FoamMix^{r} A/T System

Customer Product Manual
Part 108 240D

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Safety

Section 1
Safety

1. Introduction

This section contains general safety instructions for using your Nordson equipment. Task- and equipment-specific warnings are included in other sections of this manual where appropriate. Note all warnings and follow all instructions carefully. Failure to do so may result in personal injury, death, or property damage.

To use this equipment safely,

- read and become familiar with the general safety instructions provided in this section of the manual before installing, operating, maintaining, or repairing this equipment.
- read and carefully follow the instructions given throughout this manual for performing specific tasks and working with specific equipment.
- store this manual within easy reach of personnel installing, operating, maintaining, or repairing this equipment.
- follow all applicable safety procedures required by your company, industry standards, and government or other regulatory agencies.
- obtain and read Material Safety Data Sheets (MSDS) for all materials used. Contact your material supplier for this information.

2. Safety Symbols

Become familiar with the safety symbols presented in this section. These symbols will alert you to safety hazards and conditions that may result in personal injury, death, or property and equipment damage.

WARNING: Failure to observe this warning may result in personal injury, death, or equipment damage.

2. Safety Symbols (contd.)

WARNING: Risk of electrical shock. Failure to observe this warning may result in personal injury, death, or equipment damage.

WARNING: Disconnect equipment from line voltage. Failure to observe this warning may result in personal injury, death, or equipment damage.

WARNING: Risk of explosion or fire. Fire, open flames, and smoking prohibited.

WARNING: Wear protective clothing, safety goggles, and approved respiratory protection. Failure to observe may result in serious injury.

WARNING: Hot! Risk of burns. Wear heat-protective clothing, safety goggles with side shields and/or heat-protective gloves depending on the symbol shown.

WARNING: System or material pressurized. Relieve pressure. Failure to observe this warning may result in serious injury or death.

WARNING: Injection hazard. Do not point this device at yourself or other personnel. Failure to observe this warning may result in serious injury or death.

CAUTION: Failure to observe may result in equipment damage.

CAUTION: Hot surface. Failure to observe may result in burns.

3. Qualified Personnel

"Qualified personnel" is defined here as individuals who thoroughly understand the equipment and its safe operation, maintenance, and repair. Qualified personnel are physically capable of performing the required tasks, familiar with all relevant safety rules and regulations, and have been trained to safely install, operate, maintain, and repair the equipment. It is the responsibility of the company operating the equipment to see that its personnel meet these requirements.

4. Intended Use

WARNING: Use of this equipment in ways other than described in this manual may result in personal injury, death, or property and equipment damage. Use this equipment only as described in this manual.

Nordson Corporation cannot be responsible for injuries or damages resulting from nonstandard, unintended applications of its equipment. This equipment is designed and intended only for the purpose described in this manual. Uses not described in this manual are considered unintended uses and may result in serious personal injury, death, or property damage. Unintended uses may result from taking the following actions:

- making changes to equipment that have not been recommended or described in this manual or using parts that are not genuine Nordson replacement parts
- failing to make sure that auxiliary equipment complies with approval agency requirements, local codes, and all applicable safety standards
- using materials or auxiliary equipment that are inappropriate or incompatible with your Nordson equipment
- allowing unqualified personnel to perform any task

5. Installation

Read the installation section of all system component manuals before installing your equipment. A thorough understanding of system components and their requirements will help you to install the system safely and efficiently.

- Allow only qualified personnel to install Nordson and auxiliary equipment.
- Use only approved equipment. Using unapproved equipment in an approved system may void agency approvals.

5. Installation (contd.)

- Make sure all equipment is rated and approved for the environment in which you are using it.
- Follow all instructions for installing components and accessories.
- Install all electrical, pneumatic, gas, and hydraulic connections to local code.
- Install locking, manual shutoff valves in the air supply lines to the system. This allows you to relieve air pressure and lock out the pneumatic system before undertaking maintenance and repairs.
- Install a locking disconnect switch or breaker in the service line ahead of any electrical equipment.
- Use only electrical wire of sufficient gauge and insulation to handle the rated current demand. All wiring must meet all applicable codes.
- Ground (and fuse, if necessary) all electrically conductive equipment within 10 feet (3 meters) of the spray area or according to its rated current consumption. (See the ID plate on your equipment.) Ungrounded conductive equipment can store a static charge which could ignite a fire or cause an explosion if a hot spark is discharged.
- Route electrical wiring, cables, hoses, and air supply tubing along a protected path. Make sure they will not be damaged. Do not bend cables or hoses around a radius of less than 6 in. (152 mm).
- Use only designated lifting points or lugs to lift and move heavy equipment. Always balance and block loads when lifting to prevent shifting. Lifting devices must be inspected, certified, and rated for a greater weight than the equipment being lifted.
- Do not use unapproved fluid hoses. Solvents may cause them to deteriorate rapidly and allow flammable liquids or pressurized material to escape.
- Protect components from damage, wear, and harsh environmental conditions.
- Allow ample room for maintenance, material supply container drop-off and loading, panel accessibility, and cover removal.
- Protect equipment with safety devices as specified by applicable safety regulations.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning.

6. Operation

Only qualified personnel, physically capable of operating the equipment and with no impairments to their judgement or reaction times, are permitted to operate this equipment.

Read all component manuals before operating your Nordson equipment. A thorough understanding of components and their operation will help you operate the system safely and efficiently.

- Before starting this equipment, check all safety interlocks, fire-detection systems, and protective devices such as panels and covers. Make sure all devices are fully functional. Do not operate the system if these devices are not working properly. Do not deactivate or bypass automatic safety interlocks, locked-out electrical disconnects, or pneumatic valves.

- Never operate equipment with a known malfunction or leak.

- Do not attempt to operate electrical equipment if standing water is present.

- Know where EMERGENCY STOP buttons, safety shutoff components, and fire extinguisher are located. Make sure they work. If a component malfunctions, shut down and lock out the equipment immediately.

- Know the pinch points, temperatures, pressures, and dispense material composition for all equipment that you are working with. Recognize potential hazards associated with these and exercise appropriate caution.

- Use this equipment only in the environments for which it is rated. Do not operate this equipment in humid, flammable, or explosive environments unless it has been rated for safe operation in these environments.

- Before operating, make sure all equipment, objects being sprayed, and fluid containers are connected to a true earth ground.

- Do not remove guards while unit is in operation. Failure to observe may cause personal injury from moving mechanical parts under the guards.

6. Operation (contd.)

- Never touch exposed electrical connections or equipment while the power is ON.
- If you notice electrical arcing in a spray area, shut down the system immediately. An arc can cause a fire or explosion.
- Do not operate the equipment at pressures higher than the rated maximum working pressure of any component in the system.
- Keep parts of the body or loose clothing away from moving equipment or parts. Remove jewelry and cover or tie back long hair.
- Shut off moving equipment before taking measurements or inspecting workpieces.
- Wear National Institute of Occupational Safety and Health (NIOSH) approved respirators while operating spray equipment and when performing maintenance and cleaning tasks.
- Wear gloves, eye protection, and protective clothing to protect your skin when operating equipment.
- If your skin has been exposed to dispense materials or solvents wash frequently with soap and water, especially before eating or drinking. Do not use solvents to remove coating materials from your skin.
- Do not use high-pressure compressed air to blow dust or powder off your skin or clothes. High-pressure compressed air can be injected under the skin and cause serious injury or death. Treat all high-pressure fittings and hoses as if they could leak and cause injury.
- Never point handguns or applicator nozzles at yourself or other persons.
- Do not smoke in the spray area. A lit cigarette could ignite a fire or cause an explosion.
- Keep paint pumps, pressure pots, and containers of flammable materials far enough away from spray booths to prevent their inclusion in a booth fire.
- Make sure the liquid in the heater is circulated to the external circuit when the heater is operating.
- Do not use fluids that will corrode the equipment.

7. Less-Obvious Dangers

Operators should also be aware of less-obvious dangers in the workplace that often cannot be completely eliminated:

- exposed surfaces on the equipment which may be hot or have sharp edges and cannot be practically safeguarded
- ungrounded conductive equipment which may continue to store an electrostatic charge after the equipment has been shut off
- vapors and materials which may cause allergic reactions or other health problems
- automatic hydraulic, pneumatic, or mechanical equipment or parts that may move without warning
- unguarded, moving mechanical assemblies

8. Action in the Event of a System or Component Malfunction

Do not operate a system that contains malfunctioning components. If a component malfunctions, turn the system OFF immediately.

- Disconnect and lock out electrical power. Close and lock out hydraulic and pneumatic shutoff valves and relieve pressures.
- Allow only qualified personnel to make repairs.

9. Maintenance and Repair

Allow only qualified personnel to perform maintenance, troubleshooting, and repair tasks.

- Always wear appropriate protective clothing and use safety devices when working on this equipment.
- Follow the recommended maintenance procedures in your equipment manuals.
- Do not service or adjust any equipment unless another person trained in first aid and CPR is present.
- Use only genuine Nordson replacement parts. Using unapproved parts or making unapproved modifications to equipment may void agency approvals and create safety hazards.

9. Maintenance and Repair *(contd.)*

- Refer to MSDS before using solvents to clean this equipment. The MSDS will provide use, storage, and disposal information about the solvent. Read this information carefully and follow all instructions.

WARNING: Note the flash point of the cleaning solvent used. Only use controlled methods and equipment, such as temperature-controlled or explosion-protected heaters, to heat cleaning solvent. Observe explosion-prevention regulations and follow applicable safety instructions.

- Never use an open flame to clean the unit or components of the unit.
- Do not store flammable materials in the spray area or room. Keep paint pumps, pressure pots, and containers of flammable materials far enough away from spray booths to prevent their inclusion in a booth fire. If a fire or explosion occurs, flammable materials in the area will increase the chances and the extent of personal injuries and property damage.
- Make sure that the room where you are working is sufficiently ventilated. Avoid breathing vapors over prolonged periods of time.
- Check interlock systems periodically to ensure their effectiveness.
- Check all ground connections periodically with a megohm meter. Resistance to ground must not exceed one megohm. If sparks or arcing occur, shut down the system immediately.
- Make sure the spray area floor is conductive to ground and that the operator's platform is grounded.
- Connect all disconnected equipment ground cables and wires after servicing the equipment. Ground conductive equipment.
- Disconnect, lock out, and tag electrical power at a disconnect or breaker in the service line ahead of electrical equipment before servicing.

WARNING: Service lines connected to panel disconnect switches may still be energized unless they are disconnected. Make sure the power is off before servicing. Wait five minutes for the capacitors to discharge after shutting off the electrical power.

- If a "power on" test is required, perform the test carefully and then shut off and lock out power as soon as the test is over.

9. Maintenance and Repair (contd.)

- Never troubleshoot a power supply without first disconnecting all external power supplies and discharging the high-voltage capacitors with an insulated screwdriver.
- Do not attempt to service electrical equipment if there is standing water present. Do not service electrical equipment in a high-humidity environment.
- Use tools with insulated handles when working with electrical equipment.
- Keep high-voltage connection points clean and protected with dielectric grease or oil.
- Relieve air and fluid pressures before servicing equipment. Follow the specific instructions in this manual.
- Do not attempt to service a moving piece of equipment. Shut off the equipment and lock out power. Secure the equipment to prevent uncontrolled movement.
- If you must disassemble a spring-loaded component, carefully preload the spring first if it is possible to do so.

10. Material and Solvent Precautions

WARNING: Hot! Risk of burns. Wear heat-protective clothing, safety goggles with side shields and/or heat-protective gloves.

Heated materials may cause severe burns on contact. Remember that some materials, even solid materials, may retain heat for some time. If you are burned by a heated material, immediately cool the affected skin with lots of cool, clean water. Do not try to remove hot, melted material from the skin. Seek immediate medical attention.

High-pressure fluids, unless they are safely contained, are extremely hazardous. A jet of high-pressure fluid can act like a knife or needle, penetrate skin and muscle, and inject itself into your body. Injected fluids can cause toxic poisoning.

10. Material and Solvent Precautions (contd.)

Do not treat an injection injury as minor. Seek medical care immediately. Inform the medical staff at the hospital that you have an injection injury and identify the fluid that was injected. If possible, give the doctor copies of the MSDS for the injected fluid and for any additives, such as solvents, that are in the injected fluid.

Nordson recommends that you carry a National Safety Equipment Manufacturers Association (NSEMA) wallet card to give to emergency medical staff in the event of an injection injury. These cards are supplied with the equipment. Additional cards are available free from Nordson Corporation.

WARNING: Injection hazard. Do not go near a known leak in a hose or fitting, and stay clear of all dispensing device nozzles or orifices. Do not point a dispensing device at yourself or other personnel. The high-pressure fluid stream can penetrate skin and inject fluid into the body causing serious injury or death.

- Always handle fluid dispensing devices carefully. Do not point the nozzle of a pressurized device at yourself or other personnel.
- Never place hands, fingers, or other parts of your body directly over a nozzle or near a leak in a high-pressure system.
- Never “back-flush” the nozzles. Blocking a nozzle causes the high-pressure fluid to change direction. An injection injury may result.
- Always relieve system pressure before servicing equipment. Trigger all dispensing devices and bleed off system pressure.

Halogenated hydrocarbon solvents can cause an explosion when used with aluminum components in a pressurized fluid pumping system (pumps, heaters, filters, valves, spray guns, and tanks). The explosion could cause serious bodily injury, death, or substantial property damage. No available stabilizers will prevent this violent reaction from happening.

WARNING: Never use halogenated hydrocarbon solvents to clean aluminum parts or to flush any system. Cleaning agents, coatings and paints, or adhesives may contain halogenated hydrocarbon solvents. Obtain and read MSDS for each material and solvent being used.

- Use nonhalogenated solvents.

10. Material and Solvent Precautions (contd.)

- Contact your solvent supplier to determine whether your existing materials and solvents contain halogenated hydrocarbons or to obtain a suitable, nonhalogenated hydrocarbon solvent for cleaning and flushing your system.

- See Table 1-1. Check the labels on your solvent containers. Halogenated hydrocarbon solvents can be recognized if any of the following elements are listed in the name of the product or or as an ingredient:

Element	Symbol	Prefix
Flourine	F	“Flouro-”
Chlorine	Cl	“Chloro-”
Bromine	Br	“Bromo-”
Iodine	I	“Iodo-”

- Pump the system empty, shut off the pumps, and relieve the system pressure.

- Disassemble and inspect the system components. Replace any damaged or corroded parts.

- Thoroughly clean all noncorroded parts with nonhalogenated hydrocarbon solvents before reassembling the system.

- Contact your coatings, solvent, or adhesive supplier for a nonhalogenated solvent to thoroughly flush the entire system before operating it.

- If you must use halogenated hydrocarbon solvents, consult your Nordson representative about compatible Nordson components.

10. Material and Solvent Precautions (contd.)

Table 1-1 Solvents Containing Halogenated Fluids

Chlorinated Solvents	Iodinated Solvents	Brominated Solvents	Fluorocarbon Solvents
Carbon Tetrachloride	Ethyl Iodide	Ethylene Dibromide	Dichlorofluoromethane
Chloroform	Methyl Iodide	Methyl Bromide	Trichlorofluoromethane
Ethylene Dichloride	N-butyl Iodide	Methylene Chlorobromide	Freon
Methylene Chloride	Propyl Iodide		
1-1-1 Trichloroethane			
Monochlorobenzene			
Orthodichlorobenzene			
Perchloroethylene			
Trichloroethylene			

11. Disposal

Dispose of equipment and materials used in operation and cleaning according to your local regulations.

Section 2

Description

Section 2
Description

1. Introduction

See Figure 2-1. The FoamMix A/T system mixes material with air to produce a uniform-density foamed material. Air is usually mixed in with the material, but various kinds of gas may be used to achieve the desired end-product. The system consists of electrical and mechanical enclosures.

The electrical enclosure has a light tower, disconnect switch, display, and keypad. The left side of the enclosure has a 120-Vac outlet for computer or external disk drive power; the right side has two customer I/O connections and two serial ports.

The mechanical enclosure contains the material and air connection points, and the cooling fans. The material connections are located on either the left or right side of the mechanical enclosure, depending on your unit.

1. Introduction (contd.)

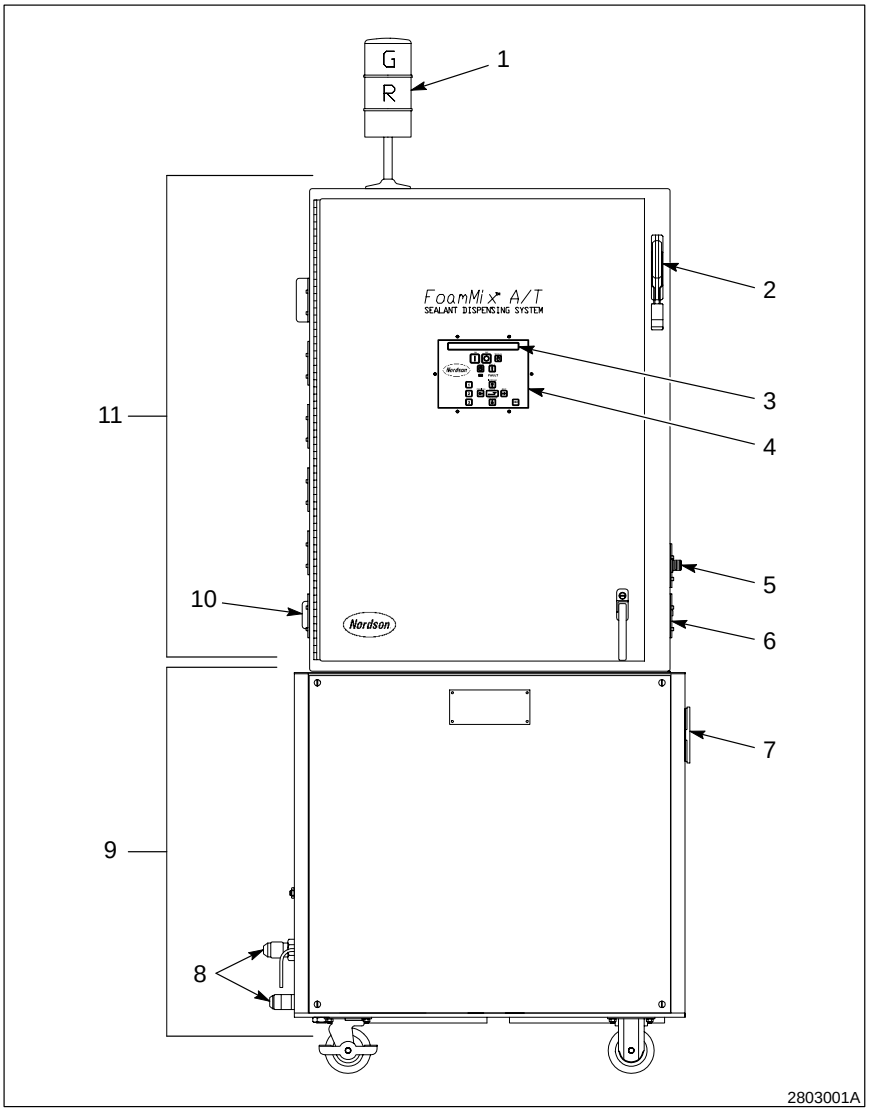


Fig. 2-1 FoamMix A/T System (left-hand model)

1. Light tower
2. Disconnect switch
3. Display
4. Control panel
5. Customer I/O connections (J1 and J2)
6. Serial communication ports (1 and 2)
7. Cooling fans
8. Fluid connection points
9. Mechanical enclosure
10. 120-Vac outlet
11. Electrical enclosure

2. Description

The following paragraphs provide a description of the FoamMix A/T system features.

Control Panel

The control panel consists of a keypad and display. Use the keypad to enter operating settings and system setpoints. To prevent unauthorized data entries, you must enter two passwords to change the setup.

These system functions can be shown on the display:

- system operating modes, pressures, and temperatures
- material and air flow rates
- motor speed and current
- material-to-air ratio of foamed material
- diagnostic messages

System Diagnostics

Sensors will shut down the system and activate a light in the light tower in the event of a major fault or emergency condition.

Remote Signal Output

Connectors J1 and J2 provide system ready, system fault, and pump interlock signals to remote signal or control devices.

Process Data Logging Function

The process data logging (PDL) function collects production data during normal operation:

- time and date of each entry
- part identifier
- volume of material dispensed
- volume of air dispensed
- operating settings
- faults

The data log can be downloaded at any time from the two RS-232 serial ports to a personal computer or optional external disk drive.

Inlet and Outlet Sampling Gun Ports

Sampling guns and hoses connect to the inlet and outlet ports of the FoamMix A/T unit. This feature allows you to check the material at the inlet and foamed material at the outlet points in the process.

Air Regulator

An air regulator in the mechanical enclosure can adjust air pressure to operate the optional mastic regulator.

3. Theory of Operation

See Figure 2-2. The FoamMix A/T system combines material with air to produce a uniform-density foamed material. As the dispensing gun deposits the material onto the substrate, the air inside the material expands. This expansion produces the foamed material.

A flow meter measures the volume of material that enters the mixer. The controller monitors and controls the air added to the material in the mixer. A process controller regulates the density of the foamed material.

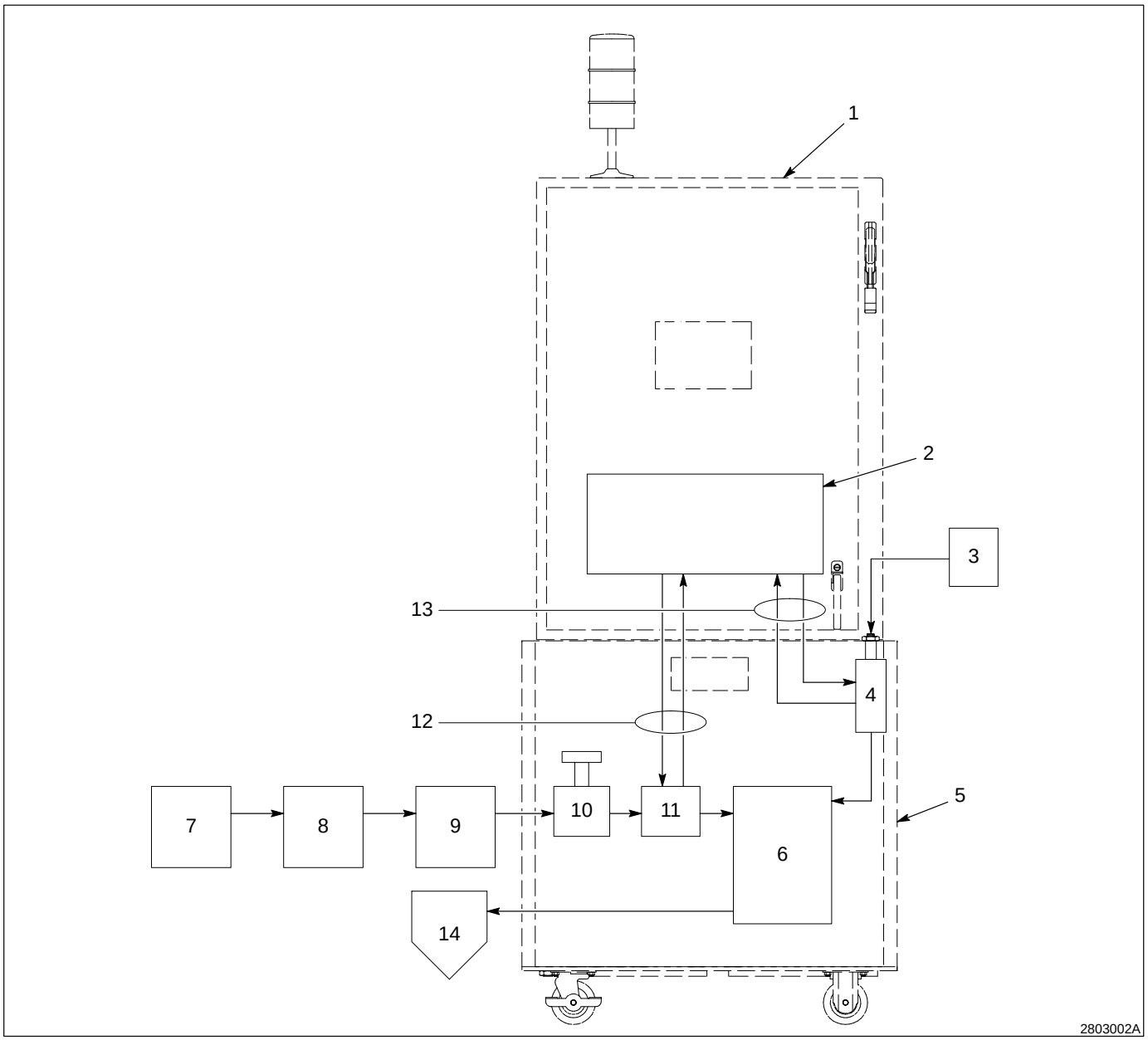


Fig. 2-2 System Block Diagram

1. Electrical enclosure
2. Process controller
3. High-pressure air source
4. Air control sensor and valve
5. Mechanical enclosure
6. Mixer
7. Material delivery system or pump
8. Optional filter
9. Optional mastic regulator
10. Shut-off dump valve
11. Flow meter
12. Flow meter signal cable
13. Density reduction signal cable
14. Dispensing gun

4. Sub-Systems

The mechanical enclosure of the FoamMix A/T system contains four sub-systems:

- Low-pressure air
- High-pressure air
- Material
- Oil

Low-Pressure Air

See Figure 2-3 and Table 2-1. The low-pressure air system supplies air to the optional mastic regulator, the oil pump, and the three-way shut-off bleed valve. Pressure gauges and regulator valves control and monitor system air pressures. The customer must provide a low-pressure air source for the FoamMix A/T system.

Table 2-1 Low Pressure Air Sub-System

Description	Function
Regulator valve V1, Pressure gauge G1	Supplies air to the mastic regulator on the external filter package. Maximum material pressure is 248.3 bar (3600 psig).
Regulator valve V2, Pressure gauge G2	Supplies air to three-way shut-off bleed valve V9. Must be set to 50 psig (3 bar).
Regulator valve V3, Pressure gauge G3	Supplies air to the oil pump. Maximum oil pressure at oil pump is 248.3 bar (3600 psig).
Low-pressure air filter F1	Filters low-pressure air to the system.
Low-pressure air manifold M1	Supplies air to air regulator valves V2 and V3.
Shut-off valve actuator A1 and solenoid valve V8	Drives the shut-off/bleed valve V9 if a system fault occurs (low oil pressure fault).
Three-way shut-off bleed valve V9	Isolates the unit from pump pressure if a fault occurs and relieves material pressure at mixer.
Oil pump solenoid valve V17	Shuts off or turns on the low-pressure air to oil pump P1.

High-Pressure Air

See Figure 2-3 and Table 2-2. The high-pressure air system injects a precise volume of air into the material to produce the foamed material. A process controller regulates the density of the foamed material. Pressure gauges and regulator valves control and monitor system air pressures. The customer must provide a high-pressure air source for the FoamMix A/T system.

Table 2-2 High-Pressure Air Sub-System

Description	Function
Adjustable back pressure check valve V14	Protects the back pressure regulator V12 if the differential pressure between the inlet and regulator dome exceeds 24.8 bar (360 psig).
High pressure air regulator V11	Regulates the high-pressure air supply to the mixer.
Pressure transducer PT4	Monitors the air mixer pressure.
Pressure transducer PT3	Monitors air manifold pressure.
High pressure air manifold M3	Receives high-pressure air from the source.
High-pressure air shut-off valve V10	Shuts off the high-pressure air supply at the inlet of manifold M3.
High pressure air filter/dryer F2, Desiccant cartridge, Micron filter	Traps all particles 7 microns or larger before they enter the high pressure air circuit. The dryer ensures that the high-pressure air supply contains no more than 5 ppm of water.
Air flow sensor FS2, air solenoid control valve V16	Regulates high pressure air flow to the mixer as part of a closed-loop system. V16 controls air flow into the mixer. FS2 sends a signal to the process controller for comparison and control signal adjustment, if any.
Mixer check valve V13	Protects the air components from damage if the material pressure exceeds the mixer air pressure
High pressure air relief valve V15	Provides an external dump for air pressure if the pressure rises above 248.3 bar (3600 psi).
Back pressure regulator valve V12	Controls the pressure drop across the air solenoid control valve V16 and sensor FS2 to maintain the calibrated accuracy of the valve. Maintains a constant 2 bar (30 psig) regardless of the air flow or upstream pressure.

Material

See Figure 2-3 and Table 2-3. The material sub-system delivers pre-foamed material to the mixer. Pressure gauges and regulator valves control and monitor air pressures.

The mixer assembly is divided into two sections: the mixing section and oil bearing housing. The speed reduction provided by the V-belt drive pulleys allows the mixer to operate at up to 600 rpm, depending on flow rates and material characteristics.

The process controller monitors the oil pressure and the material pressure circuits. If the material and oil pressures approach each other, the controller activates a system alarm and closes the shut-off/dump valve. This stops material flow into the mixer and relieves mixer material pressure.

Table 2-3 Material Sub-System

Description	Function
Three-way shutoff bleed valve V9	Shuts off material pressure and flow to the mixer if the mixer oil pressure drops lower than 21 bar (300 psi) above mixer material pressure. When valve shuts off, it diverts the material from the mixer and relieves mixer pressure. It will also close if the air pressure supply is low or electrical power is lost.
Material flow meter FS1	Measures the flow rate of material as it enters the mixer. Sends a signal to the process controller. The controller uses this signal to regulate the amount of air injected into the mixer to obtain the desired density reduction.
Sealant pressure transducer PT2	Monitors material pressure in the mixing section of the mixer.
Resistance temperature detector RTD-1	Measures material temperature in the mixer.

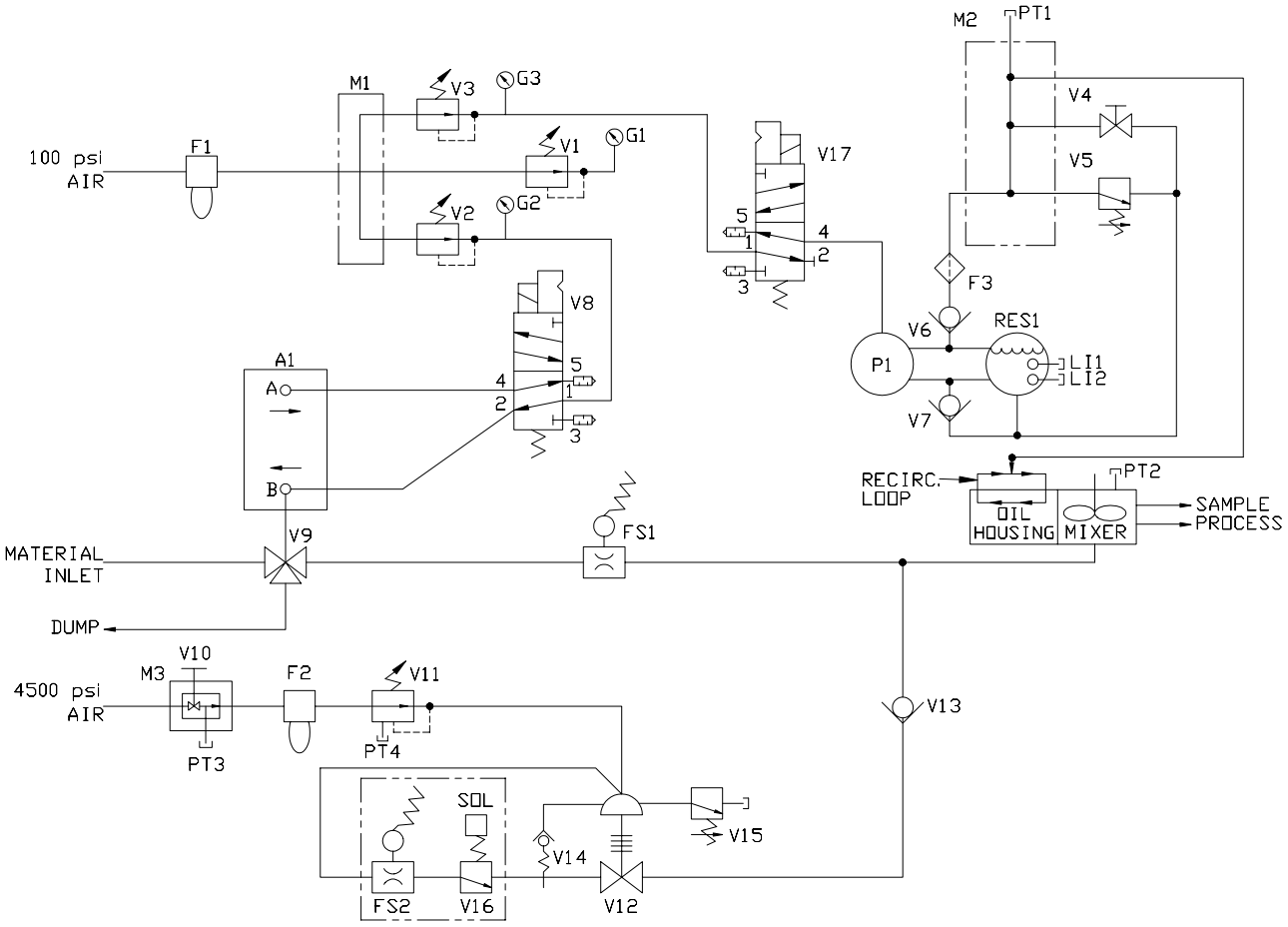
Oil

See Figure 2-3 and Table 2-4. The oil system maintains pressure inside the mixer oil bearing housing to lubricate the mixer seals and tapered roller bearings. The oil in the system is filtered to trap particles before they enter the manifold. Valves are provided at various points in the system to maintain pressure and proper oil flow.

