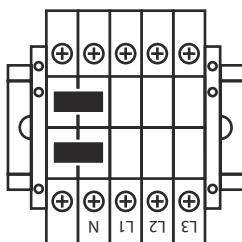
3. Close junction box cover.

1. Locate power jumpers.

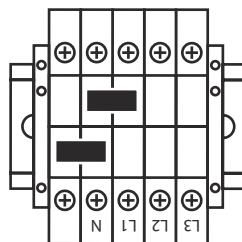


TB2

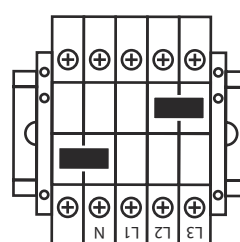
Terminal Blocks
Position red jumpers
as shown



380V 3Ø WYE
(as shipped)



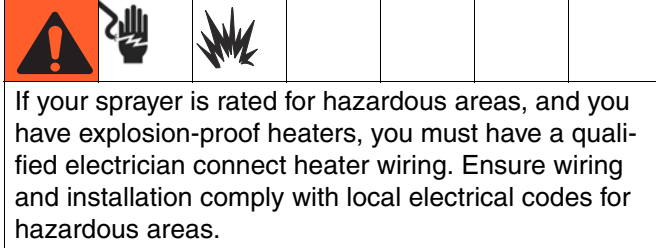
230V 3Ø Delta



230V 1Ø

Wire Sprayers with Explosion-Proof Heaters

(Hazardous location sprayers only)



Improperly installed or connected equipment will create a hazardous condition and cause fire, explosion, or electric shock. Follow local regulations.

When explosion-proof heaters are used, ensure wiring, wiring connections, switches, and electrical distribution panel all meet flame-proof (explosion-proof) requirements.

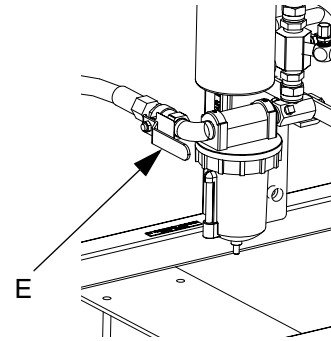
Refer to Viscon HP heater manual 309524 for electrical connection instructions and guidelines in hazardous locations.

Connect Air Supply

Connect air supply line to 3/4 npt(f) air filter inlet.

NOTE:

Use a 3/4 in. (19.1 mm) ID minimum air hose.



NOTE:

Air supply requirement: 150 psi (1.0 MPa, 10.3 bar) maximum; 50 psi (0.35 MPa, 3.5 bar) minimum (while running).

Flow volume required: 70 scfm (1.96 m³/min) minimum; 250 scfm (7.0 m³/min) maximum. Available fluid pressure and flow rate are directly related to available air volume. See **Pump Performance Charts**, page 80.

General flow volume guidelines:

- 70 scfm (1.96 m³/min) per gpm (lpm) while spraying
- 10 scfm (0.28 m³/min) added per agitator
- 10 scfm (0.28 m³/min) added per drum feed pump

NOTE:

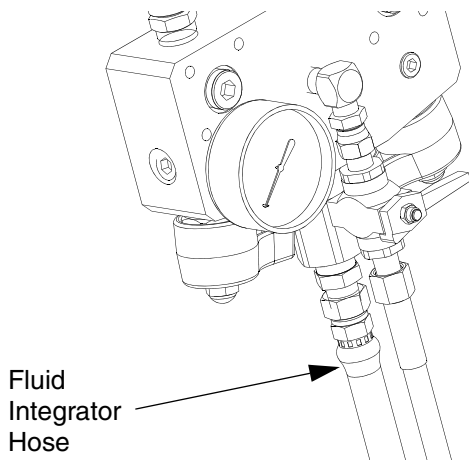
If your sprayer is for use in hazardous areas, the control box is powered by an air-driven alternator.

NOTE:

Dosing valves are operated by air. The sprayer will not operate correctly if the inlet air gauge drops below 50 psi (0.35 MPa, 3.5 bar) while spraying.

Connect Fluid Hose Assembly

1. Connect fluid hose to fluid manifold outlet. Do not install gun spray tip yet.



r_XM1A00_312359_313289_20A

NOTICE

Do not assemble static mixer directly to the fluid manifold. Install static mixer after first 25 ft. (7.5 m) of integrator hose to ensure material doses are completely integrated. Spraying poorly integrated material could require rework of parts sprayed.

2. Tighten all fittings.

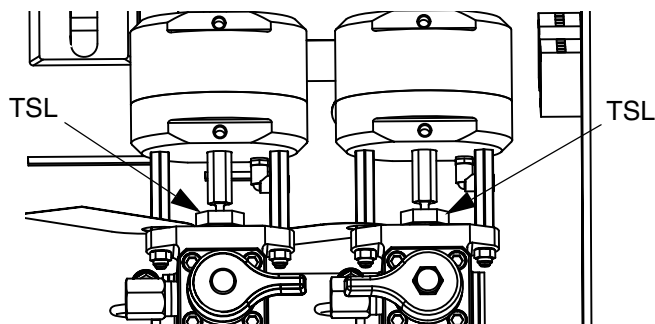
Adjust Packing Nuts

1. Fill A and B pump packing nuts with throat seal liquid (TSL) and torque to 50 ft-lbs (67.5 N•m). Follow instructions in Xtreme Lowers manual 311762.

NOTE:

After the first day of use re-torque packing nuts.

2. Fill metering valves A and B packing nuts with throat seal liquid (TSL) and tighten 1/4 turn after nut contacts packings; about 145-155 in-lbs (16-18 N•m).



NOTE:

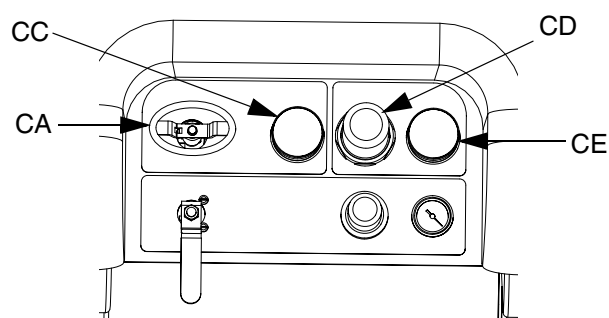
For pump and meter valves, check packing nut tightness after first hour of operation and again after 24 hours. Then check as needed, or when TSL discolors or seeps over packing nut. Also check tightness whenever sprayer is transported. Tighten packing nuts only when all fluid pressure is relieved.

Basic Operation

Power On (Alternator Power Supplied Systems)

1. Set main pump air regulator (CD) to minimum setting.
2. Open main air valve (E) and main pump and air valve (CA) to start air-powered alternator.



Main air pressure is displayed on gauge (CC). Fluid Control screen will display after five seconds.



Power On (Wall Power Supplied Systems)

Turn on main power disconnect. Fluid Control screen will display after five seconds.

Adjust Ratio and Setup

1. Turn key to right (setup position). Yellow LED will flash and the Home Setup screen will display.
2. Press  and  to change ratio.
3. When desired ratio is displayed, turn key to left. Yellow LED will turn off.
4. Change optional setup selections to desired parameters, as described in **Set System Settings (Optional)**, page 24.

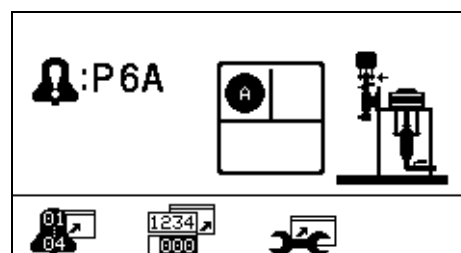
Final Setup

Perform the following steps if shutting down during setup.

1. Relieve system pressure. See **Pressure Relief Procedure**, page 34.
2. Flush and prime system. See **Prime** (page 27), **Flush Mixed Material** (page 36) and **Park Fluid Pump Rods** (page 38).
3. Check ratio accuracy. Run **Pump and Metering Test** (page 40) and **Batch Ratio Dispense Test** (page 43) to check ratio accuracy.

View Alarms

When an alarm occurs the alarm information screen automatically displays. It shows the current alarm code along with a bell icon. It also shows the alarm location with top and side views of the sprayer.





There are two levels of alarms: warnings and advisories. A bell icon indicates an alarm. A solid bell icon with an exclamation point and three audible alerts indicate a warning. And an outlined hollow bell icon and a single audible alert indicate an advisory.

Diagnose Alarms

See **Alarm Codes and Troubleshooting**, page 51, for causes and solutions to each alarm code.

Clear Alarms

Press  to clear alarms. Press  to return the run (fluid control) screen.

For more information on alarms and alarm codes, see **Alarms**, page 50.

Set System Settings (Optional)


NOTE:

For details regarding the user interface display screens see **User Interface Display**, page 59.

To set user interface parameters and USB parameters,


press  from the Home Setup screen.



Set User Interface Parameters



Press  from the potlife/hose length screen to move to the user interface parameters screen.








The following user interface parameters are configurable:

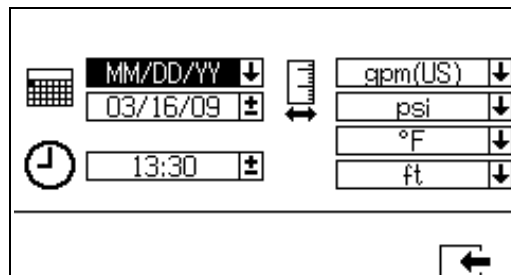
- date format
- date (factory set)
- time (factory set)
- units of measurement for:
 - fluid flow rate
 - pressure
 - temperature
 - hose length

To change the date format, press  to select the field.


Press  to open the drop down field. Press  and

 to select the preferred format. Press  again to save that date format. Follow this procedure to change the units of measurement formats as well.









To change the date and time, press  to select the field. Press  to make the field selectable. Press  and  to scroll through each digit. Press  and  to move to the next digit in the field. Press  to save the change.

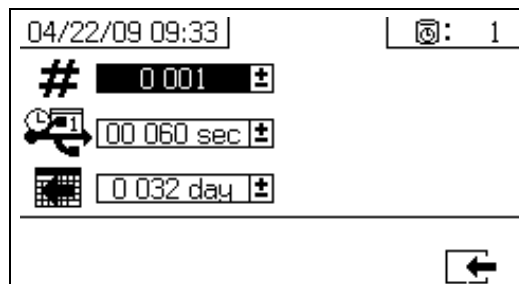


Set USB Parameters

Press  from the user interface parameters screen to move to the USB parameters screen.

To set the sprayer number, configure the number of days data will record to the USB data logs, and how often the

data will record: press  and  to move through each field. Press  to make a field selectable. Press  and  to scroll through each digit. Press  and  to move to the next digit in each field. Press  to save the change.



Set Maintenance Parameters (Optional)


NOTE:

Prior to configuring system settings, see **Enable Setup Screens**, page 64, to ensure screens shown in this section are viewable and configurable. If they are not, follow instructions in **Enable Setup Screens** to enable them.

NOTE:








For details regarding the user interface display screens see **User Interface Display**, page 59.

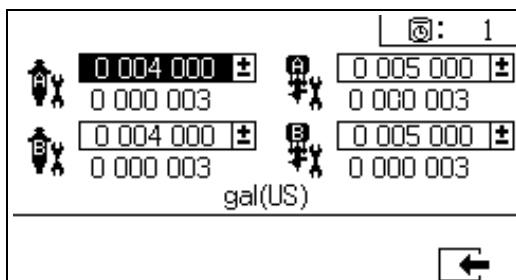
To set maintenance parameters for pumps and valves,

including maintenance schedules, press  from the Home Setup screen.

Use the first screen to set maintenance setpoint amounts for pumps and dosing valves. Use the second screen to set the maintenance schedule for changing the incoming air filter.

Set Maintenance Setpoints






To set maintenance setpoint values, press  and  to move through each field, and press  to make a field selectable. Press  to scroll through each setpoint digit. Press  and  to scroll through the optional values. Continue this process until the desired setpoint is reached. Press  to save that setpoint.

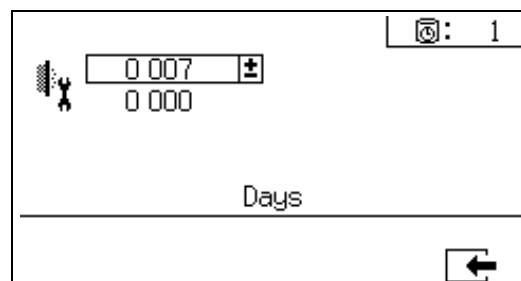


Set Maintenance Schedule

To set the number of days between changing the incoming air filter that will result in a reminder advisory, press

 to move to the Maintenance Setup 2 screen.

Press  to make the field selectable. Press  to scroll through each digit, and press  and  to scroll through the optional values. Press  to save the number of days value.





Set Sprayer Limits (Optional)

NOTE:








For details regarding the limits setup screens, see **User Limits Setup Screens**, page 66.

To set and adjust pump pressure limits and temperature limits:

1. Select  in the Enable Setup 2 screen. See **Enable Setup Screens**, page 64, for instructions.
2. From the Home Setup screen press  to jump to the limits screens.
3. Follow the instructions in **Set Pressure Limits** and **Set Temperature Limits**.


Set Pressure Limits

Use the following instructions to set pressure limits for each pump that if met will issue an advisory and/or warning.

To set pressure limits, press  and  to move through each field, and press  to make a field selectable. Press  to scroll through each pressure digit, and press  and  to scroll through the optional values. Continue this process until you reach the desired pressure limit. Press  to save.


NOTE:




The B pump pressure always runs 10-20% higher than the A pump pressure.


03/25/09 12:07		⑥: 1	
A		B	
4 000 psi ±	⊗	4 600 psi ±	
0 300 psi ±	±⬆	0 300 psi ±	
0 500 psi ±	±⬇	0 500 psi ±	
			



Set Temperature Limits


Use the following instructions to set temperature limits that if met will issue an advisory and/or warning.

Press  to move to the temperature limits screen.

To set temperature limits, press  and  to move through each field, and press  to make a field


selectable. Press  to scroll through each tempera-

ture digit, and press  and  to scroll through the optional values. Continue this process until you reach

your desired temperature limit. Press  to save the value.

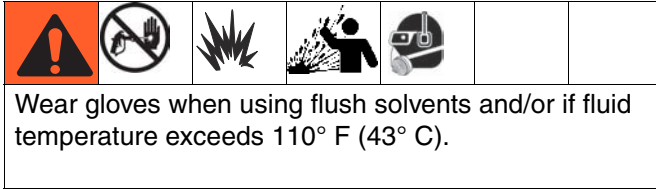
NOTE:

The allowable range for the temperature setpoint is 34° - 160°F (1° - 71°C).

03/25/09 12:09		⑥: 1	
A		B	
105 °F ±	⊗	105 °F ±	
10 °F ±	±⬆	10 °F ±	
25 °F ±	±⬇	25 °F ±	
			

Prime

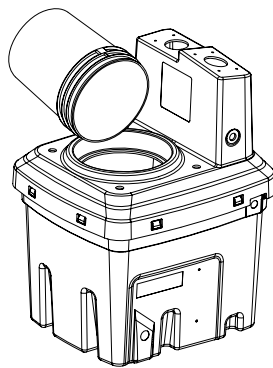
Prime A and B Fluids



NOTE:

Do not install gun spray tip yet. To avoid splashing, use the lowest pressure possible to prime.

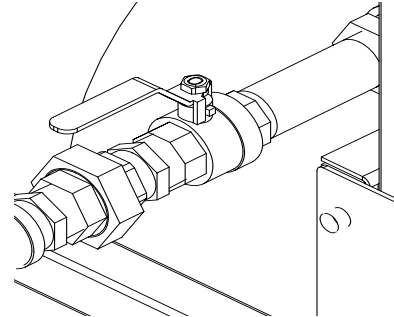
1. Condition materials prior to adding to hoppers. Ensure resin materials are thoroughly agitated, homogenous, and pourable prior to adding to hopper. Stir hardeners back into suspension prior to adding material to hopper.
2. Fill A and B reservoirs with proper materials. Fill A side with major volume of material; fill B side with minor volume of material.



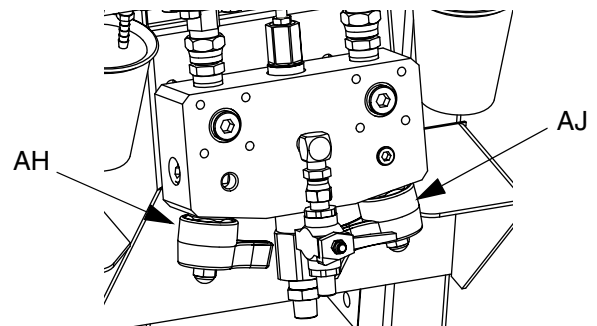
20 Gallon Hopper Shown

3. Move recirculation lines to empty containers.

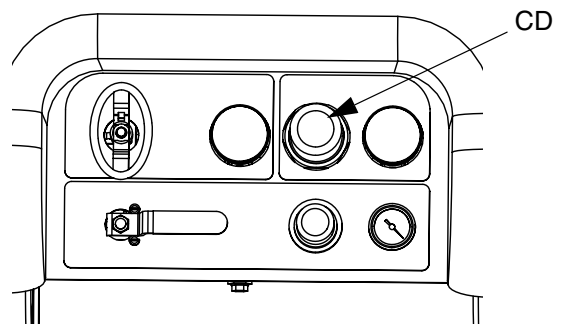
4. Open ball valves into pumps.



5. Turn mix manifold valves (AH, AJ) clockwise to close them.









6. Turn on air supply. Set main pump air regulator (CD) to 20 psi (138 kPa 1.38 bar).





7. Use manual pump run mode.

NOTE:

When run independently set to  or . Press  and  as needed to prime. Monitor containers to avoid overflow.

8. Select Pump A . Press . Slowly turn main pump air regulator (CD) clockwise to increase air pressure until pump A starts. Dispense into pail until clean fluid comes out of A. Close recirculation valve.

NOTE:

When priming or flushing pumps, it is normal to get cavitation or pump runaway alarms. Clear alarms , and press  again as necessary. These alarms prevent excessive pump speeds, which will damage pump packings.

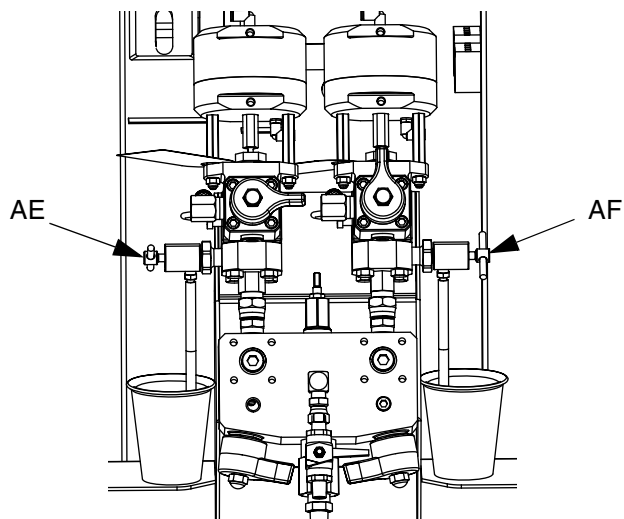
9. Move recirculation line back to reservoir.

10. Repeat for B side.

11. Dispense a small amount of each material through both sampling valves (AE, AF).

NOTE:

Open sampling valves slowly to avoid splashing.



12. Close both sampling valves (AE, AF).

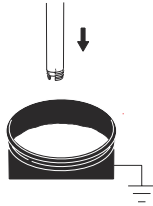
NOTE:

If a remote mix manifold is used, disconnect hoses at mix manifold and prime with material. Reconnect hoses.

