Sure Coat® Modular Gun Control System

Part B: Pneumatic Modules

Customer Product Manual
Part 334658B
Issued 4/03

For parts and technical support, call the Industrial Coating Systems Customer Support Center at (800) 433-9319 or contact your local Nordson representative.

This document is subject to change without notice.
Check http://emanuals.nordson.com for the latest version.

NORDSON CORPORATION • AMHERST, OHIO • USA

Table of Contents

Description ..... **B 1-1**
Introduction ..... B 1-1
Standard, Two-Gauge Modules ..... B 1-1
Flow 1/Flow 2, Three-Gauge Modules ..... B 1-2
Back Panel Connections ..... B 1-3

Operation ..... **B 2-1**
Recommended Air Pressure Settings ..... B 2-1
Air Pressure Adjustments ..... B 2-1
Flow Rate Air Pressure ..... B 2-2
Atomizing Air Pressure ..... B 2-2

Repair ..... **B 3-1**
Regulator Assembly Replacement ..... B 3-1
Manifold Replacement ..... B 3-3
Disassembly ..... B 3-3
Assembly ..... B 3-4
Solenoid Valve Rebuild ..... B 3-4
Pneumatic Schematics ..... B 3-7
Standard Pneumatic Module ..... B 3-7
Flow 1/Flow 2 Pneumatic Module ..... B 3-8

Parts ..... **B 4-1**
Introduction ..... B 4-1
Standard ..... B 4-2
Flow 1/Flow 2 ..... B 4-4
Manifold Modules ..... B 4-6
One Valve ..... B 4-6
Two Valve ..... B 4-7
Regulator Modules ..... B 4-8
Two Gauge ..... B 4-8
Three Gauge ..... B 4-8
Service Kits ..... B 4-9
Valve 1 Service Kit ..... B 4-9
Valve 2 Service Kit ..... B 4-10

Contact Us

Nordson Corporation welcomes requests for information, comments, and inquiries about its products. General information about Nordson can be found on the Internet using the following address: http://www.nordson.com.

Address all correspondence to:

Nordson Corporation
Attn: Customer Service
555 Jackson Street
Amherst, OH 44001

Section B 1
Description

Introduction

The pneumatic modules control the atomizing and flow rate air pressures to the guns. Each gun in a system has a separate pneumatic module to control its air pressures. Each enclosure holds two pneumatic modules side-by-side.

Two types of pneumatic modules are available:

- Standard, two-gauge
- Flow 1/Flow 2, three-gauge

NOTE: The modular gun control system must have a single type of pneumatic module. The two types cannot be mixed in a system.

Standard, Two-Gauge Modules

See Figure B 1-1. Standard, two-gauge modules control flow rate and atomizing air to the guns.

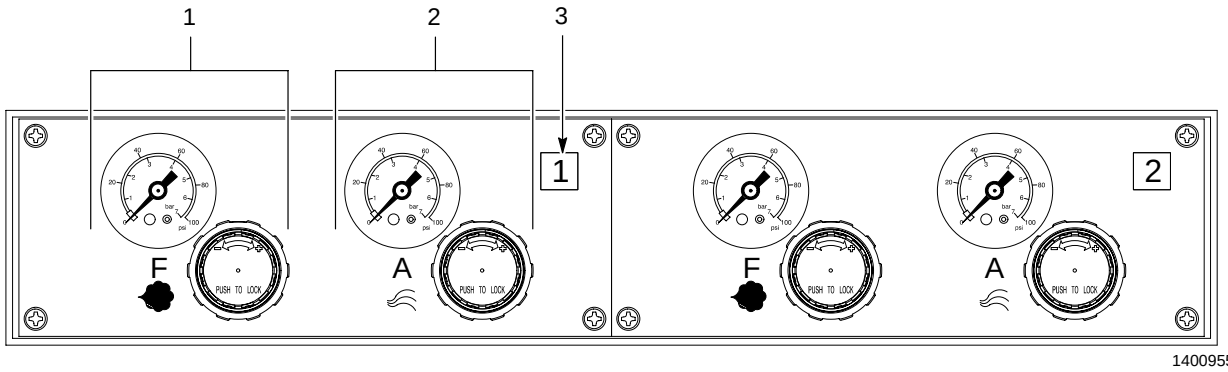


Figure B 1-1 Standard Pneumatic Modules

1. Flow rate air
2. Atomizing air
3. Gun identification label

Flow 1/Flow 2, Three-Gauge Modules

See Figure B 1-2. Flow 1/flow 2, three-gauge modules have two flow rate air regulators and gauges, allowing the operator to set two different flow rate air pressures. Pressing the F1/F2 key on the central control unit allows the operator to quickly switch between the two flow rate air pressure settings.

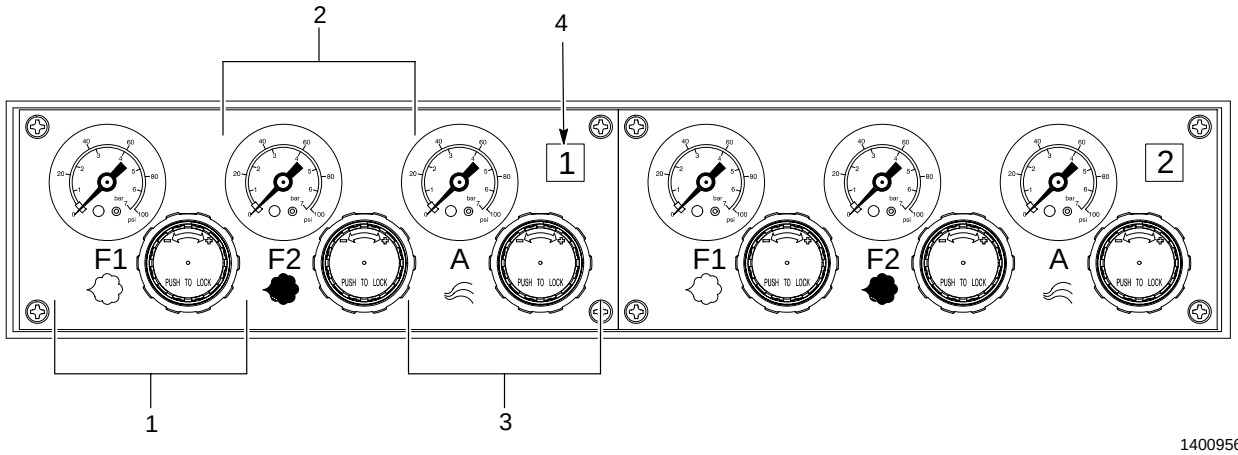


Figure B 1-2 Flow 1/Flow 2 Pneumatic Modules

1. Flow rate air 1
2. Flow rate air 2
3. Atomizing air
4. Gun identification label

Back Panel Connections

Refer to Table B 1-1 and see Figure B 1-3.