Table 2-4 Oil Sub-System

Description	Function
Oil Pump P1	Maintains oil pressure in the mixer oil bearing housing.
Filter F3	Traps small particles at the outlet of P1 before they enter manifold M2
Oil Check Valve V6	Keeps oil from flowing back from filter F3 if the oil pump P1 fails.
Oil Check Valve V7	Maintains pressure to reservoir RES1.
Fans	Move air into the mechanical enclosure. One fan moves air across the fins of the oil bearing housing to help cool it.
Diverter Valve V4	Relieves oil pressure for servicing by returning pressurized oil to reservoir RES1.
Oil Relief Valve V5	Returns oil from manifold M2 to reservoir RES1, if oil chamber pressure exceeds 248.3 bar (3600 psig).
Pressure Transducer PT1	Monitors oil pressure in the oil pump manifold.
Oil RTD-2 (TEMP)	Monitors oil temperature in the oil bearing housing.
Oil Reservoir (RES1)	Stores oil for the system. (Non-pressurized)
Level Indicators Ll1 and LI2	Monitors the oil level in reservoir RES1.

FoamMix System Schematic



LEGEND

A1	SHUT OFF VALVE ACTUATOR	RES1	OIL PUMP RESERVOIR
F1	LOW PRESSURE AIR FILTER	V1	AIR REGULATOR - MASTIC REGULATOR
F2	HIGH PRESSURE AIR FILTER	V2	AIR REGULATOR - SHUT OFF VALVE
F3	OIL CIRCUIT FILTER (40 MICRON)	V3	AIR REGULATOR - OIL PUMP
FS1	FLOW METER - MATERIAL	V4	OIL NEEDLE VALVE - BLEED OFF
FS2	FLOW SENSOR - AIR	V5	OIL RELIEF VALVE
G1	PRESSURE GAGE - MASTIC REGULATOR	V6	OIL PUMP CHECK VALVE
G2	PRESSURE GAGE - SHUT OFF VALVE	V7	OIL RESERVOIR CHECK VALVE
G3	PRESSURE GAGE - OIL PUMP	V8	SHUT OFF VALVE - SOLENOID VALVE
LI1	OIL LEVEL INDICATOR - ALARM	V9	3-WAY SHUT OFF - BLEED OFF VALVE
LI2	OIL LEVEL INDICATOR - FAULT	V10	HIGH PRESSURE AIR SHUT OFF VALVE
M1	LOW PRESSURE AIR MANIFOLD	V11	AIR REGULATOR - HIGH PRESSURE AIR
M2	OIL MANIFOLD	V12	BACK PRESSURE REGULATOR VALVE
M3	HIGH PRESSURE AIR MANIFOLD	V13	MIXER CHECK VALVE
P1	OIL PUMP	V14	ADJUSTABLE BACK PRESSURE CHECK VALVE
PT1	PRESSURE TRANSDUCER - OIL PRESSURE	V15	HIGH PRESSURE AIR RELIEF VALVE
PT2	PRESSURE TRANSDUCER - SEALANT PRESSURE	V16	AIR SOLENOID CONTROL VALVE
PT3	PRESSURE TRANSDUCER - GAS SUPPLY PRESSURE	V17	OIL PUMP SOLENOID VALVE
PT4	PRESSURE TRANSDUCER - MIXER GAS PRESSURE		

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Fig. 2-3 FoamMix System Schematic

Section 3

Installation

Section 3
Installation

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

1. Installation

See Figure 3-1. Refer to the *Specification* section for FoamMix A/T system requirements and technical data. To install the FoamMix A/T system unit, perform the following:

Unpacking

1. Remove the FoamMix A/T system unit from its crate, and inspect the unit for dents, scratches, or other physical damage. If there is any visible damage, call your Nordson representative immediately.
2. Position the system so all side panels of the mechanical enclosure (15) can be removed or opened for servicing.

Electrical Connections

1. Make sure that the main disconnect switch (4) is in the off position.
2. Place the light tower (7) upright. Use screws to install it on top of the electrical enclosure (1).
3. Open the electrical enclosure (1) door. Remove the front panel of the mechanical enclosure (15). Perform the following:
   a. Check all grounds (12) and connectors (11)—P1 through P12 and J1 through J12—for tightness. Inspect all other wiring for loose connectors and damaged wires.
   b. Make sure all circuit boards are seated properly.
4. Install a locking disconnect (6) in the service line (2) ahead of the FoamMix A/T system. Shut off and lock out power so the power source (5) is not a danger.
5. Place the service line and earth ground inside a grounded, electrical conduit. Remove the knockout (8) and attach the conduit.
6. Install the service line (2) leads to the top of the main disconnect block (3).

Air Connections

1. Install the low-pressure air line to the low-pressure air fitting (21).
2. Install the high-pressure air line to the high-pressure air fitting (20).

Material Connections

1. Connect material supply hose from the bulk delivery system (or pump) to the material inlet fitting (17).
2. Connect a material process hose and gun(s) to the material process fitting (18).

Optional Equipment

The following paragraphs provide information for connecting optional equipment to the FoamMix A/T system.

Process Data Logging

To use Process Data Logging (PDL) function, you need these components:

- Serial Computer Cable
- Datalink Software (3.5 in. or 5.25 in. diskette)

Refer to the *Kit List* in the *Parts* section for ordering information.

When you connect communication cables to the serial ports (13),

- serial port 1 is set up to monitor foamed material output
- serial port 2 is set up for downloading data.

Power for Accessories

If any accessories require 120-Vac power to operate, plug them into the outlet (22). Up to two accessories can be plugged in to the outlet at any one time.

Mastic Regulator

If an optional air-loaded mastic regulator is used, connect the air line from the mastic regulator to the mastic regulator fitting (16).

Before Operating

1. Close the electrical enclosure (1) door.
2. Make sure all mechanical enclosure (15) panels are secure. Unlock the locking disconnect (6).
3. Turn on the main disconnect switch (4).

FoamMix A/T System Diagram

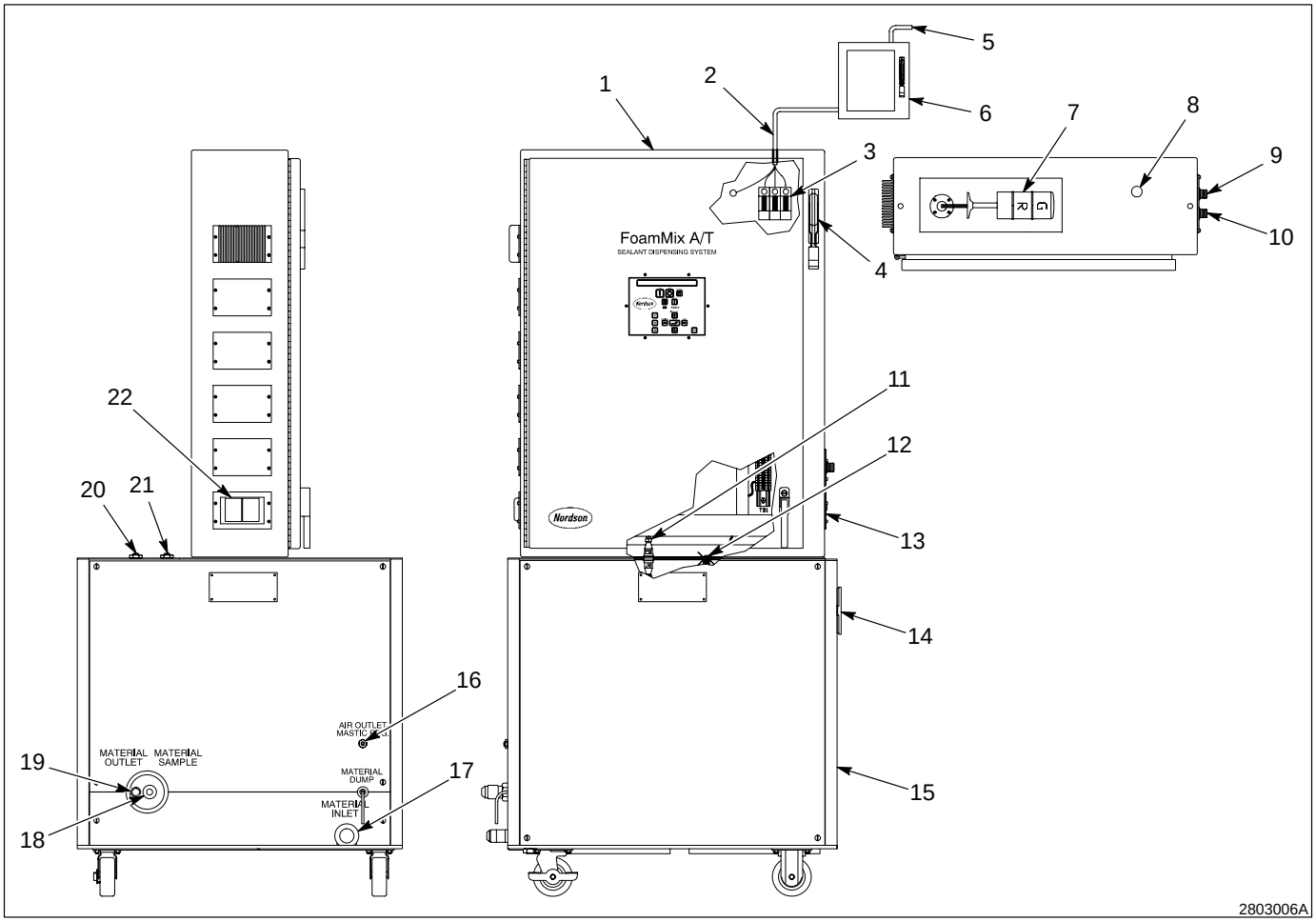


Fig. 3-1 Connection Points

1. Electrical enclosure
2. Service line
3. Main disconnect block
4. Main disconnect switch
5. Power source
6. Locking disconnect
7. Light tower
8. Knockout
9. Customer I/O connection (J1)
10. Customer I/O connection (J2)
11. Connectors
12. Grounds
13. Serial ports
14. Cooling fans
15. Mechanical enclosure
16. Mastic regulator fitting
17. Material inlet fitting
18. Material process fitting
19. Material sample fitting
20. High-pressure air fitting
21. Low-pressure air fitting
22. Outlet (120 Vac)

Section 4

Configuring the System

Section 4
Configuring the System

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

1. Introduction

Read the following paragraphs before performing any procedures in this section.

Control Panel

See Figure 4-1. The control panel display shows the system status, mode, faults, and other information. The flashing cursor on the display shows which item is selected in each menu. Table 4-1 lists the function of each control panel push button.

Table 4-1 Control Panel Push Buttons

Push Button	Function	Note
ON	Initiates the STARTUP mode of operation.	A
OFF	Initiates the SHUTDOWN mode of operation. The controller automatically enters this mode when the system has a major fault condition.	A
MANUAL	Initiates the MANUAL mode of operation. Functional even when system has a major fault condition. Password-protected.	A
PURGE	Inactive for FoamMix A/T.	
FAULT	View FAULT messages.	
1, 2, 3	Enters the password(s)	
INCREASE, DECREASE	Enters numerical values in the MANUAL or PROGRAM sub-menus	
PREVIOUS, NEXT	Scrolls through messages or displays (also called select keys—to choose part of a menu before pressing the ENTER key)	
ENTER	Saves all entered information to the process controller memory, or enters a selected menu.	
ESC	Access the next higher level menu from a sub-menu display. When entering data—restores original value. Resets the FAULT monitoring function.	
NOTE A: The mode of operation is displayed on each menu in the upper right hand corner of the screen		

Control Panel *(contd)*

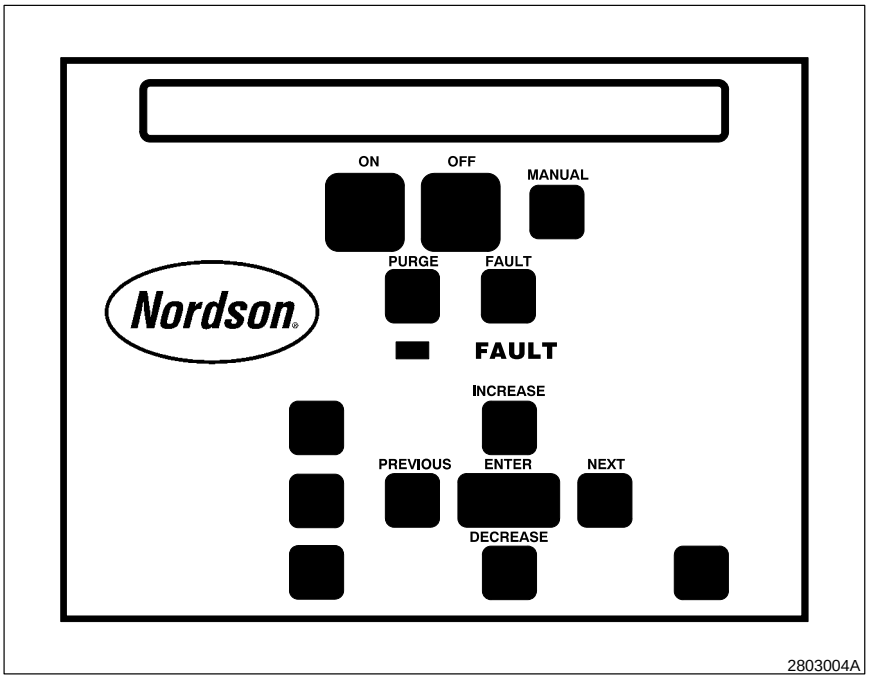


Fig. 4-1 FoamMix A/T System Keypad

Menus

See Figure 4-2. Use the FoamMix A/T software tree as a guide for accessing the menus. Use the keypad to access sub-menus within each menu in Table 4-2.

Table 4-2 Menus

Menu	Function	Note
MAIN	Access system functions and communications.	
PROGRAM	Enter system setpoints and operating parameters while in either STARTUP or SHUTDOWN mode.	A
SERVICE	Configure the system while in either the STARTUP or SHUTDOWN mode.	A
MANUAL	Troubleshoot the system.	A
NOTE A: These menus are password-protected. Refer to *Password* in this section for more information.		

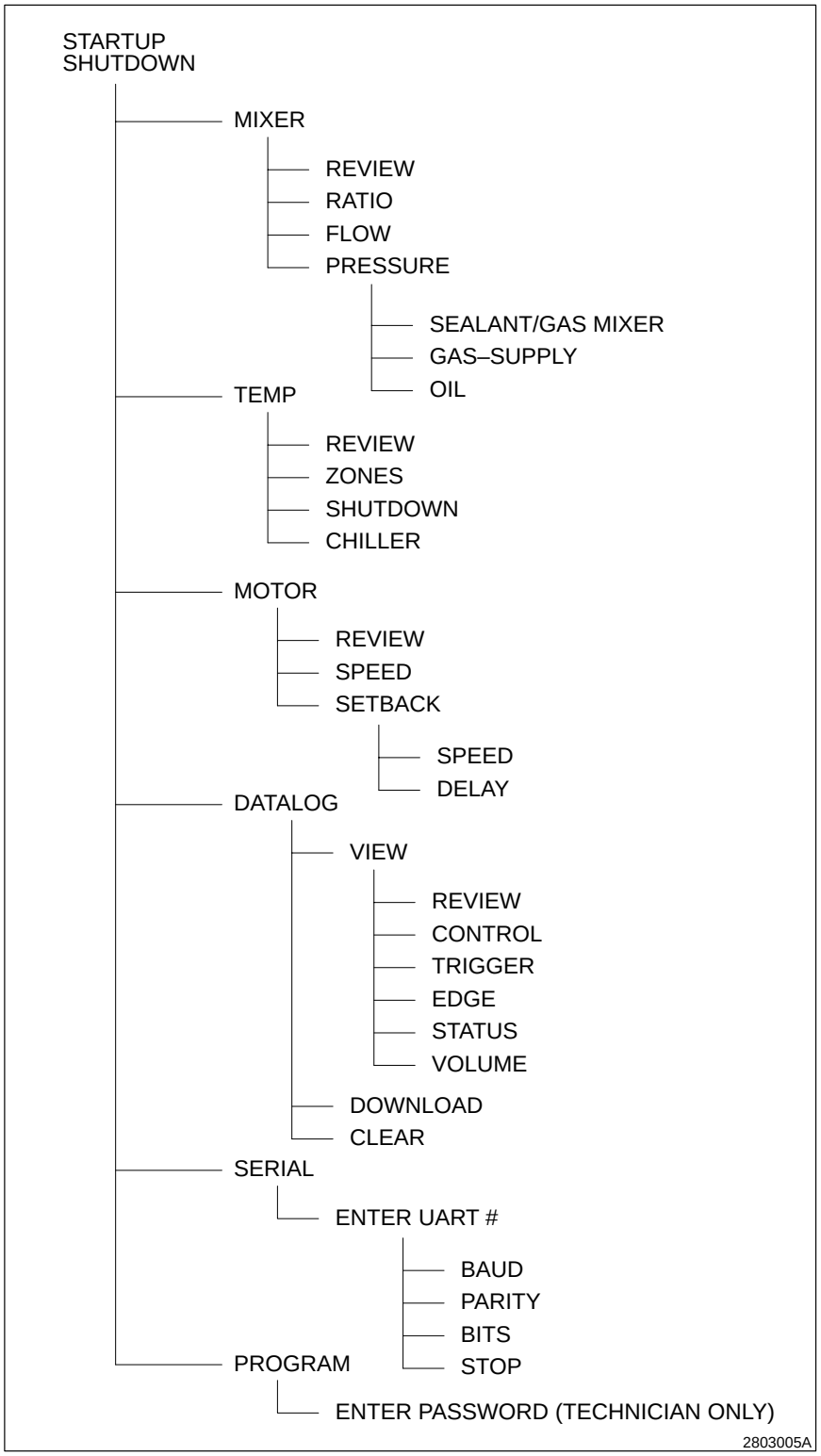


Fig. 4-2 Menus

Setting Parameters

These parameters must bet set before putting the FoamMix A/T system into service:

- Operational Settings
- Programming Setpoints
- System Pressurization

2. Operational Settings

The following paragraphs provide set up procedures for the operational settings. Access the operational settings from the SERVICE menu.

Accessing the Service Menu

Perform these steps to access the SERVICE menu:

1. Press these push buttons:
   - OFF
   - PROGRAM
   - ENTER
2. Press these push buttons to enter the password:
   - INCREASE
   - 1, 2, and 3
   - DECREASE
3. Select MORE. Press ENTER.
4. Select SERVICE. Press ENTER. The following appears:

{MORE GAS SLNT TEMP RANGE PRESSURE}

OR

{MORE CHILLER OIL PUMP LANG TIME}

5. Select MORE and press ENTER to display the desired menu.

Gas

Perform these steps to set the flow range for the high-pressure air flow sensor:

1. From the SERVICE menu, select GAS. Press ENTER.

NOTE: The SCCM range is stamped on flow sensor FS2.

2. Press INCREASE and DECREASE to select the SCCM range. Press ENTER.

Sealant

NOTE: The COUNTS/LITER number is the K-factor value that is on the material flow meter FS1 tag.

1. From the SERVICE menu, select SLNT. Press ENTER.
2. Use the INCREASE and DECREASE keys to select the COUNTS/LITER. Press ENTER.

Temp Range

Perform the following steps to set the TEMP RANGE:

1. From the SERVICE menu, select TEMP-RANGE. Press ENTER.
2. Use the NEXT key to select COOL. Press ENTER.

NOTE: The WARM and HOT temperature ranges are disabled for the FoamMix A/T system.

Pressure

Perform these steps to set the pressure transducer range:

1. From the SERVICE menu, select PRESSURE. Press ENTER.
2. Press NEXT to select HIGH. Press ENTER.

NOTE: The LOW pressure transducer range is disabled for the FoamMix A/T system.

Oil Pump Indicators

Perform these steps to set the oil pump indicators:

1. From the SERVICE menu, select OIL-PUMP. Press ENTER.
2. Select YES. Press ENTER.

Language

Perform these steps to display the desired language:

1. From the SERVICE menu, select LANG. Press ENTER.
2. Select the display language from the two available lists. Press ENTER.

Motor Time

From the SERVICE menu, select TIME. Press ENTER. The motor operation hours appear on the display.

3. Programming Setpoints

The following paragraphs provide procedures for programming the FoamMix A/T system setpoints. Access the programming setpoints from the PROGRAM menu. Contact Nordson Corporation if you need additional setpoint information.

Entering the Program Menu

Perform these steps to access the PROGRAM menu:

NOTE: You can change setpoints in either the SHUTDOWN mode (OFF) or the STARTUP mode (ON).

1. Press either OFF or ON.
2. Select PROGRAM and press ENTER.
3. Enter the password by pressing 1 four times. Press ENTER. The following appears:

{MORE MIXER TEMP MOTOR CLOCK DATALOG}

OR

{MORE SERIAL PASSWORD}

4. Select MORE and press ENTER to display the desired menu.

Mixer Ratio

Perform the following steps to program the mixer ratio setpoint:

1. From the programming menu, select MIXER. Press ENTER.
2. Select RATIO. Press ENTER.
3. Use INCREASE and DECREASE to select the GAS RATIO INDEX SETPOINT number. The range is from 0.0 (OFF) to 10.0, in 0.1 increments. The default value is OFF.

NOTE: No actual units of measurement are associated with the RATIO value.

4. Press ENTER.

Mixer Pressure Units

Perform these steps to program the mixer pressure units:

1. From the PROGRAM menu, select MIXER. Press ENTER.
2. Select PRESSURE-UNITS. Press ENTER.
3. Use PREVIOUS and NEXT to select the either BAR or PSI. Press ENTER.

Mixer Accel

Perform these steps to program the signal acceleration and response to the air solenoid control valve (V16).

1. From the PROGRAM menu, select MIXER. Press ENTER.
2. Select ACCEL. Press ENTER.
3. Use INCREASE and DECREASE to select the 0.1 to 10.0 V/SEC signal.

NOTE: A 10.0 V/SEC setting provides maximum acceleration and response. The default setting is 0.1 volt per sec.

4. Press ENTER.

Mixer Time Const

Perform these steps to program the averaging time for the material flow:

NOTE: A higher averaging time slows the value response, but the value and display will be stable.

1. From the PROGRAM menu, select MIXER. Press ENTER.
2. Select TIME CONST. Press ENTER.
3. Use INCREASE and DECREASE to select the number of seconds (5–30 sec). The default setting is 30 seconds.
4. Press ENTER.

Temp Units

Perform these steps to program the temperature units:

1. From the PROGRAM menu, select TEMP. Press ENTER.
2. Select UNITS. Press ENTER.
3. Use PREVIOUS and NEXT to select either °C or °F. The default setting is °C.
4. Press ENTER.

Temp Shutdown

Perform these steps to program the system shutdown temperature:

1. From the PROGRAM menu, select TEMP. Press ENTER.
2. Select SHUTDOWN. Press ENTER.
3. Use INCREASE and DECREASE to select the shutdown temperature.
4. Press ENTER.

Motor Speed

The mixer motor speed is a percentage of maximum speed. The speed range is between 20–100%. A maximum motor speed of 100% drives the mixer about 600 rpm.

1. From the PROGRAM menu, select MOTOR. Press ENTER.
2. Select SPEED. Press ENTER.
3. Use INCREASE and DECREASE to select the percentage of maximum motor speed. The default setting is 20%.
4. Press ENTER.

Motor Setback Speed

Perform these steps to program the motor setback speed:

1. From the PROGRAM menu, select MOTOR. Press ENTER.
2. Select SETBACK. Press ENTER.
3. Select SPEED. Press ENTER.
4. Select OFF or use INCREASE and DECREASE to select a percentage of the MOTOR SPEED setback between 20–100%. The default setting is 20%.
5. Press ENTER.

Motor Setback Delay

Perform the following steps to program the setback delay or shutdown delay of the mixer motor. If flow meter (FS1) does not detect material flow within the selected delay time (5–300 seconds, in 5-second increments), the process controller will setback or shutdown the motor.

1. From the PROGRAM menu, select MOTOR. Press ENTER.
2. Select SETBACK. Press ENTER.
3. Select DELAY. Press ENTER.
4. Use INCREASE and DECREASE to select a delay time between 5–300 sec. The default setting is 30 sec.
5. Press ENTER.

Clock

Programing the clock consists of

- selecting a format
- setting the time
- setting the date

Format

1. From the program menu, select CLOCK. Press ENTER.
2. Select TIME. Press ENTER.
3. Select FORMAT. Press ENTER.
4. Use PREVIOUS and NEXT to select either the 12-hour or 24-hour format.
5. Press ENTER.

Time

1. From the program menu, select CLOCK. Press ENTER.
2. Select TIME. Press ENTER.
3. Select TIME-OF-DAY. Press ENTER.
4. Use INCREASE and DECREASE to enter the current time.
5. Press ENTER.

Date

1. From the program menu, select CLOCK. Press ENTER.
2. Select TIME. Press ENTER.
3. Select DATE. Press ENTER.
4. Use INCREASE and DECREASE to enter the current date (XX/XX/XX).
5. Press ENTER.

4. Configuring the Process Data Logging Function

The Process Data Logging (PDL) collects and sends production data to an external device (terminal or PC) using Serial Port 1 (UART 0). You can save it in extended memory and download it later from Serial Port 2 (UART 1). All data are transferred in standard ASCII format. The following paragraphs provide procedures for configuring the PDL.

Datalog Control

Perform these steps to turn the PDL function on or off:

1. From the PROGRAM menu, select DATALOG. Press ENTER.
2. Select CONTROL. Press ENTER.
3. Use PREVIOUS and NEXT to select ON or OFF.
4. Press ENTER.

Datalog Trigger

The available datalog trigger devices are

- GUN
- PART STROBE
- TIMER

NOTE: If you choose GUN or PART STROBE, contact Nordson Corporation for help in selecting the proper external contact closure.

Perform these steps to select a datalog trigger device:

1. From the PROGRAM menu, select DATALOG. Press ENTER.
2. Select TRIGGER. Press ENTER.
3. Select one of the devices in the following paragraphs.

Gun

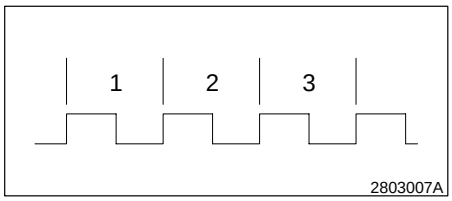


Fig. 4-3 Rising Edge GUN PDL Sample Periods

1. First sample period
2. Second sample period
3. Third sample period

NOTE: This procedure also programs the datalog EDGE setpoint.

1. Select GUN. Press ENTER.
2. Use PREVIOUS and NEXT to select EDGE. Press ENTER.

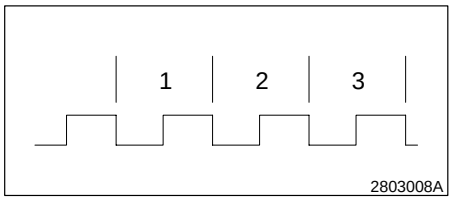


Fig. 4-4 GUN PDL Sample Periods, Falling Edge

1. First sample period
2. Second sample period
3. Third sample period

3. See Figures 4-3, 4-4. Select either RISING or FALLING edge sample periods. Press ENTER.

Part Strobe

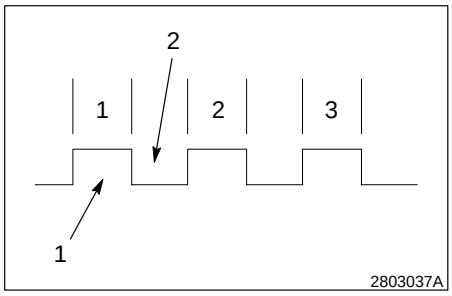


Fig. 4-5 Parts Strobe

1. Data taken
2. No data

1. See Figure 4-5. Select PART STROBE to collect data when the external contact closes and signal goes high.
2. Press ENTER.

Timer

1. Select TIMER. Press ENTER.
2. Use INCREASE and DECREASE to select the sample period. Press ENTER.

Datalog Edge

This setpoint is only programmed when you select GUN as a TRIGGER device. Refer to the *Datalog Trigger*, *GUN* procedures.

Serial Menu

Perform the following steps to select a serial port:

1. From the PROGRAM menu, select SERIAL. Press ENTER. Use INCREASE and DECREASE to select the serial port UART number:
   a. Select 0 if the target is an ADPI or PC connected to Serial Port 1.
   b. Select 1 to store the datalog in extended memory. Connect the output cable to Serial Port 2.
2. Press ENTER.

Serial Baud

Perform these steps to program the PDL baud.

1. From the PROGRAM menu, select SERIAL. Press ENTER.
2. Select BAUD. Press ENTER.
3. Select 4800. Press ENTER.

Serial Parity

Perform these steps to set the parity:

1. From the PROGRAM menu, select SERIAL. Press ENTER.
2. Select PARITY. Press ENTER.
3. Select NO. Press ENTER.

Serial Bits

Perform these steps to set the BITS.

1. From the PROGRAM menu, select SERIAL. Press ENTER.
2. Select BITS. Press ENTER.
3. Select 8. Press ENTER.

Serial Stop

Perform these steps to set the STOP.

1. From the PROGRAM menu, select SERIAL. Press ENTER.
2. Select STOP. Press ENTER.
3. Select 1. Press ENTER.

5. Changing the Password

Perform these steps to change the password:

1. From the PROGRAM menu, select PASSWORD. Press ENTER.
2. From the CHANGE PASSWORD menu, select YES. Press ENTER.
3. From the ENTER NEW PASSWORD menu, select a new password using the 1 – 2 – 3 keys. The password can be up to 5 digits.

NOTE: If you do not select a password and press ENTER, the passwords for the PROGRAM and MANUAL modes are disabled.

4. Press ENTER to save the new password, or ESC to restore the original password. If you press ENTER, a request to verify the password appears on the display.
5. Enter the new password for verification:
   a. NEW PASSWORD IN EFFECT appears on the display if the process controller verifies the password. Press ESC to exit the display.
   b. If the process controller does not verify the new password,
      - repeat this procedure and select a new password, or
      - press ESC to exit the display. The old password is still in effect.

6. Setting System Pressures

The following paragraphs provide procedures for setting the system pressures. See Figure 4-6 for component locations.

NOTE: The operational settings and programming setpoints must be set before you perform the following procedures.

NOTE: The menus display SEALANT for material and GAS for air.

Panel Removal

Loosen the quarter-turn fasteners (12) securing the front panel (11) to the mechanical enclosure (13).

Low Pressure Air Supply

Perform these steps to set the low pressure supply:

1. Turn the V2 regulator knob (5) counterclockwise until the V2 gauge (9) reads 0 bar/psi.
2. Verify that 6 bar (100 psi) of shop air is present at the low air pressure connection.
3. Turn the V2 regulator knob (5) clockwise until the V2 gauge (9) reads approximately 4 bar (70 psig).

Oil Pressure

CAUTION: To prevent damage to the mixer oil bearing housing, you must properly set the oil pressure.

Perform these steps to set the oil pressure:

1. Press the OFF key to enter the SHUTDOWN mode.
2. Select MIXER. Press ENTER.
3. Select PRESSURE. Press ENTER.
4. Select OIL. Press ENTER.
   OIL PRESSURE = _____ PSI appears.

Oil Pressure *(contd)*

NOTE: 3600 psig (248 bar) is the maximum pressure of the oil circuit. Oil relief valve V5 opens if this pressure is exceeded. If the relief valve V5 opens, use regulator V3 to decrease the pressure until it closes.

CAUTION: To prevent a fatal system fault, the oil pressure must be at least 13 bar (200 psig) greater than the material pressure in the mixer.

5. Watch the oil pressure reading on the display and slowly turn the V3 regulator knob (4) clockwise. Increase the oil pressure until it is about 21 bar (300 psig) higher than the proposed material pressure in the mixer.

High Pressure Air Supply

Perform the following steps to set the high pressure air supply:

1. Locate the V10 high pressure shutoff valve knob (3) on the M3 high pressure manifold (1). Turn the valve knob clockwise to turn off the valve.