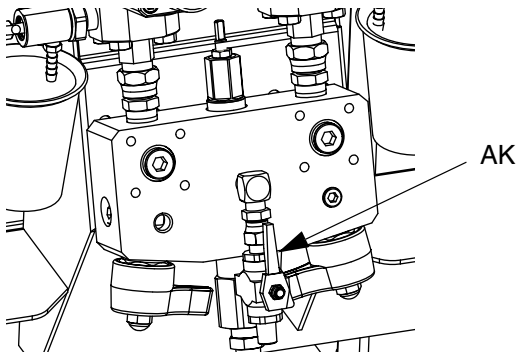
Prime Solvent Flush Pump



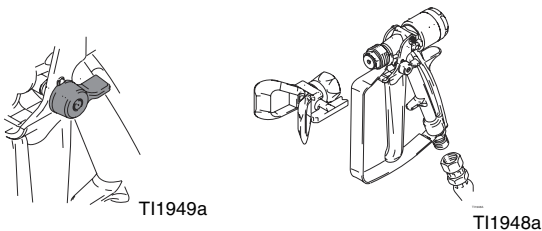
1. Connect flush pail ground wire to a metal pail of solvent.
2. Place siphon tube in the pail of solvent.



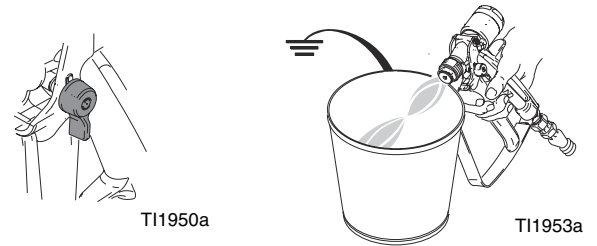
3. Open solvent flush valve (AK) on mix manifold.



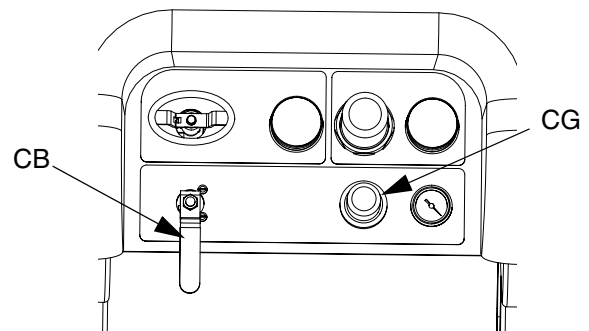
4. Ensure trigger lock is engaged. Remove spray tip.



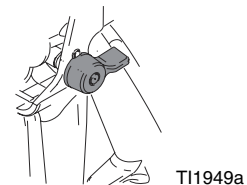
5. Disengage trigger lock and trigger gun into a grounded pail. Use a pail lid with a hole to dispense through. Seal around hole and gun with a rag to prevent splash back. Be careful to keep fingers away from front of gun.



6. Open solvent pump air valve (CB). Pull out and slowly turn solvent pump air regulator (CG) clockwise to prime solvent pump and push air out of mix hose and gun. Trigger gun until all air is purged.



7. Close solvent pump air valve (CB) and trigger gun to relieve pressure. Engage gun trigger lock.

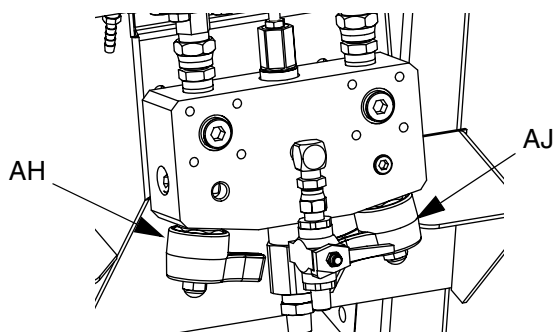


Recirculate

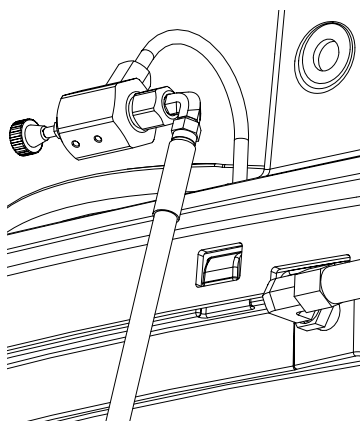
Without Heat

If using a system that does not require heat, recirculation is still required prior to spraying. Recirculation ensures that any settled fillers are mixed in, the pump lines are fully primed, and the pump check valves are operating smoothly.

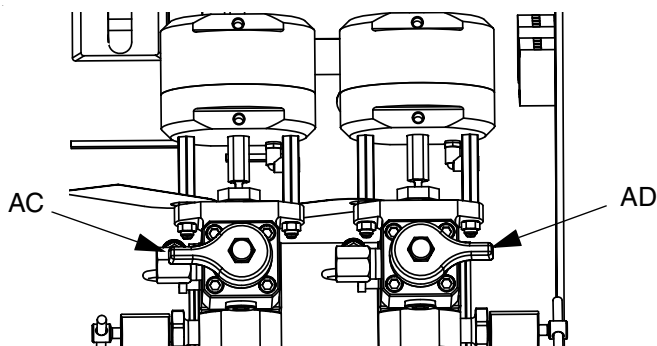
1. Follow **Prime**, page 27.
2. Close mix manifold valves (AH, AJ).



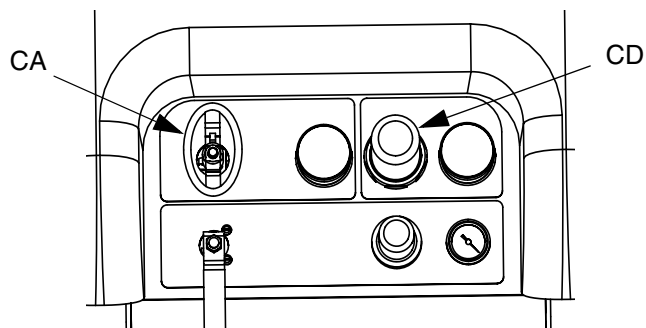
3. Ensure recirculation hoses are in the correct hoppers.



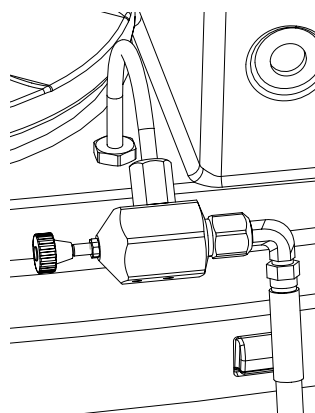
4. Open recirculation valves (AC, AD).




5. Select pumps to recirculate by pressing **ATB** to scroll through: **TA**, **TB**, or **ATB**.
6. Turn on the main air shutoff valve (CA). Use system air regulator (CD) to slowly increase the air pressure to the pumps until they start running slowly.



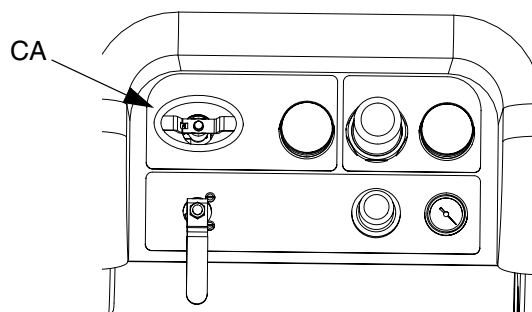
7. If the pumps are running too quickly, close the restrictor on each fluid line.



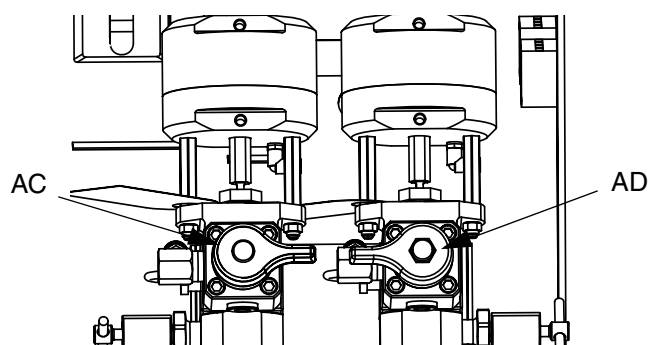
8. Run the pumps until the material has reached the desired temperature. See **Heat Fluid**, page 31.

9. Once desired temperature is reached, press .

10. Turn off the main air shutoff valve (CA).



11. Close recirculation valves (AC, AD).



12. See **Spray**, page 32.

NOTE:

If you circulate in Pump mode at pressures greater than 3000 psi (21 MPa, 210 bar), an advisory is issued and the yellow LED on the display illuminates. This is a reminder to select Spray mode prior to spraying and to circulate at a lower pressure to avoid excessive pump wear.

With Heat

Using recirculation mode when heating the material is required. Note the temperature at the top of the heater (outgoing or back to hopper). When the thermometer and display reach operating temperature, the material is ready to spray.

Heat Fluid

To heat fluid evenly throughout the system:

1. Circulate fluid at approximately 1 gpm (10-20 cycles/min.) to raise temperature of hoppers to 80-90° F (27-32° C).
2. Decrease circulation rate to approximately 0.25 gpm (5 cycles/min.) to increase the heater outlet temperature to match the spray temperature.






NOTE:

Circulating fluid too quickly without decreasing the circulation rate will increase only the hopper temperature. Similarly, circulating fluid too slowly will increase only the heater outlet temperature.

NOTE:

Agitate, recirculate, and heat material only as necessary to avoid mixing air into the fluid.

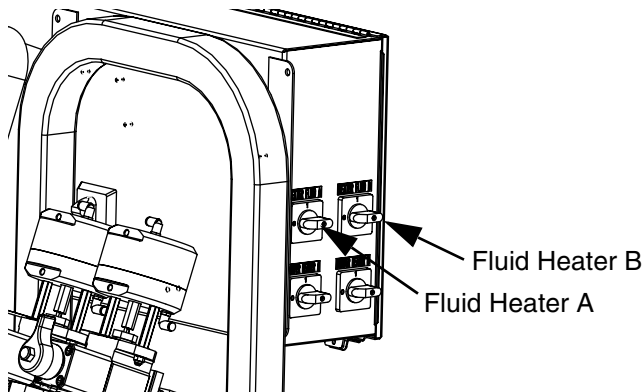
Spray

						
Wear gloves when using flush solvents and/or if fluid temperature exceeds 110° F (43° C).						

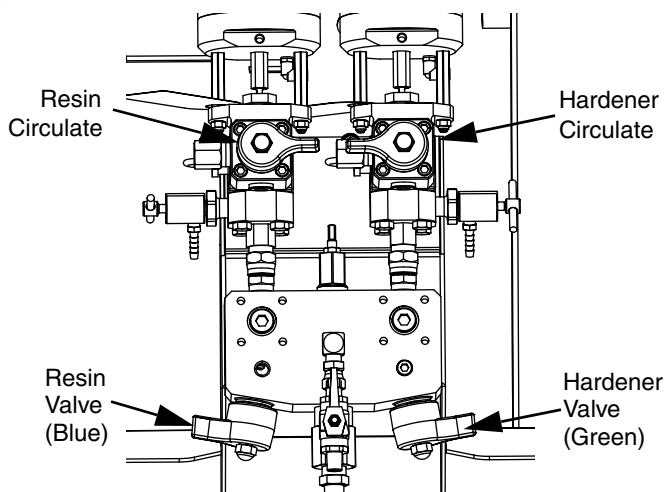
NOTE:

After the first day of spraying follow **Pressure Relief Procedure**, page 34, and then tighten throat seals on both pumps and dosing valves.

1. If heaters are used, use heater junction box to turn them on. To adjust heater temperature, refer to the Viscon HP manual for instructions, and the **Heat Fluid** section, page 31.



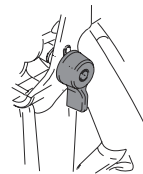
2. Close recirculation valves and mix manifold flush valve. Open mix manifold valves A (blue) and B (green).



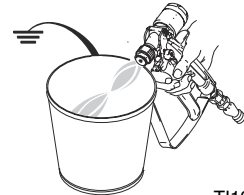
3. Adjust pump air regulator to 30 psi (0.21 MPa, 2.1 bar).

4. Select  . Press .

5. Disengage trigger lock and trigger gun into a grounded metal pail. Use a metal pail lid with a hole to dispense through to avoid splashing. Dispense flush solvent out of mix hose until a well mixed coating flows from the gun.



TI1950a



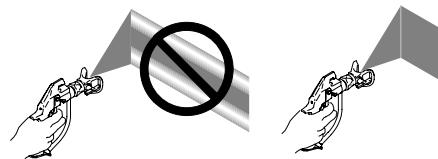
TI1953a

6. Engage trigger lock. Install tip on gun.



TI1949a

7. Adjust air regulator (CD) to the necessary spraying pressure and apply coating to a test panel. Look at ratio screen to ensure it is reading the correct ratio.



Also, look at bar graph to ensure mix manifold restriction adjustment is within optimal range. Refer to **Batch Ratio Dispense Test**, page 43 and **Adjust B Mix Manifold Restriction**, page 33.

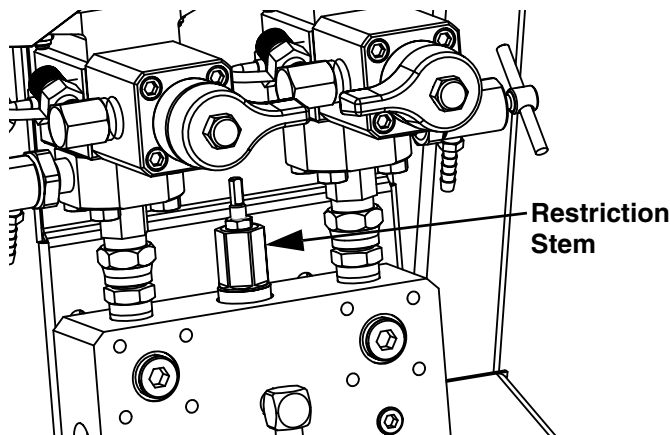
8. Follow **Flush Mix Manifold**, page 36, or **Park Fluid Pump Rods**, page 38, when you are finished spraying or before potlife expires.

NOTE:

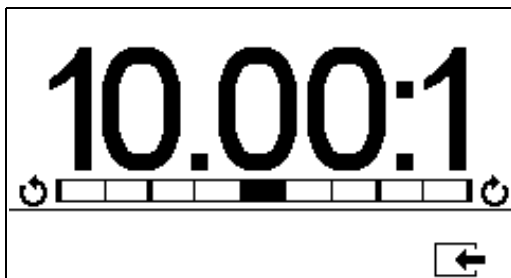
Mixed material potlife or working time decreases with increased temperature. Pot life in hose is much shorter than dry time of coating.

Adjust B Mix Manifold Restriction

Adjust the restriction stem on the mix manifold to optimize the B side dosing control window. The goal is to create a constant flow on the A side and frequent dosing or a near constant flow on the B side.



1. With material at normal spray temperature and tip installed on spray gun, trigger gun for at least 10 seconds.
2. Navigate to Ratio Mode screen. See **Ratio Mode**, page 69. Check bar graph.





- If the dark bar stays to the right, the B dosing valve is dosing at a minimum pulse twice every second because there is no restriction. Adjust the restriction stem clockwise to decrease the B side flow rate. The valve will stay open longer and/or pulse more often.
- If the dark bar stays to the left, the B dosing valve is staying open most of the time and the A dosing valve may cycle off to compensate. Adjust the restriction stem counterclockwise to increase the B side dosing flow rate.

NOTE:

- It is normal for the bar to move on the graph while spraying. If the adjustment is too far off, you will receive an alarm. If the ratio will not hold, you will receive alarm R4B or R1B. See **Alarm Codes and Troubleshooting**, page 51.
- If the bar swings back and fourth and you are using feed pumps, the feed pressure may be too high. Keep feed pressure under 250 psi (1.75 MPa, 17.5 bar). High pressure pumps receive a pressure boost that is twice the pressure feed on the upstroke only. High feed pressures can cause pressure swings between A and B. The system will compensate, but the bar graph will show the swing.

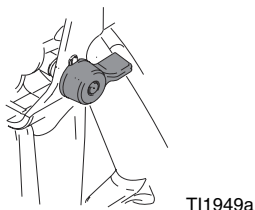
Pressure Relief Procedure

						
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Follow **Flush Mixed Material** when you stop spraying or dispensing; and before cleaning, checking, servicing, or transporting equipment.

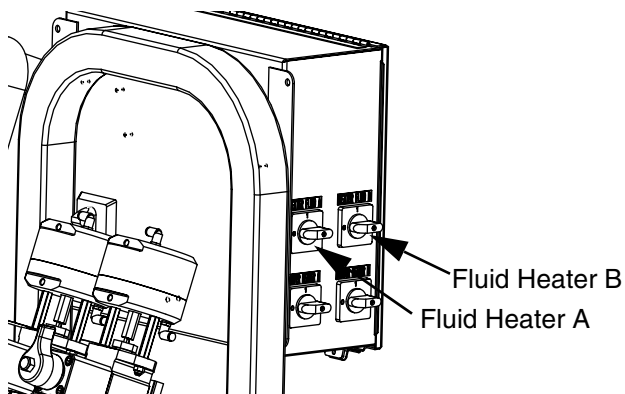
Relieve A and B Fluid Pressure

1. Engage trigger lock.

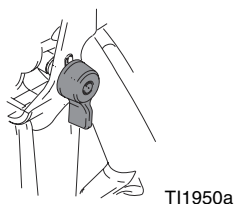


2. Press .

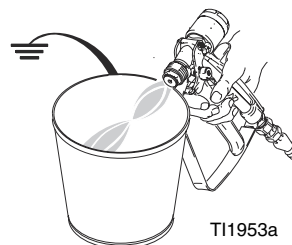
3. If fluid heaters are used, shut them off using the controls on the heater control box or the heater power junction box.



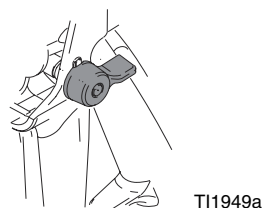
4. Shut off feed pumps, if used.
5. Remove spray tip and clean.
6. Disengage trigger lock.



7. Hold a metal part of the gun firmly to a grounded metal pail with a splash guard in place. Trigger gun to relieve pressure in material hoses.

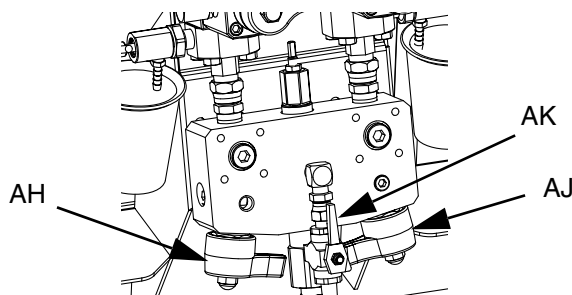


8. Engage trigger lock.

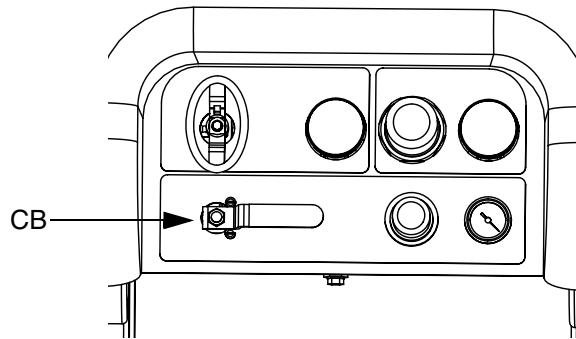


Relieve Pump Fluid Pressure and Flush Mix Hose

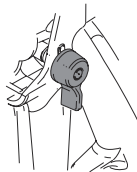
9. Close mix manifold valves (AH, AJ), then open solvent flush valve (AK) on mix manifold.