NOTE: The back panel connections are the same on both types of pneumatic modules.

Table B 1-1 Back Panel Connections

Item	Connections	Function
1	Input air connection	Connects the pneumatic modules to the system's main air manifold.
2	Gun identification label	Identifies which gun the pneumatic module controls. This number must match the number assigned to the gun on the central control unit.
3	Flow rate air connection	Supplies regulated flow rate air to the powder pump.
4	Atomizing air connection	Supplies regulated atomizing air to the powder pump.
5	Gun air connection	Supplies unregulated gun air to the gun. **NOTE:** Connection to this fitting is not required in all applications. If your guns are not equipped for gun air, leave all of the gun air fittings on the pneumatic modules plugged.
6	Solenoid receptacle	Connects the pneumatic module to the gun driver card in the main control cabinet. This connection allows the pneumatic modules to interface with the central control unit to allow gun triggering. **NOTE:** The number on the solenoid cable must match the number on the gun identification label.

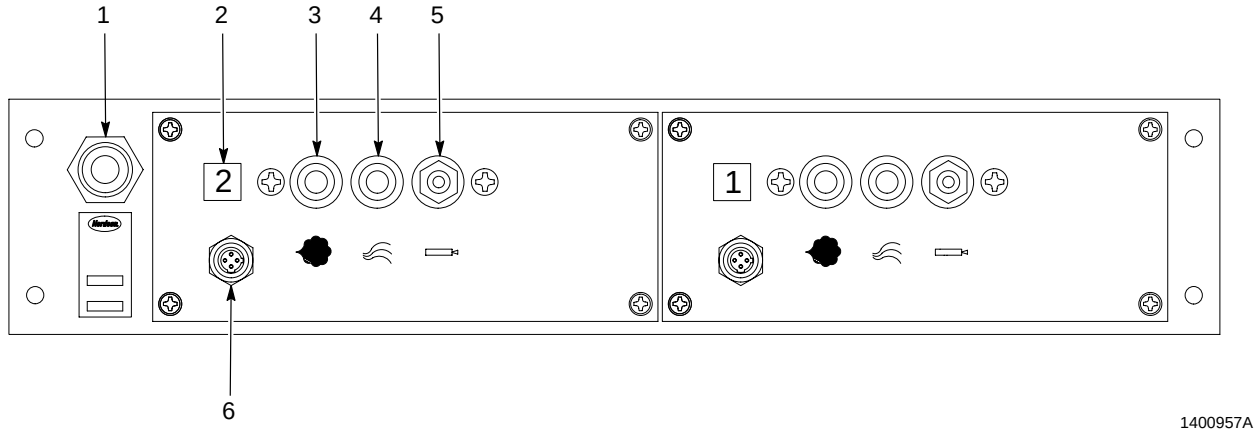


Figure B 1-3 Pneumatic Module Back Panel Connections

Section B 2
Operation

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

Recommended Air Pressure Settings

NOTE: These pressures are average starting points. Pressures vary according to required film build, line speed, and part configuration. Refer to *Air Pressure Adjustments* in this section for guidelines for adjusting the air pressures to obtain the desired results.

Flow rate air: 2 bar (30 psi)

Atomizing air: 1 bar (15 psi)

Air Pressure Adjustments

The following paragraphs explain the different air pressures controlled by the pneumatic modules. Use these guidelines to adjust the system air pressures to suit your application.

Flow Rate Air Pressure

Flow rate air transports a powder and air mixture from the feed hopper to the spray gun. Increasing the flow rate air pressure increases the amount of powder sprayed from the gun and may increase the thickness of the powder deposited on the part.

If the flow rate air pressure is set too low, an inadequate film build or uneven powder output may result. If the flow rate air pressure is too high, too much powder could be output at too high a velocity. This could cause excessive film build or overspray, which reduces transfer efficiency and wastes powder. Excessive flow rate air pressure may also accelerate the build-up of impact fused powder (impact fusion) in the gun or pump or cause premature wear of the gun and pump parts that are in contact with the powder.

Keeping the amount of overspray to a minimum reduces the amount of powder that must be recovered and recycled. This minimizes wear on the system components such as pumps, spray guns, and filters. Maintenance costs are also kept down.

NOTE: Flow 1 and flow 2 are used to quickly change flow rate air settings to maximize powder usage and minimize waste. Press the F1/F2 key on the central control unit to switch between flow rate air settings.

Atomizing Air Pressure

Atomizing air is added to the powder and air stream to increase the powder velocity in the feed hose and break up clumps of powder. Higher atomizing air pressures are needed at lower powder flow rates to keep the powder particles suspended in the air stream. Higher powder velocities may cause the spray pattern to change.

If the atomizing air pressure is set too low, the result may be uneven powder output or puffing and surging from the gun. If the atomizing air pressure is set too high, the powder velocity may increase and cause excessive overspray, impact fusion, and premature wear of the pump and gun parts.

Section B 3
Repair

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

Regulator Assembly Replacement

WARNING: System or material pressurized. Relieve system pressure before servicing. Failure to observe this warning could result in property damage, personal injury, or death.

1. See Figure B 3-1. Remove the four screws (6) securing the regulator panel (3) to the pneumatic module (1). Carefully pull the regulator panel, with regulator assemblies attached, out of the pneumatic module.
2. Tag and disconnect the air tubing from the fittings labeled IN and OUT on the back of the regulator assembly (2).
3. Pull the regulator knob (5) off of the regulator assembly.
4. Unscrew the panel nut (4) from the regulator assembly and remove the regulator assembly from the regulator panel.
5. Install the new regulator assembly through the rear of the panel. Secure the assembly to the panel using the new panel nut.
6. Install the new regulator knob onto the regulator assembly.
7. Connect the air tubing to the fittings marked IN and OUT on the regulator assembly. Refer to *Pneumatic Schematics* in this section for a schematic of your pneumatic module.

Regulator Assembly Replacement *(contd)*

8. Put the regulator panel back into place on the pneumatic module.
9. Secure the regulator panel to the pneumatic module using the four screws.