2. Make sure that the high pressure air connection (2) is installed.

NOTE: Air pressure must not exceed 310 bar (4500 psig).

3. Turn on the air source.

4. Turn the V10 high pressure air shutoff valve knob (3) slowly counterclockwise.

5. From the MIXER – PRESSURE – OIL menu, press ESC. Select PRESSURE. Press ENTER.

6. Select SEALANT/GAS MIXER. Press ENTER.
   SEALANT = ___ PSI MIXER GAS = ___ PSI appears.

7. Turn the V11 regulator knob (7) clockwise until the MIXER GAS pressure is at least 13 bar (200 psig) above the proposed SEALANT pressure.

Material Pressure

Perform these steps to set the material pressure:

NOTE: The actual SEALANT pressure depends on your material supply source and process. Contact Nordson Corporation for additional information, if necessary.

1. Make sure SEALANT = ___ PSI MIXER GAS = __ PSI still appears on the display.

2. If your system features the optional mastic regulator, perform these steps:

   a. Turn the V1 regulator knob (6) counterclockwise until the V1 gauge (8) reads 0 psi/bar.

   b. Watch the SEALANT value on the display and adjust the regulator until you reach an air pressure that sets the material pressure limit to about 3000 psig (206 bar).

3. If your system does not use the optional mastic regulator, set the material supply pressure to approximately 206 bar (3000 psig).

NOTE: The material supply should have an adjustable in-line regulation device to obtain the proper flow and foam.

4. Operate your system and make adjustments as necessary. When you finish making the adjustments, write down the pressures on the regulator gauges (8, 9, and 10).

Panel Installation

Install the front panel (11) on the mechanical enclosure (13). Tighten the quarter-turn fasteners (12).

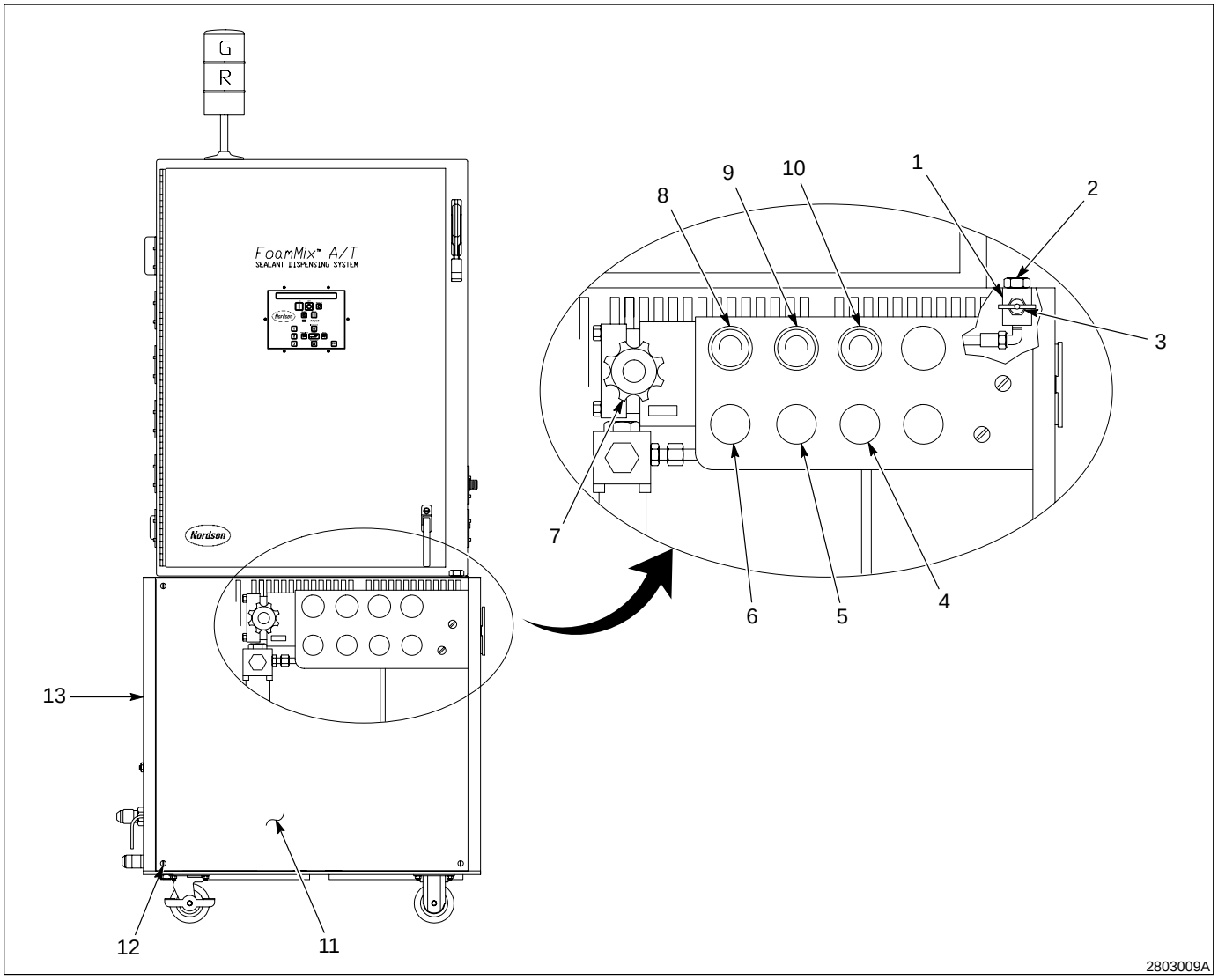


Fig. 4-6 Setting System Pressures

1. M3 high pressure air manifold
2. High pressure air connection
3. V10 High pressure air shutoff valve knob
4. V3 regulator knob
5. V2 regulator knob
6. V1 regulator knob
7. V11 regulator
8. V1 Gauge
9. V2 Gauge
10. V3 Gauge
11. Front panel
12. Quarter-turn fasteners
13. Mechanical enclosure

Section 5

Operation

Section 5
Operation

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

1. Daily Operation

NOTE: Read this section before you perform any operating procedures.

The following paragraphs provide daily operating procedures for the FoamMix A/T system.

Startup Mode

Perform these steps to enter STARTUP:

NOTE: If system pressure was lost during SHUTDOWN, purge the material remaining in the mixer and downstream hoses before entering STARTUP.

1. Press ON. After a few seconds, the following menu appears:

				READY
{MORE	MIXER	TEMP	MOTOR	PROGRAM}

2. Turn on the low-pressure air supply to the system.
3. Turn on the high-pressure air flow-to the system.
4. Turn on the material supply to the system.
5. If the FAULT light flashes, correct the fault condition that appears on the display. Refer to *Fault Messages* in this section for more information.

Viewing System Parameters

Use Table 5-1 to view the system setpoints and actual FoamMix A/T system operation readings.

Table 5-1 How to View System Parameters

From the MAIN menu...	Select...	To View...
Select MIXER. Press ENTER.	REVIEW	display mixer setpoints, flows, and pressures
	RATIO	GAS RATIO INDEX SETPOINT
	FLOW	SLNT FLOW (CCPM)—Sealant flow is a calculated value. GAS FLOW (SCCM)—Actual reading taken at FS2 and V16.
	FLMTR	SEALANT FLMTR COUNTS—Actual flow meter counts
	PRESSURE	mixer gas measured at PT4, press SEALANT/GAS—MIXER gas supply measured by PT3 at M3, press GAS SUPPLY oil pressure, press OIL
Select TEMP. Press ENTER.	REVIEW	display temperature setpoints and actual readings
	ZONES	setpoints, actual sealant and oil temperature, and setback temperature
	SHUTDOWN	shutdown temperature setpoint
	CHILLER	This parameter is not used on the FoamMix A/T system.
Select MOTOR. Press ENTER.	REVIEW	mixer motor setpoints, and actual speed and amperage readings
	SPEED	percentage of maximum mixer motor speed, and actual current
	SETBACK	setback speed setpoint (%), press. SPEED mixer motor setback delay (in seconds), press DELAY

Continued on next page

From the MAIN menu...	Select...	To View...
If the PDL is configured, select DATALOG. Press ENTER.	VIEW	**NOTE:** When you configured the system; if you selected • PART STROBE for data collection, EDGE and PERIOD will not appear on the VIEW menu • GUN for data collection, EDGE appears on the VIEW menu • and programmed INTERNAL TIMER, PERIOD appears on the VIEW menu menus as the PDL collects data, press REVIEW on or off condition of datalog, press CONTROL type of device that triggers data log, press TRIGGER point where external device signal collects data, press EDGE sampling time interval selected for internal timer, press PERIOD current part count, press STATUS volume of dispensed material, press VOLUME

Material Sampling

Refer to the *FoamMix A/T: Foam Density Determination Procedure* instruction sheet for directions on sampling both unfoamed and foamed material.

Purge

Press PURGE to purge the high-pressure air line.

Shutdown Mode

To enter the SHUTDOWN mode, press OFF. The following menu appears:

{MORE	MIXER	TEMP	MOTOR	SHUTDOWN PROGRAM}

NOTE: Keep the air and material supply sources at full operating pressure.

Shutdown Mode Power-Up Sequence

Perform the SHUTDOWN power-up sequence as follows:

NOTE: The controller performs a self-test during power-up. If the controller does not pass the test, refer to the *Troubleshooting* section for more information.

1. Turn on power to the electrical enclosure.

2. Press ON. READY appears on the top line of the display.

2. Fault Messages

When a fault occurs, the red light on the tower and the FAULT light on the keypad flashes. There are four types of fault messages:

- major fault—places the system in SHUTDOWN and logs the fault message in memory

- minor fault—logs the fault message in memory

- fatal error and system halted—serious internal faults that automatically appear on the display

NOTE: The MANUAL and SHUTDOWN modes are the only modes that you can enter after a major fault.

Viewing and Clearing Fault Messages

NOTE: If there are faults in the system, you must correct the problems and clear the fault messages. Refer to the *Troubleshooting* section for troubleshooting procedures.

1. Press FAULT. Press PREVIOUS or NEXT to scroll through the fault messages. When you have seen all of the fault messages, the following appears on the display:

```
***  FAULT DISPLAY ***
TOTAL SYSTEM FAULTS: ____
```

If there are no faults, the following appears on the display:

```
***  FAULT DISPLAY ***
NO FAULTS PRESENT IN SYSTEM
```

2. Correct all problems listed on the display.

3. To clear a FAULT, press ESC.

3. Extended Shutdown and Startup

The following paragraphs provide extended shutdown and startup procedures for the FoamMix A/T system.

Extended Shutdown

Use this procedure to shut down the FoamMix A/T system for more than three days:

1. Shut off the main material supply to the FoamMix A/T system. Bleed off the pressurized material from the process dump line into a waste container.
2. Trigger the process dispensing gun to purge pressure from the process hose.
3. Locate the high-pressure air supply regulator (customer-supplied). Note the outlet pressure on the regulator gauge so you can reset the pressure later. Turn down the regulator outlet pressure until the gauge reads zero.
4. If servicing is required, remove the high-pressure air supply hose from the top right surface of the mechanical enclosure.
5. Locate the low-pressure air supply regulator (customer-supplied). Note the outlet pressure on the regulator gauge so you can reset the pressure later. Turn down the regulator outlet pressure until the gauge reads zero.
6. Press OFF. Select DATALOG. Press ENTER.
7. Select VIEW. Press ENTER.
8. Select REVIEW. Press ENTER. Make sure the pressures on the display are at 0 psi/ bar.
9. Turn off the main disconnect switch on the electrical enclosure.

Startup After Extended Shutdown

Use this procedure to start up the system after an extended shutdown:

1. If necessary, connect any fluid and material hoses that were removed during servicing.
2. Turn on the main disconnect switch on the electrical enclosure.
3. When the controller completes the self test, select DATALOG. Press ENTER.

Startup After Extended Shutdown (contd)

4. Select VIEW. Press ENTER.
5. Select REVIEW. Press ENTER. Make sure the pressures on the display are at 0 psi/bar.
6. Press FAULT to see if there are any faults stored in memory. If there are any faults not related to pressure, refer to the *Troubleshooting* section for more information.
7. Turn on the low-pressure air supply. Increase the regulator setting from 0 psi/bar to the value you noted in *step 5* of the *Extended System Shutdown* procedure.
8. Turn on the high-pressure air supply. Increase the regulator setting from zero to the value you noted in *step 3* of the *Extended System Shutdown* procedure.
9. Press ON.
10. Turn on the material supply to the system.
11. Point the dispensing gun into a waste container. Trigger the gun to purge the air from the system.

4. Process Data Logging Function

The following paragraphs provide information on using the optional Process Data Logging (PDL) function.

Displaying the PDL at an External Terminal or PC

The external terminal or PC displays Information as it is collected. The display will scroll until all data has been downloaded.

1. Press ESC. The following data appears on the external terminal or PC monitor:

date	time	part ID	slnt vol (cc)	gas vol (cc)	slnt temp (F)	oil temp (F)	slnt press (psi)	oil press (psi)	gas press (psi)	supply press (psi)	ratio	motor speed (%)	motor idle (%)	motor curr (A)	faults
xxxx	xxxx	xxxx	xxxx	xxxx	xxx	xxx	xxxx	xxxx	xxxx	xxxx	xx.x	xxx	xxx	xx	xxxxxxxx

2. Press ESC to return to the previous menu.

Saving Data in Extended Memory

Use the PDL menus to save operating data and system faults. Refer to *Downloading The PDL From Extended Memory* in this section for more information.

PDL Faults

See Table 5-2. PDL faults appear as eight bit-mapped words in the data log. The Most Significant Bit (MSB) and Least Significant Bit (LSB) ratings set the fault priority. Read the fault field from left-to-right (the first character is bit 7 and the last character is bit 0). For example, in SYSTEM READY condition with no errors, the fault field would read “10000000”.

Table 5-2 PDL Faults

Data	Bit	Interpretation
SYSTEM READY	7 (MSB)	“1” if system is in a ready state; “0” otherwise
MOTOR OVERTEMP	6	“1” if an error is present; “0” otherwise
LOW OIL PRESSURE	5	“1” if an error is present; “0” otherwise
RATIO ERROR	4	“1” if an error is present; “0” otherwise
TEMP. SHUTDOWN ERROR	3	“1” if any zone is at shutdown temp.; “0” otherwise
HEATER ERROR	2	“1” if any heater error is present; “0” otherwise
RTD ERROR	1	“1” if any other error is present; “0” otherwise
Other Error	0 (LSB)	“1” if any other error is present; “0” otherwise

Downloading the PDL from Extended Memory

You can download the data log file (*FOAMMIX.DAT*) when the production run is done. The date and time are the first fields recorded for each entry and fault is the last. Date and time are stored in quotations to signify a label field.

Use this procedure to download the data log from extended memory to an external disk drive or PC:

1. From the MAIN menu, select DATALOG. Press ENTER.
2. Select DOWNLOAD. Press ENTER.
3. Select BEGIN. Press ENTER. As the PDL data log downloads to the disk drive or PC, the display shows the number of entries that remain in the queue. This number automatically decreases as the file is written to disk.

Downloading the PDL from Extended Memory (contd)

4. After the entire PDL data log file has been written to disk, DOWNLOAD COMPLETED SUCCESSFULLY appears on the display.

5. Press ESC to return to the DATA DOWNLOAD menu. The display automatically updates to include the RECOVER menu.

PDL Datalog Recovery

If an error occurs during downloading, use the RECOVER menu to restore the data log:

1. After you complete the download attempt, press the ESC key to leave the DATALOG DOWNLOAD menu.

2. Select RECOVER and press the ENTER key.

3. When the recovery is done, check the display for a message about recovery success or failure. If a failure occurs, perform the downloading procedure again. Refer to *Downloading the PDL from Extended Memory* in this section.

Clearing the PDL Datalog Queue

Clear the PDL data log queue of all entries as follows:

1. Go to the DATALOG menu and press the ENTER key.

2. Select CLEAR and press the ENTER key.

Section 6

Maintenance

Section 6
Maintenance

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

1. Introduction

The following table provides the periodic maintenance schedule for the FoamMix A/T system. Perform these procedures as recommended. Refer to the *Repair* section for disassembly and repair procedures.

2. Maintenance Schedule

Refer to Table 6-1. To order replacement parts, refer to the *Parts* section in this manual or consult your Nordson service representative.

2. Maintenance Schedule
(contd.)

Table 6-1 Maintenance Schedule

When	Procedures	Note
Every 40 hours of service	Inspect all hydraulic, gas, and electrical connections. Repair/replace as necessary. Check for any “kinks” in the hoses.	
	Inspect the fan filters. Clean the filters, if necessary.	
	Check the compressor oil level (optional high-pressure air source). Fill if necessary.	A
	Put unit in shutdown mode to clear certain portions of the system.	
	Drain any condensation (optional high-pressure air source).	
Every 160 hours of service	Replace the desiccant cartridge (optional high-pressure air source).	A
	Replace the 7-micron filter in the high-pressure filter/dryer.	A
	Check the mixer V-belt for wear and proper tension. Replace if necessary.	A
	Clean the cooling fins on the oil bearing housing	
	Change the air filter (optional low-pressure air source).	
	Replace the compressor air filter cartridge (optional high-pressure air source).	A
Every 240 hours of service	Change the air compressor oil (optional high-pressure air source).	A
	Check the oil reservoir for proper oil level.	A
Every 1000 hours of service	Replace the fan filters, mixer check valve, and relief valves.	A
Every 2000 hours of service	Replace the material safety shut-off valve.	A
	Replace the 40-micron oil filter.	A
	Drain the oil from the oil reservoir. Add new oil.	A
	Replace back pressure regulator valve and all pressure transducers.	A
Every 4000 hours of service	Replace all resistive temperature devices, flow meter, flow sensor, and flow valve.	A
NOTE A: Only technicians are permitted to perform this action or maintenance.		

Section 7

Troubleshooting

Section 7
Troubleshooting

WARNING: Allow only qualified personnel to perform the following tasks. Observe and follow the safety instructions in this document and all other related documentation.

1. Introduction

WARNING: Before removing any component from the system, disconnect and lock, out power to the system. Relieve fluid and system pressure.

This section contains troubleshooting procedures. These procedures cover only the most common problems that you may encounter. If you cannot solve the problem with the information given here, contact your local Nordson representative for help.

2. Major Fault Messages

The following tables provide troubleshooting procedures for the major fault messages.

Problem	Possible Cause	Corrective Action
1. FATAL ERROR SYSTEM CRC—CALL SERVICE This indicates that • incorrect data was detected in the memory area that stores programmable values for SERVICE • the NVRAM device was tested and is functioning properly	Wrong SERVICE values	Program correct values. Refer to the *Configuring the System* section for procedures.
2. LINE FREQUENCY INTERRUPTS NOT DETECTED Several error conditions exists. The temperature control system does not work if the line frequency interrupts are not connected.	Failure to detect line frequency interrupts at the CPU	Check these items: 1. Incorrect jumper selection on temperature board #0. 2. Improper switch setting on the CPU board. 3. Connections between the power monitor board and temperature board.
3. LOW OIL PRESSURE This fault occurs during • the mixer startup sequence • STARTUP, when system is in ready-state if oil pressure is less than sum of material pressure plus 200 psi (13 bar).	Low air supply pressure to the oil pump Oil relief valve V5 leaks Oil bleed-off valve V4 leaks Faulty Oil pressure transducer PT1 Oil pump check valve V6 leaking	Turn regulator V3 knob clockwise to increase air pressure to the oil pump. Check oil relief valve V5 for leaks and replace if necessary. Set new valve for 3600 psi (248 bar) maximum. Check oil bleed-off valve V4 for leaks and replace if necessary. Replace transducer PT1. Check oil pump check valve V4 for leaks and replace if necessary.

Continued on next page

Problem	Possible Cause	Corrective Action
4. MOTOR OVERTEMPERATURE	Motor thermostat tripped	Refer to the *Mixer motor not turning* problem.
	Oil in reservoir RES1 contaminated or low	Check oil level and add if necessary. If the oil level is not low it may be contaminated. Drain, then add new oil.
	Faulty RTD2	Replace RTD2.
	Mixer motor speed too high	Lower speed. Refer to *Programming Setpoint Motor Speed* in the *Configuring the System* section.
	Material build-up in mixer	Check mixer housing and shaft for damage. Repair if necessary.
	Mixer seals worn	Replace mixer assembly.
5. NVRAM ERROR—DEFAULTS LOADED This indicates that • incorrect data was detected in the memory area that stores system setpoints • the NVRAM device was tested and is functioning properly	Wrong setpoints entered	Check system setpoints and adjust if necessary. Refer to the *Configuring the System* section for procedures.

Continued on next page

2. Major Fault Messages
(contd.)

Problem	Possible Cause	Corrective Action
6. RATIO CONTROL PARAMETERS OUT OF RANGE This indicates that the control system cannot supply enough air to operate the material flow and programmed ratio. The system logs the fault if the control system error is greater than the threshold. The threshold is equal to the programmed airflow sensor FS2 and has a range of 100–1000 cc.	Reduced foam level	Check these items: 1. Check programmed density ratio. Adjust the ratio if necessary. 2. Check high-pressure air shutoff valve V10. If closed, open it. 3. Raise high-pressure air supply at mixer to at least 200 psi (14 bar) above the material pressure. 4. Check air solenoid control valve V16 and air flow sensor FS2. Replace, if necessary. 5. Check high-pressure air filter F2 or filter air dryer for blockages. Replace, if necessary. 6. Check output signal of flow meter FS1 when material is flowing. If signal is missing, replace flow meter FS1. 7. See if valve V13 is stuck open. Replace, if it is clogged. 8. Check for material in air lines.

Continued on next page

Problem	Possible Cause	Corrective Action
6. RATIO CONTROL PARAMETERS *(contd.)*	Reduced foam level *(contd.)*	9. Check system configuration and pressures. Refer to *Configuring the System* section. 10. Check gas supply pressure transducer PT3 for damage and replace if necessary. 11. Check mixer gas transducer PT4 for damage and replace if necessary. 12. Check sealant pressure transducer PT2 for damage and replace if necessary. 13. Check FoamMix A/T control board for damage and replace if necessary.
	Increased foam level	Check corrective action items 1,4,6,9, and 13 for possible cause, *Reduced foam level.* Check diaphragm in back pressure regulator valve for damage. Replace, if necessary.
	Bad temperature board	Replace temperature board.
	Bad power monitor board	Replace power monitor board.

Continued on next page

2. Major Fault Messages
(contd.)

Problem	Possible Cause	Corrective Action
6. RATIO CONTROL PARAMETERS *(contd.)*	Gun Spitting	Wrong nozzle and hose size. Contact your Nordson Corporation service representative for application information. Check mixer motor speed and V-belt tension. Adjust, if necessary. Make sure density ratio is not too high. Check all pressures and mixer ratio. Adjust, if necessary. Refer to *Programming Setpoint*, *Mixer Ratio* in the *Configuring the System* section. Check pressure regulator valve V12 for a ruptured diaphragm. Replace diaphragm, if damaged. Test for leaks at air solenoid valve V16 back or pressure regulator V1. Refer to *Testing the High-Pressure Gas Circuitry* in this section for procedures. Replace valves, if necessary. Check the air solubility in the material. Increase material pressure, if necessary. Make sure 3-way shut-off valve V9 is fully open and not damaged. Replace valve, if necessary. Check mixer shaft for wear. Replace, if necessary.

Continued on next page

Problem	Possible Cause	Corrective Action
7. YYYYYY ABOVE SHUTDOWN TEMPERATURE The actual average temperature for the channel is greater than the programmed shutdown temperature.	Refer to Problem 4	Refer to Problem 4.
8. YYYYYY LOW OIL LEVEL SHUTDOWN Sensor LI2 monitors the pump oil level shutdown function. This message appears when the oil is very low.	Low oil level Oil Leak	Refer to *Changing Oil* in the *Maintenance* section. Check for leaks and repair as necessary.
9. YYYYYY NOT CONNECTED During power-up the system determines which temperature channels are connected or vacant. This message appears if you do not connect an RTD and heater to a required temperature channel. Vacant temperature channels are not necessary and do not have an RTD and heater.	RTD or heater not connected to temperature channel	Shut off power and connect the RTD or heater.
10. YYYYYY OPEN SENSOR	Open RTD	Replace RTD.
11. YYYYYY SHORTED SENSOR	Shorted resistance temperature detector RTD	Replace RTD.

3. Minor Fault Messages

The following table provides troubleshooting procedures for the minor fault messages.

Problem	Possible Cause	Corrective Action
1. BATTERY FAILURE IN NVRAM/CLOCK DEVICE	Low battery	Replace the clock/battery-backed RAM chip on the CPU board.
2. LOW GAS SUPPLY PRESSURE This message appears during the mixer startup sequence and system ready functions. This indicates that the air supply pressure is less than the sum of the mixer air pressure and 200 psi (13 bar)	Faulty compressor Low-pressure air supply	Check the compressor. Adjust the low-pressure air supply.
3. MOTOR AT CURRENT LIMIT	Motor current greater than 10 amps	Adjust motor current.
4. YYYYYY LOW OIL LEVEL WARNING Sensor LI1 monitors the pump oil level warning function. This message appears when the oil is slightly low.	Low oil level Oil Leak	Refer to *Changing Oil* in the *Maintenance* section. Repair leak.
5. YYYYYY OVERTEMPERATURE	Actual average temperature for a channel is greater than the sum of the programmed setpoint and overtemperature differential	Check setpoint temperatures.

4. Fatal Error Messages

The following table provides troubleshooting procedures for the fatal error messages.

Problem	Possible Cause	Corrective Action
1. FOAMMIX BOARD # ____ NOT FOUND During power-up, a test determines which boards are installed. This messages appears if the required board is not installed.	Faulty board	Check the board and replace if necessary.
2. IO BOARD # ____ NOT FOUND	Refer to problem 1	Refer to problem 1.
3. NON-VOLATILE RAM FAILURE	Defective NVRAM/timer chip	Replace the NVRAM/timer chip. All setpoints, including those protected by SERVICE password, must be reset. Refer to the *Configuring the System* section.
4. RAM FAILURE	Defective RAM devices	Check RAM devices and replace, if necessary.
5. ROM FAILURE	PROM's contain wrong data	Replace PROM's.
6. TEMP BOARD # ____ NOT FOUND	Refer to problem 1	Refer to problem 1.

5. System Halted Messages

The following table lists system halted messages. These messages indicate that an electrical or software problem must be repaired to continue system operation.

SYSTEM HALTED—ADDRESS ERROR PC = _____ ACC = _____	SYSTEM HALTED—PRIVILEGE VIOLATION PC = _____
SYSTEM HALTED—AUTO VECTOR ERROR PC = _____	SYSTEM HALTED—SERIOUS INTRPT PC = _____
SYSTEM HALTED—BUS ERROR PC = _____ ACC = _____	SYSTEM HALTED—SWI TRAP PC = _____
SYSTEM HALTED—DATA REGISTER ERROR PC = _____	SYSTEM HALTED—TRACE ERROR PC = _____
SYSTEM HALTED—INSTRUCTION ERROR PC = _____	SYSTEM HALTED—TRAP ON OVERFLOW ERROR PC = _____
SYSTEM HALTED—LINE EMULATION 0 ERROR PC = _____	SYSTEM HALTED—UNINITIALIZED INTRPT PC = _____
SYSTEM HALTED—LINE EMULATION 1 ERROR PC = _____	SYSTEM HALTED—ZERO DIVIDE ERROR PC = _____
SYSTEM HALTED—LOW POWER FAIL PC = _____	

6. Mixer Motor

The following table provides troubleshooting procedures for the mixer motor.

Problem	Possible Cause	Corrective Action
1. Mixer motor not turning	Blown fuse	Shutoff power. Check continuity of fuses F8 and F9. Replace fuse(s) as required.
	V-belt damaged or poorly tensioned	Replace V-belt, if necessary. Refer to *Replacing the V-Belt* in this manual.
	No material flow	Turn on dispensing gun and verify flow. Motor will not run when system has reached maximum material pressure.
	Motor Speed not programmed properly	Re-adjust maximum mixer motor speed. refer to *Programming Setpoint—Motor Speed* in the *Configuring the System* section.
	Excessive motor speed or mixer V-belt too tight	Reduce motor load by lowering maximum mixer motor speed. Refer to the *Programming Setpoint—Motor Speed in* the *Configuring the System* section.
		Check for excessive mixer V-belt tension. Re-tension the V-belt. Refer to the *Disassembly and Repair* section, *Replacing the V-Belt* in this manual.
	High motor temperature	Allow motor to cool and automatically reset. Correct fault by lowering motor speed, reducing belt tension, or cleaning FAN1 and FAN2 filters on mechanical enclosure.
	Damaged FoamMix A/T control board	Replace board.
	Damaged motor control board	Replace board. Refer to the *Disassembly and Repair* section, *Replacing the Motor Control Board*.
	Material flow meter FS1 not working properly	Check transmitter output (5 to 24 VDC) when material is flowing. Replace FS1 if signal is missing or erratic. Refer to the *Disassembly and Repair* section, *Replacing the Material Flow Meter FS1.*
	Cured material in the mixer	Replace mixer housing and shaft. Refer to *Mixer Housing* in the *Disassembly and Repair* section.

7. Using the Manual Menu

Use the MANUAL menu to

- view or modify system operation setpoints before changing the setup configuration
- perform self-diagnostics tests

Entering the Manual Menu

When you enter or exit the MANUAL menu,

- air solenoid control valve V16 closes
- output to air flow sensor FS2 turns off
- the mixer motor stops

Perform these steps to access the MANUAL menu:

1. Press MANUAL.
2. Enter the password (1111) and press ENTER. The following appears on the display:

MANUAL
{MOTOR GAS FLOW GAS SOL DISPL DIAG}

Changing Mixer Motor Speed and Gas Flow

Perform these steps to change mixer motor speed and gas flow:

1. From the MANUAL menu, select MOTOR or GAS-FLOW. Press ENTER.
2. Press INCREASE or DECREASE keys to adjust these operations:
   - MOTOR—watch the current draw of the motor as you adjust the motor speed setpoint from 0–100%.
   - GAS-FLOW—watch the actual gas flow (in SCCM) as you adjust the gas flow command from 0.0 to 1.0.

NOTE: When you exit the MANUAL mode, the system settings reset to the original ones programmed in the *Configuring the System* section.

Displaying System Operation Values

Perform these steps to display system operation values:

1. From the MANUAL menu, select DISPL. Press ENTER to access these displays:
   - SEALANT/GAS-MIXER
   - SEALANT
   - OIL
   - MOTOR
   - GAS SUPPLY
   - FLMTR
   - TEMP
2. Select the operation you wish to view. Select MORE to display the last four choices. Press ENTER.
3. Press the ESC key to return to this selection.

8. Testing the System

Use the diagnostic menus to perform these tests:

- Temperature board test
- FoamMix control board test
- I/O board test
- Serial board test
- Extended RAM test
- External disk drive test
- Display test
- Keyboard test
- PROM test
- RAM test

NOTE: Throughout these tests, circuit boards are referred to as cards.

Entering the Diagnostic Menus

Perform these steps to access the diagnostic menus:

From the MANUAL menu, select DIAG. Press ENTER. This menu appears:

```
{MORE  TEMP  FOAMMIX  I/O  SERIAL  EXTRAM}
```

If you select MORE and press ENTER, this menu appears:

```
{MORE  ADPI  DISPLAY  KEY  PROM  RAM}
```

Temperature Circuit Board Test

1. From the DIAG menu, select TEMP. Press ENTER. This message appears:

DIAGNOSTICS MANUAL ENTER CARD# TO TEST (0–15):

2. Use INCREASE or DECREASE to enter the card number (switch setting #0).

   If the card number selected is not installed, this message appears:

DIAGNOSTICS MANUAL CARD NOT INSTALLED PRESS ESC

   If the card number selected is installed, this menu appears:

DIAGNOSTICS TEMP MANUAL {HEATER RTD_SHORT_CURRENT_AUX OUT}

NOTE: The HEATER, CURRENT, and AUX-OUT tests are not applicable for the FoamMix A/T system.

3. Perform the RTD and SHORT tests from the DIAGNOSTICS TEMP menu. Refer to the following paragraphs for procedures.

RTD Test

1. From the DIAGNOSTICS TEMP menu, select RTD. Press ENTER. This message appears:

DIAGNOSTICS TEMP MANUAL ENTER RTD CHANNEL (0–2):

2. Enter the RTD channel number. The RTD input value appears on the display. An RTD input value of

   - 0–25 indicates a shorted sensor
   - 1012–1023 indicates an open sensor
   - 26–1011 represents the normal operating range (0–274 °C or 32–525 °F).