10. Open solvent pump air control valve (CB). Use lowest pressure needed to flush material out of hose.



11. Disengage trigger lock.



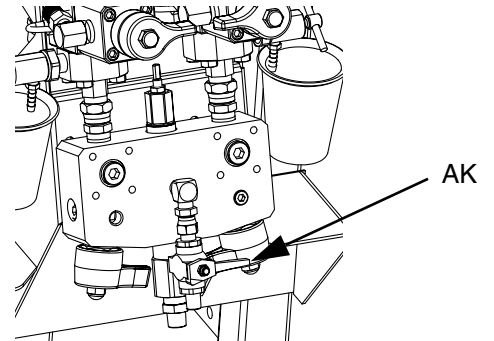
TI1950a

12. Hold a metal part of the gun firmly to a grounded metal pail with a splash guard in place. Trigger gun to flush mixed material out of line with clean solvent.

13. Shut off solvent pump air control valve (CB).

14. Disengage trigger lock.

15. Close solvent flush valve (AK) on mix manifold.



16. Release any residual gun pressure and engage trigger lock.




TI1949a

Flush Mixed Material



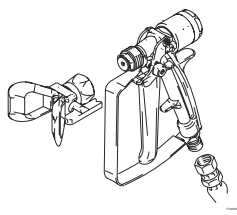
Flush Mix Manifold

Use Solvent Pump

1. Press  to turn off system. Engage trigger lock. Remove spray tip.

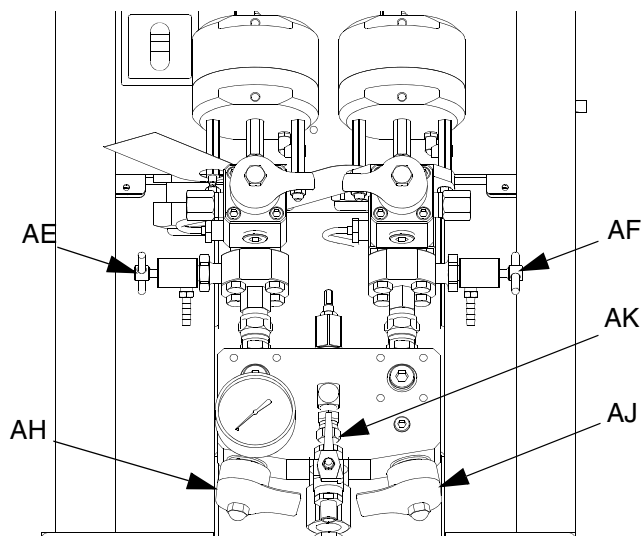


TI1949a



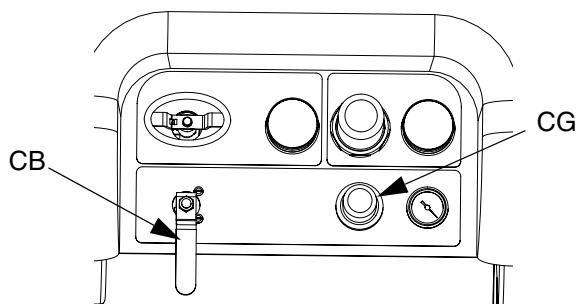
TI1948a

2. Ensure sampling valves (AE, AF) and mix manifold valves (AH, AJ) are closed.



3. Open solvent shutoff valve (AK) at mix manifold.

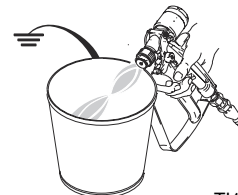
4. Open solvent pump air valve (CB). Pull out and slowly turn solvent pump air regulator (CG) clockwise to increase air pressure. Use lowest possible pressure.



5. Disengage trigger lock and trigger gun into a grounded pail. Use a pail lid with a hole to dispense through. Seal around hole and gun with a rag to prevent splash back. Be careful to keep fingers away from front of gun. Flush out mixed material until clean solvent dispenses.



TI1950a



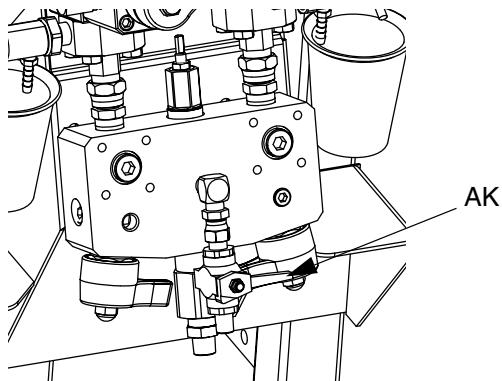
TI1953a

6. Engage trigger lock.

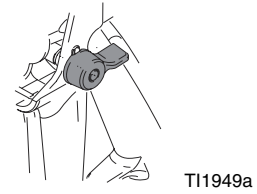


TI1949a

7. Close solvent pump air valve (CB) and solvent shut-off valve (AK) at mix manifold. Trigger spray gun to relieve pressure.



9. Engage trigger lock.



8. Follow **Pressure Relief Procedure**, page 34.

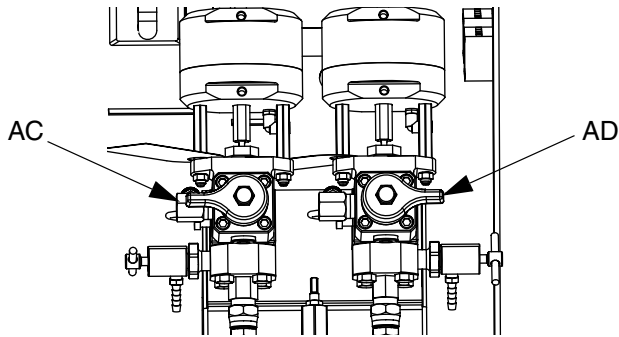
10. Disassemble and clean spray tip with solvent by hand. Reinstall on gun.

Park Fluid Pump Rods

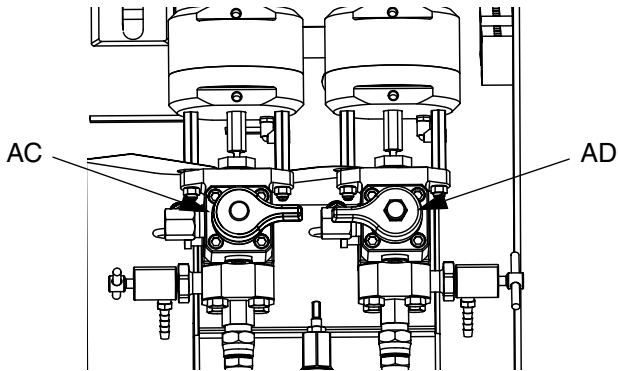
1. Relieve pressure. See **Pressure Relief Procedure**, page 34.

2. Press  .

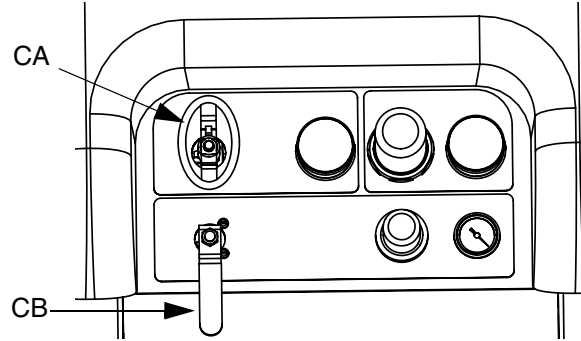
3. Turn recirculation valves (AC, AD) counter clockwise to open them. Each pump will run through recirculation until they reach the bottom stroke, and then stop.



4. When each blue pump LED turns off, close the corresponding circulation valve.



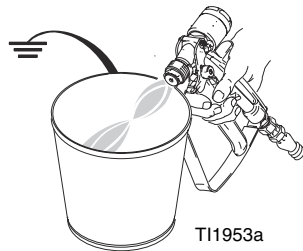
5. Shut off main pump air valve (CA) and air supply to entire system.



Shutdown Entire System

Follow this procedure prior to servicing equipment or shutdown.

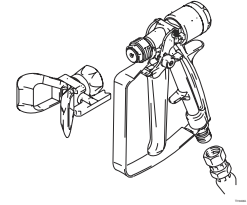
1. Follow **Flush Mixed Material**, page 36. Use a metal pail lid with a splash guard to avoid splashing.



2. Engage trigger lock, turn off air regulator, and close main air shutoff valve. Remove spray tip.



TI1949a



TI1948a

3. *For overnight shutdown:*

- Follow **Park Fluid Pump Rods** on page 38.
- Cap fluid outlets to keep solvent in the lines.
- Fill pump A and B packing nuts with throat seal liquid (TSL).

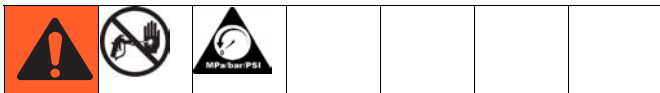
System Verification

Graco recommends running the following tests daily.

Mix and Integration Tests

Use the following tests to check for proper mix and integration.

Butterfly Test



At low pressure, normal flow rate, and without a spray tip installed, dispense a 1/2 in. (12.7 mm) bead of material onto foil until multiple changeovers of each pump have occurred. Fold the sheet of foil over the fluid then peel it back and look for unmixed material (appears marble-like).

Curing Test

Spray a single continuous pattern on foil at typical pressure setting, flow rate, and tip size until multiple changeovers of each pump have occurred. Trigger and de-trigger at typical intervals for the application. Do not overlap or cross over your spray pattern.

Check curing at various time intervals, listed on the material data sheet. For example, check for dry to touch by running your finger along the test pattern's entire length at the time listed on the data sheet.

NOTE:

Spots that take longer to cure indicate insufficient integration.

Appearance Test

Spray material onto metal substrate. Look for variations in color, gloss, or texture that may indicate improperly catalyzed material.

Pump and Metering Test

This test checks the following four items and should be run every time a new job is started, or if there is a suspected problem.

- Verifies that the pumps installed match the pumps selected on the Setup screen by dispensing exactly 750 ml of each material.
- Verifies that each pump holds fluid against the pump inlet valve by stalling on the down stroke.
- Verifies that each pump holds fluid against the pump piston valve and packings by stalling on the upstroke.
- Verifies that each metering valve holds fluid, and that there are no external leaks between the pump and metering valve.
- Verifies that the recirculation valves (AC, AD) are closed and do not leak.

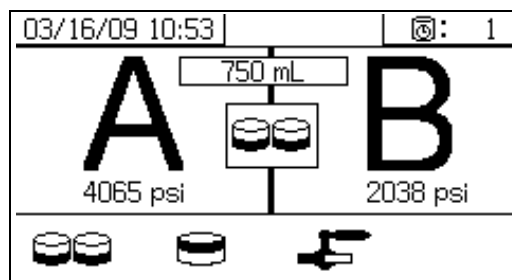
This test will dispense 750 ml of component A, and then 750 ml of component B. Dispense into separate cups so the fluid can be returned to the supply tanks.

NOTE:

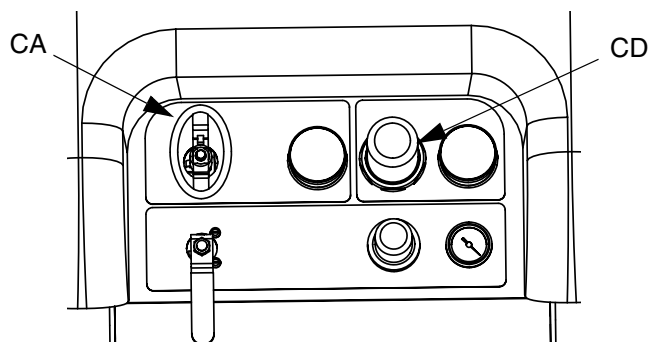
During each dispense the flow will stop once to stall the upstroke, once to stall the downstroke, and then it will finish the dispense. Do not close the sampling valve until the third flow stops and the blue pump light (DK) goes out.

1. Enter Test mode in the run (fluid control) screen.

See **Test Screens** on page 69. Select  to run pump test.

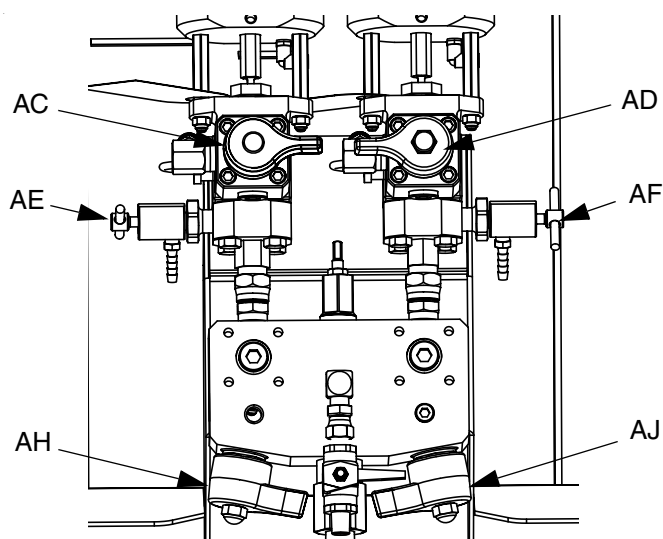


2. Set main pump air regulator (CD) pressure to zero. Open main pump and air valve (CA). Adjust main pump air regulator (CD) pressure to 50 psi (0.35 MPa, 3.5 bar).

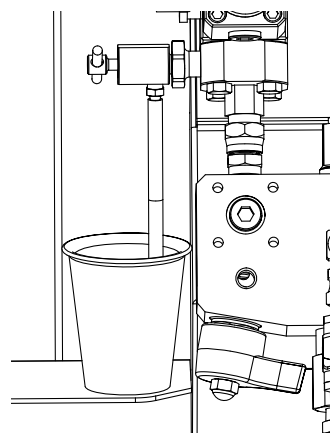


3. Dispense fluid A:

- a. Close recirculation valves (AC, AD), mix manifold valves (AH, AJ), and both sampling valves (AE, AF).



- b. Place a clean 1 quart (1000 cc) container under sampling valve A (AE).



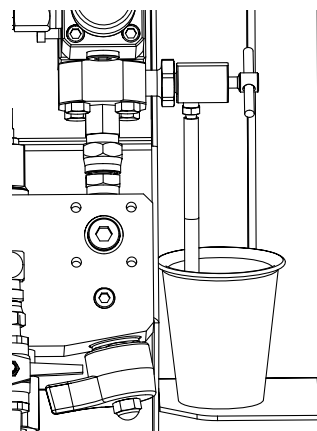
- c. Press . Pump A light (DK) comes on.

- d. Slowly open and adjust sampling valve A (AE) to achieve desired flow. Pump stops automatically; twice during test and again when dispense completes. Pump A light (DK) turns off, Pump B light (DK) turns on.

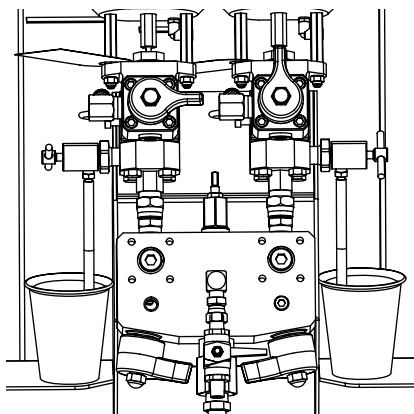
4. Close sampling valve A (AE).

5. Dispense fluid B as follows:

- a. Place a clean 1 quart (1000 cc) container under sampling valve B (AF).



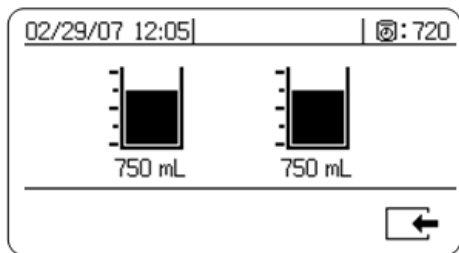
- b. Slowly open and adjust sampling valve B to achieve desired flow. Pump stops automatically; twice during test and again when dispense completes. Pump B light (DK) turns off.
 - c. Close sampling valve B (AF).
6. Compare fluid amounts in containers; they should be equal at 750 ml (25.3 fl. oz.) each. Repeat test if fluids are not equal. If problem persists, see **Alarm Codes and Troubleshooting**, page 51



- -
 -
 -
 -
 -
 7. Return fluid used in test to corresponding fluid supply container.

Confirm Pump Test

The Confirm Pump Test screen displays when the pump test completes without error. This screen displays the target volume of material dispensed into each beaker from each pump.



Batch Ratio Dispense Test


NOTE:

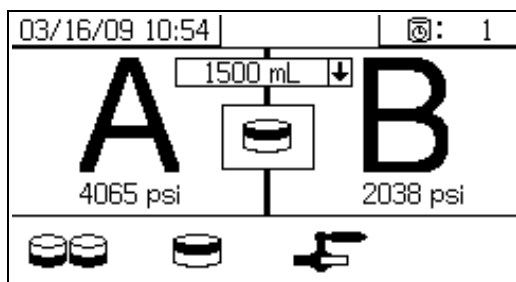
This test dispenses a calculated volume of each fluid based on ratio. The two fluids combined equal the batch size selected.





Follow this procedure to dispense a batch (into one container) for touch-up work or to verify a ratio setting (use separate containers for fluids A and B).

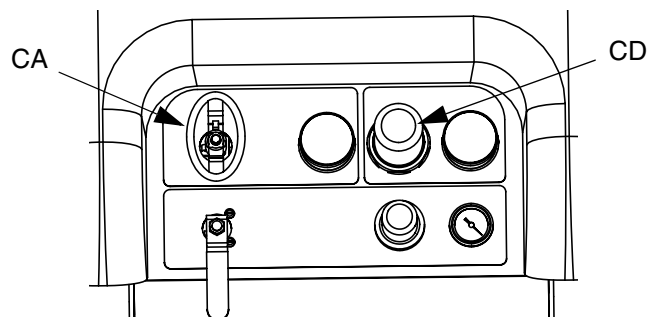
Dispense into a container with graduations no greater than 5% of each component. If the ratio is known by weight, use a scale for greatest accuracy.

1. Enter Test mode in the run (fluid control) screen.

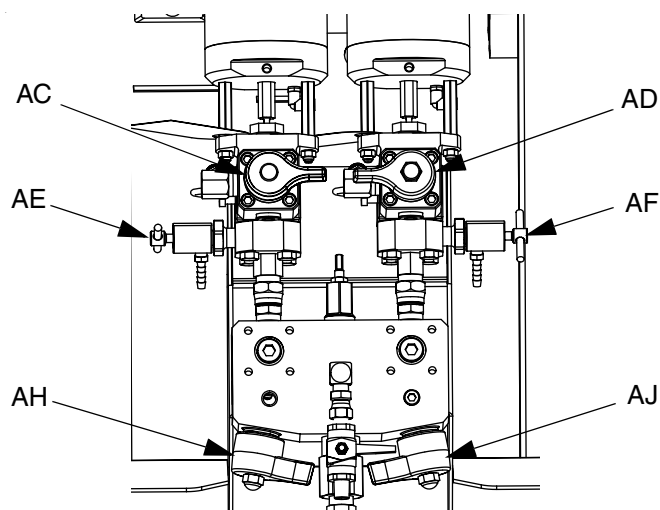
See **Test Screens** on page 69. Select  to run batch dispense test.



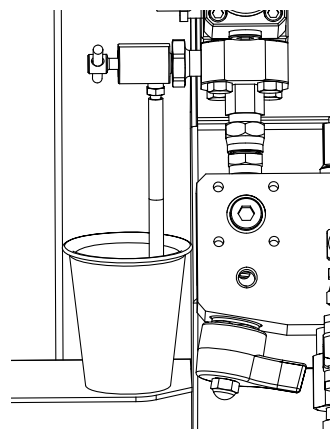
2. Adjust dispense amounts from 500 ml to 2000 ml (in 250 ml increments) by pressing  to open the drop-down box. Then press  and  to select the desired value. Press  to select that value.
3. Set main pump air regulator (CD) pressure to zero. Open main pump and air valve (CA). Adjust main pump air regulator (CD) pressure to 50 psi (0.35 MPa, 3.5 bar).