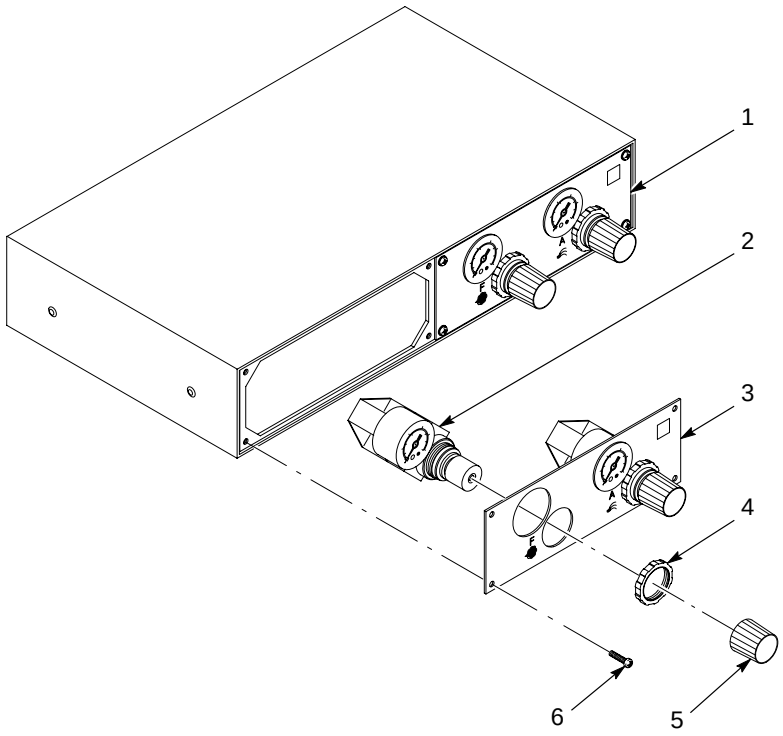


Figure B 3-1 Regulator Assembly Replacement

1. Pneumatic module
2. Regulator assembly
3. Regulator panel
4. Panel nut
5. Regulator knob
6. Screws

Note: Standard pneumatic module shown. Your unit may differ slightly from the one illustrated.

Manifold Replacement

WARNING: System or material pressurized. Relieve system pressure before servicing. Failure to observe this warning could result in property damage, personal injury, or death.

Disassembly

1. See Figure B 3-2. Disconnect the solenoid connector from the solenoid receptacle (4).
2. Disconnect the air tubing from the air out fittings on the back of the pneumatic panel (3).
3. Remove the four screws (5) securing the pneumatic panel to the pneumatic module enclosure (1). Carefully pull the pneumatic panel and manifold assembly (2) out of the pneumatic module enclosure.
4. Disconnect the air tubing from the air in fittings on the manifold.
5. Remove any plugs from the air in fittings on the manifold and save them for reuse.
6. Remove the lock nuts holding the solenoid receptacle to the pneumatic panel.
7. Remove the screws holding the manifold to the pneumatic panel. Remove the manifold module and discard it.

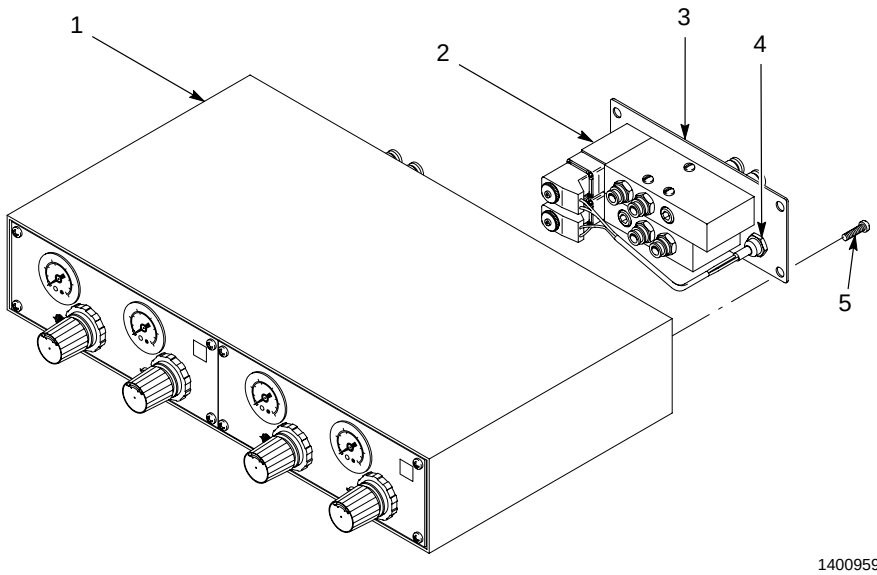


Figure B 3-2 Manifold Replacement

1. Pneumatic module enclosure
2. Manifold
3. Pneumatic panel
4. Solenoid receptacle
5. Screws

Note: Your unit may differ slightly from the one illustrated.

Assembly

1. See Figure B 3-2. Secure the new manifold (2) to the pneumatic panel (3) using the two screws.
2. Secure the solenoid receptacle (4) to the pneumatic panel using the lock nuts.
3. Connect the air tubing to the air in fittings on the back of the manifold module. Refer to *Pneumatic Schematics* in this section for a schematic of your pneumatic module.
4. Install the plugs that you removed from the old manifold into the unused air in fittings on the new manifold.
5. Put the manifold module and pneumatic panel back into place on the pneumatic module enclosure (1).
6. Secure the pneumatic panel to the pneumatic module enclosure using the four screws (5).
7. Refer to Table B 3-2. Connect the air tubing to the air out fittings using the guidelines provided.

Table B 3-2 Air Out Tubing Connections

Tubing Color	Tubing Size	Function
Blue	8 mm	Atomizing air
Black	8 mm	Flow rate air
Clear	4 mm	Gun air