   The RTD input value appears on the display:

DIAGNOSTICS TEMP MANUAL CH____ INPUT VALUE:

3. Press ESC to exit.

Short Test

1. From the DIAGNOSTICS TEMP menu, select SHORT to scan channels 0 and 2.

   a. If the RTD is functional, this message appears:

DIAGNOSTICS TEMP MANUAL RTD OK, CHANNEL NO.: ____

   b. If the RTD is shorted, this message appears:

DIAGNOSTICS TEMP MANUAL RTD SHORTED, CHANNEL NO.:___

2. Press ESC to exit.

FoamMix Control Board Test

1. From the DIAG menu, select FOAMMIX. Press ENTER.

DIAGNOSTICS MANUAL ENTER CARD# TO TEST (0–15):

2. Enter the card number (switch setting #0).

   If the card number selected is not installed, this message appears:

DIAGNOSTICS MANUAL CARD NOT INSTALLED PRESS ESC

   If the card number selected is installed, the DIAGNOSTICS FOAMMIX menu appears:

DIAGNOSTICS FOAMMIX MANUAL {INPUTS_OUTPUTS}

You can test either analog INPUTS or OUTPUTS. Refer to the following paragraphs for procedures.

Inputs

1. From the DIAGNOSTICS FOAMMIX menu. This message appears:

DIAGNOSTICS FOAMMIX MANUAL ENTER INPUT CHANNEL (0–7):

2. See Table 7-1 for channel identifications and Table 7-2 for a list of FoamMix test points. Enter the desired channel number (0 7). The INPUT VALUE appears:

DIAGNOSTICS FOAMMIX	MANUAL
CH ____ INPUT VALUE:	

3. Press ESC to exit.

Outputs

1. Select OUTPUTS from the DIAGNOSTICS FOAMMIX menu. This message appears:

DIAGNOSTICS FOAMMIX	MANUAL
ENTER OUTPUT CHANNEL (0 OR 1):	

2. The channels are configured as follows:
   - #0 = motor speed
   - #1 = gas control valve flow command
3. Enter the desired channel. This message appears:

DIAGNOSTICS FOAMMIX	MANUAL
RAMPING D/A OUTPUT CH ____	

4. Press ESC to exit.

Channel Identifications

Table 7-1 Channel Identifications

Channel Number	Channel Description	Scaling Range FoamMix Board Revision Levels 116 632A B C D	Scaling Range FoamMix Board Revision Levels 116 632E and Later
0	Oil Pressure	51 255 (0 5000 psi)	204 1023 (0 5000 psi)
1	Sealant Pressure	51 255 (0 5000 psi)	204 1023 (0 5000 psi)
2	Mixer Air Pressure	51 255 (0 5000 psi)	204 1023 (0 5000 psi)
3	Air Control Valve Flow	00 255 (0 max flow)	00 1023 (0 max flow)
4	Motor Current	00 255 (0 20 amps)	00 1023 (0 20 amps)
5	Motor Speed	00 255 (0 1725 rpm)	00 1023 (0 1725 rpm)
6	Air Control Valve Reference	00 255 (0 max flow)	00 1023 (0 max flow)
7	Air Supply Pressure	51 255 (0 5000 psi)	204 1023 (0 5000 psi)

Table 7-2 Test Points

Test Point	Description	Range	Meaning
1	Motor Current	0–5 Volts	0–17.9 amps
2	Gas Supply	1–5 Volts	0–5000 psi
3	Gas Control Valve (Actual Flow)	0–5 Volts	0–5000 SCCM
4	Mixer Gas Pressure	1–5 Volts	0–5000 psi
5	Sealant Pressure	1–5 Volts	0–5000 psi
6	Oil Pressure	1–5 Volts	0–5000 psi
7	Motor Speed Reference	1–5 Volts	0 –100%
8	Gas Control Valve (Flow Reference)	0–5 Volts	0–5000 SCCM
9	Analog	Digital & Perimeter Ground Common	

I/O Board Test

1. From the DIAG menu, select I/O. Press ENTER. This message appears:

DIAGNOSTICS MANUAL ENTER CARD# TO TEST (0–15):

2. Enter the card number (switch setting #0)

   If the card number selected is not installed, this message appears:

DIAGNOSTICS MANUAL CARD NOT INSTALLED PRESS ESC

   If the card number selected is installed, this menu appears:

DIAGNOSTICS I/O	MANUAL
{INPUTS OUTPUTS}	

Inputs

1. From the DIAGNOSTICS I/O menu, select INPUTS to display the digital input value.

2. When prompted, enter

   - 0 to test I/O board A
   - 1 to test I/O board B

NOTE: The digital input value appears as a bit pattern and corresponds to the state of an input. A value of 1 indicates high input; a value of 0 indicates low input.

DIAGNOSTICS I/O	MANUAL
DIGITAL INPUT VALUE: XXXXXXXX	

Table 7-3 lists the I/O inputs for board A (card #0). Table 7-4 lists the I/O inputs for board B (card #1).

Table 7-3 I/O inputs for board A (card #0)

Channel	LED Label (Green)	Function
0	d8	Motor Thermostat
1	d7	Motor Prestart
2	d6	PDL Gun Trigger
3	d5	Oil Level Low Warning
4	d4	Oil Level Low Fault
5	d3	PDL Part Strobe
6	d2	Future
7	d1	Future

Table 7-4 I/O inputs for board A (card #0)

Channel	LED Label (Green)	Function
0	d8	Part ID (least significant bit)
1	d7	Part ID
2	d6	Part ID
3	d5	Part ID (most significant bit)
4	d4	future
5	d3	future
6	d2	future
7	d1	future

Output

NOTE: There are currently no outputs assigned to I/O board B.

1. From the I/O menu, select OUTPUTS to control the digital outputs on I/O board A (8 total). This message appears:

DIAGNOSTICS I/O	MANUAL
ENTER I/O BOARD OUTPUT : 00000000	

2. Use NEXT and PREVIOUS to move the cursor. Use INCREASE or DECREASE to toggle the bits. Enter 0 to open a relay and 1 to close it. See Table 7-5 for system assignments.

3. Press ENTER. The selected values appear on the display.

Table 7-5 I/O inputs for board A (card #0)

Channel	LED Label (Red)	Function
0	d16	Motor Start Relay
1	d15	Air Solenoid (Open)
2	d14	Fault
3	d13	System Ready
4	d12	Chiller Valve
5	d11	Air Solenoid (Close)
6	d10	Chiller On/Off
7	d9	Pump Interlock

Serial Board Test

1. From DIAG menu, select SERIAL. Press ENTER. This menu appears:

DIAG SERIAL	MANUAL
ENTER CARD TO TEST (0–15):	

2. At the prompt, enter the card UART number. Serial port 1 is UART 0 and serial port 2 is UART 1.

DIAG SERIAL	MANUAL
ENTER UART # TO TEST (0–3):	

After both parameters are entered, this menu appears:

DIAG SERIAL	MANUAL
{LOCAL REMOTE ASCII DUMP}	

3. Select

   - LOCAL to initiate an internal test loop
   - REMOTE to initiate an external test loop
   - ASCII DUMP to test communications between the FoamMix A/T and an external terminal. Make sure the terminal baud rate, parity, stop bits, and bits/character are entered.

   The display shows a message confirming the success or failure of the test.

Extended RAM Test

From the DIAG menu, select EXTRAM. Press ENTER. This occurs:

- The read/write test to the extended RAM is activated.
- Process data logging (PDL) information is stored in extended memory and existing data is erased.
- The display shows a message confirming the success or failure of the test.

External Disk Drive Test

1. From the DIAG menu, select ADPI. Press ENTER. This menu appears:

DIAG ADPI	MANUAL
{COMM READ XREAD WRITE XWRITE FORMAT}	

2. Select

   - COMM and press ENTER to test the communications link between the FoamMix A/T and ADPI disk drive
   - READ and press ENTER to make sure that the FoamMix A/T can read a diskette in the external disk drive
   - WRITE and press ENTER to write a test file to the external disk drive
   - FORMAT and press ENTER to see if a low density, 5-$^{1}/_{4}$ in. diskette can be formatted in the external disk drive

NOTE: XREAD and XWRITE are not applicable for the FoamMix A/T.

3. A message appears on the display confirming the success or failure of the test.

Display Test

1. From the DIAG menu, select ADPI. Press ENTER. This menu appears:

DIAGNOSTICS DISPLAY TEST	MANUAL
VISUALLY INSPECT DISPLAY FUNCTIONS	

2. Select DISPLAY. The display performs a series of diagnostic tests. Table 7-6 lists the screens that appear.

Table 7-6 Screen displays

DIAGNOSTICS DISPLAY TEST MANUAL CURSOR ON >> X (X represents the cursor)	# #
DIAGNOSTICS DISPLAY TEST MANUAL CURSOR OFF >>	$ $
DIAGNOSTICS DISPLAY TEST MANUAL CLEAR DISPLAY/CURSOR HOME TEST FOLLOWS	N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N
X_(X represents the cursor)	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
(solid blocks fill entire display)	R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R R
DIAGNOSTICS DISPLAY TEST MANUAL CHARACTER TEST FOLLOWS	D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D D
! $ % & ’ ( ) * + ,, . / 0 1 2 3 4 5 6 7 8 9 : ; << = >> ? @ ABCDEFGHIJKLMNOPQRSTUVWXYZ[ ] __	S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S S
abcdefghijklmnopqrstuvwxyz	O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O O
DIAGNOSTICS DISPLAY TEST MANUAL PIXEL TEST FOLLOWS	N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N
* *	DIAGNOSTICS DISPLAY TEST MANUAL *** TEST COMPLETE ***

Keypad Test

1. From the DIAG menu, select KEY. This message appears:

DIAGNOSTICS KEYBOARD TEST	MANUAL
PRESS ' _____ ' KEY . . .	

2. Press the key indicated on the display. If the key works, the controller automatically updates the display and prompts you to test another key.

   If you press the wrong key or, the key is not working, this message appears:

DIAGNOSTICS KEYBOARD TEST	MANUAL
PRESS ' _____ ' KEY . . . INCORRECT KEY	

   If you do not press a key or, no keys are recognized by the system, this message appears:

DIAGNOSTICS KEYBOARD TEST	MANUAL
PRESS ' _____ ' KEY . . . NEVER SAW A KEY	

   This process continues until all keys are tested. One of these messages appears after the test:

DIAGNOSTICS KEYBOARD TEST	MANUAL
*** TEST PASSED ***	

DIAGNOSTICS KEYBOARD TEST	MANUAL
*** TEST FAILED ***	

PROM Test

From the DIAG menu, select PROM. This test generates a 16 bit CRC which is compared to the value stored in the PROM. This message appears:

DIAGNOSTICS PROM TEST	MANUAL
CALCULATING CRC . . .	

If the values are equal, this message appears until you press the ESC key:

DIAGNOSTICS PROM TEST	MANUAL
*** TEST PASSED ***	

If the calculated and stored values do not match, the system locks up and this message appears:

*** FATAL ERROR **
ROM FAILURE

RAM Test

From the DIAG menu, select RAM. During the test, these messages appear:

DIAGNOSTICS RAM TEST	MANUAL
TEST IN PROGRESS . . .	

If the RAM test passes, this message appears:

DIAGNOSTICS RAM TEST	MANUAL
*** TEST PASSED ***	

If the RAM test fails, the system locks up and one of these messages appear:

DIAGNOSTICS RAM TEST	MANUAL
NON VOLATILE RAM FAILURE	

DIAGNOSTICS RAM TEST	MANUAL
RAM FAILURE	

Schematics

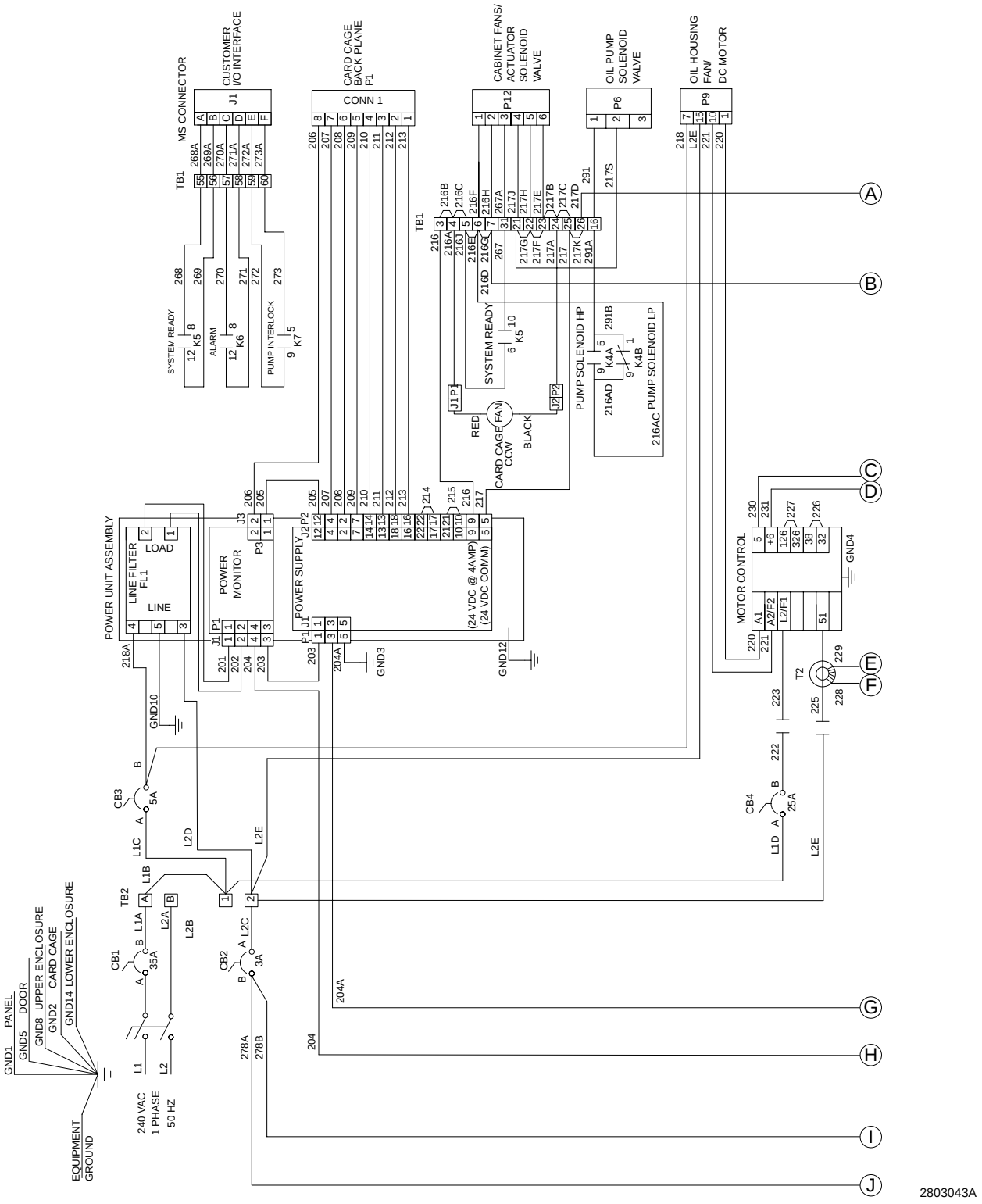


Fig. 7-1 Upper enclosure electrical schematic (Sheet 1 of 3)

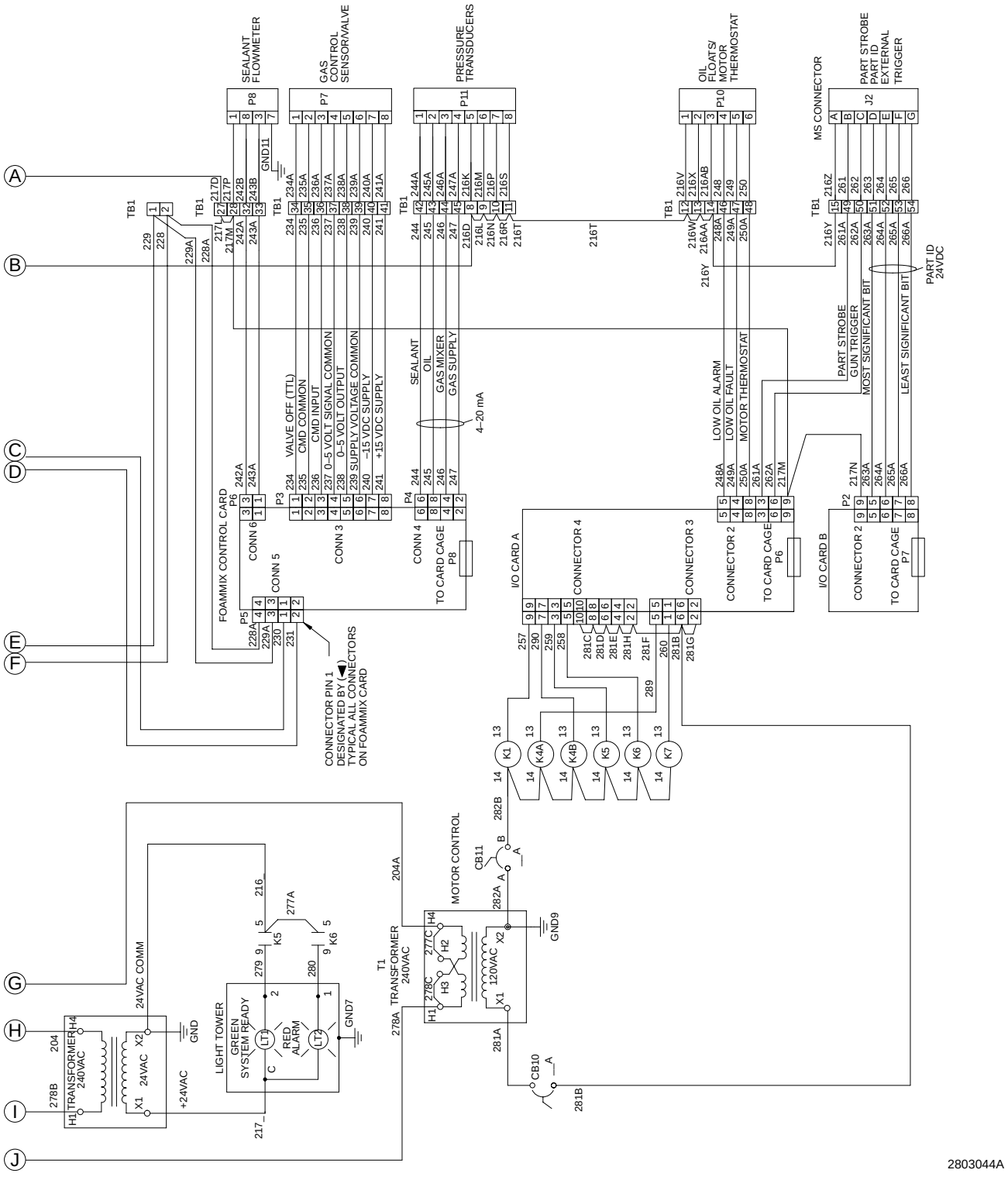
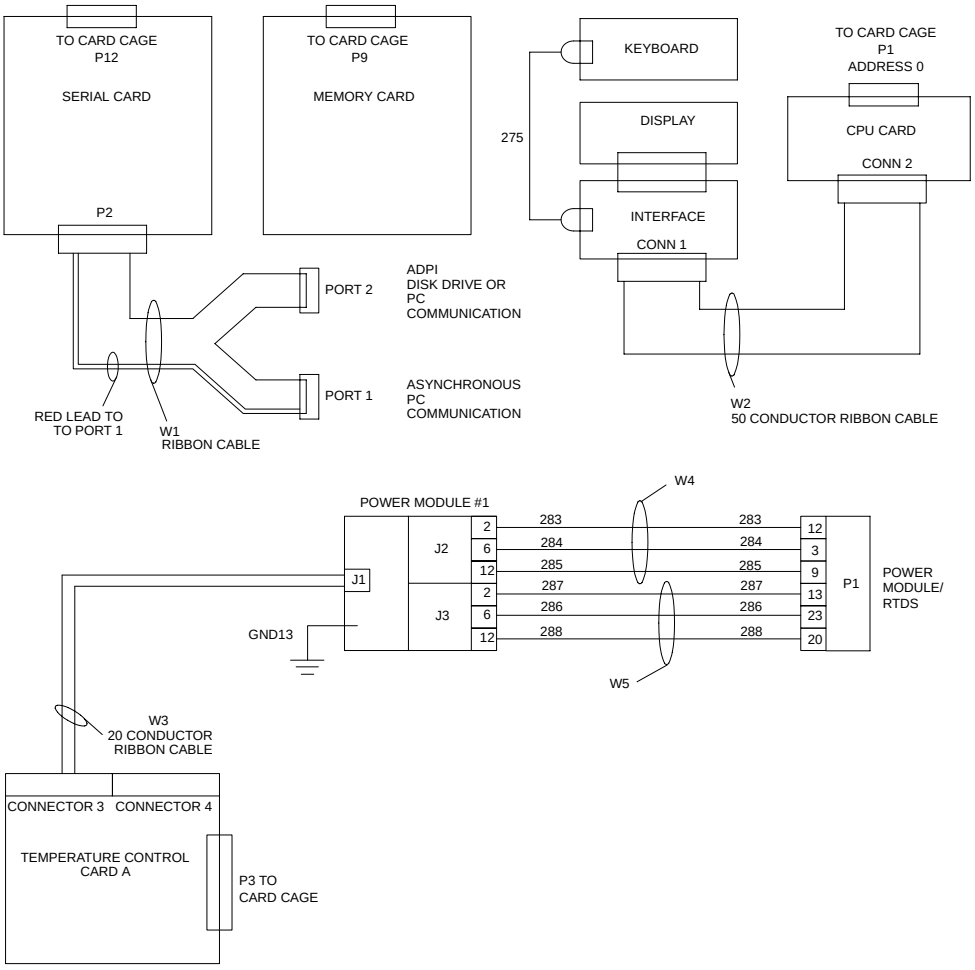


Fig. 7-1 Upper enclosure electrical schematic (Sheet 2 of 3)

Schematics *(contd.)*



2803047A

Fig. 7-1 Upper enclosure electrical schematic (Sheet 3 of 3)

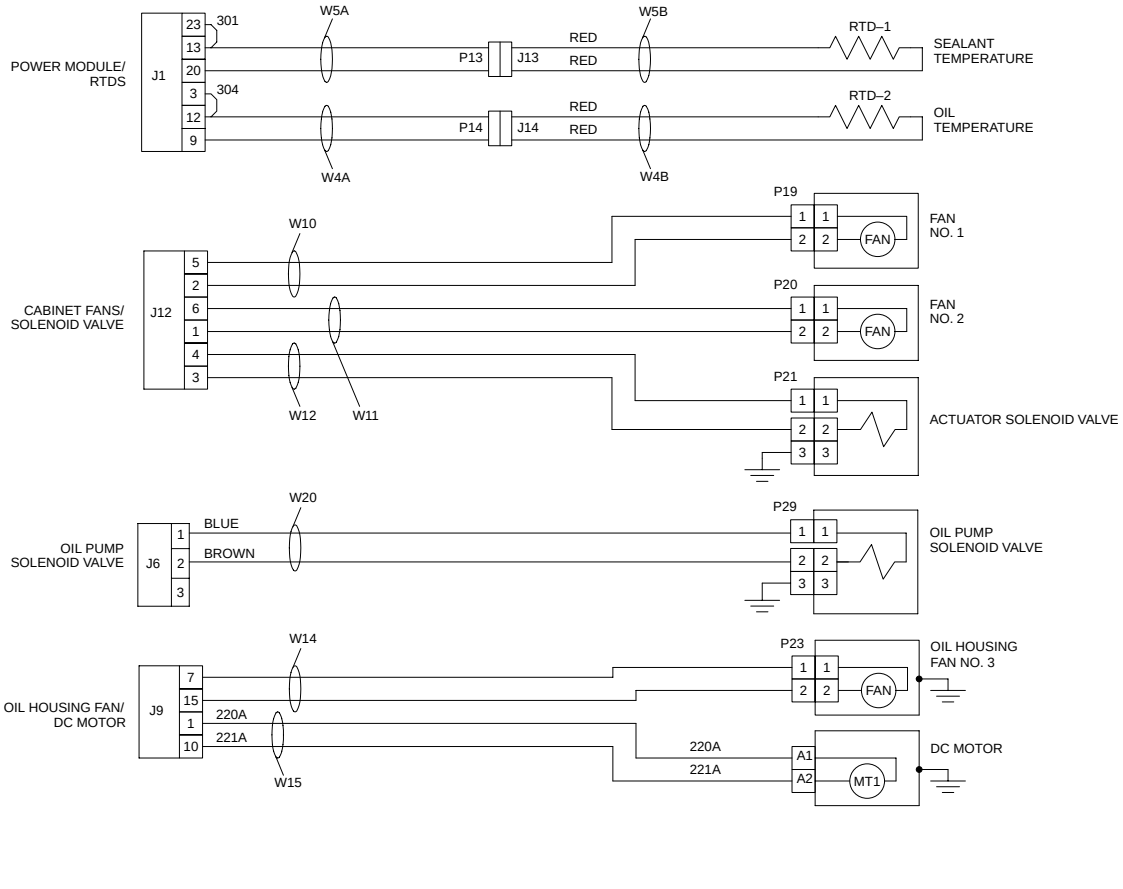


Fig. 7-2 Lower enclosure electrical schematic (Sheet 1 of 2)

Schematics *(contd.)*

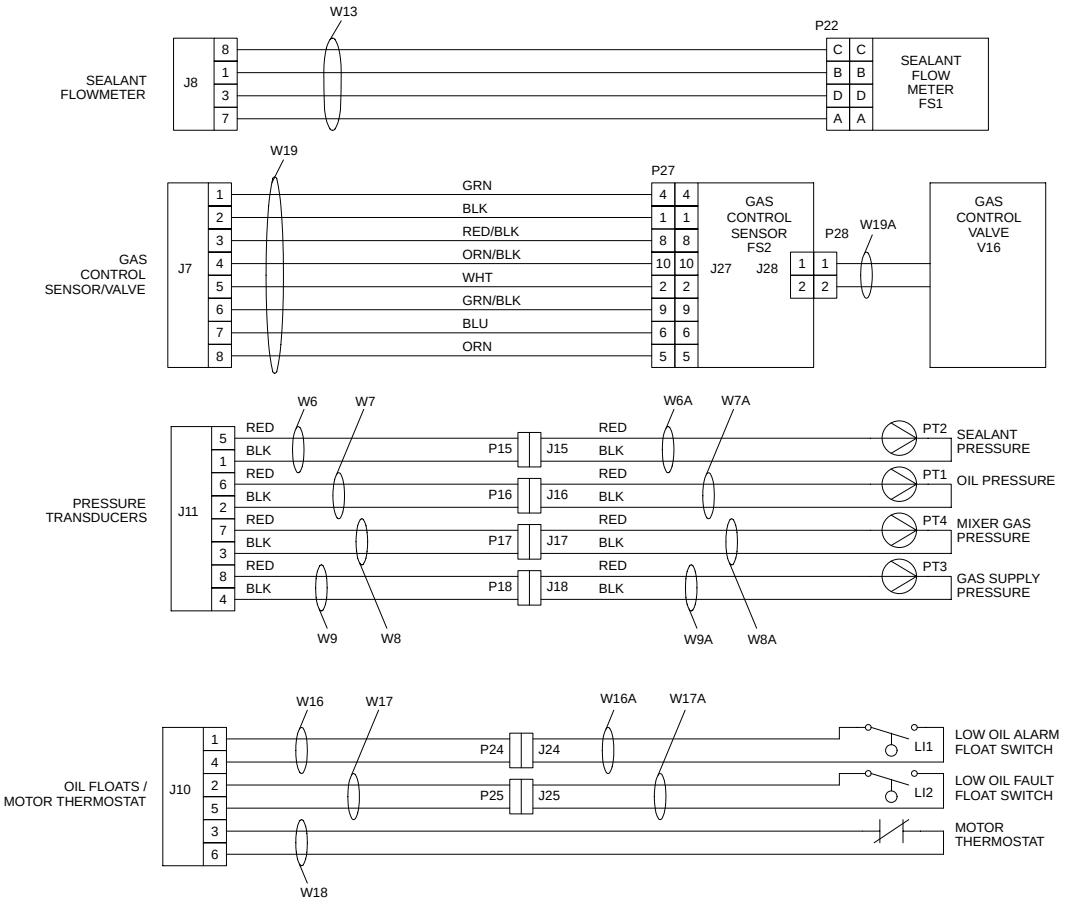


Fig. 7-2 Lower enclosure electrical schematic (Sheet 2 of 2)

Section 8

Repair

Section 8
Repair

WARNING: Allow only qualified personnel to perform the following tasks. Follow the safety instructions in this document and all other related documentation.

WARNING: This equipment contains energized electrical potentials that could be fatal. Disconnect and lock out power to the unit before servicing.

WARNING: To prevent personal injury or damage to the equipment, relieve all pressures before performing any maintenance or service. Refer to the *FoamMix A/T Lockout Procedure* in this section for instructions.

1. Electrical Enclosure

The following paragraphs provide procedures for repairing the electrical enclosure. Figure 8-1 illustrates the major components of the electrical enclosure.

Electrical Enclosure Door

To gain access to components, unlatch and open the electrical enclosure door. When you complete repairs, close and latch the electrical enclosure door.

Display Contrast

See Figure 8-1. Perform these steps to adjust the display contrast:

NOTE: The CPU board is located in rack position 1 of the card cage.

1. Locate the trim potentiometer that is directly above the 50-pin ribbon connector (P1) on the CPU board (19).

2. Using a small insulated screwdriver, adjust the potentiometer to the desired contrast.

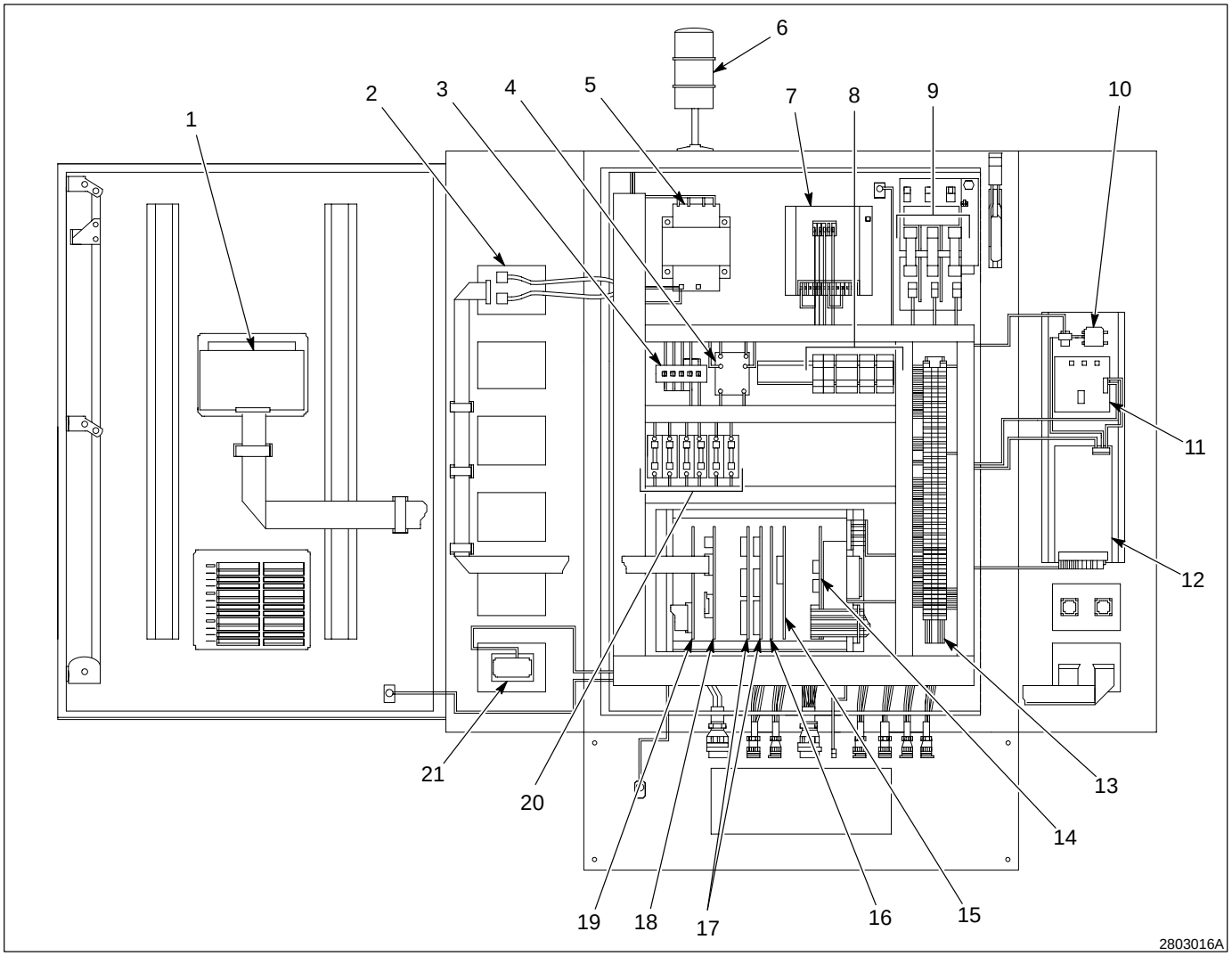


Fig. 8-1 FoamMix A/T electrical enclosure

1. Keyboard/display
2. Power module #1
3. Terminal block TB2
4. Relay K1
5. 240/120 VA transformer T1
6. Light tower
7. Motor control board
8. Relays K5-K7
9. Fuses F1-F3
10. Line filter FL1
11. Power monitor board
12. Power supply
13. Terminal block TB1
14. Serial card
15. Memory card
16. FoamMix card
17. I/O card
18. Temperature card
19. CPU board
20. Fuses (F4-F9)
21. 120 Vac receptacle

Motor Control Board

See Figure 8-1. Perform these steps to replace the motor control board (7):

1. Disconnect these wires from the motor control board:
   - 220, 221, 223, and 225 from the middle terminal strip
   - 230 and 231 from the bottom terminal strip
   - GND4
2. Remove the screws that secure the motor control board to the back panel.
3. Disconnect wire jumper 226 and connect it between terminals 32 and 38 on the new motor control board.
4. Disconnect wire jumper 227 and connect it between terminals 126 and 326 on the new motor control board.
5. Use the screws to secure the motor control board to the back panel.
6. Connect these wires to the middle terminal strip on the motor control board:
   - 221 to terminal A2/F2
   - 220 to terminal A1
   - 223 to terminal L2/F1
   - 225 to terminal 51
7. Connect ground wire GND4 to the motor control board.