4. Close recirculation valves (AC, AD), mix manifold valves (AH, AJ), and sampling valves (AE, AF).



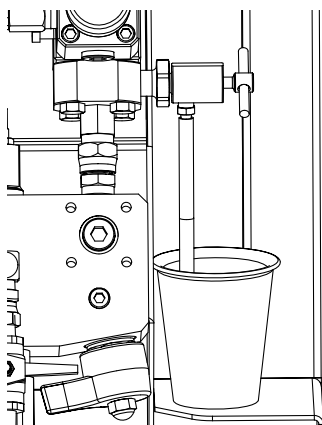
5. Place a clean container under sampling valve A (AE).



6. Press . Pump A light comes on.

7. Dispense fluid A. Slowly open and adjust sampling valve A (AE) to achieve desired flow. The pump stops automatically when dispense completes. Pump A light (DK) turns off, Pump B light (DK) turns on.
8. Close sampling valve A (AE).
9. Dispense fluid B as follows:
 - a. *Batch dispense:* move container under sampling valve B (AF).

Ratio check: place clean container under sampling valve B (AF).

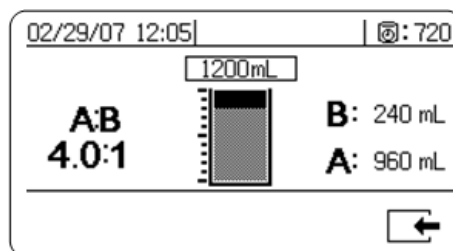


- b. Slowly open and adjust sampling valve B (AF) to achieve desired flow. The pump stops automatically when dispense completes. Pump B light (DK) turns off.
 - c. Close sampling valve B (AF).
10. *Batch dispense:* stir material until mixed.
Ratio check: compare A and B fluid dispensed.

Confirm Batch Dispense Test

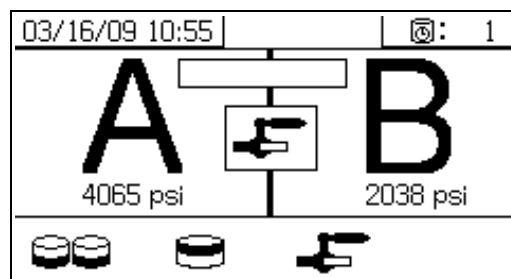
The Confirm Batch Dispense Test screen displays when the batch dispense test completes without error. This screen displays the selected ratio between the pumps and the volume of material dispensed from each pump.

The gray at the bottom of the beaker represents the volume of material dispensed by pump A and the black at the top of the beaker represents the volume of material dispensed by pump B.






Down Stream Valve Leak Test

This test confirms or troubleshoots leaks in components located down stream of the dosing valves. Use this test to detect closed or worn valves, and to detect leaks in circulation valves installed at a remote mix manifold.



1. Close both mix manifold valves downstream of the dosing valves.
2. Close recirculation valves (AC, AD).
3. Enter Test mode in the run (fluid control) screen.

See **Test Screens** on page 69. Select  to run down stream valve leak test.

4. Select  . Press  . Ensure dosing valves (AA, AB) are open by verifying blue LEDs are illuminated for both dosing valves.
5. If test is successful, both pumps will stall against the down stream valves when the dosing valves (AA, AB) are open. If any movement is detected in the pumps after stalling, an alarm is issued indicating which side has a leak.

Empty and Flush Entire System (new sprayer or end of job)



NOTE:

- If the system includes heaters and heated hose, turn them off and allow to cool before flushing. Do not turn on heaters until fluid lines are clear of solvent.
- Cover fluid container and use the lowest possible pressure when flushing to avoid splashing.
- Before color change or shutdown for storage, flush at a higher flow rate and for a longer time.
- To flush only the fluid manifold, see **Flush Mixed Material**, page 36.

Guidelines

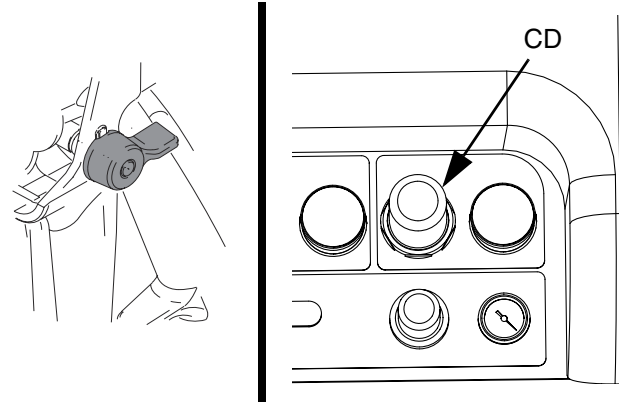
Flush new systems if coating materials will be contaminated by 10W oil.

Flush system when any of the following situations occur. Flushing will help prevent materials from clogging the line between hoppers and pump inlets.

- anytime sprayer will not be used for more than one week
- if materials used will settle
- if using thixotropic resins that require agitation

Procedure

1. Follow **Prime**, page 27 and **Flush Mixed Material**, page 36, as required. Engage trigger lock. Turn main pump air regulator (CD) fully counter-clockwise to shut off.



2. Move circulation return lines to separate fluid containers to pump remaining fluid out of system.
3. Increase main pump air regulator (CD) pressure to 20 psi (138 kPa, 1.38 bar).

4. Select  . Press .

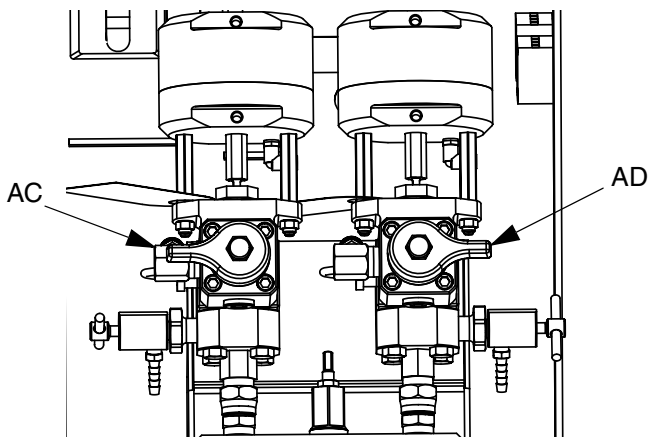
NOTE:

When running pumps independently set to  or  . Press  and  as needed to clean.

NOTE:



If sprayer does not start with static pressure, increase air pressure by 10 psi (69 kPa, 0.7 bar) increments. To avoid splashing, do not exceed 35 psi (241 kPa, 2.4 bar).


5. Open recirculation valves (AC, AD) for respective pump dispense side. Run pumps until the A and B reservoirs are empty. Salvage the material in separate, clean containers.



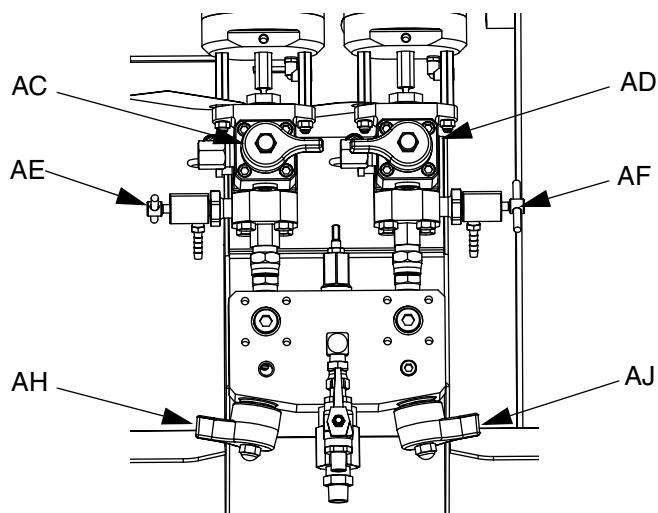
NOTE:


When priming or flushing the pumps, it is normal to get cavitation or pump runaway alarms. Clear the alarms

, and press  again as necessary. These alarms prevent excessive pump speeds that can damage pump packings.

6. Wipe reservoirs clean, then add solvent to each. Move circulation lines to waste containers.
7. Repeat Step 4 to flush through each side until clean solvent exits recirculation hose.
8. Press . Move recirculation hoses back to reservoirs. Continue recirculating until system is thoroughly flushed.

9. Close recirculation valves (AC, AD) and open mix manifold valves (AH, AJ). Dispense fresh solvent through mix manifold valves and out gun.

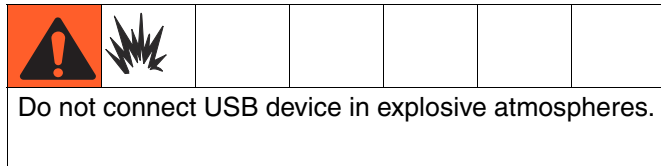


10. Close mix manifold valves (AH, AJ).
11. Slowly open sampling valves (AE, AF) to flush solvent through until clean. Close sampling valves.
Press .
12. Follow **Park Fluid Pump Rods**, page 38.
13. Remove pump fluid filters, if installed, and soak in solvent. Clean and replace filter cap. Clean filter o-rings and leave out to dry. Do not leave o-rings in solvent.
14. Close main air valve (E).

NOTE:

Fill A and B pump packing nuts with TSL. Also, always leave some type of fluid, such as solvent or oil, in the system to prevent scale build up. This build up can flake off later. Do not use water.

Download Data from USB



USB Logs

Spray Log 1

(Default log for download.) The spray log records key data while the system is in spray mode. It records A and B temperature, A and B pressure, A and B flow, A and B batch totals, ratios, restrictor adjustments, alarm codes, and commands.

By default, the spray log records data every 60 seconds. This 60 second interval will record about 32 days of data if spraying 8 hours per day, 7 days per week. To change the default, see **Download Setup**, page 47.

NOTE:

Once the spray log is full, new data automatically overwrites old data.

NOTE:

After data in the spray log is downloaded it remains in the USB module until it is overwritten.

Alarm Log 2

The alarm log records all alarm codes generated over a two year period. This log should be used for troubleshooting purposes and cannot be deleted.

Command Log 3

The command log records all commands received over a two year period. This log should be used for troubleshooting purposes and cannot be deleted.

Data Log 4

The data log records (every 60 seconds) all data that occurs during spray mode over a two year period. This log should be used for troubleshooting purposes and cannot be deleted.

NOTE:

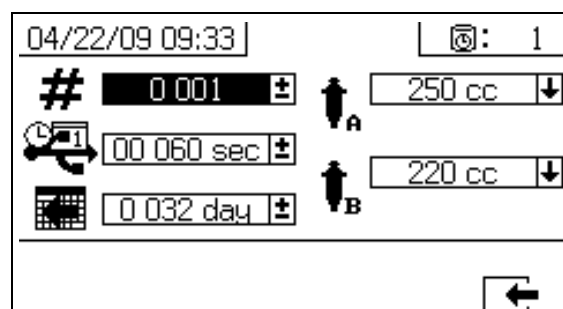
The 60 second recording period cannot be adjusted.

Download Setup

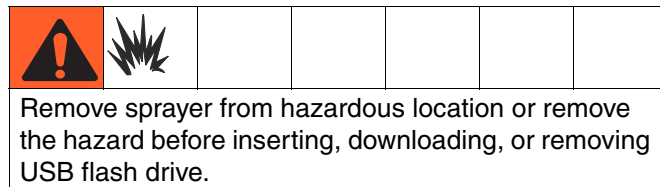
Navigate to the System Setup screen. Change the number of days of recorded data to download (default is 32),

by pressing and to move to . Press to make the field selectable. Press to

scroll through each digit. Press to save the new digit. Follow the same procedure to change the time interval at which data will record (default is 60 seconds). Exit the System Setup screen.



Download Procedure




1. Insert USB flash drive into USB port (DR). Use only Graco-recommended USB flash drives; see **Recommended USB Flash Drives**, page 73.


NOTE:



Inserting the USB flash drive while the sprayer is running will stop sprayer operation.

- 2. The USB download screen automatically displays, and the selected log(s) automatically downloads. The USB symbol flashes to indicate download is in process.

NOTE:

To cancel download, press  while in process. Wait for USB icon to stop flashing, and then remove USB flash drive.

- 3. The USB icon stops flashing when download completes. The box below displays , which indicates the download was successful
- 4. Remove USB flash drive from USB port (DR).

						
Never leave USB flash drive in USB port (DR).						

- 5. Insert USB flash drive into USB port of computer.
- 6. The USB flash drive window automatically opens. If it does not, open USB flash drive from within Windows® Explorer.

- 7. Open Graco folder.
- 8. Open sprayer folder. If downloading data from more than one sprayer, there will be more than one sprayer folder. Each sprayer folder is labeled with the corresponding USB serial number.
- 9. Open DOWNLOAD folder.
- 10. Open folder labeled with the highest number. The highest number indicates the most recent data download.
- 11. Open log file. Log files open in Microsoft® Excel® by default. However, they can also be opened in any text editor or Microsoft® Word.

NOTE:

All USB logs are saved in Unicode (UTF-16) format. If opening the log file in Microsoft Word, select Unicode encoding.

Maintenance

Filters

Once a week check, clean, and replace (if needed) the following filters. Be sure to follow the **Flush Mixed Material**, page 36, prior to performing filter maintenance.

- Both pump filters; see manual 311762 for instructions.
- Main air inlet manifold filter; see manual 313289, Replace Air Filter Element section, for instructions.
- Air regulator filter (5 micron) on air control assembly; see manual 313289, Replace Air Filter Element section, for instructions.
- B side mix manifold strainer (as required); see manual 312749.

Seals

Once a week, check and tighten throat seals on both pumps and dosing valves. Be sure to follow the **Flush Mixed Material**, page 36, prior to tightening seals.

Cleaning Procedure

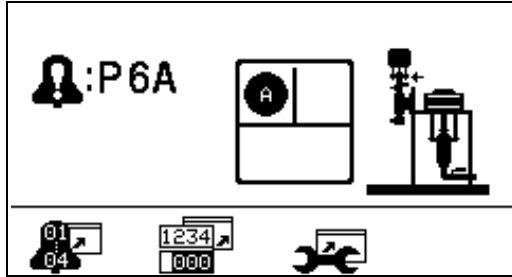


1. Ensure all equipment is grounded. See **Grounding**, page 11.
2. Ensure the area where the sprayer will be cleaned is well ventilated; and remove all ignition sources.
3. Turn off all heaters and allow equipment to cool.
4. Flush mixed material. See **Flush Mixed Material**, page 36.
5. Relieve pressure. See **Pressure Relief Procedure**, page 34.
6. Shutdown sprayer and turn off all power. See **Shutdown Entire System**, page 39.
7. Clean external surfaces only using a rag soaked in solvent that is compatible with the spray material and the surfaces being cleaned.
8. Allow enough time for solvent to dry before using sprayer.

Alarms

View Alarms

When an alarm occurs the alarm information screen automatically displays. It shows the current alarm code along with a bell icon. It also shows the alarm location with top and side views of the sprayer.





There are two levels of alarms: warnings and advisories. A bell icon indicates an alarm. A solid bell icon with an exclamation point and three audible alerts indicate a warning. And an outlined hollow bell icon and a single audible alert indicate an advisory.

Advisories are notifications that require attention but not immediately. Warnings require immediate correction; therefore, sprayer operation automatically stops.

Diagnose Alarms

See **Alarm Codes and Troubleshooting** for causes and solutions to each alarm code.

Clear Alarms

Press  to clear alarms. From the alarm information screen, press  to return to the run (fluid control) screen.

Alarm Codes and Troubleshooting

NOTE: See XM Plural-Component Sprayers Repair-Parts manuals for non-alarm based troubleshooting.

Alarm Code	Alarm Problem	When Active	Cause	Solution
General Performance Alarms				
R4B	Ratio High B (Overdose B), system delivering too much B component.	Spray	B Dosing valve not closing.	Perform Pump Test to test for leakage. See Pump and Metering Test , page 40.
				Loosen valve packing nut. See manual 313289.
				Check air signal at valve top
				Repair valve or air solenoid. See manual 313289.
			No B restriction at mix manifold.	Increase B Restriction by turning B restrictor stem clockwise. See Adjust B Mix Manifold Restriction , page 33.
			Pump filter plugged on A side.	Clean filter. See manual 311762. Use alternate 30 mesh screen. See manual 311762 for part number.
R1B	Ratio Low B (under dose B); system delivering not enough B component.	Spray	Inlet air dropping below 50 psi (0.35 MPa, 3.5 bar) while spraying. B dosing valve not closing correctly.	Check air filters. See manual 313289.
				Use larger air hose.
				Use larger compressor.
				Use smaller gun tips or less guns to reduce flow rate.
REC	System detected five R4B (ratio high B) or five R1B (ratio low B) alarms within five minutes. Sprayer shuts down for five minutes to resolve problem.	Spray	See R4B or R1B alarm causes.	Check for air signal to valve.
				Open green mix manifold valve.
				Use alternate 30 mesh screen. See manual 311762 for part number.
FHA FHB	System detects pump movement (fluid flow) when there should not be.	Spray	Recirculation valve or dosing valve open or leaking for more than five seconds.	Clean B pump outlet filter. See manual 311762.
				See R4B or R1B alarm solutions. Flush mixed material if necessary, and purge off-ratio mixed material in hose.
FHA FHB	System detects pump movement (fluid flow) when there should not be.	Spray	Recirculation valve or dosing valve open or leaking for more than five seconds.	Close or repair recirculation valve, and run Pump Test. See Pump and Metering Test , page 40. See manual 313289 if needed.

Alarm Code	Alarm Problem	When Active	Cause	Solution
R2D	Dosing sizes are not optimized.	Spray	Dosing valve is operating near high or low timing limits.	Adjust mix manifold B restrictor stem clockwise or counter clockwise as indicated by bar graph on ratio screen. See Adjust B Mix Manifold Restriction , page 33.
P4A P4B	Pressure high.	Always	Fluid pressure is above maximum.	Decrease main air regulator.
DAA DAB	Pump runaway, above 60 cpm for 10 sec.	Always	No material in pump or lines; no fluid restriction.	Refill material in tank or hoses; install fluid tip.
DDA DDB	Pump cavitation; dives more than 1/2 of stroke.	Spray	No fluid or valve closed.	Refill supply and open inlet valve.
			Material is too cold or thick.	Increase material temperature to reduce viscosity. See Heat Fluid , page 31. Shear material with agitation to reduce viscosity.
			Pump inlet check valve not closing.	Clear debris from check valve. Or replace ball, seat, and seal.
			Feed pump not providing material.	Check feed pump (if used).
			Inlet strainer plugged (if used).	Check and clean strainer. See manual 313289.
P1A P1B	Pressure low.	Spray, Pump Test, Leak Test	Fluid pressure is below 1000 psi (7 MPa, 70 bar).	Increase main air regulator.
P4R	Pressure high.	Recirculation	Pressure is above maximum advisory limit of 3000 psi (21 MPa, 210 bar).	Decrease pump air regulator pressure.
P5R	Pressure high.	Recirculation	Pressure is above maximum warning limit of 5200 psi (35.9 MPa, 359 bar).	Decrease pump air regulator pressure.
Pump Test (Daily Check Recommended)				
DFA DFB	Pump did not stall against fluid pressure on up stroke only.	Pump Test	Pump piston check valve, piston packings, or dosing valve are not holding fluid pressure.	Flush pump. See Empty and Flush Entire System (new sprayer or end of job) , page 45. Recheck. Remove, clean, and repair lower. See manual 313289.
DGA DGB	Pump did not stall against fluid pressure on down stroke only.	Pump Test	Pump inlet check or dose valve is fouled, or damaged.	Remove inlet housing & clean and inspect. See manual 313289.
DEA DEB	Pump does not move in 10 minutes.	Park or Pump Test	Recirculation valves were not opened to allow flow.	Open recirculation valves.