8. Connect the solenoid connector to the solenoid receptacle.

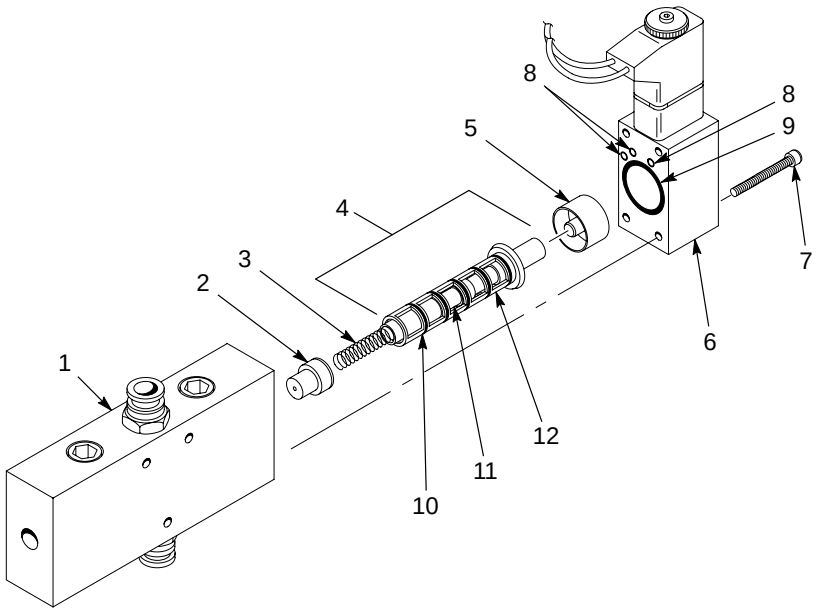
Solenoid Valve Rebuild

Valve 1 (Trigger) Rebuild: See Figure B 3-3

Valve 2 (F1/F2) Rebuild: See Figure B 3-4

NOTE: Seven tee seals are included in the seal kit. If you rebuild the trigger valve, use all seven tee seals. If you rebuild the F1/F2 valve, you will only use six tee seals.

1. Remove the manifold. Refer to *Manifold Replacement* for instructions.
2. Remove the screws (7) and pull the end cap (6) off the solenoid valve body (1). Make sure the three small O-rings (8) and flat round gasket (9) remain in the end cap.
3. Remove the piston and bushing (5) from the valve body.
4. Push on the spring pad (2) to force the spool assembly (4) out of the valve body.



1400398A

Figure B 3-3 Valve Number 1 (Trigger) Solenoid Valve Rebuild

1. Valve body
2. Spring pad
3. Spring
4. Spool assembly
5. Piston and bushing
6. End cap
7. Screw
8. O-rings
9. Round gasket
10. Tee seal
11. Spool
12. Spacer

5. Disassemble the spool assembly and clean and replace parts as necessary.
6. Assemble the solenoid valve. Lightly lubricate the following items with the lubricant included in the service kit before installing it them:
   - spool (11)
   - tee seals (10)
   - piston (5) bushing
   - O-rings (8)
   - gasket (9)

NOTE: The spacers (12) and tee seals (10) are identical and may be installed in any location along the spool (11). Use only six of the seven tee seals provided in the seal kit when rebuilding the F1/F2 or soft start valve.

Solenoid Valve Rebuild *(contd)*

7. Install the spool assembly into the valve body.
8. Install the piston and bushing into the valve body.
9. Make sure that the small O-rings are aligned with the holes in the valve body, and install the end cap using the four screws. Torque the screws to 1 N•m (9 in.-lb).

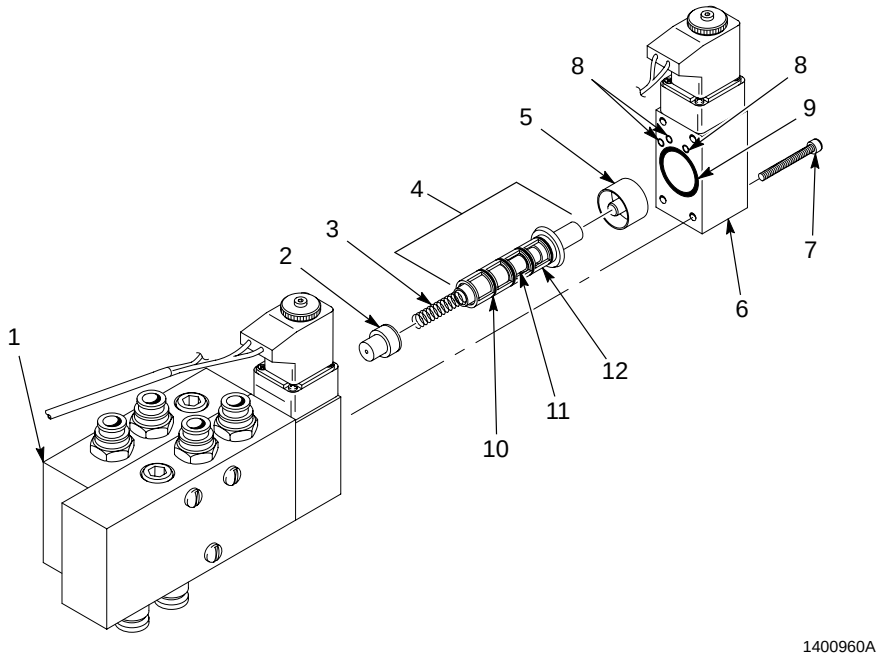


Figure B 3-4 Valve Number 2 (F1/F2) Solenoid Valve Rebuild

1. Valve body
2. Spring pad
3. Spring
4. Spool assembly
5. Piston and bushing
6. End cap
7. Screw
8. O-rings
9. Round gasket
10. Tee seal
11. Spool
12. Spacer

Pneumatic Schematics

Standard Pneumatic Module

See Figure B 3-5.

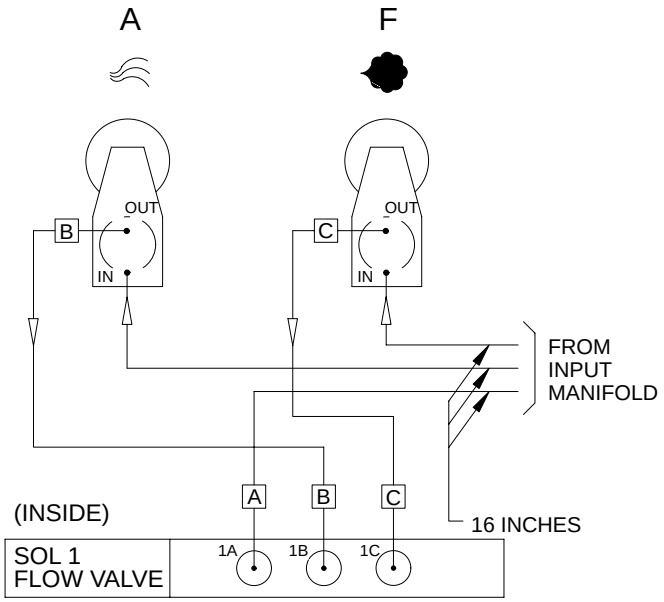


Figure B 3-5 Standard Pneumatic Module Schematic

Flow 1/Flow 2 Pneumatic Module

See Figure B 3-6.