240/120 VA Transformer T1

See Figure 8-1. Perform these steps to replace 240/120 VA transformer T1 (5):

1. Disconnect these wires from the transformer:
   - 277B from H4
   - 278B from H1
   - 281 and 281B from X1
   - 282, 282B, and GND9 from X2
2. Remove the screws and washers that secure the transformer to the back panel.
3. Remove these jumper wires:
   - 278C from H1 and H3
   - jumper 277C from H2 and H4

   Install the jumper wires at the same position on the new transformer.

240/120 VA Transformer T1
(contd)

4. Use the screws and washers to secure the new transformer to the back panel.

5. Connect these wires to the transformer:

   - 277B to H4
   - 278B to H1
   - 281 and 281B X1
   - 282, 282B, and GND9 to X2

Power Module #1

See Figure 8-1. Perform these steps to replace power module # 1 (2):

1. Disconnect J1, J2, J3, and GND13 from the power module.

NOTE: Support the power module while you remove the screws.

2. Remove the screws that secure the power module to the electrical enclosure.

3. If the four neon bulbs on the new power module are bent over, carefully align them upright.

4. Use the screws to secure the new power module to the electrical enclosure.

5. Connect J1, J2, J3, and GND13 to the power module.

Fuses

See Figure 8-1. Perform these steps to replace the fuses (9, 20):

1. Use the rejection ring in the main disconnect fuse holder to remove fuses F1 through F3. Use a fuse puller to remove fuses F4 through F9.

CAUTION: Fuses F4 through F9 must be installed in the same position as the old fuse. To prevent damage to the fuse and fuse holder, do not rotate the fuse 180°.

2. Place new fuses into their holders, then press into place.

3. Insert the rejection ring on the main disconnect fuse holder.

Power Unit Assembly

See Figure 8-1. The following paragraphs provide replacement procedures for line filter FL1 (10), the power monitor board, and the power supply.

Line Filter

1. Disconnect the wire leads from line filter FL1 (10):
   - 201 from LOAD 2
   - 202 from LOAD 1
   - 218A from LINE 4
   - 219A from LINE 3
   - GND10 from LINE 5
2. Remove the nuts, lock washers, and screws that secure the line filter to the power unit bracket.
3. Use the nuts, lock washers, and screws to secure the new line filter to the power unit bracket. Tighten the screws securely.
4. Connect the wire leads to the line filter:
   - 201 to LOAD 2
   - 202 to LOAD 1
   - 218A to LINE 4
   - 219A to LINE 3
   - GND10 to LINE 5

Power Monitor

1. Disconnect these connectors from the power monitor board (11):
   - J1 from P1
   - J3 from P3
2. Remove the power monitor from the power unit bracket.
3. Install the new power monitor on the power unit bracket.
4. Connect these connectors:
   - J1 to P1
   - J3 to P3

Power Supply

1. Disconnect these connectors from the power supply (12):
   - P1 (3-wire) from J1
   - P2 (8-wire) from J2
2. Remove the screws and washers that secure the power supply to the power unit bracket.
3. Use the screws and washers to secure the new power supply to the power unit bracket.
4. Connect these connectors:
   - P1 (3-wire) to J1
   - P2 (8-wire) to J2

2. Mechanical Components

WARNING: To prevent personal injury or damage to the equipment, relieve all pressures before performing any maintenance or service. Refer to the *FoamMix A/T Lockout Procedure* in this section for instructions.

WARNING: This equipment contains energized electrical potentials that could be fatal. Disconnect and lock out power to the unit before servicing.

NOTE: Leak detector fluid and thread lubricant are necessary for some of the following procedures. Refer to the *Parts* section for ordering information.

NOTE: Replace all panels after servicing this equipment.

FoamMix A/T Lockout Safety Procedure

See Figures 8-1 through 8-5 for component locations.

1. Enter the SHUTDOWN mode of operation at the controller keypad/display.
2. Turn off the pump and close the external mastic regulator.
3. Remove the front and back panels.

FoamMix A/T Lockout Safety Procedure (contd)

4. Bleed low air pressure regulator V1 down to 0 psi/bar.

NOTE: Regulator V1 supplies air to the external mastic regulator.

5. Trigger the dispensing guns to relieve material pressure inside the mixer.

WARNING: Failure to perform Step 6 may result in personal injury.

6. Verify that material pressure is less than 200 psig (13 bar) at the REVIEW display:

MIXER REVIEW	XXXXXXXX
SEALANT = _____ PSI	MIXER GAS = _____PSI

7. Bleed low-pressure air regulator V3 down to 0 psi/bar.

NOTE: Regulator V3 supplies air to the oil pump.

8. Relieve oil pressure to the reservoir via diverter valve V4, located on the oil manifold M2.

WARNING: Failure to perform Step 9 may result in personal injury.

9. Verify that oil pressure is less than 200 psi (13 bar) at the REVIEW display:

MIXER REVIEW	XXXXXXXX
OIL PRESSURE = _____ PSI	

10. Close high-pressure air shutoff valve V10 located on manifold M3.

11. Relieve high-pressure air regulator V11 until it reaches its full counterclockwise off position.

FoamMix A/T Lockout Safety Procedure *(contd)*

WARNING: Failure to perform Step 12 may result in personal injury.

12. Verify that mixer air pressure is less than 200 psi (13 bar) at the REVIEW display:

MIXER REVIEW	XXXXXXXX
GAS SUPPLY PRESSURE = _____ PSI	

WARNING: This equipment contains energized potentials that could be fatal.

13. Shut off and lock out electrical disconnect on electrical enclosure.

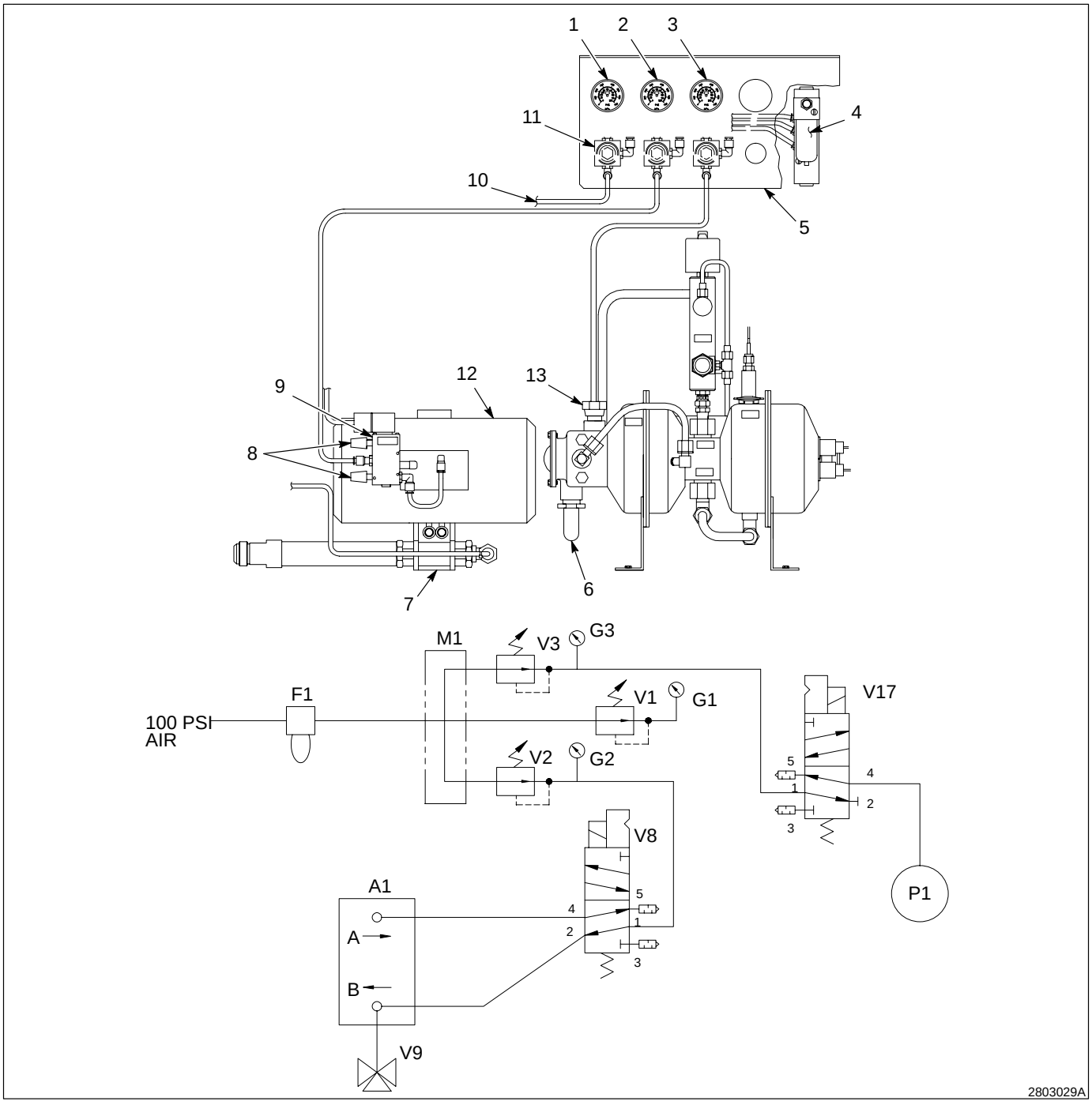


Fig. 8-2 Low-pressure air system

1. Air to external mastic regulator gage G1
2. Air to shutoff valve pressure gage G2
3. Air to oil pump pressure gage G3
4. Low-pressure air filter F1

Note: A complete FoamMix system schematic is located in the *Description* section.

5. Low-pressure air manifold M1
6. Air exhaust
7. 3-way shutoff bleed valve V9
8. Air exhaust
9. Shutoff solenoid valve V8
10. To external mastic air regulator
11. Air regulators V–V3
12. Shutoff actuator A1
13. Air inlet

FoamMix A/T Lockout Safety Procedure (contd)

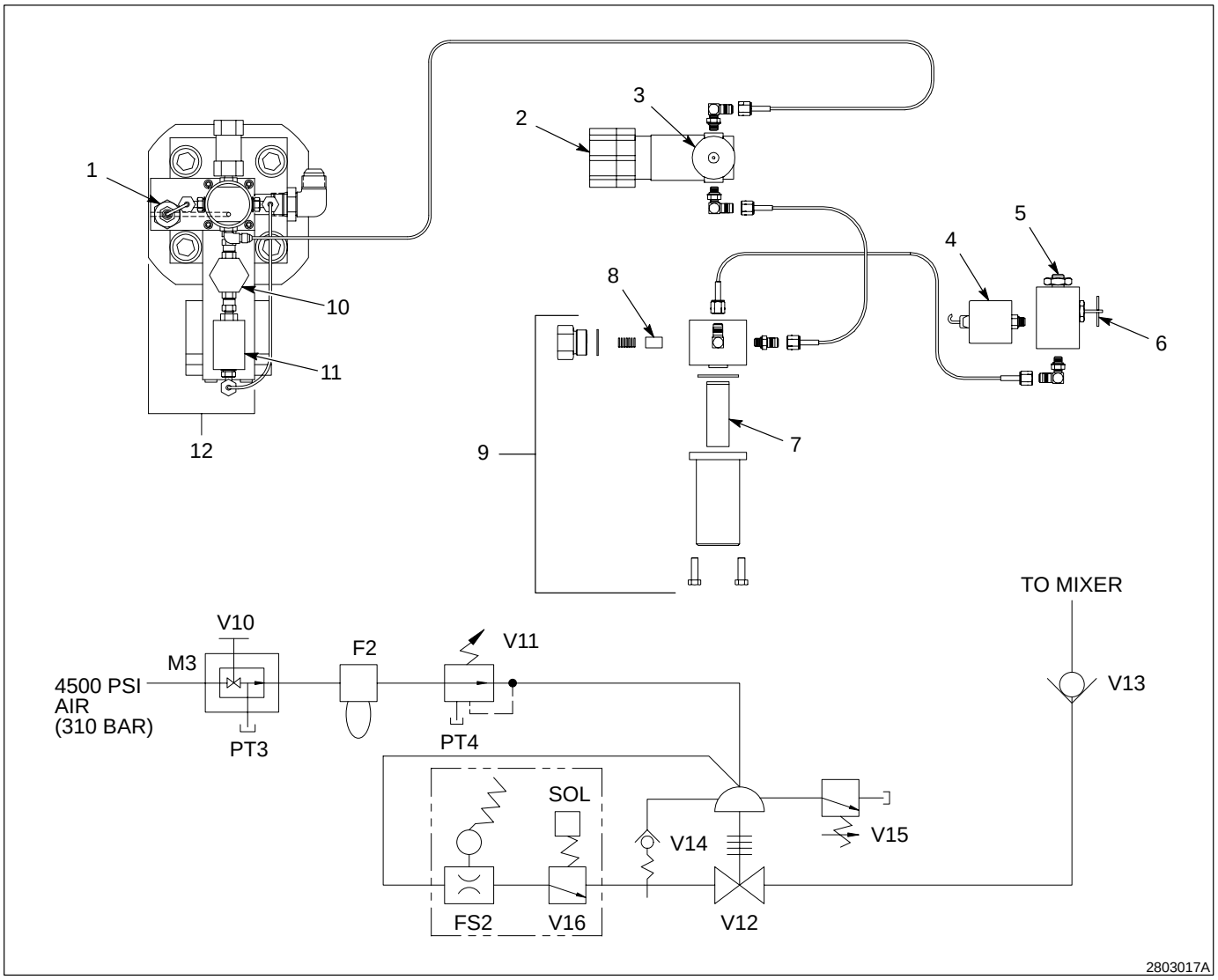


Fig. 8-3 High-pressure air system

1. Adjustable back-pressure check valve V14
   Note: Set at 360 psi (24 bar)
2. High-pressure air regulator V11
3. Pressure transducer PT4
4. Pressure transducer PT3
5. High-pressure air manifold M3
6. High-pressure air shutoff valve V10
7. Desiccant cartridge
8. Micron filter
9. High-pressure air filter/dryer F2
10. Air solenoid control valve V16
11. Air flow sensor FS2
12. High-pressure gas circuitry

Note: A complete FoamMix system schematic is located in the *Description* section.

FoamMix A/T Lockout Safety Procedure (contd)

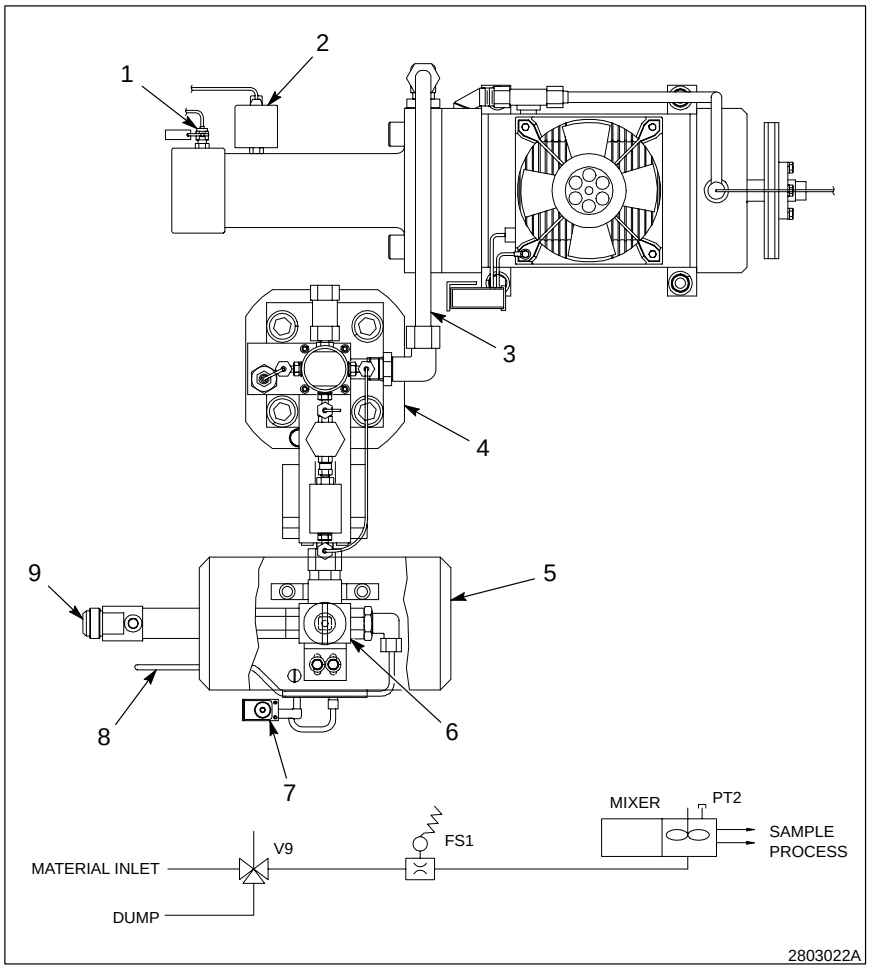


Fig. 8-4 Material system

1. Sealant RTD (TEMP)
2. Sealant pressure transducer PT2
3. Material inlet from material flow meter FS1 to mixer
4. Material flow meter FS (underneath high-pressure gas circuitry)
5. Shutoff actuator A1
6. 3-way shutoff bleed valve V9
7. Shut off solenoid valve V8
8. Material dump
9. Material inlet

Note: A complete FoamMix system schematic is located in the *Description* section.

FoamMix A/T Lockout Safety Procedure (contd)

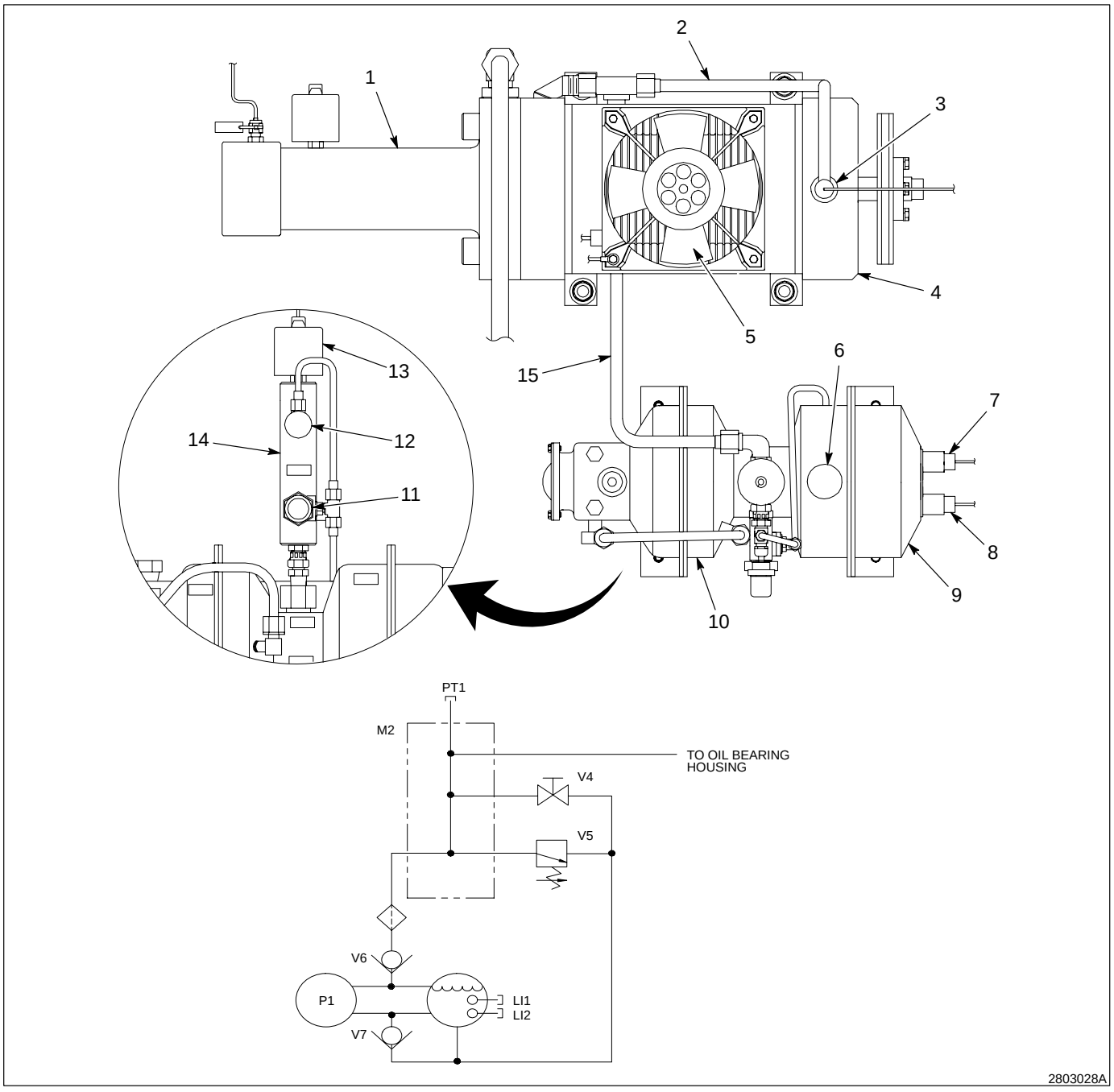


Fig. 8-5 Oil system

1. Mixer
2. Oil bearing housing circulation loop
3. Oil RTD-2 (Temp)
4. Oil bearing housing
5. FAN3
6. Filler cap
7. Oil float: major fault indicator LI2
8. Oil float: minor fault indicator LI1
9. Oil reservoir RES1
10. Oil pump P1
11. Oil relief valve V5
12. Diverter valve V4
13. Pressure transducer PT1
14. Oil manifold
15. Oil pump feed to oil bearing housing

Note: A complete FoamMix system schematic is located in the *Description* section.

Low-Pressure Air Filter F1

See Figure 8-6.

1. Low-pressure air filter F1 filter (2) is mounted behind the low-pressure air manifold (1). Unscrew the bowl counterclockwise and remove.
2. Unscrew the filter/diverter counterclockwise and remove.
3. Replace the filter/diverter and O-ring.
4. Replace the bowl.
5. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

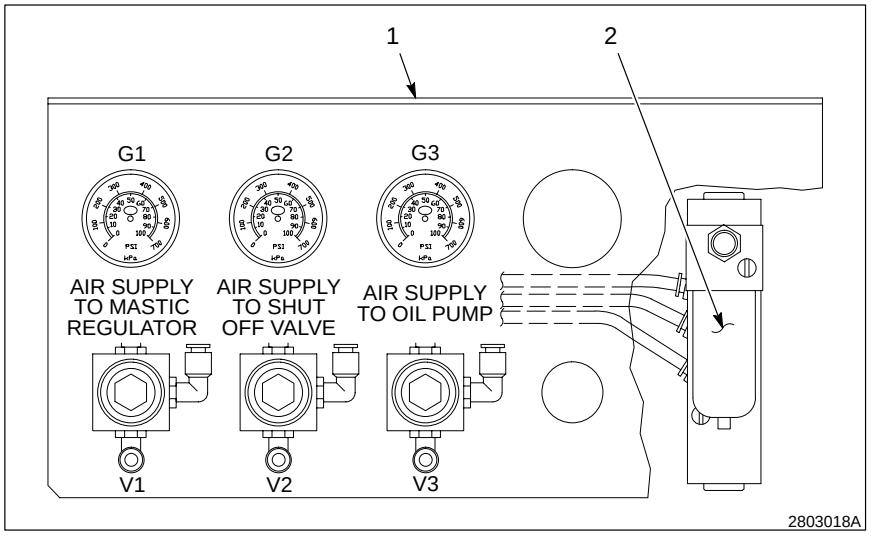


Fig. 8-6 Low-pressure air filter assembly

1. Air manifold M1
2. Air filter F1

High-Pressure Air Filter/Dryer F2

See Figure 8-7.

Desiccant Cartridge

1. Remove the flange screws (7) securing the cartridge cover (6).

NOTE: Do not apply O-ring lubricant to the O-ring.

2. Remove and discard the O-ring (4).

3. Remove and discard the desiccant cartridge (5).

4. Install a new desiccant cartridge (5).

5. Install the O-ring (4).

6. Install the cartridge cover (6). Tighten the flange screws (7) to 20 ft lb (27 N•m) in an alternating pattern.

7. Slowly open high-pressure air shutoff valve V10 and high-pressure air regulator V11.

8. Use leak detector fluid to check for leaks. If no leaks are detected, pressurize the unit. Refer to the *Configuring the System* section for procedures.

Filter

1. Remove these parts from high-pressure air filter/dryer F2:
   - filter plug (8)
   - spring (2)
   - 7-micron filter (3)

NOTE: Do not apply O-ring lubricant on the O-ring.

2. Remove the O-ring (1) from the filter plug (8). Install a new O-ring on the filter plug.

3. Insert a new 7-micron filter (3) and spring (2) into air filter/dryer F2.

4. Install the filter plug (8) and tighten to 70 ft lb (95 N•m).

5. Slowly open valves V10 and V11.

6. Use leak detector fluid to check for leaks. If no leaks are detected, pressurize the unit. Refer to the *Configuring the System* section for procedures.

High-Pressure Air Filter/Dryer F2 (contd)

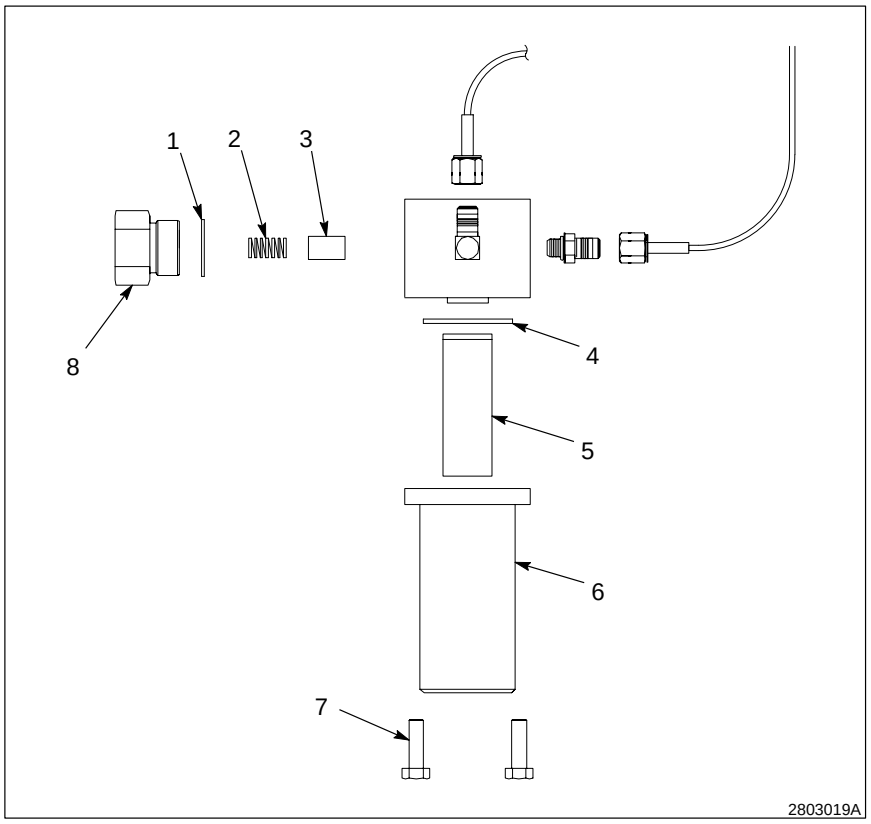


Fig. 8-7 High-pressure air filter/dryer assembly

1. O-Ring
2. Spring
3. 7-micron filter
4. O-ring
5. Desiccant cartridge
6. Cartridge cover
7. Flange screw
8. Filter plug

High-Pressure Regulator

See Figure 8-3.

1. Disconnect the air line at the high air pressure regulator (2) input port elbow.
2. Disconnect the air line at the high air pressure regulator (2) output port connector.
3. Remove the screws, lock washers, and washers that secure the lower mounting bracket.
4. Remove mixer gas pressure transducer PT4 (3).

High-Pressure Regulator
(contd)

5. Remove the high-pressure air regulator (2).
6. Install the mixer gas pressure transducer PT4 (3) onto the new high-pressure air regulator (2).
7. Use the lower mounting bracket, washers, lock washers, and screws to secure the high-pressure regulator.
8. Connect the input and output high-pressure air lines.
9. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

Pressure Transducer

See Figures 8-3, 8-4, and 8-5 for component location. Use this procedure to replace a pressure transducer:

1. See Table 8-1. Disconnect the pressure transducer electrical connector.
2. Remove the pressure transducer.
3. Install the new transducer and O-ring.
4. Connect the transducer electrical connector.
5. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

Table 8-1 Pressure Transducer Connections

Pressure Transducer	Electrical Connectors
PT1	J16–P16
PT2	J15–P15
PT3	J18–P18
PT4	J17–P17

High-Pressure Gas Circuitry Replacement

See Figure 8-8 and 8-11 for component location.

1. Disconnect the high pressure air line from back pressure regulator valve V12.
2. Disconnect the cable from flow sensor FS2.
3. Remove the screws that secure the high pressure gas circuitry manifold to the flow meter cap manifold. Remove the old gas circuitry from the unit.
4. Install the new high pressure gas circuitry manifold on top of the flow meter cap manifold. Tighten the screws to 4 ft lb (5 N•m) in a crisscross pattern.
5. Connect the high pressure air line to back pressure regulator V12.
6. Connect the cable to flow sensor FS2.
7. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

High-Pressure Gas Circuitry Replacement (contd)

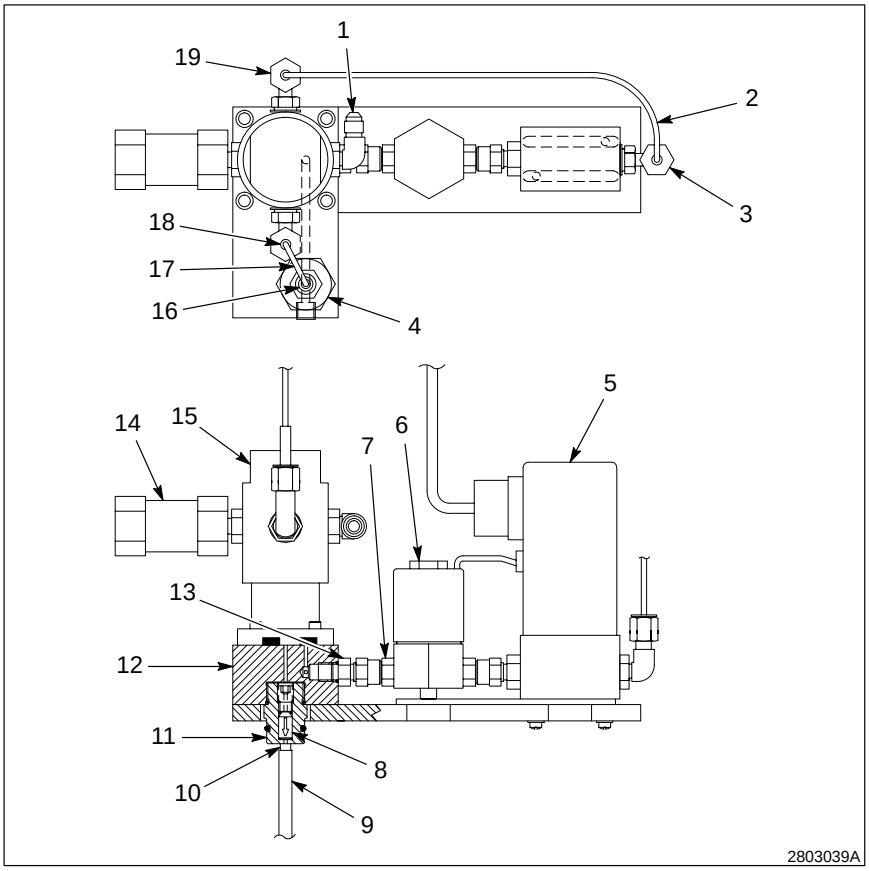


Fig. 8-8 High-pressure gas circuitry

1. High-pressure air supply inlet
2. Air line
3. FS2 inlet port
4. Adjustable back pressure check valve V14
5. Air flow sensor FS2
6. Air solenoid control valve V16
7. V16 outlet port
8. Mixer check valve V13
9. Rubber hose
10. High-pressure gas circuitry outlet
11. Mixer check valve body
12. Flow meter control block
13. Flow meter control block inlet port
14. High-pressure air relief valve V15
15. Back-pressure regulator valve
16. V14 inlet port
17. Air line
18. V12 outlet port
19. V12 outlet port

Zeroing Flow Sensor FS2

NOTE: When operating pressures are changed or flow sensor FS2 is replaced, the Z-potentiometer must be zeroed.