Alarm Code	Alarm Problem	When Active	Cause	Solution
General System Component Alarms				
DJA DJB	Pump motor linear sensor has no signal.	Always	No linear sensor signal from motor.	Swap A and B sensors. Replace sensor if problem follows sensor. See manual 313289.
			Linear sensor plugged in while power is on.	Power sprayer off and back on. Do not plug in linear sensor while power is on.
	Pump motor linear sensor is out of range.	Always	Linear sensor is beyond range.	Replace sensor or sensor magnet. See manual 313289.
PJA PJB	Pump linear sensor is out of range.	Always	Linear sensor signal is beyond range.	Replace sensor or sensor magnet. See manual 313289.
			Sprayer is not properly grounded.	See Grounding , page 11.
DKA DKB	Pump motor reed switch failure; missing signals from one or both switches.	Always	Bad motor cable connections, or bad reed switch.	Swap A and B motor cables. Replace cable if problem persists. Otherwise replace reed sensor assembly. See manual 313289.
			Reed switch cable is plugged in while power is on.	Power sprayer off and back on. Do not plug in reed switch cable while power is on.
P6A P6B	Pressure sensor failure; no signal.	Always	Pressure sensor or cable is bad on the side indicated.	Replace sensor and cable assembly. See manual 313289.
V1M	Voltage low control.	Always	Voltage dropping below low limit from power supply.	Change air filter in control filter regulator. See manual 313289.
				Check the pressure setting is 18 psi (0.13 MPa, 1.3 bar) on turbine air regulator.
			Turbine not spinning with air on.	Replace air turbine cartridge. See manual 313289.
P1M	Low air supply warning; voltage drops below 10 Vdc when pumps move. (Turbine power supplies only).	Always	Filter plugged and/or air motors are using available air and not leaving enough for turbine control voltage.	Change large air filter and control air filter. See manual 313289 for instructions. Use a larger air supply. Use smaller spray tips.
N6C	Display has no signal.	Always	No display communication signal.	Check cable connections. Replace display.
				See manual 313289.
Optional User-Settable Maintenance Warnings				
*MAA *MAB	Maintain pump.	Always, if enabled	Pump usage exceeds user-set limit. Maintenance due.	Service pump. See manual 313289.
*MEA *MEB	Maintain dosing valve.	Always, if enabled	Dosing valve usage exceeds user-set limit. Maintenance due.	Service dosing valve. See manual 313289.
*MG0	Maintain air filter.	Always, if enabled	Air filter exceeds user-set limit. Maintenance due.	Service main air filter and control filter regulator. See manual 313289.
*P5A *P5B	Pressure exceeded warning limits.	Spray	Pressure exceeded high or low warning limits for more than 15 seconds.	Adjust pump pressure regulator, change tips, or adjust target set point.

Alarm Code	Alarm Problem	When Active	Cause	Solution
Optional User-Settable Spray Limits				
*T5A T5B	Temperature exceeded warning limits.	Spray	Fluid temperature exceeded high or low warning limits for more than four minutes.	<p>If fluid temperature is too low, return to circulation mode to increase fluid temperature. Adjust heater set point if needed. See Heat Fluid, page 31.</p> <p>If fluid temperature is too high, lower heater set point, and return circulation mode to cool. See Heat Fluid, page 31.</p> <p>Adjust temperature target set-point. See Heat Fluid, page 31.</p>
*P2A P2B	Pressure exceeded advisory limits.	Spray	Pressure exceeded high or low advisory limits for more than 15 seconds.	Same as P5A or P5B above.
*T2A T2B	Temperature exceeded advisory limits.	Spray	Fluid temperature exceeded high or low limits for more than four minutes.	Same as T5A or T5B above.
*N4D	Pot life timer expired. Mixed fluid will cure in hoses, mixer, and gun.	Spray	Have not sprayed enough volume to keep fresh mixed fluid in the integration hose, mixer, whip hose, and spray gun.	Spray fluid, or flush. Resets when you leave spray mode. See Spray , page 32, or Flush Mixed Material , page 36.

Possible Alarms by Mode

The following table outlines the alarms that you may receive while operating the system. The alarms are categorized according to each mode.

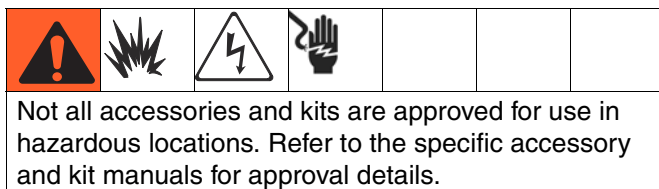
Mode	Control Logic	Alarms
Spray	Dosing valves close for startup test; green light blinks.	--
	If fluid pressure is under 1000 psi (7 MPa, 70 bar), STOP.	P1A
	If pumps move (indicating internal leakage), STOP.	FHA, F4A, F4B, FHB
	If fluid pressure is more than 103% of allowed maximum, air motor shuts off.	None
	If is pressure more than 110% of allowed maximum, STOP.	P4B
	Dosing valve A opens, and dosing valve B cycles to maintain ratio.	--
	Blue lights when dosing valves are operating.	--
	If there is not enough B component to hold ratio, dosing valve A closes momentarily.	R5D
	If A or B component is more than 5% off ratio setpoint, STOP.	R4A, R4B, R1A, R4B
Park	Both dosing valves open; A and B blue lights turn on.	--
	User opens circulation valves or sprays gun. When pump reaches bottom stroke the blue light turns off.	--
	If park does not complete in 10 minutes, turn off air to both motors.	DE--
Circulation	A and/or B dosing valves close and motor air turns on.	--
	If fluid pressure exceeds 3000 psi (21.0 MPa, 210 bar), receive yellow light advisory.	P4A, P4B
	If fluid pressure exceeds 5600 psi (39.2 MPa, 392 bar), STOP.	P4A, P4B
	If no movement in 10 minutes, turn off air to both motors.	DEA, DEB
Pump Test	Both dosing valves close; green light blinks.	--
	If fluid pressure is under 1000 psi (7.0 MPa, 70 bar), STOP.	P1A, P1B
	If pumps move (indicating leakage) STOP.	F4A, F4B
	Turn on A blue light, open A dosing valve, user opens sampling valve.	--
	Close A dosing valve on upstroke; check for no movement.	DFA
	Close A dose valve on down stroke; check for no movement.	DGA
	If pump moves on both up and down strokes.	DHA
	Open A dose valve and dispense total of 750 ml material, close valve, turn off blue light.	--
	Repeat for B side.	DFB, DGB, DHB
	If both pumps pass pump test, display shows two beakers of 750ml each.	--
	User selects total volume desired.	--
	Open A dosing valve, turn on blue light, user opens sampling valve, turn off blue light when complete.	--
	Open B dosing valve, turn on blue light, user opens sampling valve, turn off blue light when complete.	--
	Display shows volume of A and B components at end of batch dispense test.	--
Valve Test	If fluid pressure is not 1000 psi (7 MPa, 70 bar), STOP.	P1A
	Check for no movement of pumps (stall within 10 seconds).	F4A, F4B

Alarm Code Key

Use the following table as a quick guide to determine alarm codes.

What		Alert		Where	
F	Flow	1	Low	A	Material A
N	Time	2	Deviation	B	Material B
P	Pressure	4	High	C	Controller
R	Ratio	5	Limit warning	D	Dosing/Pot life
T	Temperature	6	Sensor or connection failure	M	Power or Air supply
V	Voltage			R	Recirculation
D	Pump	A	Pump runaway		
		D	Pump diving/cavitation		
		E	Pump time-out		
		F	Pump failed to stall up		
		G	Pump failed to stall down		
		H	Pump failed to stall		
		J	Linear sensor failure		
		K	Directional switch failure		
M	Maintenance due	A	Pump		
		E	Dosing valve		
		G	Filter		

Accessories and Kits



20-Gallon Hopper Kit, 255963

One complete double-wall 20-gallon hopper. See manual 312747 for more information.

Hopper Heater Kit (240V), 256257

For heating fluid in a 20-gallon hopper. See manual 312747 for more information.

Universal Hopper Fluid Inlet Kit, 256170

For connecting any of the four lower models included with XM sprayer to a 20-gallon hopper. See manual 312747 for more information.

Universal Hopper Mounting Kit, 256259

For mounting a 20-gallon hopper to the side or back of an XM sprayer. See manual 312747 for more information.

Twistork Agitator Kit, 256274

For mixing viscous materials held within a 20-gallon hopper. See manual 312769 for more information.

T2 Feed Pump Kit, 256275

For supplying viscous material from a 20-gallon hopper to an XM sprayer. See manual 312769 for more information.

5:1 Feed Pump Kit, 256276

For supplying viscous materials from a 20-gallon hopper to an XM sprayer. See manual 312769 for more information.

7-Gallon Hopper and Bracket Kit, 256260

One 7-gallon hopper and mounting brackets. Mounts to the side or back of an XM sprayer. See manual 406699 for more information.

2:1 Drum Feed Kit, 256232

One T2 pump feed kit and one Twistork agitator kit for mixing and supplying viscous materials from a with 55-gallon drum to an XM sprayer. See manual 312769 for more information.

5:1 Drum Feed Kit, 256255

One 5:1 pump feed kit and one Twistork agitator kit for mixing and supplying viscous materials from a with 55-gallon drum to an XM sprayer. See manual 312769 for more information.

Hopper/Hose Heat Circulation Kit, 256273

For circulating heated water through 20-gallon hoppers, heated hose, and Viscon HP heater. See manual 313259 for more information.

Desiccant Dryer Kit, 256512

For use with 20-gallon hoppers. See manual 406739 for more information.

Caster Kit, 256262

For mounting casters on XM sprayer frame. See manual 406690 for more information.

Hose Rack Kit, 256263

For mounting to side, front, or back of XM sprayer frame. See manual 406691 for more information.

Lower Strainer and Valve Kit, 256653

For straining material from a feed pump to an XM sprayer fluid inlet. See manual 312770 for more information.

Electric Heated Hose Power Supply Kit, 256876

For monitoring and controlling fluid temperature in low-voltage heated hoses. See manual 313258 for more information.

5000 psi Two-Component Main Heated Hose Set Kit

Electric heated hose set for adding additional sections.

Part	Description
248907	Heated hose set; 1/4 in. ID x 3/8 in. ID; 50 ft.
248908	Heated hose set; 3/8 in. ID x 3/8 in. ID; 50 ft.

10:1 Drum Feed Kit, 256433

For supplying highly viscous material from a 55-gallon drum to an XM sprayer. See manual 312769 for more information.

Shutoff/Check Valve Kit, 255278

For replacing shutoff valve or check valve. See manual 313343 for more information.

Alternator Conversion Kit, 256991

For converting an XM sprayer from wall power supply to intrinsically safe alternator power supply. See manual 313293 for more information.

Mix Manifold Kit, 255684

See manual 312749 for more information.

Remote Mix Manifold and Carriage Kit, 256980

For converting to a remote mix manifold kit with a protective guard. See manual 312749 for more information.

Level Sensor Adapter Kit, 256261

For monitoring level of spray material inside 20-gallon hopper. See manual 406740 for more information.

Appendix A

User Interface Display

The user interface display is divided into three main functions: Setup, Command, and Automatic.

Setup Functions (key “ON”)

The setup functions enable users to:

- set desired mix ratio;
- configure system settings;
- set potlife parameters;
- enable/disable functions, displays, and display components;
- set which USB logs to download;
- schedule maintenance parameters for alarms and advisories;
- and set pressure and temperature limits.

NOTE:

All setup functions, except for mix ratio, must be enabled from the Enable Setup screens before users can change or set configurations. See **Enable Setup Screens**, page 64, for instructions.

Command Functions (key “OFF” or removed)

The command functions enable users to:

- run pumps, including flush, circulate, and prime procedures;
- park pumps so pump rods are down when not in use;
- mix and spray;
- view mix ratio;
- run pump tests;
- run batch dispense ratio tests;
- run valve leak checks;
- view dispense totals;
- view alarms;
- diagnose alarms;
- and clear alarms.

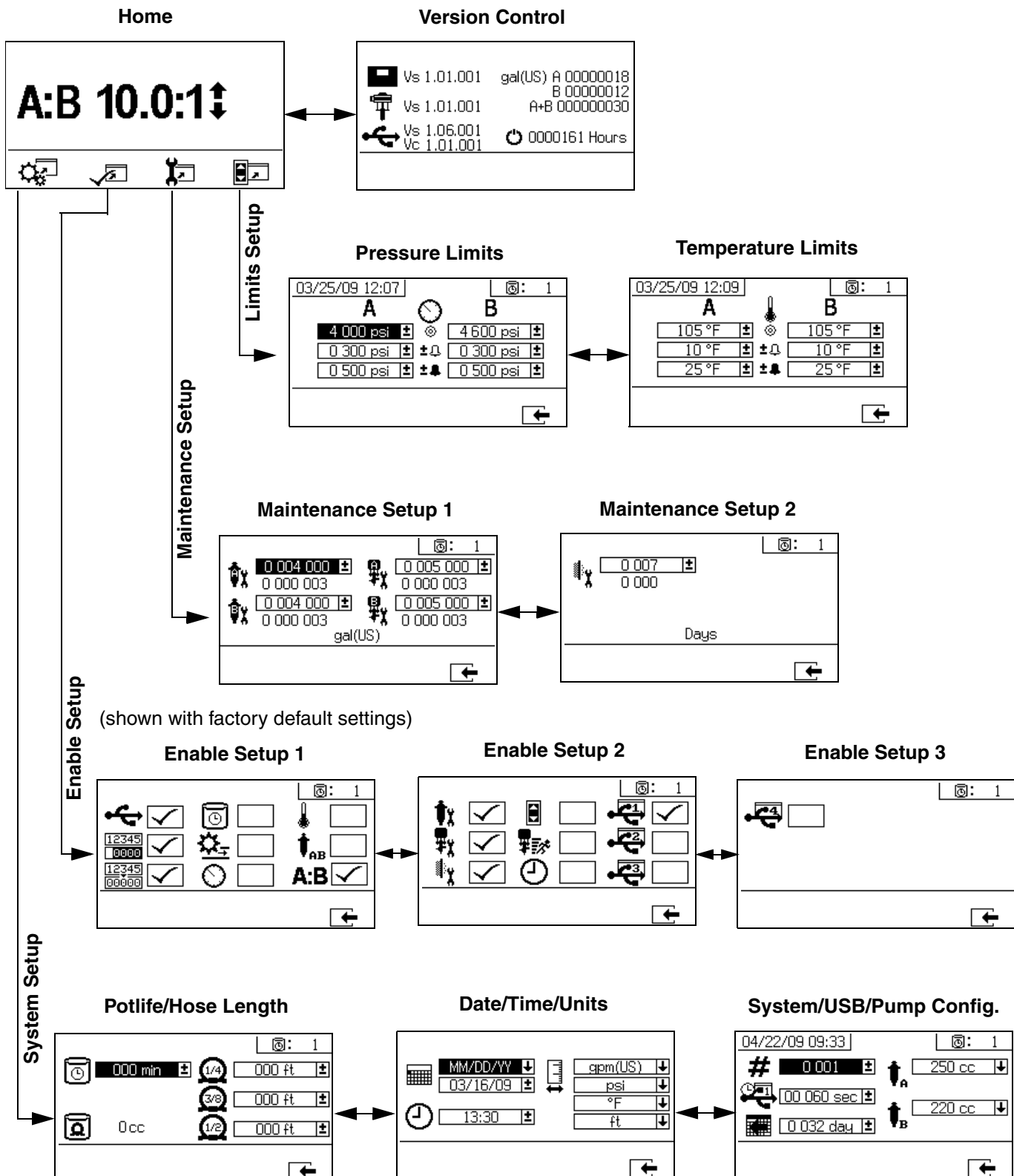
Automatic Display Functions

The automatic display functions enable users to:

- issue potlife timer alarms
- and download USB logs.

Setup Mode Screens








Setup mode screens are divided into five major sections: home, limits, maintenance, enable, and system. The following figure demonstrates the flow of the Setup mode screens beginning with the Home screen.

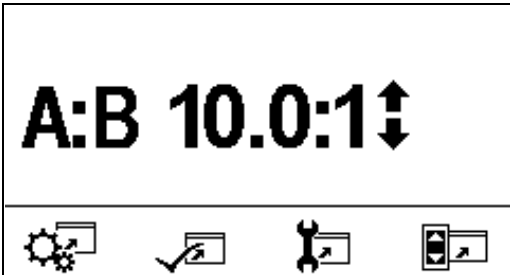


Home Setup Screens


Home





Home is the first screen that displays in Setup mode. It shows the current pump ratio, and enables users to change the mix ratio and access the following screens: system setup, enable/disable functions, maintenance setup, and limits. Refer to the following table for more details.





Icon	Function
	Increase or decrease mix ratio. Press  and  to change the mix ratio.
	Press to jump to system setup screens.
	Press to jump to functional enable/disable setup screens.
	Press to jump to maintenance setup screens.
	Press to jump to pressure and temperature limits setup screens.



Version Control

This screen displays the versions and/or status of the system components. Refer to the following table for details. To access this screen, press  from the Home Setup screen.












Icon	Function
	Display module version
	Fluid control module version
	USB version
A	Total amount dispensed by pump A
B	Total amount dispensed by pump B
A+B	Total amount dispensed by pumps A and B
	Number of hours system has been running

	Vs 1.01.001	gal(US) A 00000018
		B 00000012
	Vs 1.01.001	A+B 00000030
	Vs 1.06.001	
	Vc 1.01.001	 0000161 Hours

System Setup Screens

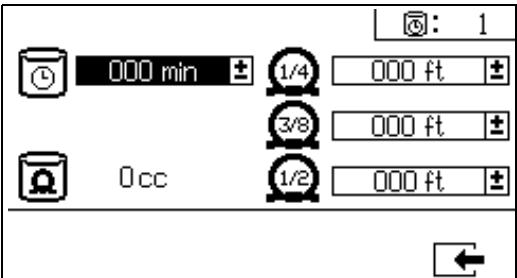
System Setup enables users to configure system settings for fluid control and operator interaction. Refer to the following table for details.

NOTE:
System settings must be enabled from the Enable Setup screens before users can change or set configurations. See **Enable Setup Screens**, page 64, for instructions.




Icon	Function
	Set number of minutes before mixed material will set in hose. Resets after material volume set by user is passed through hose.
	Indicates total hose volume. Always displayed in cc units.
	Set length of hose after mix manifold. Used to indicated total hose volume.
	Set calendar date.
	Set time.
	Set units of measurement desired for display, such as fluid and temperature.
	Set sprayer number if using more than one sprayer.
	Set number of days data will record to USB data logs.
	Set how often data will record to USB data logs.
	Select resin pump size for A side.
	Select hardener pump size for B side.






Potlife/Hose Length

This screen enables users to set the potlife timer and enter the hose inside diameter and length of each mixed material hose specific to the system. The potlife time displays in the upper right corner.



Set Potlife/Hose Length

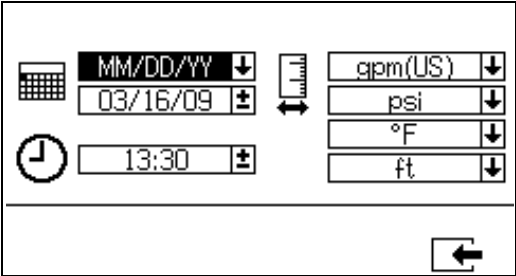
To set the potlife timer and enter the mixed material hose dimensions, press  and  to move through each field, and press  to make a field selectable.

Press  and  to select preferred units of measurement for the potlife timer and length of each mixed material hose. Press  and  to move to the next digit in each field. Once the measurement unit in the field is correct, press  to save that measurement.

Date/Time/Units

This screen enables users to set day, time, and units that will be displayed on each screen.

When the fluid flow stops the displayed time counts down in one minute intervals. The timer automatically resets when the calculated mixed fluid volume is dispensed.



System Number and USB Settings

This screen enables users to set the sprayer number if using more than one sprayer. It also enables users to configure the number of days data will record to the USB data logs and how often the data will record. See **Set System Settings (Optional)**, page 24, for instructions.