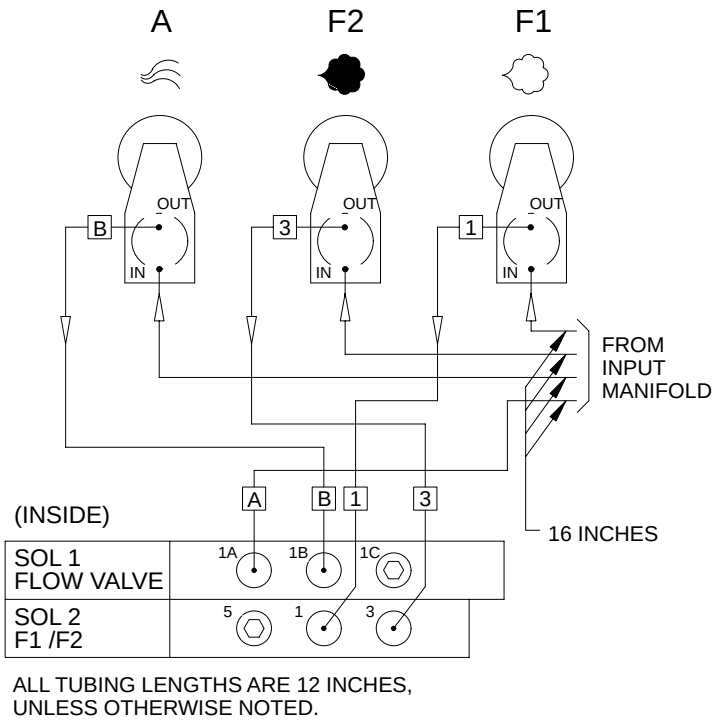


Figure B 3-6 Flow 1/Flow 2 Pneumatic Module Schematic

Section B 4
Parts

Introduction

This section illustrates the replacement parts and service kits available for the pneumatic modules.

NOTE: Refer to the *Parts* section in Part A, *System Overview*, for an explanation of how to use the illustrated parts list.

NOTE: A system must have a single type of pneumatic module. You cannot mix two different types of pneumatic modules in a system.

Standard

See Figure B 4-1.

Item	Part	Description	Quantity	Note
—	303142	KIT, upgrade, standard, dual	1	A
—	303136	• MODULE, standard, dual	1	
1	982825	• • SCREW, pan, recessed, M4 x 12, with integral lock washer bezel	16	
2	303105	• • REGULATOR MODULE, two-gauge	2	B
3	303099	• • BRACKET, support, no. 2	2	
4	982768	• • MACHINE SCREW, pan, recessed, M4 x 8, SEMS	4	
5	303122	• • WASHER, lock, internal, M20	1	
6	183455	• • FITTING, bulkhead, 10 mm x (8) 6 mm	1	
7	183804	• • PLUG, blanking, 6 mm tubing	2	
8	- - - - - -	• • MANIFOLD MODULE, 1 valve	2	C
9	- - - - - -	• • CABINET, module, regulator-manifold	1	
10	900741	• • TUBING, polyurethane, 6/4 mm, black	14	

NOTE A: This kit includes all of the parts needed to add an additional pneumatic module onto the system (including a gun driver card, solenoid interface cables, etc.). Refer to the *Upgrading the Sure Coat Modular Gun Control System* manual for a complete list of the parts included in this kit.

B: Refer to *Regulator Modules—Two Gauge* in this section for a breakdown of the parts in this assembly.

C: Refer to *Manifold Modules—One Valve* in this section for a breakdown of the parts in this assembly.