See Figure 8-9.

1. Pressurize the FoamMix A/T for operation as described in the *Configuring the System* section.

2. Electrically energize the high-pressure gas circuitry and wait 45 minutes for the unit to warm up.

3. Connect a voltmeter to test points 3 and 9 (GND) on the FoamMix card. The DC voltage reading should be zero. If not, turn the Z-potentiometer (1) on flow sensor FS2 (2) clockwise to decrease voltage to –0.10 to –0.01 Vdc.

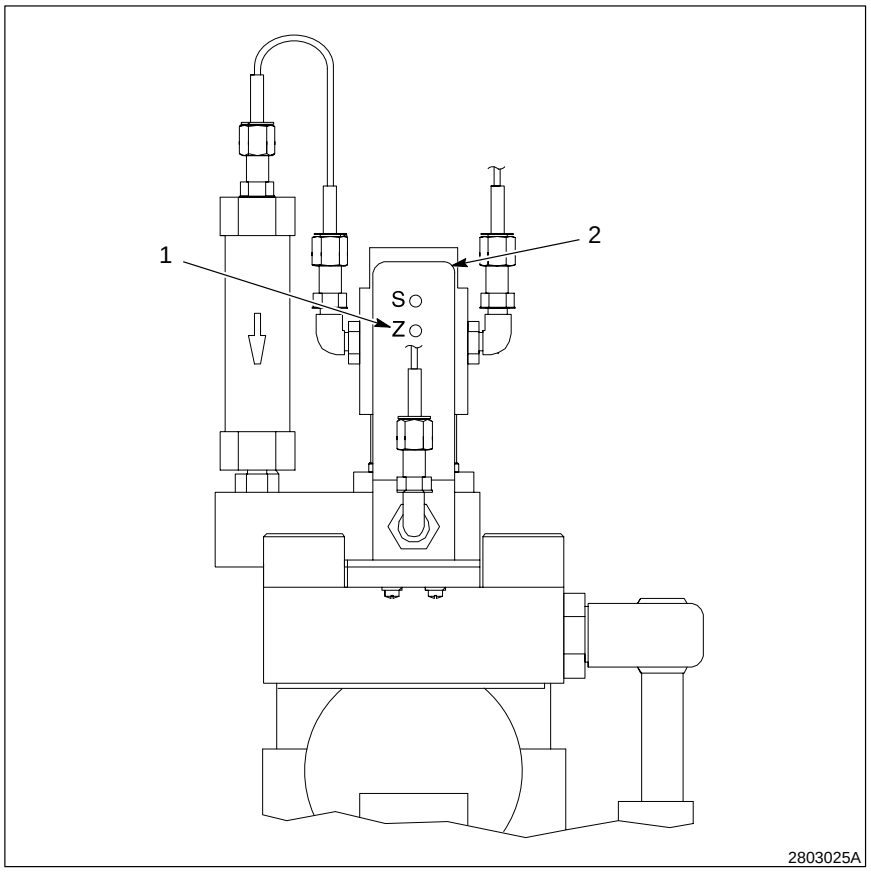


Fig. 8-9 Re-zeroing flow sensor FS2

1. Z-potentiometer
2. Flow sensor FS2

Back-Pressure Regulator Valve V12

See Figures 8-8, 8-10 and 8-12 for component location.

1. Open the high-pressure air supply line to the back-pressure regulator to relieve air pressure.
2. Disconnect the hoses and high-pressure air relief valve V15 from the back-pressure regulator.
3. Remove the screws that secure the back-pressure regulator to the flow meter control block.
4. Remove and discard the two O-rings from the base of the back-pressure regulator. Install new O-rings.
5. Install the new back-pressure regulator on the manifold. Make sure that the guide pin is correctly oriented.
6. Apply thread lubricant to the socket head screws. Use the socket screws to secure the back-pressure regulator to the flow meter control block. Tighten the screws, in a crisscross pattern, to 2 ft lb (2.7 N•m).
7. Connect the air lines.
8. Slowly apply pressure to the FoamMix A/T system and test for leaks using leak detector fluid.
9. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

Back-Pressure Regulator V12 Diaphragm

See Figures 8-3, 8-10, and 8-12 for component location.

Removal

1. Open the high-pressure air supply line to the back-pressure regulator. When pressure is relieved, remove all hoses and high-pressure air relief valve (V15) from the back-pressure regulator.
2. Loosen but do not remove the dome.
3. Remove the screws that secure the back-pressure regulator to the flow meter control block.

Removal *(contd.)*

4. Remove and discard the O-rings from the base of the back-pressure regulator.

5. Invert the back-pressure regulator and place it on a work bench as shown in Figure 8-10.

6. Remove the regulator dome.

7. Note the orientation of diaphragm, then remove and discard it. See Figure 8-10 for the orientation of the internal valve components.

Installation

1. Apply a thin coating of lubricant to the outer sealing surface of the diaphragm and to the dome mating surface.

2. Position the new diaphragm in the back-pressure regulator. Do not invert the diaphragm.

CAUTION: To prevent damage to the diaphragm, do not overtighten the dome.

3. Apply thread lubricant on the dome threads. Install the dome and hand tighten.

4. Install the new back-pressure regulator on the flow meter control block. Make sure that the guide pin is correctly oriented and the new O-rings are in position (see Figure 8-12, (19)).

5. Apply thread lubricant to the socket head screws and install. Tighten the screws to 2 ft lb (3 N•m) in a crisscross pattern.

6. Tighten the dome to 75 ft lb (102 N•m).

7. Install the air lines and components onto the dome.

8. Slowly apply pressure to the FoamMix system and test for leaks using leak detector fluid.

9. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

Back-Pressure Regulator V12 Diaphragm (contd)

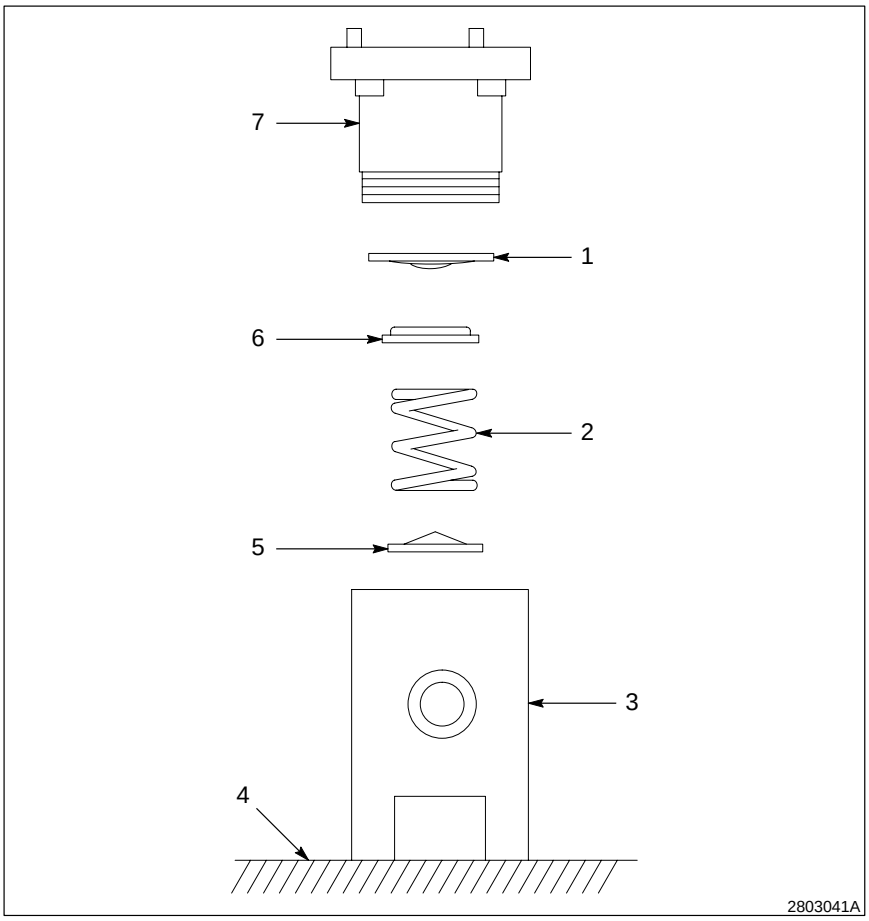


Fig. 8-10 Back-pressure regulator valve V12

1. Diaphragm
2. Spring
3. Body
4. Work bench
5. Plate
6. Button
7. Base

Mixer Check Valve V13

See Figures 8-11 and 8-12 for component location.

1. Remove the screws that secure the high-pressure gas circuitry manifold to the cap manifold.

2. Disconnect the tube fitting between air solenoid control valve V16 and the cap manifold.

3. Carefully position the high-pressure gas circuitry manifold away from flow meter FS1.

Mixer Check Valve V13 (contd)

4. Remove the mixer check valve from the high-pressure gas circuitry manifold.

5. Install a new check valve into the high-pressure gas circuitry manifold. Do not lubricate the O-rings (See Figure 8-11, (1, 2)). Tighten the check valve.

6. Install the high-pressure gas circuitry manifold on top of the cap manifold. Tighten the screws to 4 ft lb (5 N•m) in a crisscross pattern.

7. Connect the tube fitting between air solenoid control valve V16 and the cap manifold.

8. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

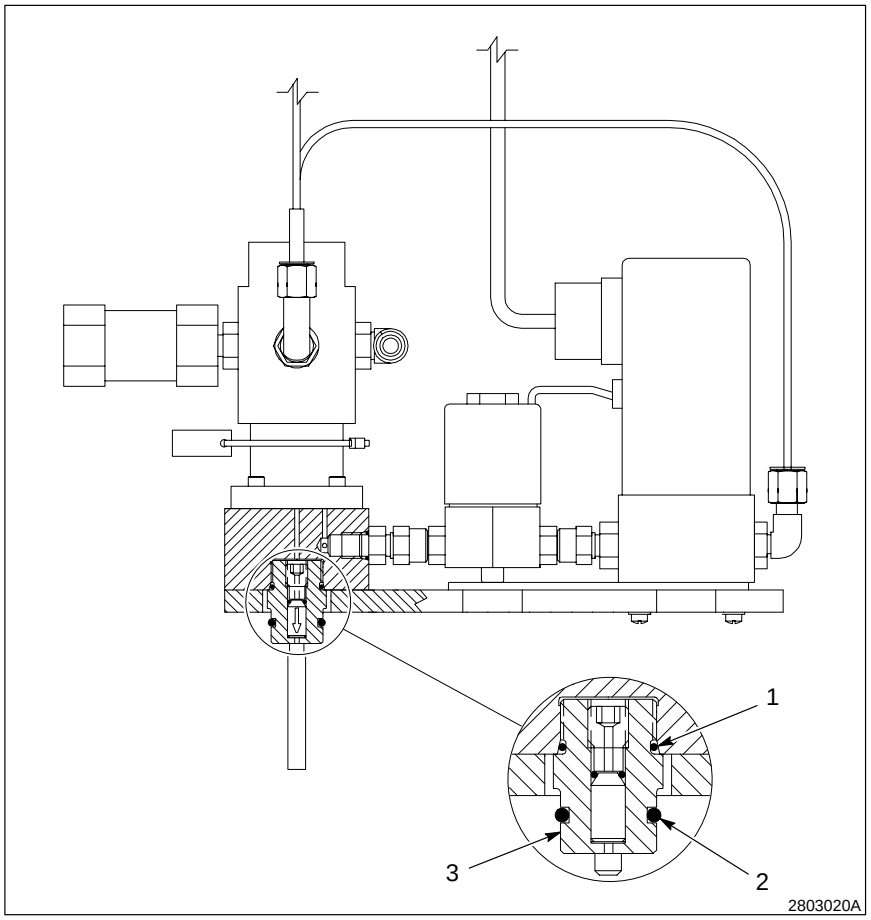


Fig. 8-11 Mixer check valve V13

1. Check valve body O-ring
2. Flow meter O-ring
3. Check valve

Material Flow Meter FS1

See Figure 8-12.

1. Disconnect the material inlet line from flow meter FS1 (12).
2. Disconnect the cable from the flow transmitter (9).
3. Remove the high-pressure gas circuitry. Refer to the *High Pressure Gas Circuitry* procedures in this section.
4. Remove the head cap screws that secure the flow meter cap manifold (14) to the base manifold (10).
5. Remove the cap manifold (14), gaskets (11, 13), flow meter (12) and flow transmitter (9). Discard the old gaskets.
6. Install new gaskets (11, 13) between the flow meter (12) and cap manifold (14).
7. Install the new flow meter (12), with flow transmitter (9), onto the base manifold (10). Connect the cable.
8. Insert four socket head cap screws. Tighten the screws to 175 ft lb (237 N•m) in an alternating pattern, one screw opposite the other, until the flow meter is secured.
9. Install the material inlet flow meter (12).
10. Install the high-pressure gas circuitry. Refer to the *High Pressure Gas Circuitry* procedures in this section.
11. Perform these steps:
    a. Pressurize the unit. Refer to the *Configuring the System* section.
    b. Enter the value, written on the K-Factor tag, into the program. Refer to *Sealant* in the *Configuring the System* section.
    c. Attach the new K-factor tag to flowmeter FS1.

Material Flow Meter FS1 *(contd)*

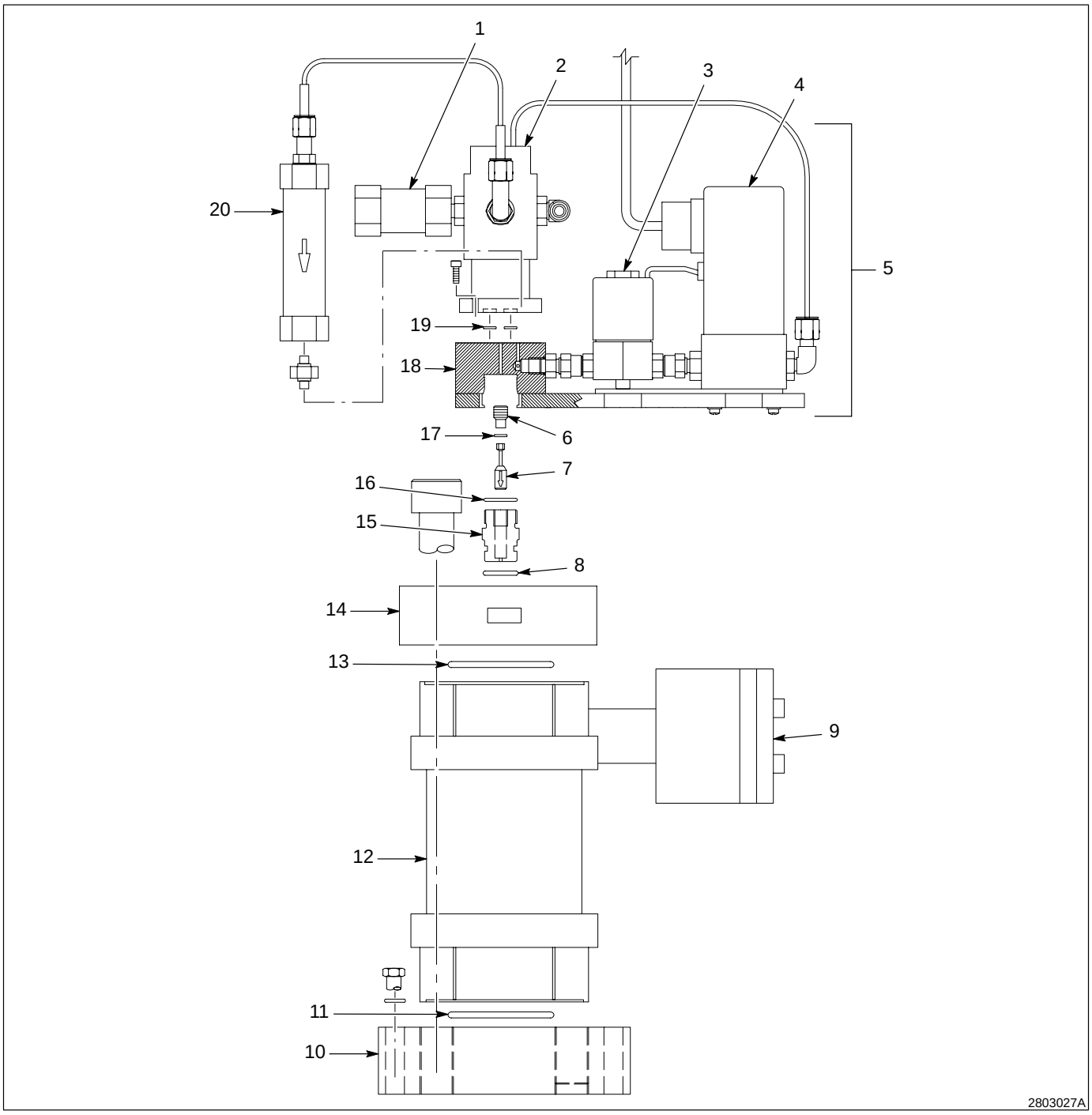


Fig. 8-12 Material flow meter FS1 disassembly

1. High-pressure air relief valve V15
2. Back-pressure regulator valve V12
3. Air solenoid control valve V16
4. Flow sensor FS2
5. High-pressure gas circuitry manifold
6. Brass retaining screw
7. Mixer check valve V13
8. Flow meter O-ring
9. Flow transmitter
10. Base manifold
11. Flow meter gasket
12. Flow meter FS1
13. Flow meter gasket
14. Flow meter cap manifold
15. Check valve body
16. Check valve body O-ring
17. Mixer check valve O-ring
18. Flow meter control block
19. Back-pressure regulator valve O-ring
20. Adjustable back-pressure check valve V14

3-Way Shutoff Bleed Valve V9

See Figure 8-13.

1. Disconnect the material lines from the process inlet (9) and dump outlet (10).
2. Disconnect the low-pressure air line (11) and the electrical cable (12) from shutoff solenoid valve V8 (1).
3. Disconnect the material line leading to material flow meter FS1 (6) at the base of 3-way shutoff bleed valve V9 (2).
4. Carefully remove shutoff actuator A1 (8) and 3-way shutoff bleed valve V9 (2).
5. Remove the screws (4) that secure the shutoff actuator mounting bracket (7) to the 3-way shutoff bleed valve V9 (2).
6. Secure new 3-way shutoff bleed valve V9 (2) to the shutoff actuator mounting bracket (7) with the screws (4). Tighten the screws securely.
7. Position shutoff actuator A1 (8) and 3-way shutoff bleed valve V9 (2) between the L-shaped mounting brackets (5).
8. Connect the material line (6) to material flow meter FS1.
9. Connect the low-pressure air line (11) and electrical cable (12) to shutoff solenoid valve V8 (1).
10. Connect the material lines leading to the process inlet (9) and dump outlet (10).
11. Pressurize the system. Refer to the *Configuring the System* for procedures.

3-Way Shutoff Bleed Valve V9

(contd)

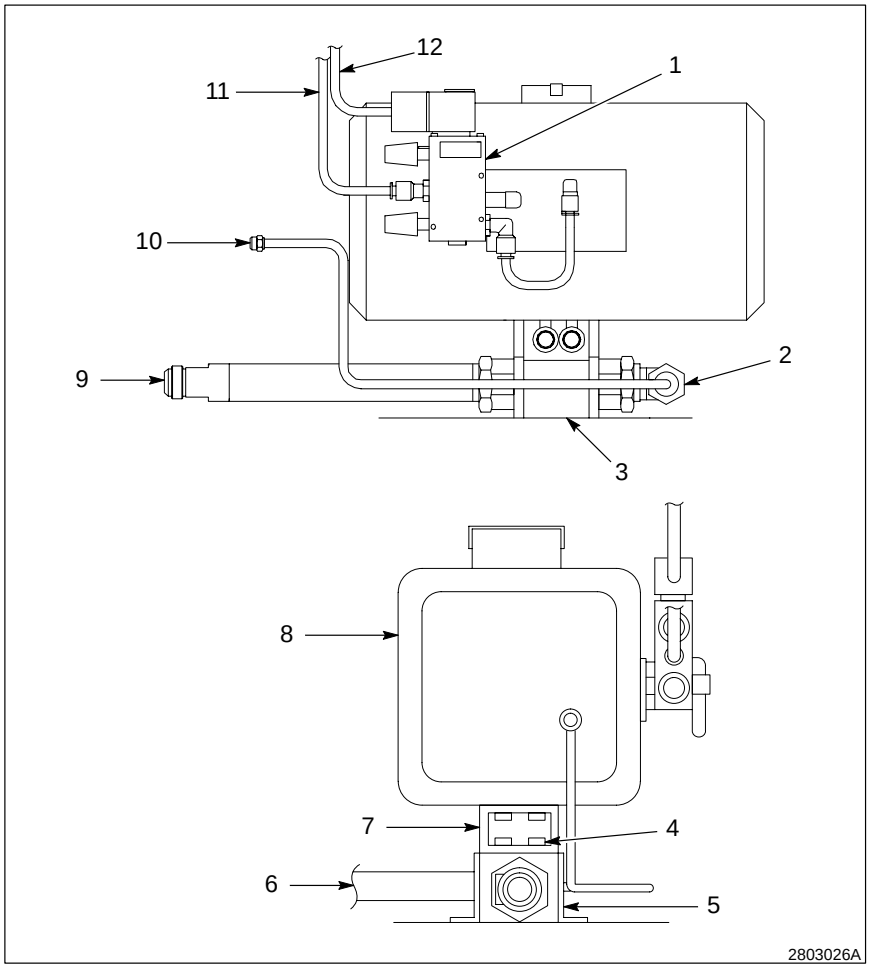


Fig. 8-13 3-way shutoff bleed valve V9 replacement

1. Shutoff solenoid valve V8
2. 3-way shutoff bleed valve V9
3. 3-way shut off valve
4. Hex head screws (4)
5. L-shaped mounting bracket
6. Material line to flow meter FS1
7. Shutoff actuator mounting bracket
8. Shutoff actuator A1
9. Process inlet
10. Dump outlet
11. Low-pressure air line
12. Electrical cable

Mixer Housing/Shaft

See Figures 8-14 and 8-15 for component location.

1. Disconnect the material inlet tubing from the mixer.
2. Disconnect the electrical leads from pressure transducer PT2 and sealant thermocouple RTD-1.
3. Remove the hex cap screws that secure the mixer housing to the oil bearing housing.
4. Secure the V-belt drive.
5. Place a wrench on the mixer shaft flats and turn counterclockwise.
6. Clean all material off oil bearing shaft threads and shoulder.
7. Install the new mixer shaft.
8. Install the new mixer body O-ring and mixer body backup ring onto the mixer oil bearing housing as illustrated in Figure 8-14.
9. Apply thread locking compound to the hex cap screws. Install the mixer housing onto the oil bearing housing using the screws. Tighten the screws to 60 ft lb (81 N•m) in crisscross pattern.
10. Install the support rod.
11. Release the V-belt drive.
12. Connect the material inlet tubing to the mixer.
13. Connect the electrical leads to pressure transducer PT2 and to sealant thermocouple RTD-1.
14. Pressurize the system. Refer to the *Configuring the System* section for procedures.

Mixer Housing/Shaft *(contd)*

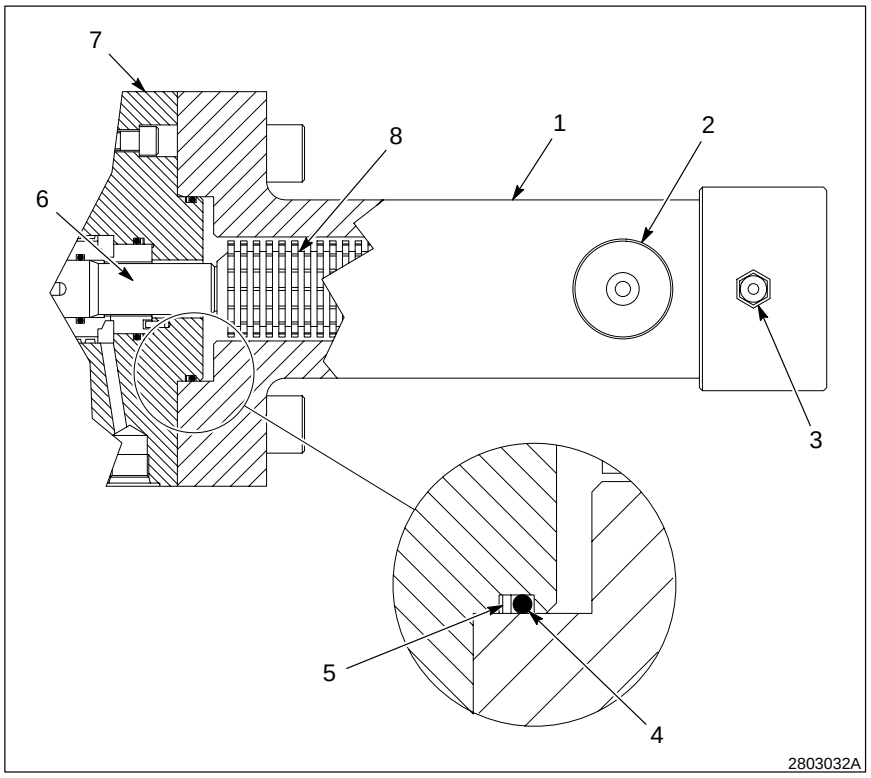


Fig. 8-14 Mixer housing shaft replacement

1. Mixer housing
2. Pressure transducer
3. Sealant RTD-1
4. Mixer body O-ring
5. Mixer body back-up ring
6. Mixer oil bearing shaft
7. Mixer oil bearing
8. Mixer shaft

RTD Replacement

See Figure 8-15. Use the following procedure to replace an RTD.

1. Disconnect the RTD cable connector inside the wireway.
2. Remove the RTD and fitting from #4 SAE port.
3. Install the new fitting into #4 SAE port.
4. Install the new RTD and adjust to the recommended set height as illustrated in Figure 8-15.
5. Turn the fitting nut counterclockwise until finger tight.
6. Mark the fitting nut at the 6 O'clock position with a grease pencil.
7. Hold the fitting body steady with a backup wrench and tighten the fitting nut $1^1/_4$ turns.
8. Connect the cable connector to the RTD.
9. Pressurize the system. Refer to the *Configuring the System* for procedures.

RTD Replacement *(contd)*

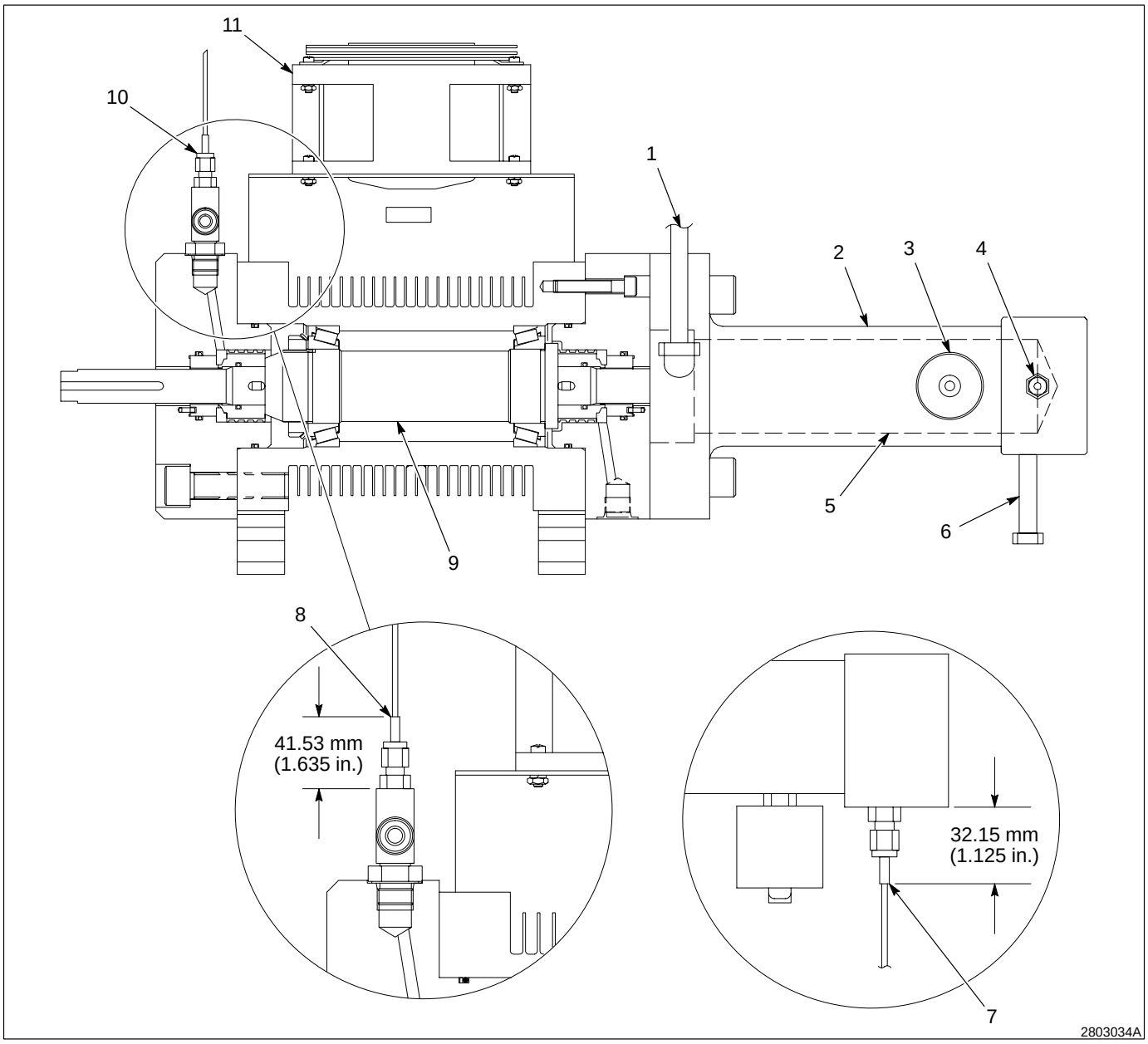


Fig. 8-15 Mixer assembly

1. Material inlet tubing
2. Mixer housing
3. Sealant pressure transducer PT2
4. Sealant temp RTD-1
5. Mixer shaft
6. Mixer support rod
7. Recommended set height for RTD
8. Recommended set height for RTD
9. Oil chamber
10. Oil temp RTD-2
11. FAN3

Note: RTD leads must be above fitting as shown

Oil Bearing/Mixer Housing

See Figures 8-16 and 8-17 for component location.

Removal

1. Disconnect the material inlet tubing that leads from the flow meter (FS1) to the mixer.
2. Disconnect the electrical lead from pressure transducer PT2.
3. Disconnect the electrical leads from the sealant thermocouple RTD 1 and the oil thermocouple RTD 2.
4. Remove FAN3:
   a. Disconnect the electrical lead and ground wire from FAN3.
   b. Remove the screws that secure the FAN3 mounting bracket to the mixer oil bearing.
5. Loosen the oil line at the base of the mixer oil bearing housing and drain the oil. Remove the fittings and the oil circulation loop.
6. Remove the belt guard.
7. Loosen the adjustable motor base center nut to relieve belt tension. Remove and discard the old belt.
8. Remove the set screw that secures the sheave/bushing to the mixer shaft.
9. Remove the mounting screws from the front face of the bushing.
10. Install the mounting screws into the three threaded holes located on the face of the bushing. Tighten the screws in a rotating pattern to pull the sheave/bushing from the shaft.
11. Loosen the mixer shaft support rod and remove.
12. Remove the hex screws that secure the mixer oil bearing to the base. Remove the mixer assembly from the frame base.