Pump Configuration

Users can change the pump size that is specific to the system.

NOTICE

Changing the pump size settings may cause the system to spray off ratio.

Set Pump Sizes








To change the pump size, press and to select the field. Press to open the drop down field.











Press and to select the preferred pump size.







Press again to save the change.

Enable Setup Screens

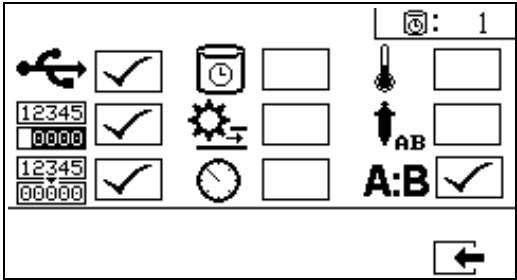
Enable Setup allows users to enable and disable functionalities, screens, and USB download log files. Checked boxes indicate the function, screen, or log file is active. Refer to the following table for details.

To enable and disable functionalities, screen, and USB log files, press  from the Home Setup screen. Once in the Enable Setup screen, press  and  to scroll through each subscreen. Press  and  to scroll through each field within the subscreens, and press  to enable or disable each. Press  to return to the Home Setup screen

Icon	Function
	USB data download function. Disable this function to prevent operators from changing USB settings. NOTE: Even if this function is disabled, selected USB logs will still be downloaded.
	Enable or disable totalizer screens.
	Enable or disable batch totalizer clear function.
	Display potlife timer on all screens. Enable or disable potlife timer setup screen.
	Display flow rates on run screens
	Display A and B pressures on run screens.
	Display A and B temperatures on run screens.
	Enable or disable ability to change pump size in system setup screens.
	Enable or disable ratio screen. If enabled, ratio screen will automatically display after sprayer runs for 10 seconds.
	Enable or disable pump maintenance setup screens.

Icon	Function
	Enable or disable dosing valve maintenance setup screen.
	Enable or disable incoming air filter maintenance setup screen.
	Enable or disable limits (pressure and temperature) screens.
	Fast dosing function. Enable function to minimize B side dose size and increase dosing rate. NOTE: Enabling this function will increase wear on the dosing valve.
	Display time on all screens.
	Enable or disable USB log files (1-4) to download.


Enable Setup 1
(Shown with factory default settings.)




Enable Setup 2


(Shown with factory default settings.)

☰: 1




☒








☒




☒










☒









☒









Enable Setup 3

(Shown with factory default settings.)

☰: 1








Maintenance Setup Screens


The maintenance setup 1 screen enables users to set maintenance setpoint amounts for pumps and dosing valves. The maintenance setup 2 screen enables users to schedule the number of days between changing the main incoming air filter before a reminder advisory will sound.

The number displayed below each selectable field indicates the amount of material dispensed, counting up to the setpoint requiring maintenance.

Icon	Function
	Set amount of material moved through pump that will result in a maintenance warning.
	Set amount of material moved through dosing valve that will result in a maintenance warning.
	Set number of days between changing the main incoming air filter before a reminder advisory is issued.


Maintenance Setup 1

☰: 1




0 004 000 ±

0 000 003




0 005 000 ±

0 000 003



0 004 000 ±


0 000 003



0 005 000 ±


0 000 003

gal(US)



Maintenance Setup 2


☰: 1



0 007 ±

0 000

Days








User Limits Setup Screens

User Limits Setup enables users to set and adjust pressure and temperature limits for both pumps, including limits that will issue advisories and warnings. Refer to the following table for details.

NOTE:

The allowable range for the temperature setpoint is 34° - 160°F (1° - 71°C). If the temperature or pressure setpoint is zero, pressure limits and alarms are disabled.

Icon	Function
	Set and adjust pressure limits for both pumps.
	Set and adjust high and low temperature limits for both pumps.
	Set target pressure or temperature.
	Set and adjust limits that if exceeded will issue an advisory. Used with pressure and temperature limits.
	Set and adjust limits that if exceeded will issue a warning. Used with pressure and temperature limits.

Process Pressure Limits (for spray mode)

03/25/09 12:07 🔍: 1

A

4 000 psi ±

0 300 psi ±

0 500 psi ±

⌚

⬆️

⬆️

B

4 600 psi ±

0 300 psi ±

0 500 psi ±

⌚

⬆️

⬆️

⬅️

Process Temperature Limits (for spray mode)

03/25/09 12:09 🔍: 1

A

105 °F ±

10 °F ±

25 °F ±

🌡️

⬆️

⬆️

B

105 °F ±

10 °F ±

25 °F ±

🌡️

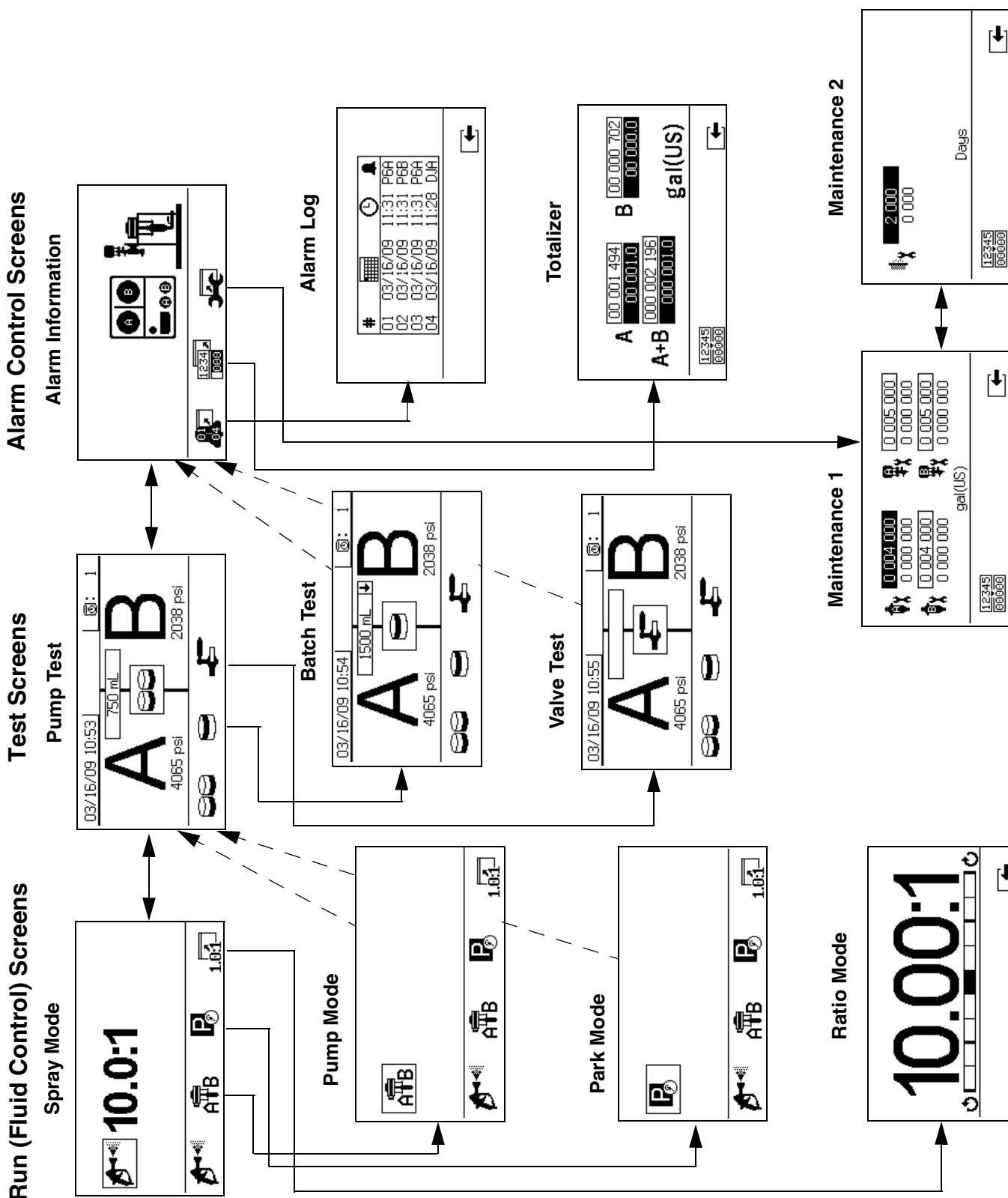
⬆️

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Operator Command Functions Screens

Command mode screens are divided into three major sections: run (fluid control), test, and alarm control. The following figure demonstrates the flow of the Command mode screens beginning with the run (fluid control) screens.







Run (Fluid Control) Screens

Run (fluid control) is the first screen displayed at power on. It enables users to spray material, and operate and park pumps. Run consists of two screens: power on/enter and ratio mode.

The power on/enter screen cycles through power on mode, spray mode, and pump mode. It always displays the current ratio setpoint, and may also display: pressure, temperature and flow rate if these functions are selected.

The ratio screen displays the current ratio and monitors the B side restriction adjustment.

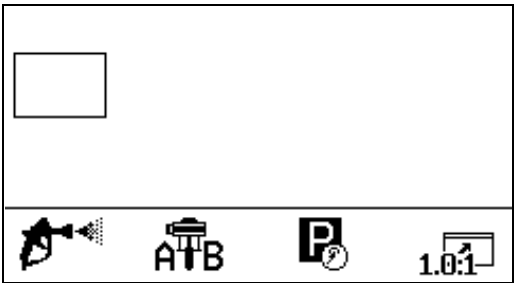
Icon	Function
	<i>Spray:</i> proportion and spray material.
	<i>Run pumps:</i> operate both pumps or operate each pump independent from the other (priming, flushing).
	<i>Park Pumps:</i> runs pump to bottom of the stroke.
	<i>Ratio:</i> jump to ratio screen.

Power On/Enter Mode

Power On/Enter Mode is the default screen when users enter Fluid Control.

NOTE:

This screen remains blank until a mode is selected.



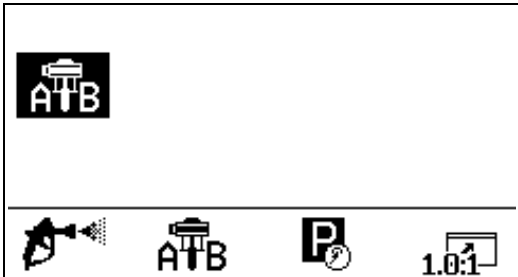
Spray Mode

Users must be in this mode to spray or proportion material. Press the button below the spray icon to enter this mode.



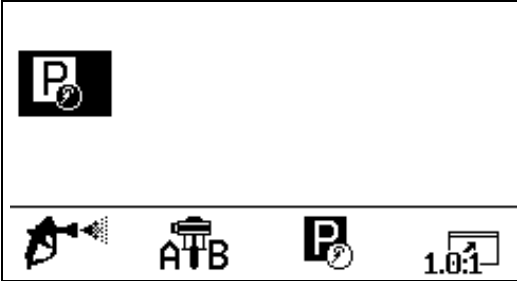
Pump Mode

Users must be in this mode to operate pumps for priming or flushing. Press the button below the pump icon to enter this mode. Continue pressing the pump icon button to cycle through pump A, pump B, and both pumps.




Park Mode


Users must be in this mode to park fluid rod pumps at the bottom of the stroke. Press the button below the park icon to enter this mode.

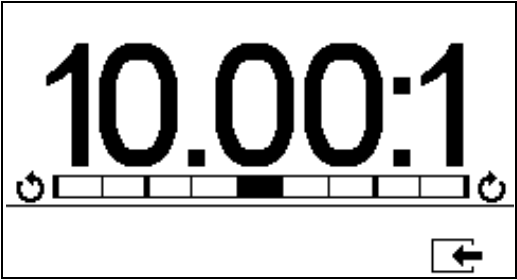


Ratio Mode

Displays the current ratio. To access this screen, press . The bar graph indicates whether the B restriction adjustment should be turned clockwise or counter clockwise.




NOTE: If the **A:B** field is enabled on the Enable Setup screen, the bar graph screen will be replaced by the Spray Mode screen after 10 seconds of spray time.

Press  to return to the Spray Mode screen.



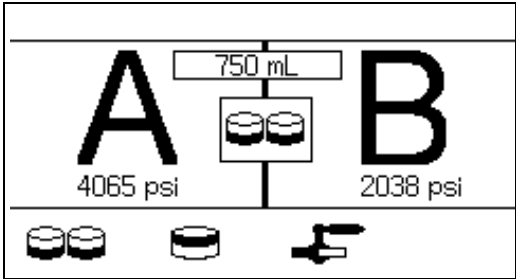
Test Screens

Test screens enable users to run batch dispense tests, pump tests, and down stream valve leak tests.

Icon	Function
	<i>Pump Test:</i> dispenses 750cc of each A and B; verifies pump selection, operation, and metering.
	<i>Batch Dispense:</i> dispenses proportioned amounts of A and B with a selectable total.
	<i>Down Stream Valve Leak Test:</i> test if valves after the dosing valves hold pressure.

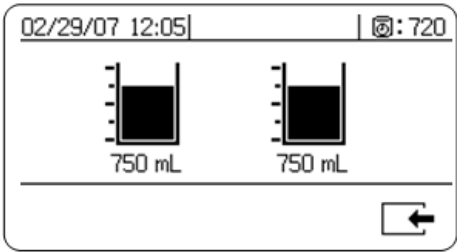
Pump Test

This screen enables users to dispense a fixed 750 ml volume of material from each pump. When the pump is active it flashes in black on the screen. When the pump completes dispensing it displays gray on the screen.



Confirm Pump Test

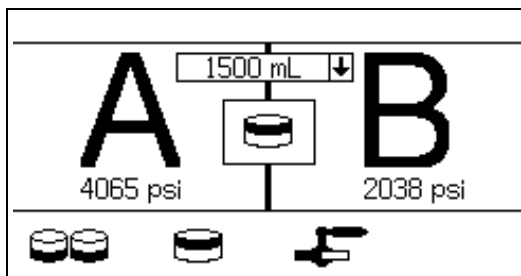
This screen displays when the pump test completes without error. This screen displays the target volume of material dispensed into each beaker from each pump.



Batch Dispense Test

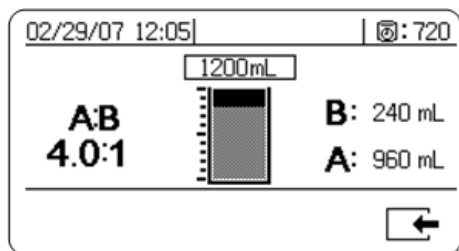
This screen enables users to dispense a selected total volume of material on ratio. For example, 1000 ml at 4:1 = 800 ml of A + 200 ml of B.

When the pump is active it flashes in black on the screen. When the pump completes dispensing it displays in gray on the screen



Confirm Batch Dispense Test

This screen displays when the batch dispense test completes without error. This screen displays the selected ratio between the pumps and the volume of material dispensed from each pump. The gray at the bottom of the beaker represents the volume of material dispensed by pump A. The black at the top of the beaker represents the volume of material dispensed by pump B.

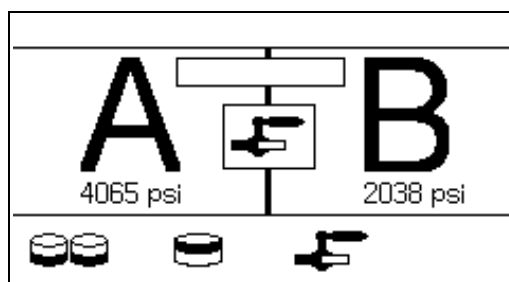


Down Stream Valve Leak Test

This screen enables users to test for closed or worn valves down stream of the A and B dosing control valves. It can be used to test the mix manifold shut-off/check valves or any remote circulation valves.

While running the test, if there is continuous pump movement on the A or B side, an error will be issued. The error indicates a leak in the valve.


There is no confirmation screen for this test. However, if the down stream valve leak test fails, an warning is issued to indicate the cause of the failure.



Alarm Control Screens

The Alarm control screens enable users to view alarm diagnostic information, alarm logs, and pump batch and grand totals. These screens also enable users to view maintenance information for pump and check valves, including the maintenance schedule.

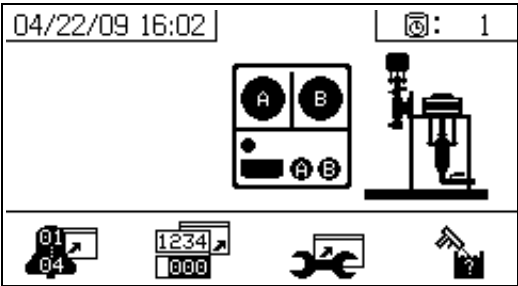
NOTE:



If the potlife timer is enabled,  displays.







Alarm

The Alarm screen displays the specific alarm code. There are two levels of alarms: warnings and advisories. A bell icon indicates an alarm. A solid bell icon with an exclamation point and three audible alerts indicate a warning. And an outlined hollow bell icon and a single audible alert indicate an advisory.

Additionally, this screen displays the location of the error with the top view and side view of the system. Refer to the following table and subsections for more details.






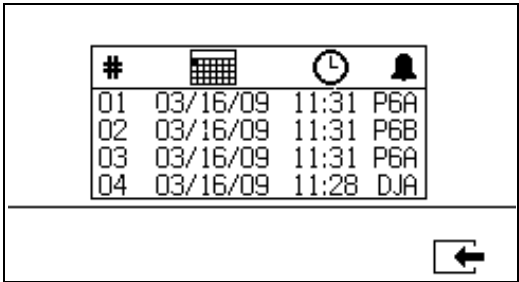
Icon	Function
	Go to Alarm log. Use up and down arrows to scroll through list.
	Go to totalizer screen. Allows users to view the grand and batch totals for each pump and both pumps combined.

Icon	Function
	Go to maintenance screen. Allows user to view maintenance information but not make changes. See Maintenance Setup 2 , page 65.
	Flush confirm. Use when the potlife timer is enabled. Press button to confirm flush before a potlife advisory is issued.
	Save data to USB drive.
	Amount of material moved through pump that will result in a maintenance warning.
	Amount of material moved through dosing valve that will result in a maintenance warning.
	Number of days between maintenance cycles that will result in a reminder advisory.

Alarm Log

View details regarding alarms received, including the date, time, and alarm code for the last 16 alarms. Up to four pages of alarms are available.

Press  to access the alarm log. The press  and  to scroll through each page of alarms.



#				
01	03/16/09	11:31	P6A	
02	03/16/09	11:31	P6B	
03	03/16/09	11:31	P6A	
04	03/16/09	11:28	DJA	



Totalizer

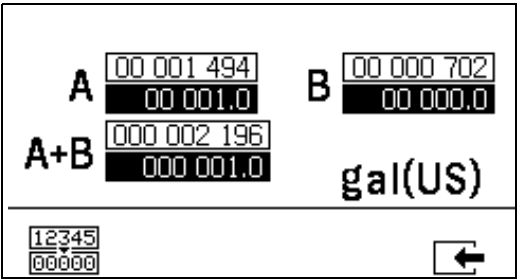
View the grand and batch totals for each pump and both pumps combined. The units of measurement are displayed in the corner and displayed in the units of measurement selected during setup.







Grand total is the amount of material the system has dispensed during its lifetime. Batch total is the amount of material dispensed since the last user reset.

Clear Batch Totalizer

To clear the batch totalizer values for A, B, and A+B,

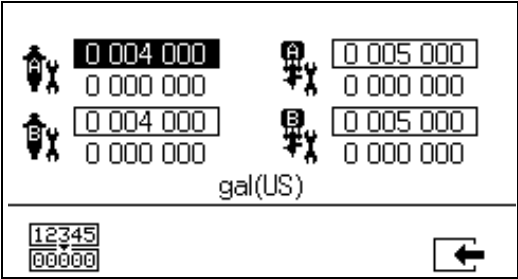
press   to set all values to zero.