NS: Not Shown

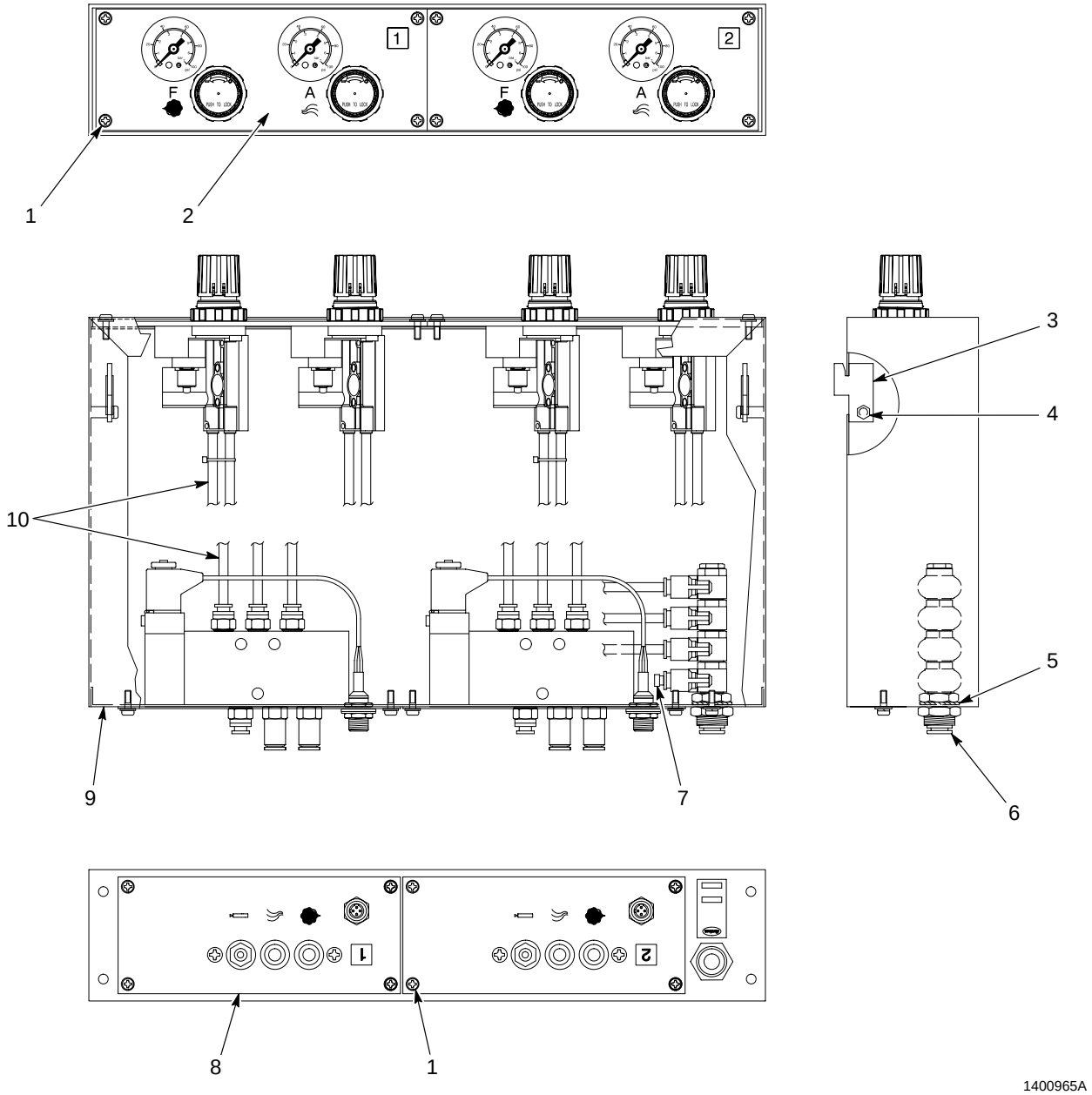


Figure B 4-1 Standard Pneumatic Modules

Flow 1/Flow 2

See Figure B 4-2.

Item	Part	Description	Quantity	Note
—	303144	KIT, upgrade, F1/F2, dual	1	A
—	303138	• MODULE, F1/F2, dual	1	
1	982825	• • SCREW, pan, recessed, M4 x 12, with internal lock washer bezel	16	
2	303106	• • REGULATOR MODULE, three-gauge	2	B
3	303099	• • BRACKET, support, no. 2	2	
4	982768	• • MACHINE SCREW, pan, recessed, M4 x 8, SEMS	2	
5	303122	• • WASHER, lock, internal, M20, steel, zinc	1	
6	183455	• • FITTING, bulkhead, 10 mm x (8) 6 mm	1	
7		• • PLUG, 6 mm tubing	5	
8	- - - - - -	• • MANIFOLD MODULE, 2 valve	2	C
9	- - - - - -	• • CABINET, module, regulator-manifold	1	
10	900741	• • TUBING, polyurethane, 6/4 mm, black	19	

NOTE A: This kit includes all of the parts needed to add an additional pneumatic module onto the system (including a gun driver card, solenoid interface cables, etc.). Refer to the *Upgrading the Sure Coat Modular Gun Control System* manual for a complete list of the parts included in this kit.

B: Refer to *Regulator Modules—Three Gauge* in this section for a breakdown of the parts in this assembly.

C: Refer to *Manifold Modules—Two Valve* in this section for a breakdown of the parts in this assembly.