Installation

1. Use the hex screws to secure the new mixer assembly to the base.

2. Install the support rod.

3. Make sure that the faces of the motor and mixer oil bearing housing are parallel. Adjust the motor mounting, if necessary.

4. Check the condition of the sheave/bushing assemblies and replace, if necessary. Refer to *Sheave/Bushing Replacement and Alignment* in this section.

5. Install a new belt. Refer to *V-Belt Replacement* in this section.

6. Make sure that you install the guard.

7. Secure FAN3 and the mounting bracket to the mixer oil bearing with the screws. Connect the electrical lead and ground wire.

8. Connect the material inlet tubing that leads from flow meter FS1 to the mixer.

9. Connect the electrical lead to

   - pressure transducer PT2
   - sealant thermocouple RTD 1
   - oil thermocouple RTD 2

10. Install the oil line, fittings and oil circulation loop on the mixer oil bearing housing.

11. Open diverter valve V4 at the base of the oil pump manifold M2.

12. Actuate the pump. Allow it to stroke ten times then close oil diverter valve V4.

13. Loosen the fitting at oil temperature RTD 2 to relieve air from the system. Close the fitting when oil flow appears.

14. Shut off the pump. Fill the oil reservoir to clear minor level fault indicator LI1. Do not fill above the three quarter full level.

15. Pressurize the unit. Refer to *Configuring the System* section for procedures.

NOTE: Check the V-belt after 100 hours running time to make sure that it is seated in the grooves, then readjust belt tension, if necessary.

Mixer and Motor Diagrams

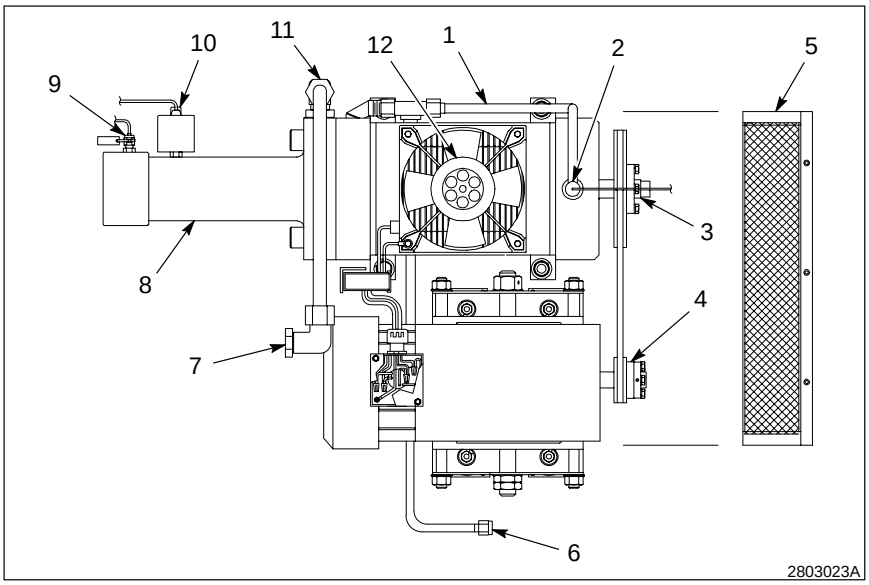


Fig. 8-16 Top view of mixer and motor

1. Mixer oil bearing housing w/oil circulation loop
2. RTD-2
3. 6.5 sheave/bushing
4. 3.5 sheave/bushing
5. Guard
6. Oil line from oil pump
7. To flow meter FS1
8. Mixer housing and shaft
9. RTD-1
10. PT2
11. Material inlet tubing—disconnect here
12. FAN3

Mixer and Motor Diagrams (contd.)

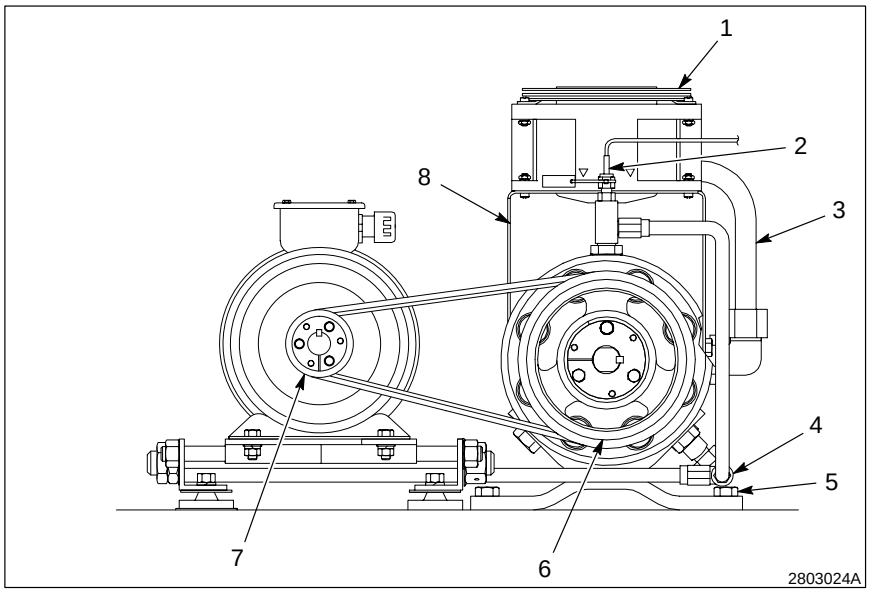


Fig. 8-17 Side view of mixer and motor

1. FAN3
2. RTD-2
3. Oil circulation loop
4. Disconnect oil line to oil bearing housing here
5. Hex head screws (4)
6. 6.5 sheave/bushing
7. 3.5 sheave/bushing
8. FAN3 mounting bracket

Changing Oil

See Figures 8-17 and 8-18 for component location.

1. Adjust regulator V3 until gage G3 reads 0 bar/psi .
2. Open diverter valve V4 on pump manifold M2.
3. Loosen the tubing connector and drain the oil reservoir.
4. Loosen the tubing connector at the base of the mixer oil bearing housing and drain oil.
5. Loosen pressure transducer PT1 on oil manifold M2 to relieve vacuum.
6. Tighten all tubing connectors and pressure transducer PT1.
7. Remove the filler cap from the oil reservoir. Fill the reservoir until it is about half full. Install the filler cap.

Changing Oil *(contd)*

8. Adjust regulator V3 until gage G3 reads 20 psi (1.4 bar).

9. Make sure diverter valve V4 is open. Actuate the pump. Close diverter valve V4 after the pump has stroked ten times.

10. Loosen the RTD2 fitting on the mixer bearing housing to relieve air from the system. Tighten the RTD2 fitting when oil appears.

11. Shut off the pump.

12. Fill the oil reservoir to clear the minor level fault indicator (LI1). Do not fill above the three quarter full level.

13. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

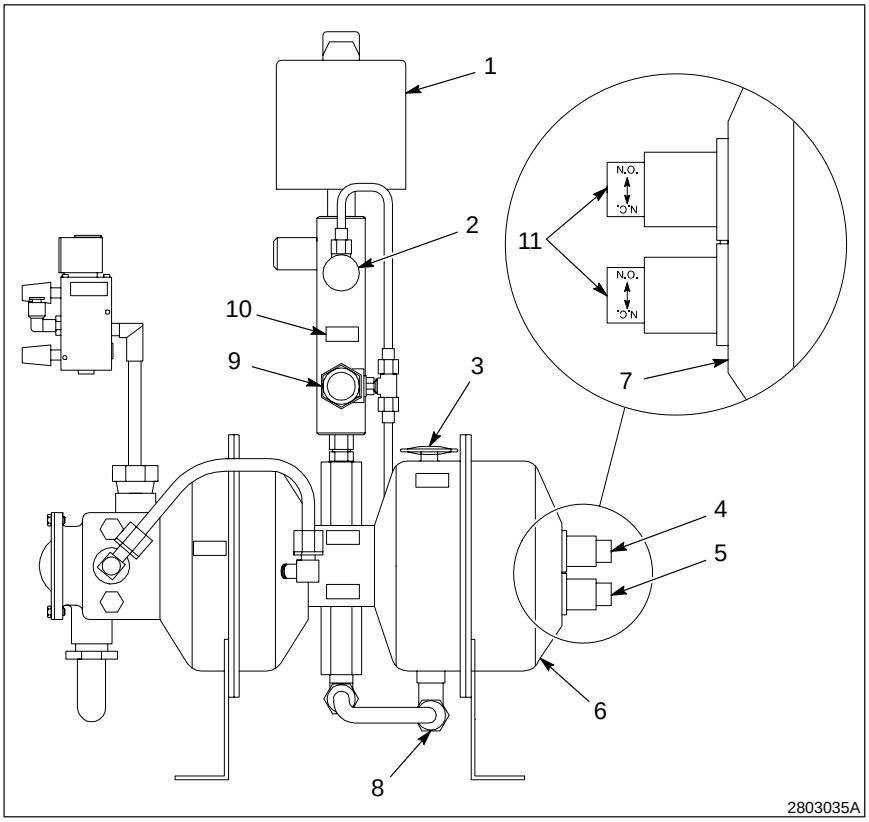


Fig. 8-18 Oil pump

1. Pressure transducer PT1
2. Diverter valve V4
3. Filler cap
4. Oil level minor fault indicator LI1
5. Oil level major fault indicator LI2
6. Oil reservoir RES1
7. Tubing connector
8. Oil relief valve V5
9. Oil manifold M2
10. Oil filter F3

Oil Filter

See Figure 8-19.

1. Make sure fluid and air pressures are relieved.
2. Disconnect pressure transducer cable J-16 (9) from P-16.
3. Disconnect the elbow fitting and lower tee fitting tubing connectors (2, 10).
4. Place a wrench on the fitting (3) upper flats and remove the oil manifold (1).
5. Remove the fitting (3), oil filter (8), and spring (7) from the check valve body (6). Inspect the fitting O-ring (5) and spring for damage. Replace damaged parts.
6. Install the spring (7) and oil filter (8) into the check valve body (6).
7. Make sure that the fitting O-ring seat (4) is facing toward the check valve body (6). Install the fitting (3) on the check valve body and tighten securely.
8. Install the oil manifold (1) to the check valve body (6).
9. Connect the elbow fitting and lower tee fitting tubing connectors (2, 10). Tighten the tubing connectors securely.

Oil Filter *(contd)*

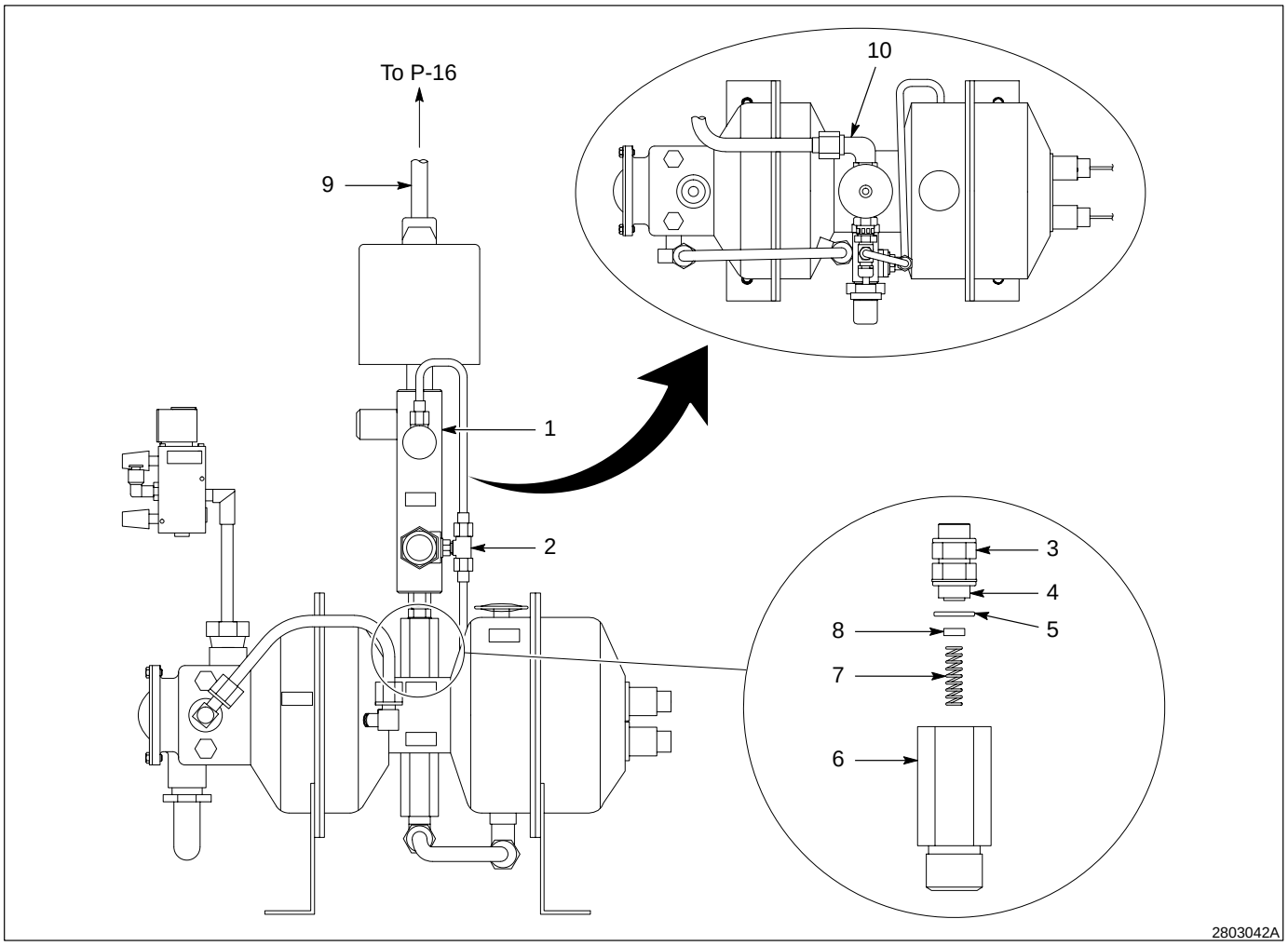


Fig. 8-19 Oil filter replacement

1. Oil manifold M2
2. Lower tubing connector
3. Fitting
4. O-ring seat
5. O-ring
6. Check valve body
7. Spring
8. Oil filter F3
9. Pressure transducer PT1 cable J-16
10. Tubing connector

Oil Level Indicator

See Figure 8 18.

1. Loosen the tubing connector (7) and drain the reservoir.
2. Disconnect these wire connectors:
   - J24 from P25
   - J25 from P25
3. Note the position of the N.O. (normally open) marking on each fault indicator. Remove the fault indicators (4, 5).

CAUTION: To prevent damage to equipment, do not use PTFE tape in place of pipe sealant paste.

4. Apply pipe sealant paste to the threads of each fault indicator.
5. Carefully install the new fault indicators into the reservoir and secure. Make sure each sensor is properly positioned. The N.O. marking on the wrench flat must be in the top position.
6. Make sure the float is working properly. Use a multi-meter to check continuity across the pins. Continuity must be open.
7. Fill the oil housing while the multi-meter is still connected to indicator. When the oil level reaches the float, the multi meter should verify a closed contact. If so, the indicator is functioning properly.
8. Connect these wire connectors:
   - J24 to P25
   - J25 to P25
9. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

Oil Pump Replacement

See Figures 8-17 and 8-18 for component location.

1. Open diverter valve V4 located on the oil pump manifold M2.
2. Disconnect the oil line below the pump and drain the reservoir.
3. Disconnect the oil line at base of mixer oil bearing housing and drain oil.
4. Disconnect the cables leading to the oil indicators (LI1 and LI2) and oil pressure transducer PT1.
5. Disconnect the low-pressure air line leading to the pump.
6. Remove the pump. Install the new pump.
7. Connect the cables to both oil indicators (LI1 & LI2) and pressure transducer PT1.
8. Connect the low-pressure air line and all oil fittings.
9. Remove the filler cap from the oil reservoir. Fill the reservoir until it is about half full. Open diverter valve V4 and actuate the pump. Close the valve after the pump has stroked ten times.
10. Loosen the fitting at oil temperature thermocouple RTD 2 to bleed air from the system. Close the fitting when oil appears.
11. Shut off the pump. Fill the oil reservoir to clear minor level fault indicator (LI1). Do not fill above three quarters full level.
12. Pressurize the unit. Refer to the *Configuring the System* section for procedures.

Motor Replacement

See Figures 8-17 and 8-20 for component location.

1. Remove the electrical access cover on the motor. Disconnect the these wires:
   - Cable W18 (motor thermostat)
   - Wires 220A and 221A.
2. Remove the V belt/sheave guard.
3. Loosen the adjustable motor base center nut to relieve belt tension. Remove and discard the old belt.
4. Remove the four hex head screws and hardware that secure the motor base plate to the motor mounting bracket.
5. Remove the sheave/bushing from the old motor.
6. Secure the new motor onto the motor mounting bracket with four hex head screws.
7. Mount the sheave/bushing on the new motor and align. Refer to *Sheave/Bushing and Alignment* in this section.
8. Install a new V-belt. Refer to *V-Belt Replacement* in this section.
9. Tighten the center base center nut when the belt is properly tensioned.
10. Connect cable W18 (motor thermostat), wire 220A and wire 221A at the electrical access box.
11. Replace the cover on the electrical access box.
12. Connect and turn on electrical power to the unit.
13. Check the motor rotation; the sheave should rotate counterclockwise. If not, reverse wires 220A and 221A.

Motor Replacement *(contd)*

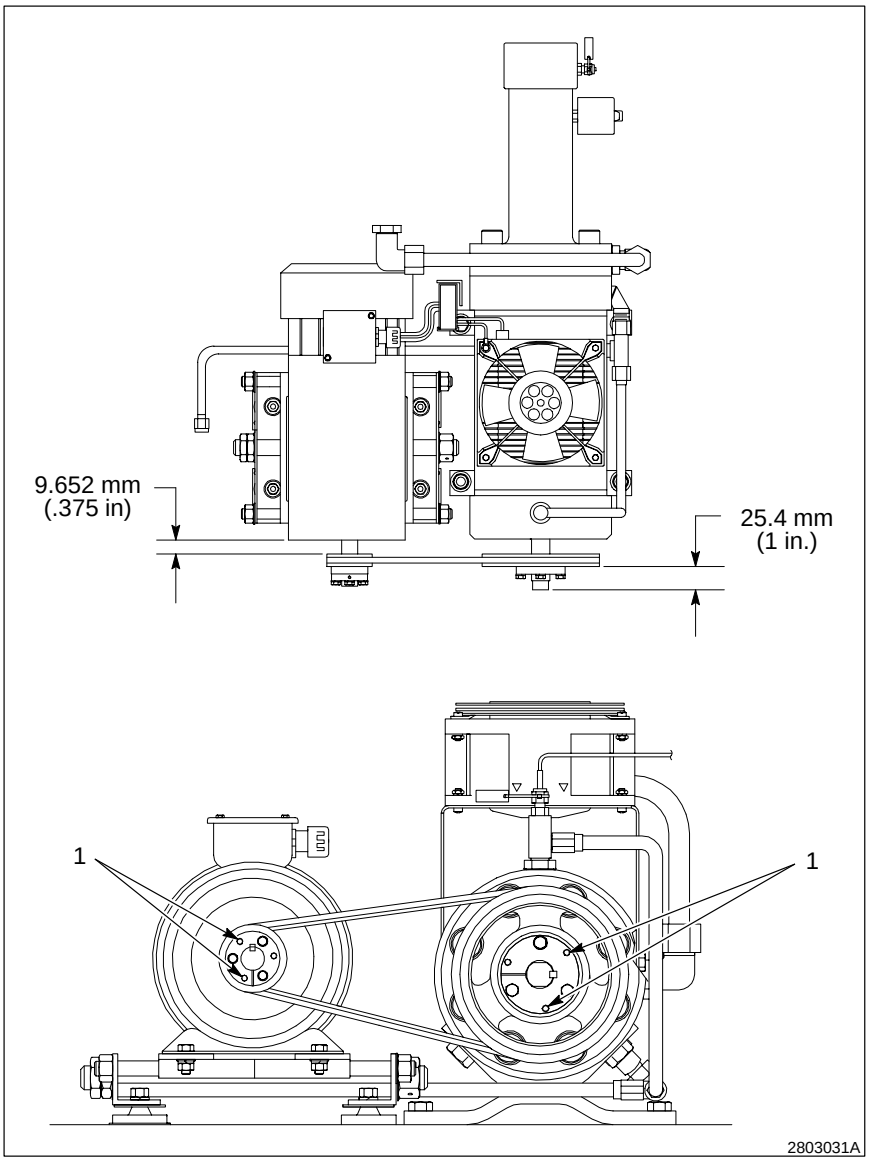


Fig. 8-20 Motor assembly

1. Threaded hole

V-Belt Replacement

See Figures 8-17 and 8-20 for component location.

1. Remove all panels and the sheave/belt guard.
2. Loosen the adjustable motor base center nut to relieve belt tension. Remove the belt.

V-Belt Replacement (contd)

3. Inspect sheave/bushings and clean. Check sheave mounting and alignment. Refer to *Sheave/Bushing and Alignment* in this section if adjustment is necessary.

4. Install the new belt.

5. Pull back on the motor and adjust the take-up until the belt is snug. Tighten the motor mount.

6. Check the belt tension:

   a. Lay a steel bar or narrow block of wood across the belt.

   b. Hold a scale behind the belt and note the position of the belt at rest.

   c. Press down on the bar or block of wood and apply even force to the belt 3–5 lb (13–22 N). A properly tensioned belt should be deflected $^{5}/_{32}$ in. (4.064 mm). If not, readjust take-up and try again.

NOTE: There is normally a rapid drop in tension during the first run-in period. Tension the new belt with $^{1}/_{3}$ greater deflection force than the maximum recommended force above.

7. Install the guard when the belt is correctly tensioned.

NOTE: After 100 hours of running time, make sure that the belt is seated in the grooves. Readjust tension, if necessary.

8. Replace all panels.

Sheave/Bushing Replacement and Alignment

See Figures 8-17 and 8-20 for component location.

1. Remove all panels and the sheave/belt guard.

2. Loosen the adjustable motor base center nut to relieve belt tension.

3. Remove and discard the old belt.

4. Remove set screw that secures sheave/bushing to the motor or mixer shaft.

5. Remove all three mounting screws from the bushing.

Sheave/Bushing Replacement and Alignment (contd)

6. Install the mounting screws in the three threaded holes located on the face of the sheave bushing. Tighten the screws in a rotating pattern to draw out the sheave and bushing from the shaft.

7. Make sure that the faces of the motor and mixer oil bearing housing are parallel. Adjust motor mounting, if necessary.

8. Install the new sheave and bushing on the motor or mixer shaft. Position each as follows:

   a. Motor—there should be a $^3/_8$ in. (9.652 mm) gap between the face of the motor and the inner edge of the sheave.

   b. Mixer—there should be a 1 in. (25.4 mm) gap between the end of the shaft and the front face of the bushing.

9. Secure the sheave/bushing to the shaft with the set screw.

10. Install a new V-belt. Refer to *V-Belt Replacement* in this section.

11. Install the guard.

12. Replace all panels.

FAN 1 and FAN 2

See Figure 8-21.

Cleaning

1. Locate the fan guard assembly (1). Remove the plastic retaining panel/grille and the foam filter element.

2. Wash the filter in mild soap and water. Rinse under clean running water.

3. Squeeze out excess water and allow the filter to dry thoroughly.

4. If the filter element is torn or severely damaged, refer to the part list section in this manual for the correct replacement part number.

5. Insert the clean filter into the retaining panel and snap the retaining panel/grille in place.

Replacing

1. Disconnect the fan wiring harness (7).
2. Remove the fan guard assembly (1).
3. Remove the screws (2), washers (3), lock washers (4), and nuts (5) that secure the fan assembly.
4. Use the nuts (5), lock washers (4), washers (3) and screws (2) to Install the new fan assembly. Tighten the nuts securely.
5. Connect the fan wiring harness (7).

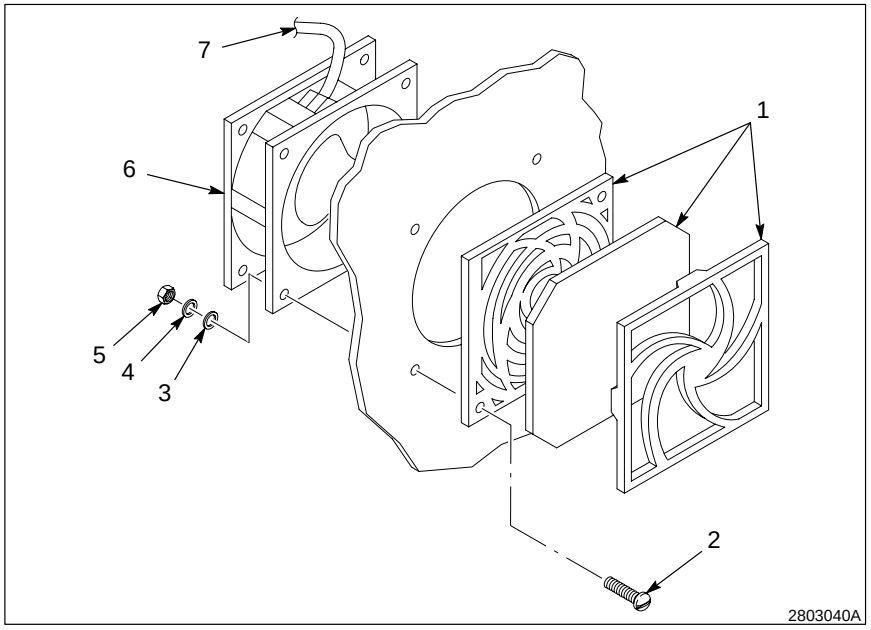


Fig. 8-21 Fan disassembly

1. Fan guard assembly
2. Flat Head Screw
3. Washer
4. Lock washer
5. Nut
6. Fan
7. Fan Wiring Harness

Section 9

Parts

Section 9
Parts

1. Introduction

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use this five-column parts list, and the accompanying illustration, to describe and locate parts correctly.

Using the Illustrated Parts List

Numbers in the Item column correspond to numbers that identify parts in illustrations following each parts list. The code NS (not shown) indicates that a listed part is not illustrated. A dash (—) is used when the part number applies to all parts in the illustration.

The six-digit number in the Part column is the Nordson Corporation part number. A series of dashes in this column (- - - - - -) means the part cannot be ordered separately.

The Description column gives the part name, as well as its dimensions and other characteristics when appropriate. Indentions show the relationships between assemblies, subassemblies, and parts.

Item	Part	Description	Quantity	Note
—	000 000	Assembly	1	
1	000 000	• Subassembly	2	A
2	000 000	• • Part	1	

- If you order the assembly, items 1 and 2 will be included.
- If you order item 1, item 2 will be included.
- If you order item 2, you will receive item 2 only.

The number in the Quantity column is the quantity required per unit, assembly, or subassembly. The code AR (As Required) is used if the part number is a bulk item ordered in quantities or if the quantity per assembly depends on the product version or model.

Letters in the Note column refer to notes at the end of each parts list. Notes contain important information about usage and ordering. Special attention should be given to notes.

2. FoamMix A/T Top Level Assemblies

See Figure 9-1.

Item	Part	Description	Quantity	Note
—	144 450	FoamMix A/T Right Hand	1	
—	141 238	FoamMix A/T Left Hand	1	
1	- - - - - -	• Upper enclosure	1	A
2	- - - - - -	• Lower enclosure	1	B

NOTE A: Refer to the *Upper Enclosure* parts list for ordering information.
B: Refer to the *Lower Enclosure* parts list for ordering information.

2. FoamMix A/T Top Level Assemblies *(contd.)*

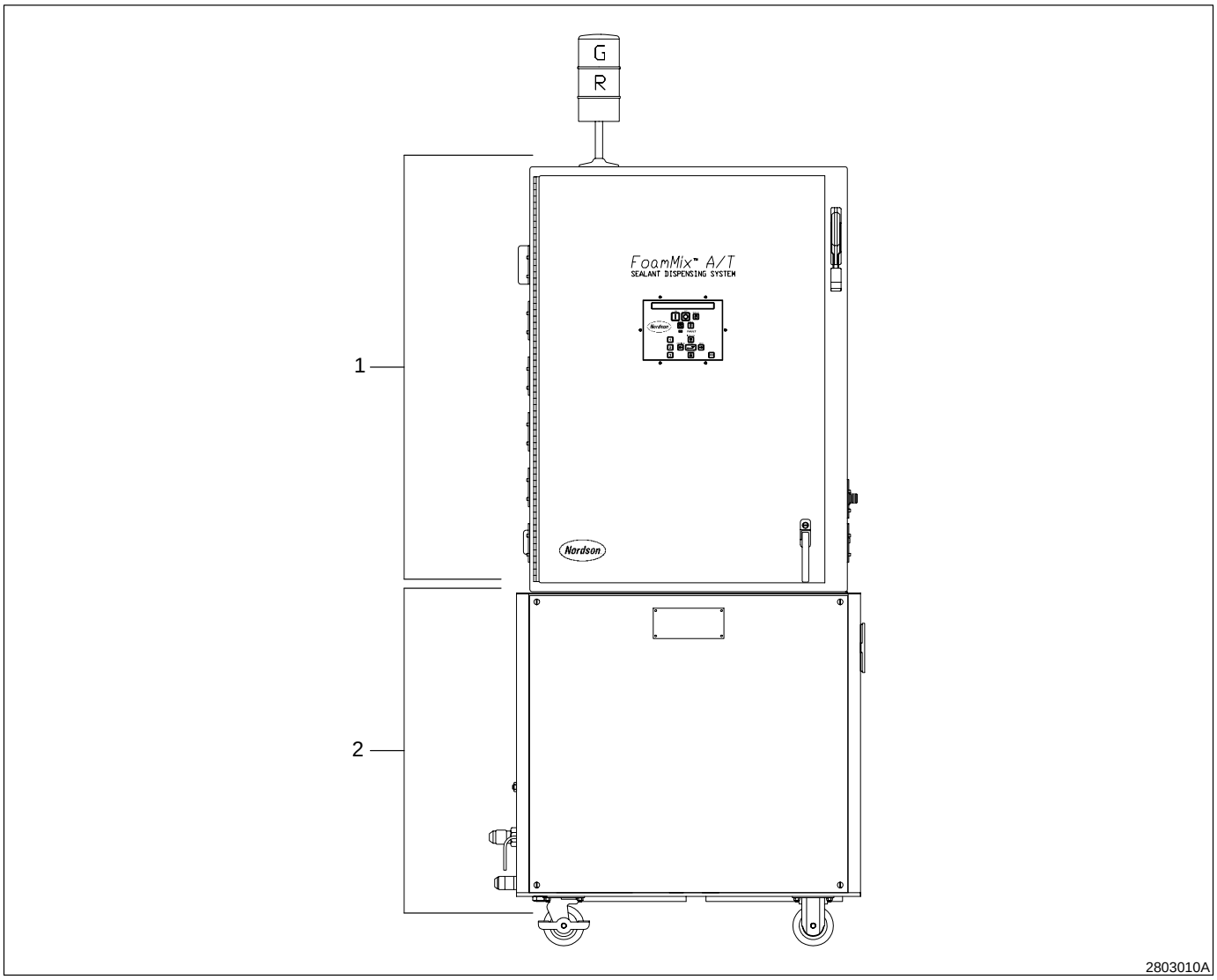


Fig. 9-1 FoamMix top level assemblies

Upper Enclosure

See Figure 9-2.

Item	Part	Description	Quantity	Note
1	115 877	Serial board	1	
2	- - - - - -	Memory board 1 meg	1	
3	125 023	Controller board w/software	1	
4	102 812	Temperature board	1	
5	105 987	I/O board	2	
6	116 632	FoamMix A/Tb Board	1	
7	118 888	35-amp fuse (F1, F2, F3)	3	
8	119 155	25-amp fuse (F8, F9)	2	
9	939 983	3-amp fuse (F6, F7)	2	
10	140 732	5-amp fuse (F4, F5)	2	
11	125 497	Power module #1	1	
12	120 978	Motor control board	1	
13	131 380	30-amp relay (K1)	1	
14	131 367	10-amp relay (K5, K6, K7)	3	
15	117 272	Line filter	1	
16	117 241	Power supply	1	
17	109 302	Power monitor	1	
18	- - - - - -	Keyboard/display assembly	1	
19	939 730	Current transformer	1	
20	- - - - - -	Light tower	1	A

NOTE A: Refer to *Service Kits* for ordering information.