Icon	Function
A  	Displays batch total and grand total for pump A. The grand total is displayed at the top, and the batch total is displayed at the bottom.
B  	Displays batch total and grand total for pump B. The grand total is displayed at the top, and the batch total is displayed at the bottom.
A+B  	Displays batch total and grand total for both pumps combined. The grand total is displayed at the top, and the batch total is displayed at the bottom.

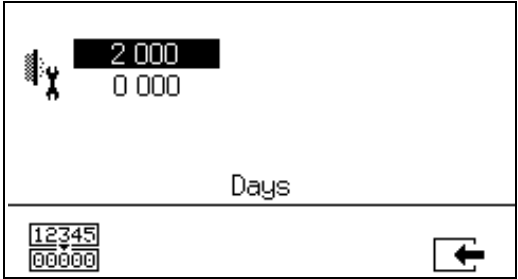
Maintenance 1 Screen

View setpoints for the amount of material that needs to move through both pumps and dosing valves that will result in a maintenance warning.







Maintenance 2 Screen

View number of days between changing the main incoming air filter before a reminder advisory is issued.








Reset Maintenance Counter

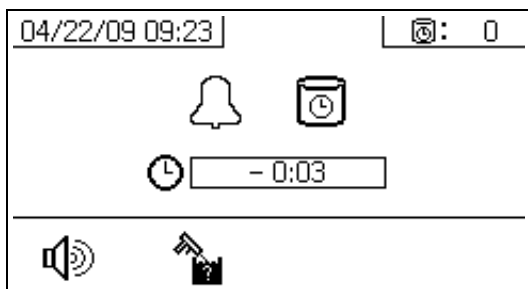
- Press  and  to scroll through and select the maintenance field to reset.
- Press   to reset the maintenance counter to zero.

Auto Display Screens

Potlife Screen

The potlife screen automatically displays when a potlife advisory occurs. The screen automatically closes when the advisory end or the user presses the flush confirm button. Refer to the following table for more details.

Icon	Function
	Advisory has been issued.
	Potlife timer is enabled.
	Time after potlife expires. Starts at 0.00 and counts down in negative one minute intervals.
	Press to mute advisory buzzer.
	Press to confirm that mixed hose has been flushed. Resets potlife timer.










USB Screen

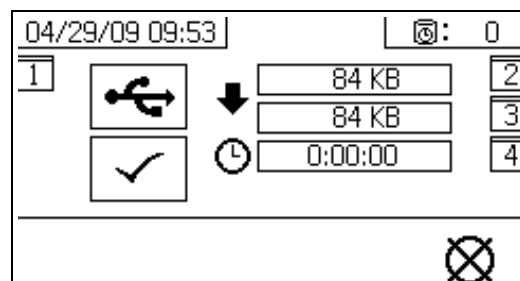
The USB screen automatically displays and the selected log(s) automatically starts downloading when the USB flash drive is inserted into the control box.

NOTE:

Inserting the USB flash drive while the sprayer is running automatically stops sprayer operation. Removing the USB flash drive automatically closes the USB screen.

The log selected for current download is displayed in the single box next to the USB icon. The other available logs are displayed in the boxes on the right side of the screen. Refer to the following table for more details.

Icon	Function
	Flashes while data download is in process.
	Check mark appears after download completes. Indicates download was successful.
	If download was not successful, appears.
	Displays total memory to download and remaining memory left to download.
	Displays time remaining for log download to complete.
	Press to cancel download. If download is cancelled, remove USB flash drive.
	Indicates which log(s) is being downloaded.



Recommended USB Flash Drives

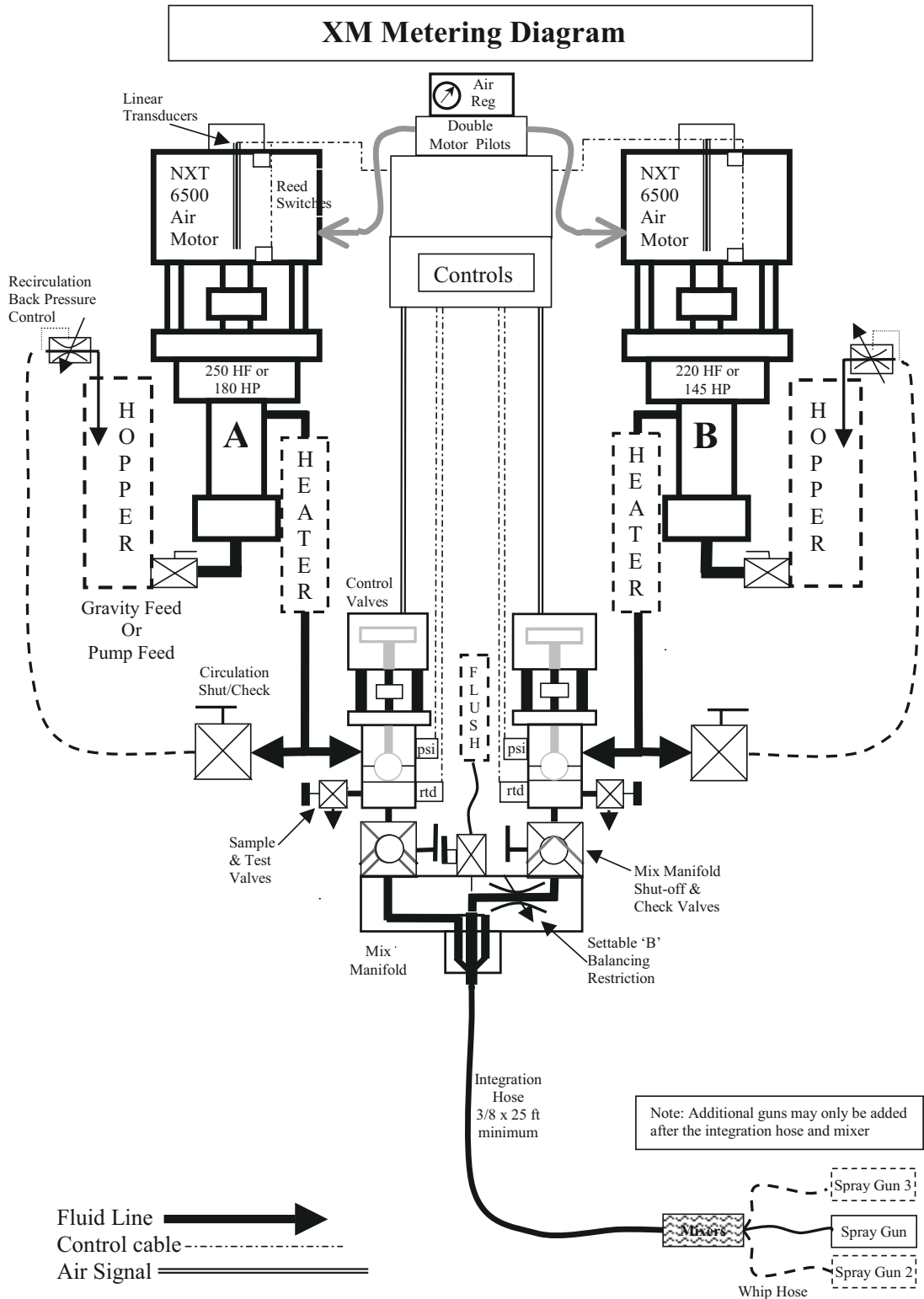
It is recommended that users use the 4GB USB flash drive (16A004) included with the XM sprayer for data download. However, the following USB flash drives can also be used, but are not available through Graco.

- Crucial Gizmo!™ 4GB USB flash drive (model JDO4GB-730)
- Transcend JetFlash® V30 4GB USB flash drive (model TS4GJFV30)

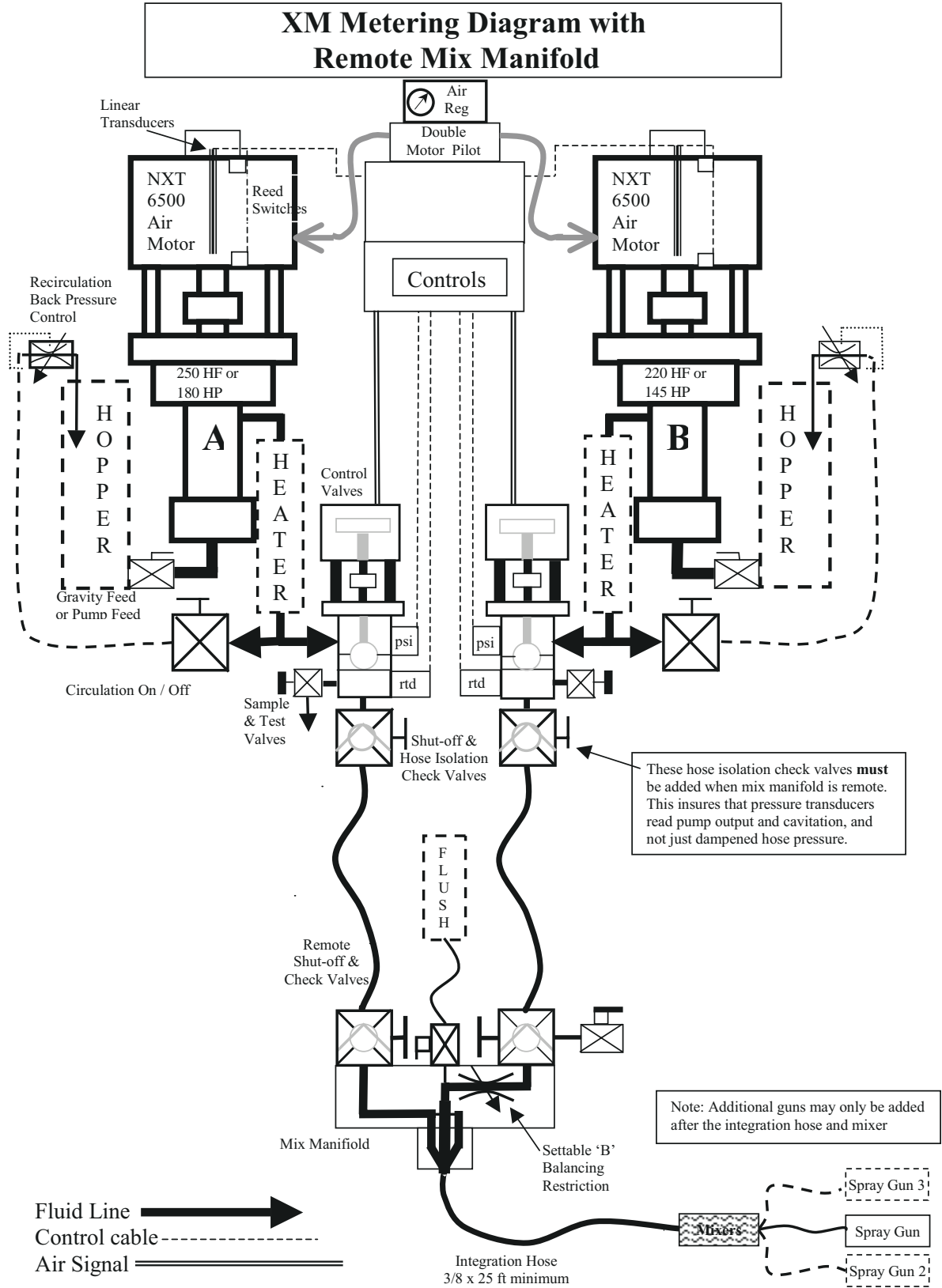
Appendix B

Metering Diagrams

Metering Diagram without Remote Mix Manifold



Metering Diagram with Remote Mix Manifold



Appendix C

Power Cord Guidelines

Use the guidelines listed in the following table to determine the power cord needed for your specific system.

Table 3: Power Cord Guidelines

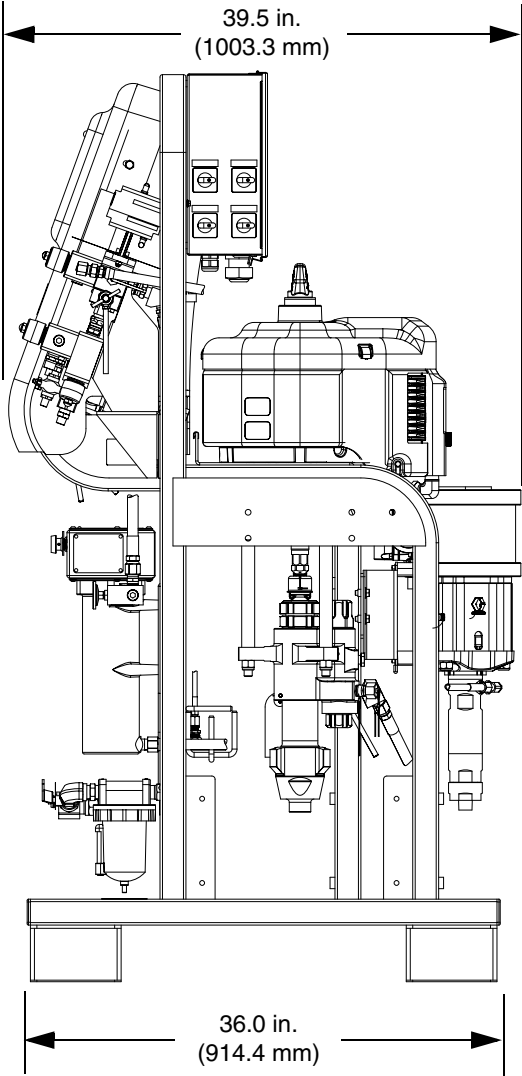
	XM_A (00, 11, 13, 21, 23)	XM_A (14-19, 24, 29)	XM_B (all)	XM_D (00, 11, 13, 21, 23)	XM_D (17, 19, 27, 29)	XM_E (all)
Power Supply	wall	wall	wall; junction box	alternator	alternator	alternator
Viscon HP Fluid Heaters	N/A	N/A	2 heaters	N/A	N/A	2 heaters
Configuration Options:						
Controls	1 A, 120 Vac	1 A, 120/240 Vac	1 A, 240 Vac	N/A	N/A	N/A
Viscon HP (2)	N/A	N/A	32 A at 240 Vac, 1 PH	N/A	N/A	32 A at 240 V, 1 PH (wired by user with explosion proof methods)
Hopper Immersion Heaters (2)	N/A	13 A at 240 V, 1 PH	13 A at 240 V, 1 PH	N/A	N/A	N/A
Viscon HP with Heat Circulation (1)	N/A	16 A at 240 V, 1 PH♦ or 15 A at 240 V, 1 PH♦	16 A at 240 V, 1 PH or 15 A at 240 V, 1 PH	N/A	16 A at 240 V, 1 PH (wired by user with explosion proof methods)	16 A at 240 V, 1 PH (wired by user with explosion proof methods)
Electric Hose Control (1)	N/A			N/A	N/A	N/A
* Full Load Peak Amperes at 240 V, 1 Phase	1 A	30 A	62 A	0 A (air only)	16 A	48 A
Cord Specification AWG (mm²) at:						
240 V, 1 PH	N/A	♦	4 (21.2) 2 wire + ground	N/A	N/A	N/A
240 V, 3 PH			6 (13.3) 3 wire + ground			
380 V, 3 PH			6 (13.3) 4 wire + ground			

♦ Wired by user if ordered. Cord size determined by user.

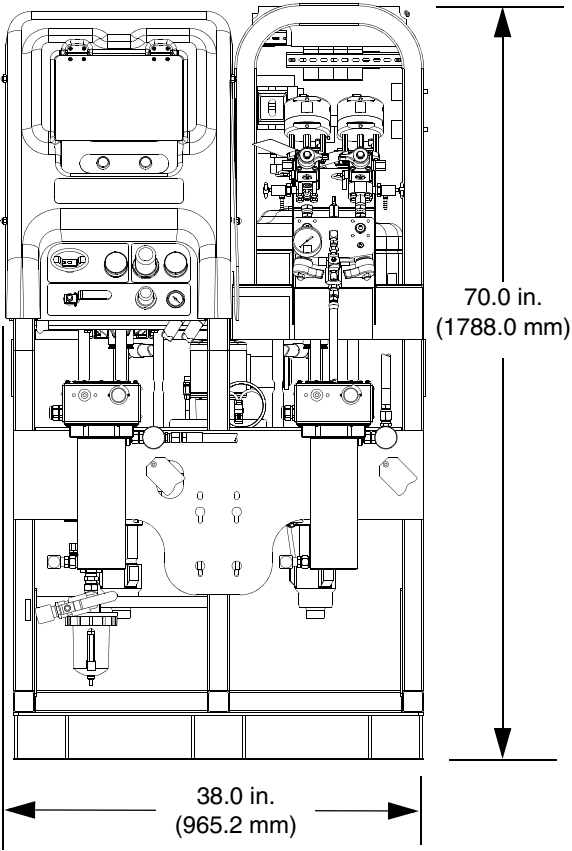
* Full load amperes with all components operating at maximum capabilities. Fuse requirements for various flow rates and heater temperature settings may be less.