NS: Not Shown

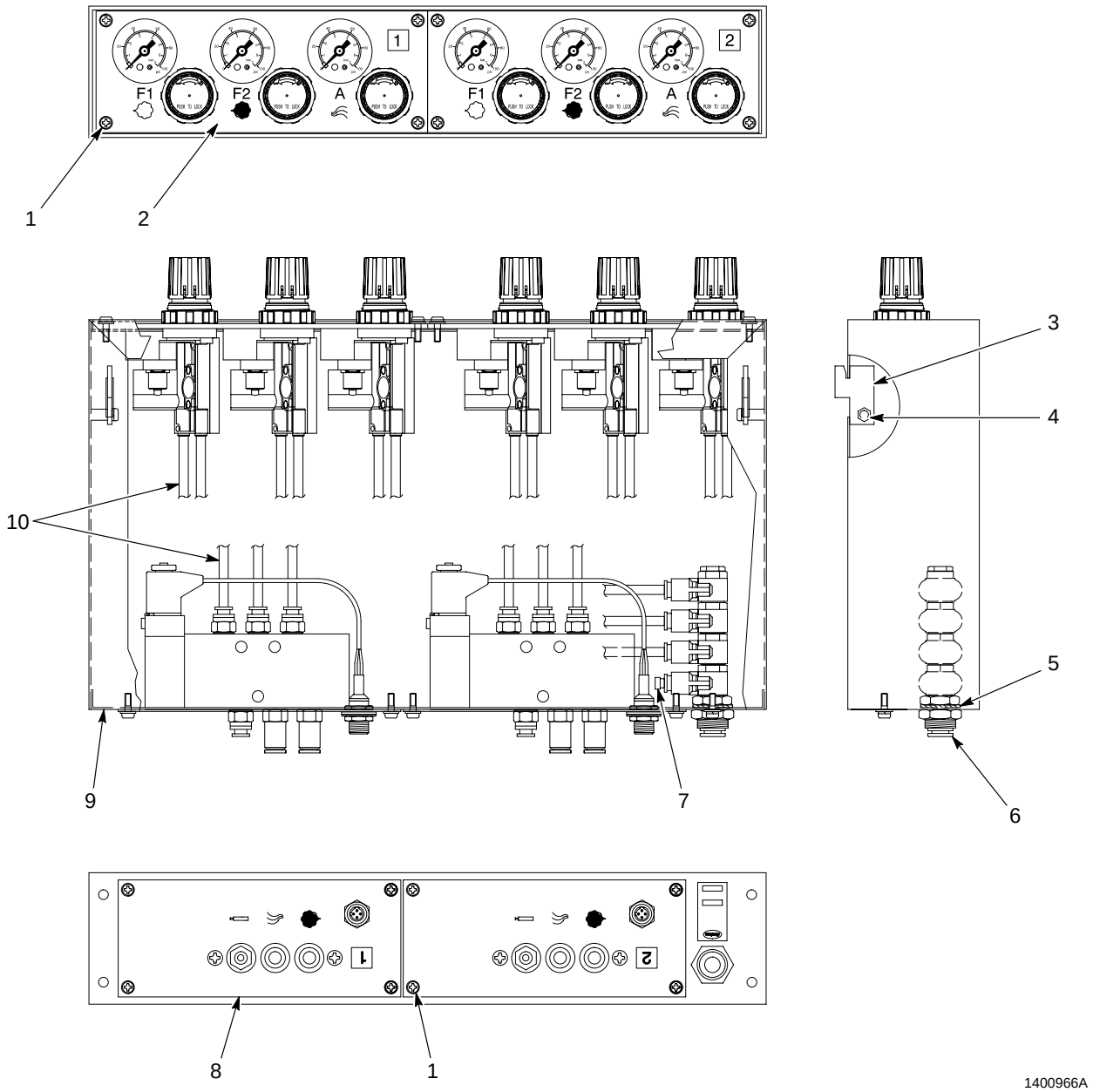


Figure B 4-2 Flow 1/Flow 2 Pneumatic Modules

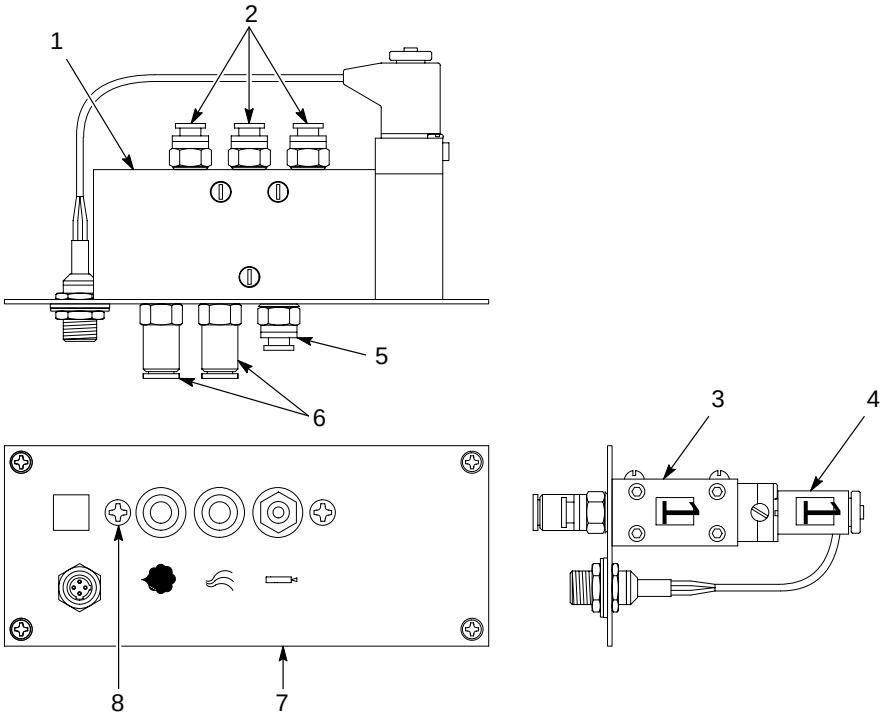
Manifold Modules

One Valve

See Figure B 4-3.

NOTE: The one-valve manifold module is used with standard pneumatic modules.

Item	Part	Description	Quantity	Note
—	- - - - - -	MANIFOLD MODULE, 1 valve	1	
1	303112	• MANIFOLD ASSEMBLY, 1 valve	1	
2	971100	• • CONNECTOR, male, 6 mm tube x $^1/_4$-in. universal	3	
3	- - - - - -	• • VALVE, 3 x 2 way, normally closed	1	A
4	303115	• • SOLENOID, with wires and connector	1	
5	288822	• • CONNECTOR, orifice, 4 mm x $^1/_4$-in. universal, dia 0.012 in.	1	
6	327748	• • VALVE, check, M8 x $^1/_4$-in., male input	2	
7	- - - - - -	• PANEL, manifold	1	
8	334799	• SCREW, pan, recessed, M5 x 10, with integral lock washer bezel	2	
NOTE A: If this valve fails, you must either replace the manifold assembly, part 303112, or repair the valve with the trigger valve service kit, part 333677.				



1400967A

Figure B 4-3 One-Valve Manifold Module

Two Valve

See Figure B 4-4.

NOTE: The two-valve manifold module is used with Flow 1/Flow 2 pneumatic modules.

Item	Part	Description	Quantity	Note
—	- - - - - -	MANIFOLD MODULE, 2 valve	1	
1	303113	• MANIFOLD ASSEMBLY, 2 valve, F1/F2	1	
2	971100	• • CONNECTOR, male, 6 mm tube x $^1/_4$-in. universal	4	
3	- - - - - -	• • VALVE, 4 way, with auxiliary port	1	A
4	303116	• • SOLENOIDS, with wires and connectors	1	
5	- - - - - -	• • VALVE, 3 x 2 way, normally closed, with auxiliary port	1	B
6	288822	• • CONNECTOR, orifice, 4 mm x $^1/_4$-in. universal, dia 0.012 in.	1	
7	327748	• • VALVE, check, M8 x $^1/_4$-in., male input	2	
8	- - - - - -	• PANEL, manifold	1	
9	334799	• SCREW, pan, recessed, M5 x 10, with lock	2	

NOTE A: If this valve fails, you must either replace the manifold assembly, part 303113, or repair the valve with the trigger valve service kit, part 333677.

B: If this valve fails, you must either replace the manifold assembly, part 303113, or repair the valve with the F1/F2 valve service kit, part 333668.

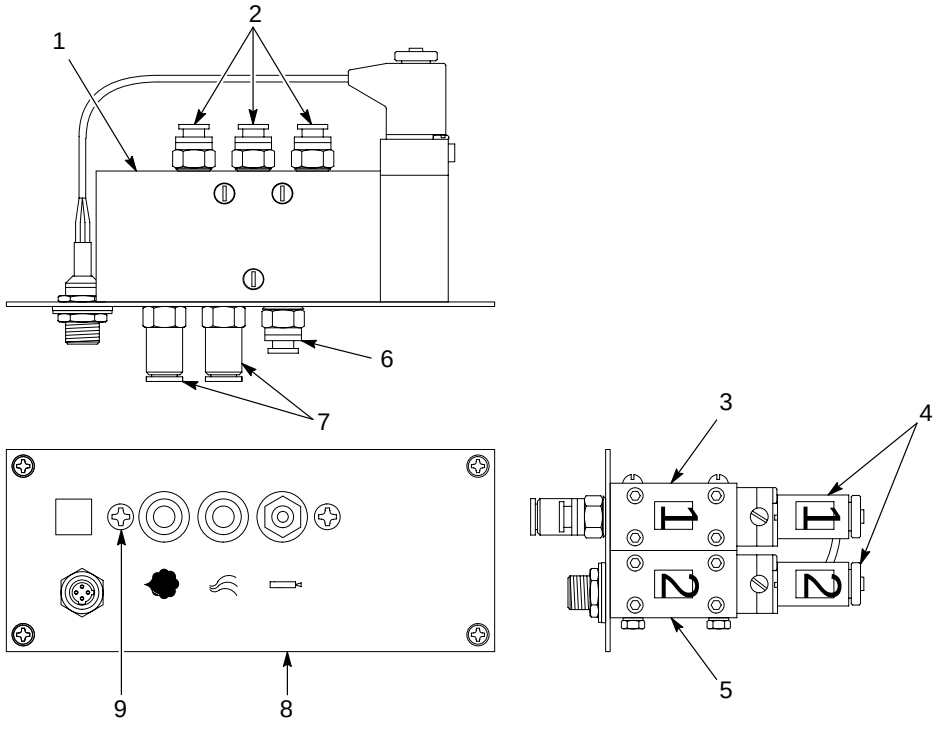


Figure B 4-4 Two-Valve Manifold Module

Regulator Modules

Two Gauge

See Figure B 4-5.