FoamMix A/T Upper Enclosure Parts Diagram

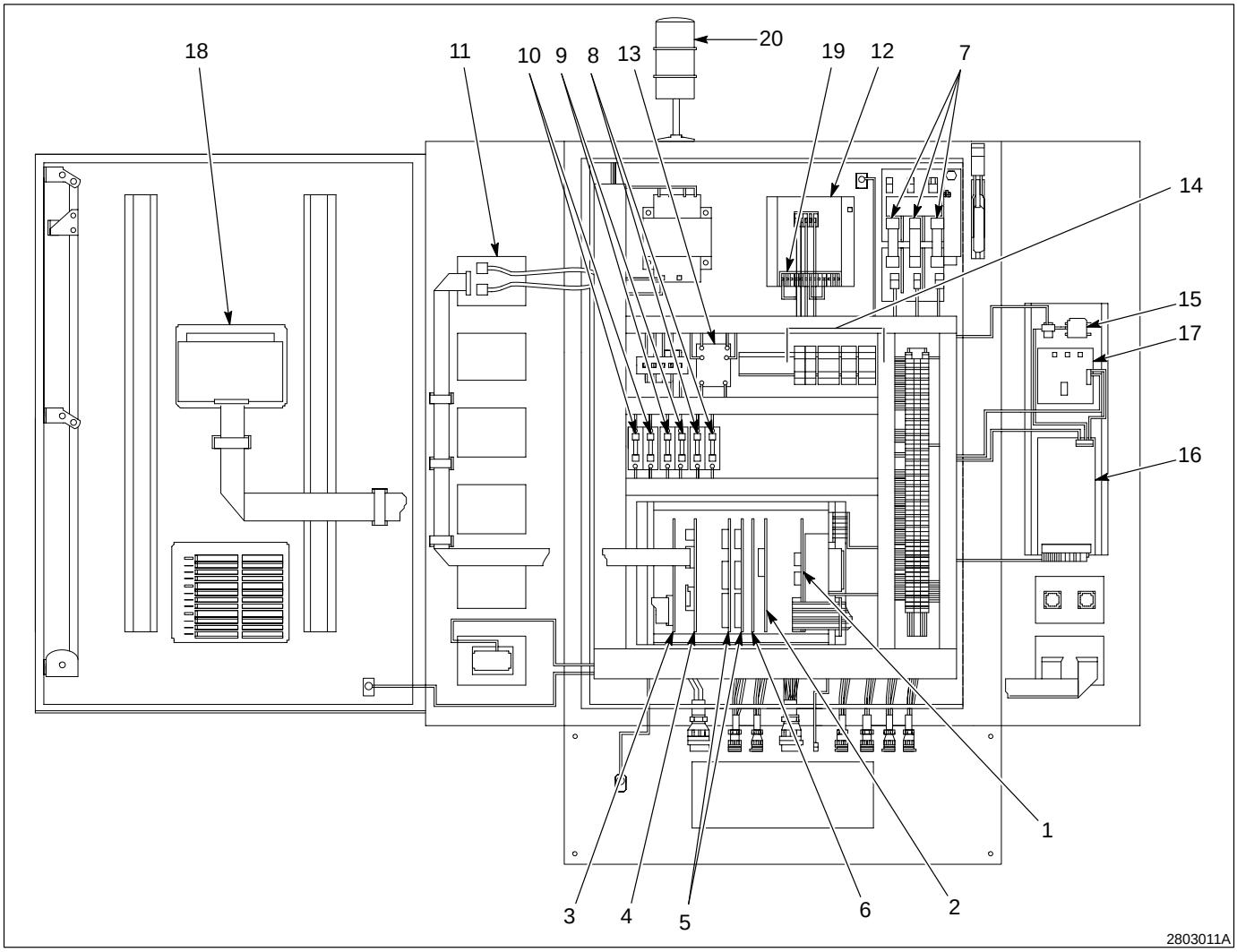


Fig. 9-2 FoamMix A/T upper enclosure parts

Lower Enclosure

See Figure 9-3.

Item	Part	Description	Quantity	Note
1	142 806	Pressure transducer PT3 gas supply	1	
2	144 030	Low pressure air filter element (f1)	1	
3	- - - - - -	Motor	1	
4	149 163	3.15 sheave/bushing service kit	1	
5	149 164	6.5 sheave /bushing service kit	1	
6	143 278	V-belt	1	
NS	134 305	24-Vdc fan (Fan 1, Fan 2)	2	
NS	134 306	Cabinet fan guard w/filter (Fan 1, Fan 2)	2	
7	142 024	Micro hose 52-in. long	1	
8	142 023	Micro hose 34-in. long	1	
NS	945 096	O-rings for gas fittings	1	
NS	945 097	O-rings for gas fittings	1	
NS	945 098	O-rings for oil fittings	1	
9	- - - - - -	Oil pump	1	A
10	- - - - - -	Mixer housing/shaft	1	A
11	- - - - - -	Oil bearing/mixer housing	1	A
12	- - - - - -	Flow meter w/ transmitter	1	A
13	- - - - - -	High pressure gas circuitry	1	A
14	135 811	240-Vac fan (Fan 3)	1	
15	133 984	24-Vdc solenoid (V8)	1	
16	142 805	Pressure transducer PT4, mixer gas	1	
17	143 484	High-pressure gas valve 4000 psi (V11)	1	
18	149 162	3-way shutoff valve (V9)	1	
19	114 341	Desiccant cartridge (F2)	1	
20	119 475	7-Micron filter (F2)	1	
21	941 332	O-ring desiccant (F2)	1	
22	945 035	O-ring 7 micron filter (F2)	1	
23	901 491	Low-pressure air regulator	3	
24	901 253	Low-pressure air regulator gauge	3	

NOTE A: Refer to *Service Kits* for ordering information.
NS: Not Shown

Lower Enclosure *(contd)*

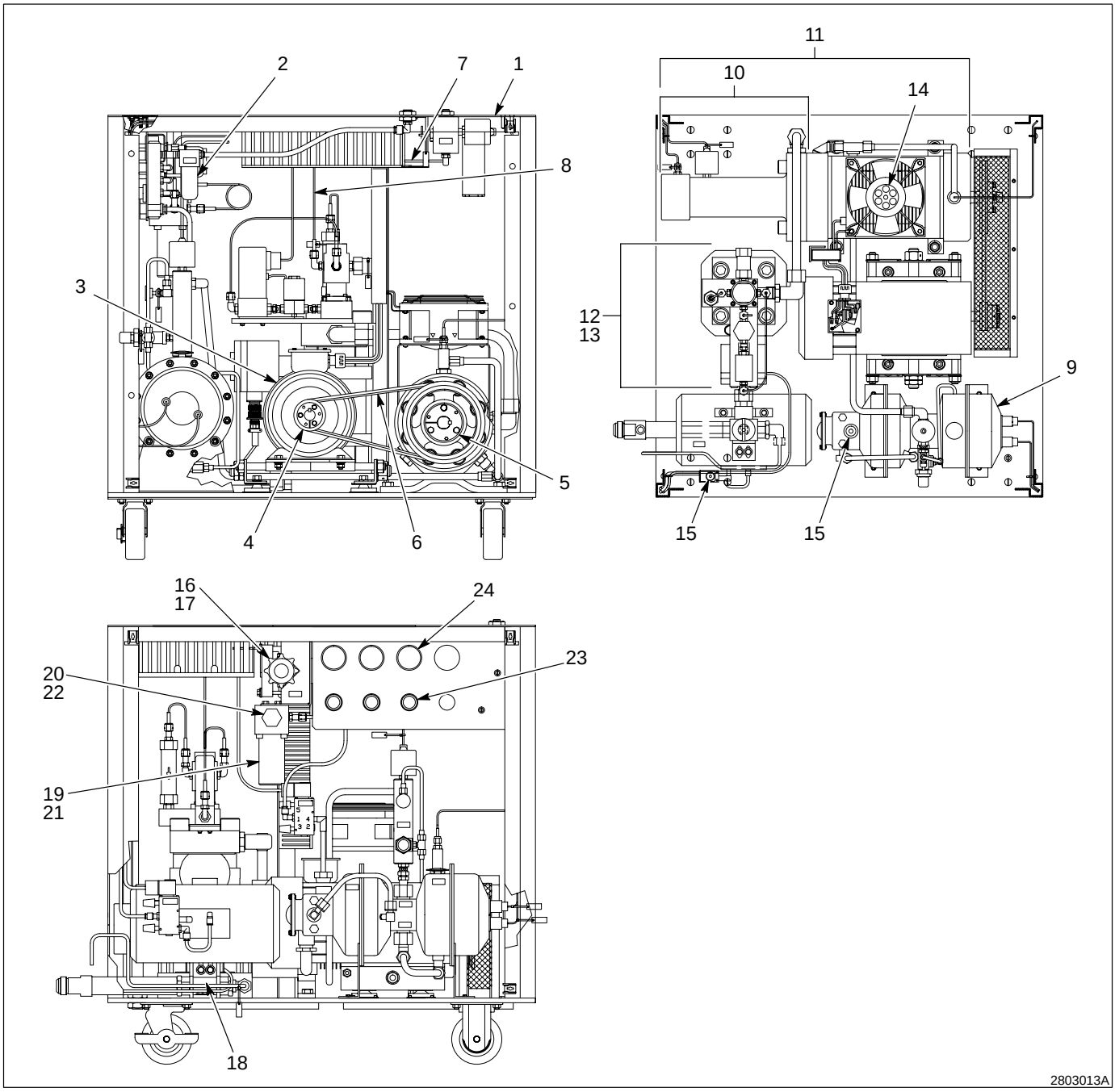


Fig. 9-3 Lower enclosure parts

3. Service Kits

The following service kits are available for the FoamMix A/T system.

Light Tower

See Figure 9-2.

Item	Part	Description	Quantity	Note
—	149 1683	Light tower service kit	1	
20	- - - - - -	• Light tower with bulb	1	
NS	- - - - - -	• Alarm light bulb	2	
NS: Not Shown				

Oil Pump

See Figure 9-4.

Item	Part	Description	Quantity	Note
—	149 165	Oil Pump Service kit	1	
1	- - - - - -	• Oil pump	1	
2	- - - - - -	• Manifold	1	
3	142 808	• Alarm (LI1), oil float level indicator	1	
4	142 809	• Fault (LI2), oil float level indicator	1	
5	143 485	• Oil relief valve, 3200 psi, (V5)	1	
6	147 195	• Oil diverter valve (V4)	1	
7	142 803	• Pressure transducer, PT1, oil pressure	1	
NS	139 580	• Oil, 1 gallon	1	
NS: Not Shown				

Oil Pump *(contd)*

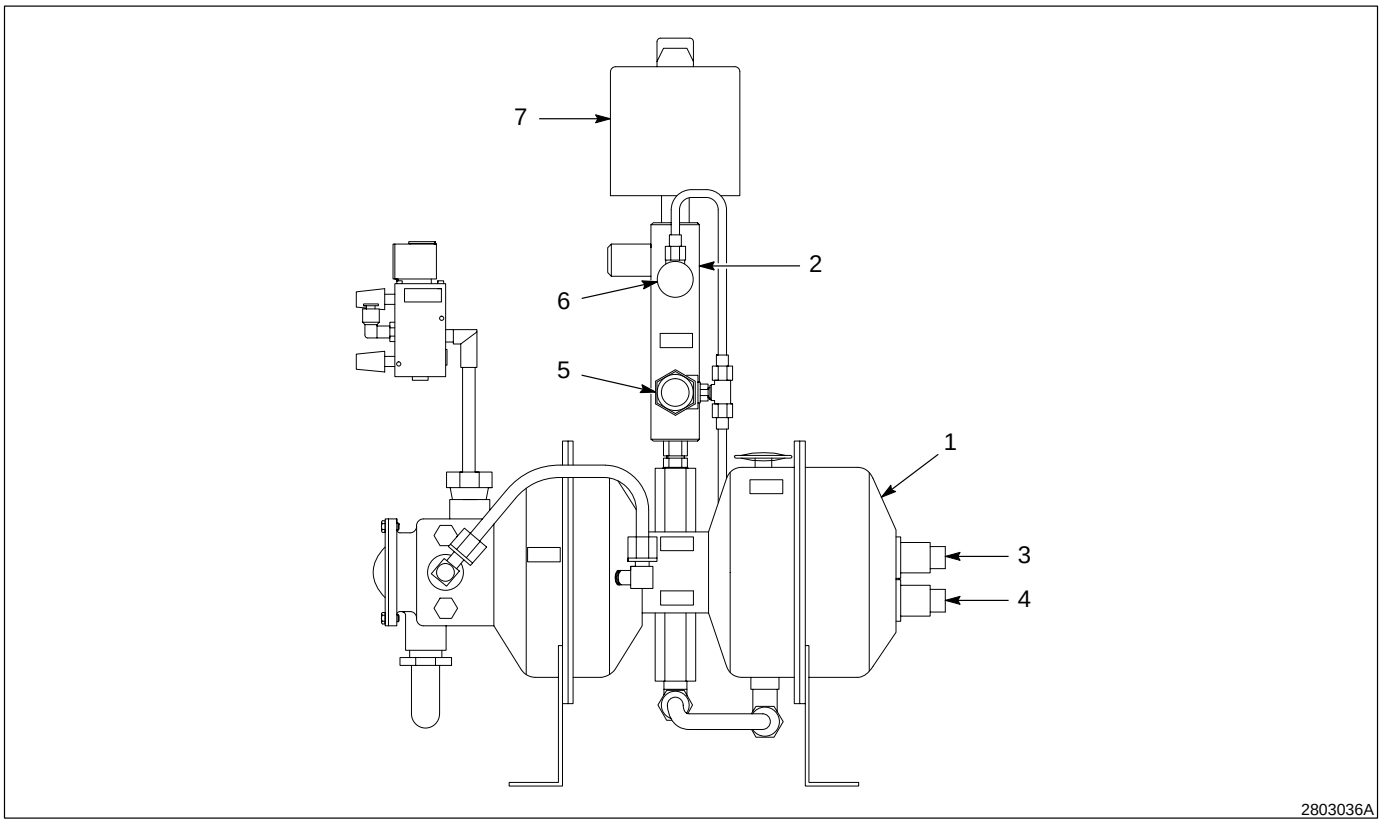


Fig. 9-4 Oil pump

Mixer Housing/Shaft

See Figure 9-5.

Item	Part	Description	Quantity	Note
—	149 167	Mixer housing/shaft service kit	1	
1	- - - - - -	• Mixer housing	1	
2	- - - - - -	• Mixer shaft	1	
3	952 371	• Mixer body back-up ring	1	
4	942 371	• Mixer body O-ring	1	
5	971 217	• RTD thermocouple fitting (RTD1)	1	
6	142 831	• High-pressure RTD1, sealant temp.	1	
7	142 801	• Pressure transducer PT2, sealant	1	

Mixer Housing/Shaft *(contd)*

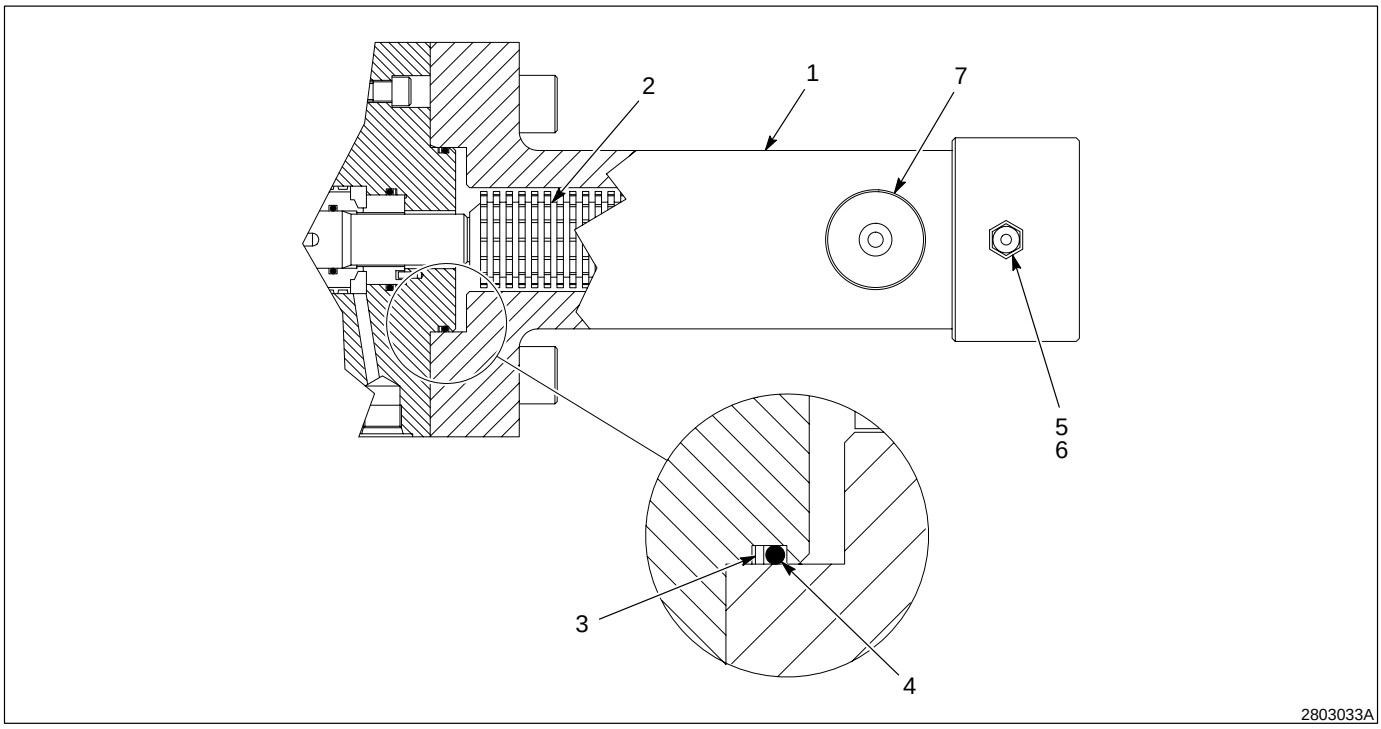


Fig. 9-5 Mixer housing shaft

Oil Bearing/Mixer Housing

See figure 9-6.

Item	Part	Description	Quantity	Note
—	149 168	Oil bearing/mixer housing service kit	1	
1	- - - - - -	• Oil bearing housing	1	
2	- - - - - -	• Mixer housing	1	
3	- - - - - -	• Mixer shaft	1	
4	952 371	• Mixer body back-up ring	3	
5	942 371	• Mixer body O-ring	3	
6	971 217	• RTD thermocouple fitting, RTD1	1	
7	142 831	• High-pressure RTD1, sealant temp	1	
8	142 801	• Pressure transducer PT2, sealant	1	
9	142 853	• High-pressure, RTD2, oil temp	1	
10	971 217	• RTD thermocouple fitting, RTD2	1	
NS	139 580	• Oil, 1 gallon	1	

NS: Not Shown

Oil Bearing/Mixer Housing

(contd)

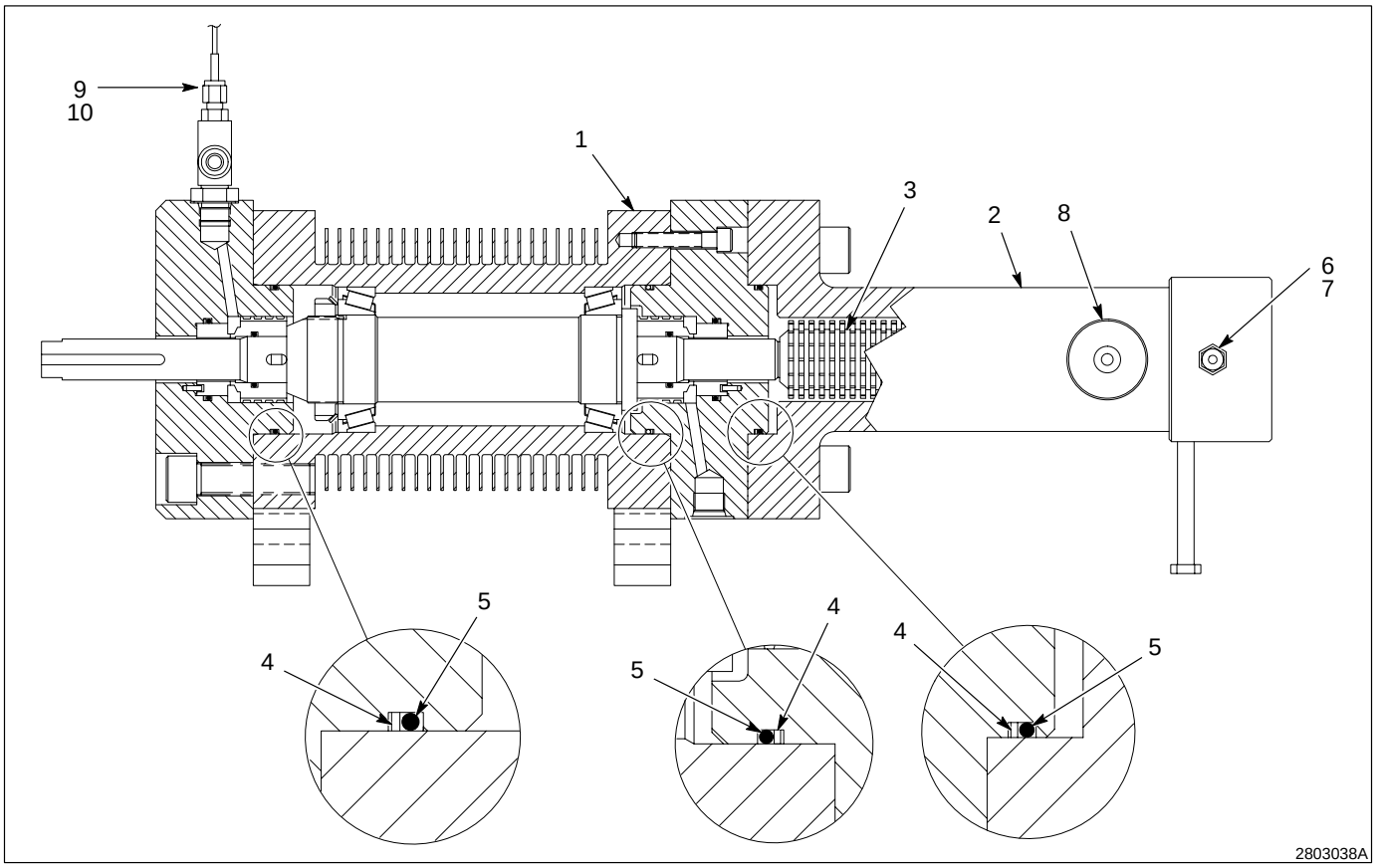


Fig. 9-6 Oil bearing mixer housing

Flow Meter with Transmitter

See Figure 9-7.

Item	Part	Description	Quantity	Note
—	149 172	Flow meter w/ transmitter service kit	1	
1	- - - - - -	• Flow meter (FS1)	1	
2	- - - - - -	• Transmitter	1	
3	144 032	• Flow meter gasket	2	

Flow Meter with Transmitter

(contd)

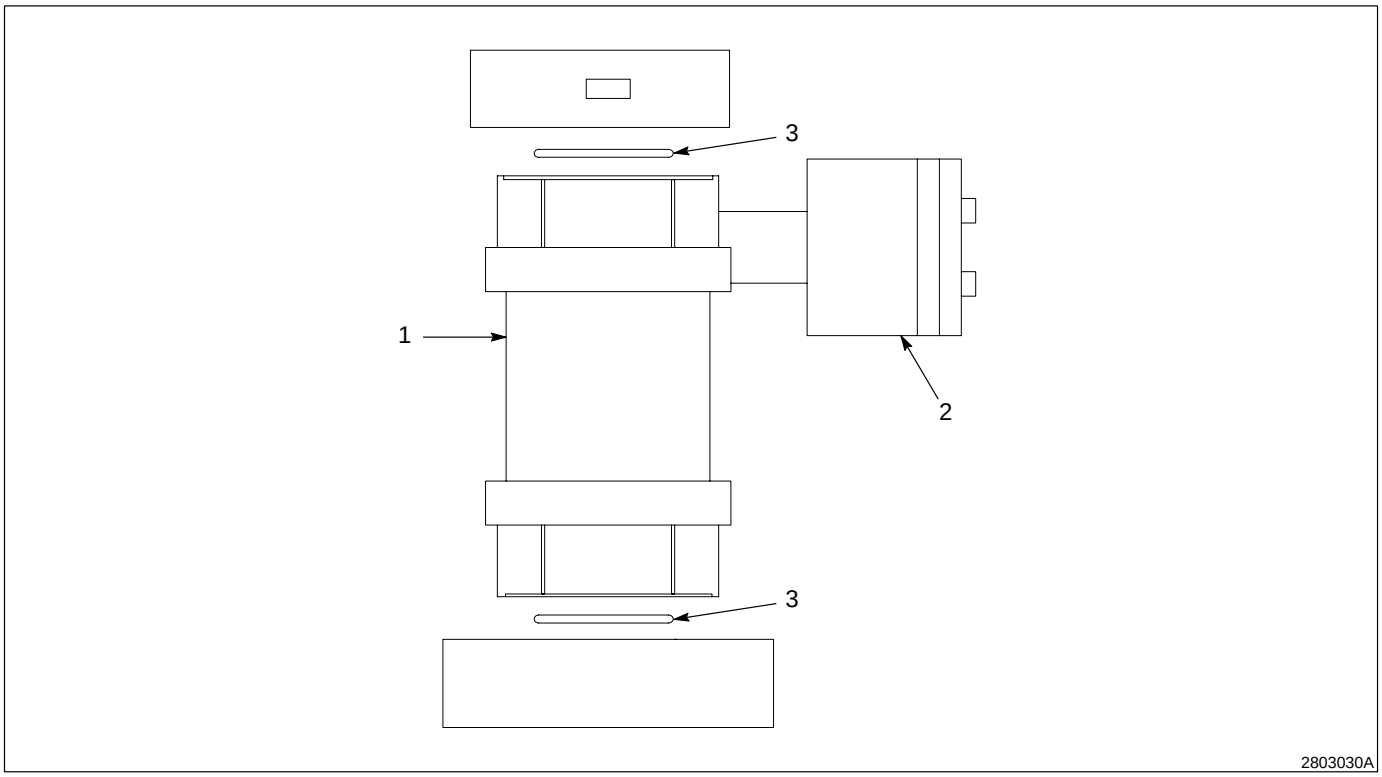


Fig. 9-7 Flow meter with transmitter

High-Pressure Gas Circuit

See Figure 9-8.

Item	Part	Description	Quantity	Note
—	149 170	High pressure gas circuitry service kit	1	
1	146 429	• Flow sensor (FS2, V16)	1	
2	143 486	• Adjustable relief valve (V14)	1	
3	143 485	• Gas relief valve, 3200 psig, (V15)	1	
4	116 181	• Back pressure regulator valve (V12)	1	
5	940 101	• Back pressure regulator O-ring	2	
6	129 964	• Back pressure regulator diaphragm	1	
7	142 022	• Micro hose, 18-in.	2	
8	- - - - - -	• Flow meter control block	1	
9	174 440	• Check valve kit	1	

High-Pressure Gas Circuit

(contd)

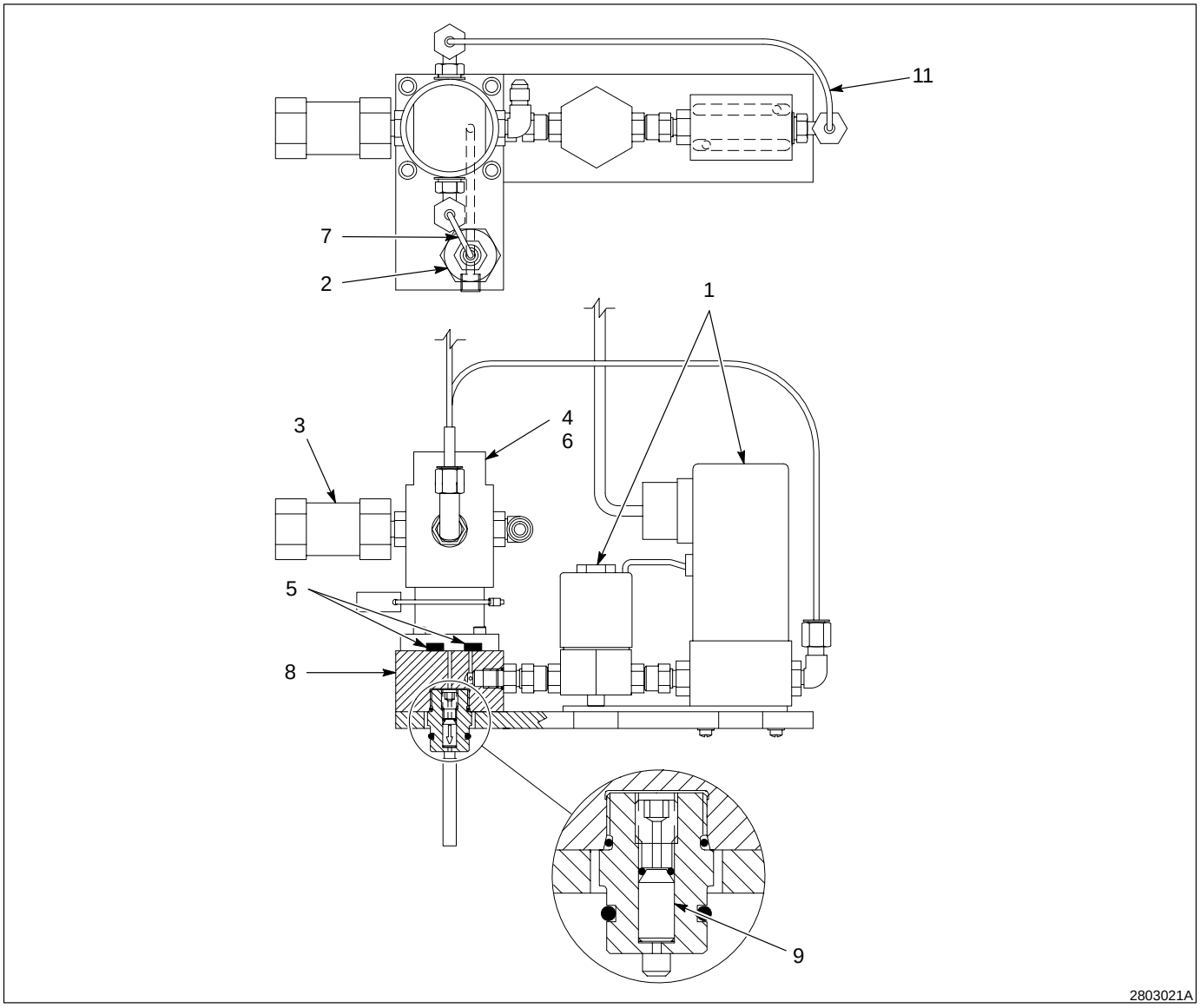


Fig. 9-8 High-pressure gas circuit

4. Recommended Spares

Keep the following parts on hand to reduce downtime.

Part	Description	Quantity
144 641	Compressor oil	10 gal
114 341	Desiccant cartridge	10
941 332	O-ring, desiccant cartridge	10
119 475	Filter, 7 micron	10
945 035	O-ring, 7 micron filter	10
144 030	Low-pressure air filter element	50
144 652	Compressor air intake service kit	50
134 306	Cabinet fan guard with filter	8
174 440	Mixer check valve	4
170 565	Oil filter, 40 micron	8
149 162	3-way shut-off valve	2
142 803	Oil pressure transducer	2
142 801	Sealant pressure transducer	2
143 278	V-belt	1
139 580	FoamMix oil	2
146 429	Brooks valve flow sensor	1
116 181	Back pressure regulator	1
940 101	O-ring, regulator	1
118 888	Fuse, 30 amp	3
119 155	Fuse, 25 amp	2
939 983	Fuse, 3 amp	2
140 372	Fuse, 5 amp	2

Section 10

Specifications

Section 10
Specifications

1. Introduction

Refer to Table 10-1 for the specifications.

Table 10-1 Specifications

Dimensions, in. (cm)	
Depth	34 (92)
Width	38 (61)
Height	89 (193)
Crated weight, lb (kg)	900 (410) approximate
Power Requirements	
Power	Amperage (max): 15 amps @ 220–240 VAC, 50/60 Hz, three phase
Air Requirements, psi (bar)	
High-pressure air supply	500–4500 (34.5–310.3), with dewpoint of –70 °F. The actual air source will vary according to the process used.
Low-pressure air supply	70–100 (4.8–6.9), filtered, regulated, and lubricated
Material supply	500–3000 (34.5–207.9)
Operating Parameters	
Viscosity range	1000–1 million cps
Density reduction	Range: 0–80% (Dependent on material properties.) Accuracy: +/– 7.5%
Ambient temperature range, °F (°C)	32–120 (0–50)
Hose and gun connections	Single point for process material (can supply multiple hoses/guns) and for sampling material.
Outlet on electrical enclosure	5 amps @ 120 VAC, 50/60 Hz, single-phase