Dimensions

System Dimensions without Hoppers



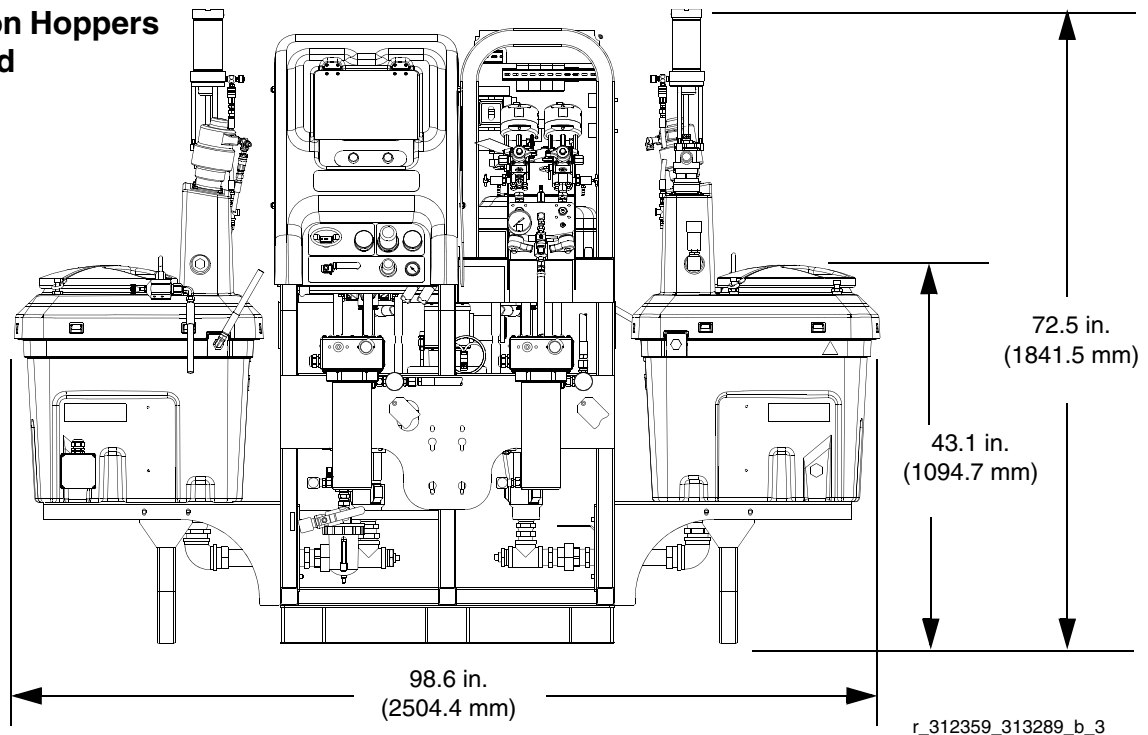
r_xm1a00_312359_313289_12a



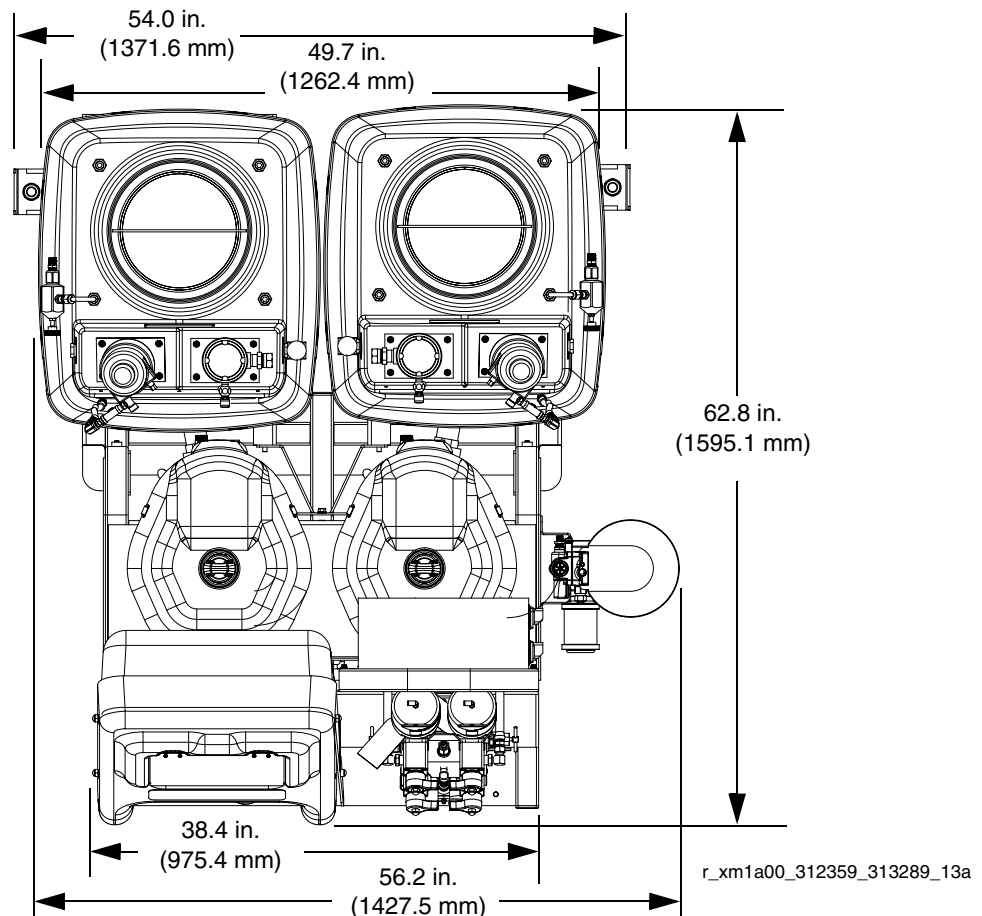
r_312359_313289_b_2

System Dimensions with Hoppers

**Two 20-Gallon Hoppers
Side Mounted**

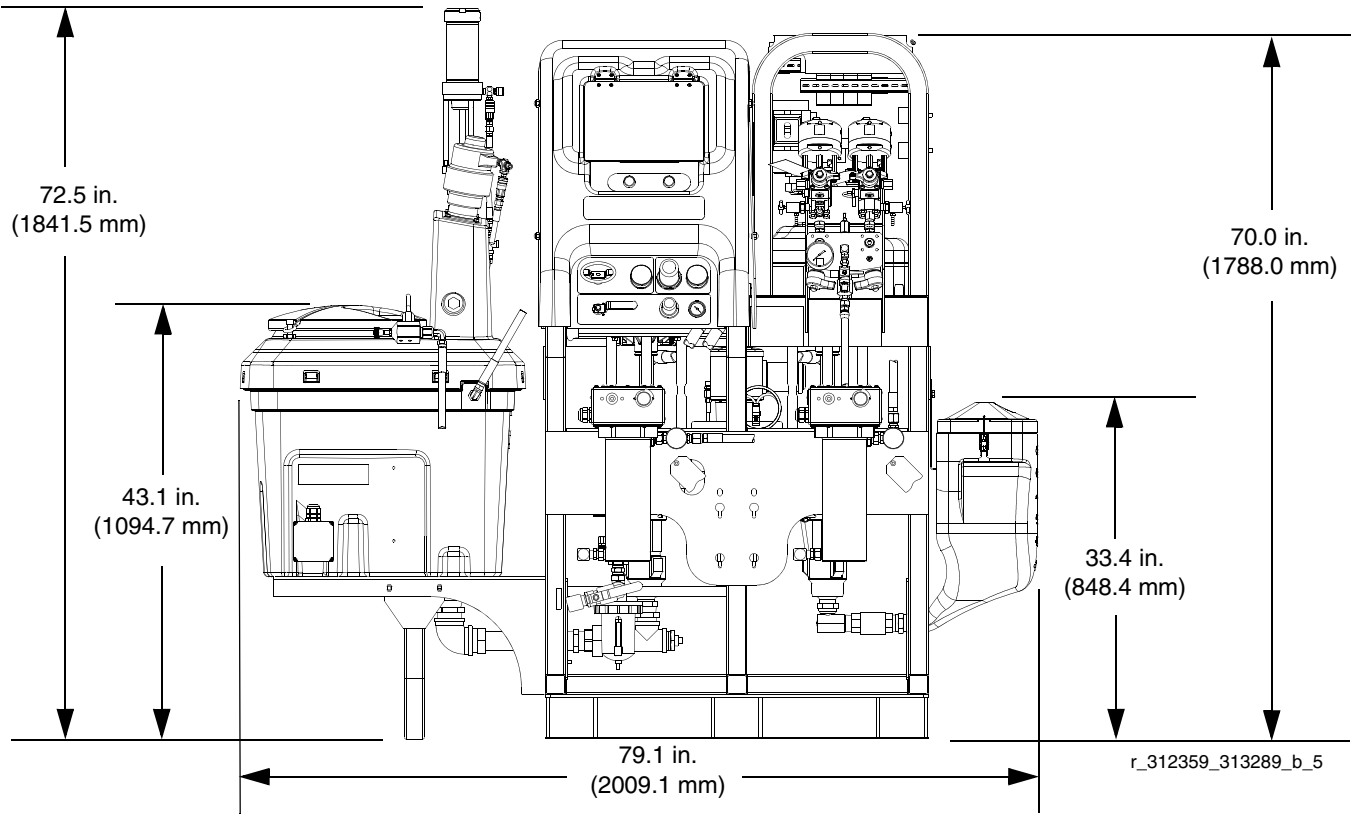


**Two 20-Gallon Hoppers
Rear Mounted
(Top View)**

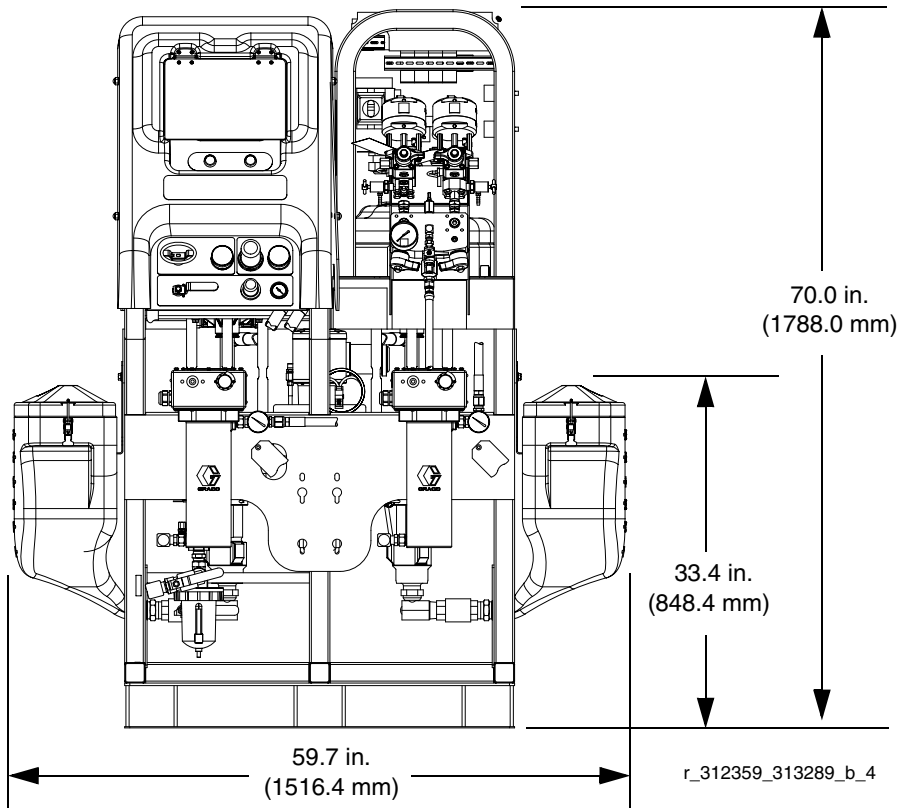


System Dimensions with Hoppers

One 20-Gallon Hopper and One 7-Gallon Hopper



Two 7-Gallon Hoppers



Pump Performance Charts

Calculate Fluid Outlet Pressure

To calculate fluid outlet pressure (MPa/bar/psi) at a specific fluid flow (lpm/gpm) and operating air pressure (MPa/bar/psi), use the following instructions and pump data charts.

1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected fluid outlet pressure curve. Follow left to scale to read fluid outlet pressure.

Calculate Pump Air Consumption

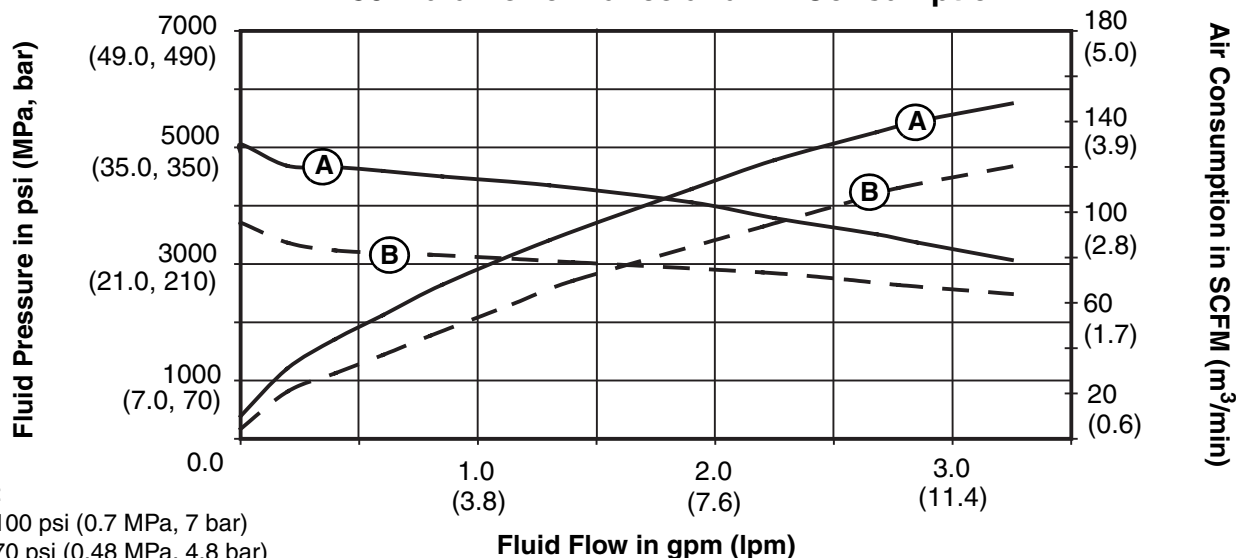
To calculate pump air consumption (m^3/min or scfm) at a specific fluid flow (lpm/gpm) and air pressure (MPa/bar/psi), use the following instructions and pump data charts.

1. Locate desired flow along bottom of chart.
2. Follow vertical line up to intersection with selected air consumption curve. Follow right to scale to read air consumption.

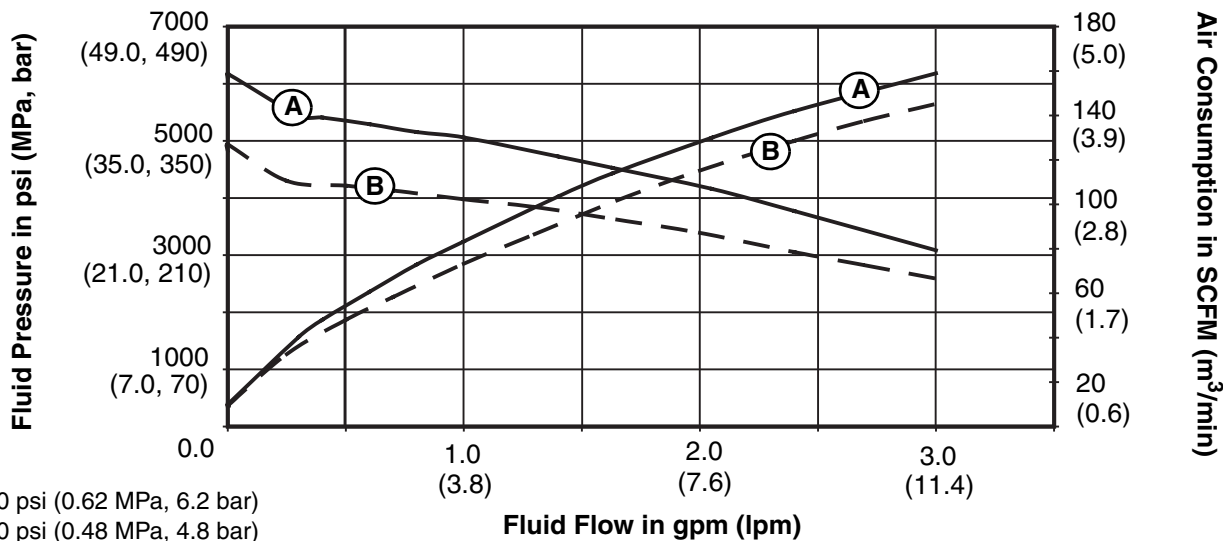
NOTE: Ratio setpoint has no significant effect on curves in either performance chart.

Air consumption includes turbine alternator; it does not include feed pumps or agitators.

XM50 Fluid Performance and Air Consumption



XM70 Fluid Performance and Air Consumption



Technical Data

Mixed ratio range	1:1-10:1 (in 0.1 increments)
Ratio tolerance range (before alarm)	+/- 5%
Flow rates	
Minimum	1 qt./min. (0.95 liter/min.)*
Maximum	3 gal./min/ (11.4 liter/min.)
Fluid viscosity range	200-20,000 cps (heavier viscosities can be mixed using heat, circulation, and/or pressure feeding)
Fluid filtration	60 mesh, (238 micron) standard on pump outlets (filter assembly not included on some models); alternative 30 mesh screens included
Air inlet	3/4 npt(f)
Fluid inlets without feed kits	1 1/4 npt(m)
Maximum fluid working pressure of mixed material	
50:1	5200 psi (35.8 MPa, 358 bar)
70:1	6300 psi (43.5 MPa, 435 bar)
Maximum fluid temperature	160° F (71° C)
Air supply pressure range	50-150 psi (0.35-1.0 MPa, 3.5-10.3 bar)
Maximum pump air set pressure	
50:1	100 psi (0.70 MPa, 7.0 bar)
70:1	90 psi (0.62 MPa, 6.2 bar)
Maximum pump inlet fluid feed pressure	250 psi (1.7 MPa, 17 bar)
Maximum air consumption at 100 psi (0.7 MPa, 7.0 bar)	
in scfm (m ³ /min.)	70 scfm per gpm (1.96 m ³ /min. per lpm)
Air filtration	40 micron main filter, 5 micron control air filter; see Pump Performance Charts , page 80
Ambient temperature range	
Operating	32-130° F (0-54° C)
Storage	30-160° F (-1-71° C)
Environmental conditions rating	Indoor/outdoor use
	Altitude up to 4000 m
	Maximum relative humidity to 99% up to 130° F (54° C)
	Pollution degree (11)
	Installation category (2)
Sound pressure	86 dBA at 100 psi (0.7 MPa, 7 bar)
Sound power	98 dBA at 100 psi (0.7 MPa, 7 bar)
Wetted parts	
Suction tubes	aluminum
Flush pump	carbide, PTFE, stainless steel, UHMWPE
Hoses	nylon
Pumps (A and B)	carbon steel, alloy steel, 303, 440, 17-ph grades stainless steel, zinc and nickel plating, ductile iron, tungsten carbide, PTFE
Metering valves	carbon steel, nickel plating, carbide, polyethylene, leather
Manifold	carbon steel, nickel plating, carbide, 302 stainless steel, PTFE, UHMWPE
Mixer	stainless steel housing with acetal elements
Spray gun	Refer to spray gun manual
Dimensions	See Dimensions , page 77
Weight	Base sprayer (XM1A00 and XM5A00 models) 742 lbs (336.87 kg) (Add component weights to base sprayer weight for your specific model weight.)

* Minimum flow rate is dependent on material being sprayed and mixing capability. Test your material specific to flow rate.

Graco Standard Warranty

Graco warrants all equipment referenced in this document which is manufactured by Graco and bearing its name to be free from defects in material and workmanship on the date of sale to the original purchaser for use. With the exception of any special, extended, or limited warranty published by Graco, Graco will, for a period of twelve months from the date of sale, repair or replace any part of the equipment determined by Graco to be defective. This warranty applies only when the equipment is installed, operated and maintained in accordance with Graco's written recommendations.

This warranty does not cover, and Graco shall not be liable for general wear and tear, or any malfunction, damage or wear caused by faulty installation, misapplication, abrasion, corrosion, inadequate or improper maintenance, negligence, accident, tampering, or substitution of non-Graco component parts. Nor shall Graco be liable for malfunction, damage or wear caused by the incompatibility of Graco equipment with structures, accessories, equipment or materials not supplied by Graco, or the improper design, manufacture, installation, operation or maintenance of structures, accessories, equipment or materials not supplied by Graco.

This warranty is conditioned upon the prepaid return of the equipment claimed to be defective to an authorized Graco distributor for verification of the claimed defect. If the claimed defect is verified, Graco will repair or replace free of charge any defective parts. The equipment will be returned to the original purchaser transportation prepaid. If inspection of the equipment does not disclose any defect in material or workmanship, repairs will be made at a reasonable charge, which charges may include the costs of parts, labor, and transportation.

THIS WARRANTY IS EXCLUSIVE, AND IS IN LIEU OF ANY OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO WARRANTY OF MERCHANTABILITY OR WARRANTY OF FITNESS FOR A PARTICULAR PURPOSE.

Graco's sole obligation and buyer's sole remedy for any breach of warranty shall be as set forth above. The buyer agrees that no other remedy (including, but not limited to, incidental or consequential damages for lost profits, lost sales, injury to person or property, or any other incidental or consequential loss) shall be available. Any action for breach of warranty must be brought within two (2) years of the date of sale.

GRACO MAKES NO WARRANTY, AND DISCLAIMS ALL IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE, IN CONNECTION WITH ACCESSORIES, EQUIPMENT, MATERIALS OR COMPONENTS SOLD BUT NOT MANUFACTURED BY GRACO. These items sold, but not manufactured by Graco (such as electric motors, switches, hose, etc.), are subject to the warranty, if any, of their manufacturer. Graco will provide purchaser with reasonable assistance in making any claim for breach of these warranties.

In no event will Graco be liable for indirect, incidental, special or consequential damages resulting from Graco supplying equipment hereunder, or the furnishing, performance, or use of any products or other goods sold hereto, whether due to a breach of contract, breach of warranty, the negligence of Graco, or otherwise.

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For the latest information about Graco products, visit www.graco.com.

TO PLACE AN ORDER, contact your Graco distributor or call to identify the nearest distributor.

Phone: 612-623-6921 **or Toll Free:** 1-800-328-0211 **Fax:** 612-378-3505

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Graco reserves the right to make changes at any time without notice.*

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