Item	Part	Description	Quantity	Note
—	303105	REGULATOR MODULE, 2 gauge	1	
1	- - - - - -	• PANEL, 2 gauge	1	
2	303060	• REGULATOR, assembly, 0-100 psi, 0-7 bar	2	

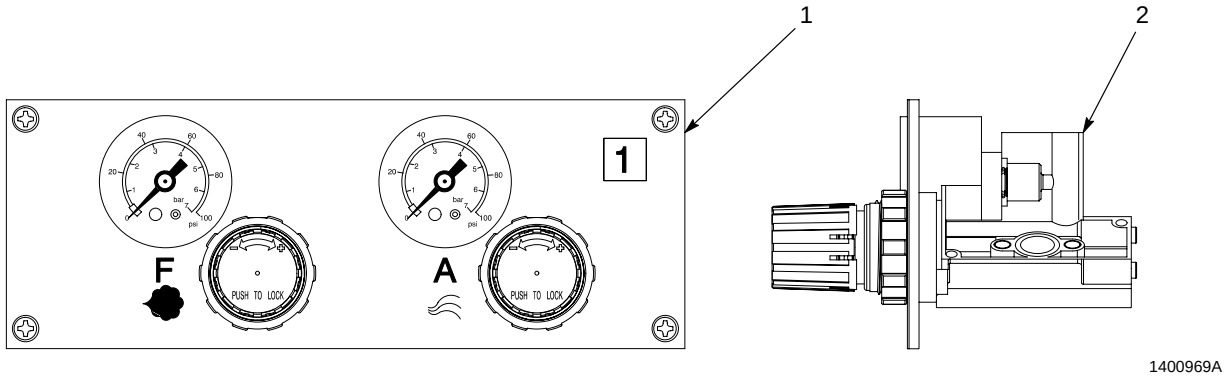


Figure B 4-5 Two-Gauge Regulator Module

Three Gauge

See Figure B 4-6.

Item	Part	Description	Quantity	Note
—	303106	REGULATOR MODULE, 3 gauge	1	
1	- - - - - -	• PANEL, 3 gauge	1	
2	303060	• REGULATOR, assembly, 0-100 psi, 0-7 bar	3	

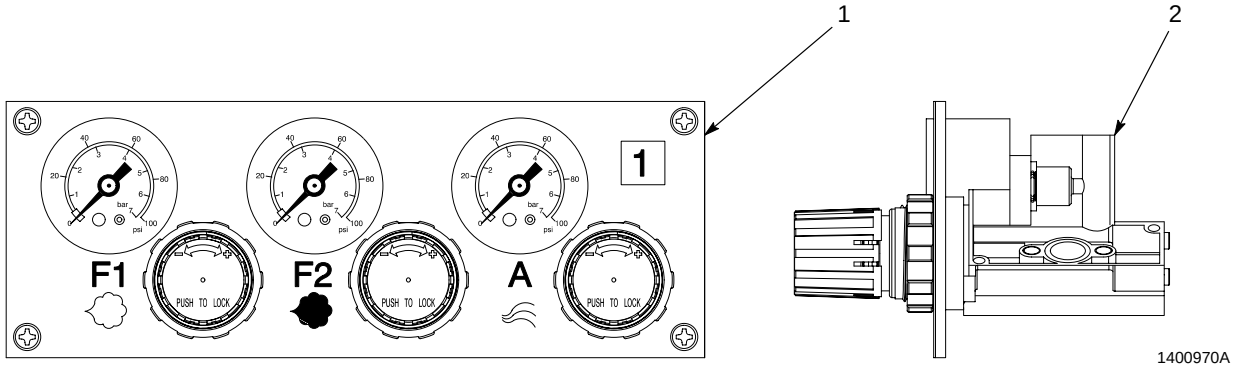


Figure B 4-6 Three-Gauge Regulator Module

Service Kits

Valve 1 Service Kit

See Figure B 4-7. Valve 1 sends flow and atomizing air to the guns when they are triggered. Use this kit to rebuild valve 1 (trigger valve).

NOTE: See Figure B 4-3 or B 4-4 item 3 for the location of the trigger valve.

Item	Part	Description	Quantity	Note
—	333677	SERVICE KIT, trigger valve	1	
1	- - - - - -	• SPRING	1	
2	1027108	• SERVICE KIT, seal, spool, valve	1	
NS	- - - - - -	• • SEAL, tee	7	
NS	- - - - - -	• • LUBRICANT	1	
3	- - - - - -	• SPOOL, 3/2/2, molded	1	
4	- - - - - -	• O-RING, piston	1	
NS: Not Shown				

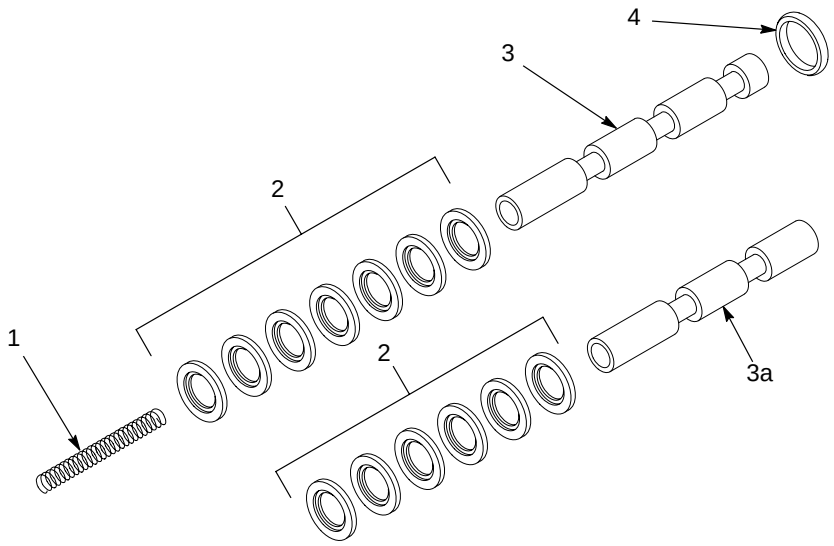


Figure B 4-7 Valve Spool Assemblies

Valve 2 Service Kit

See Figure B 4-7. Valve 2 switches between the two flow rate air pressures.

NOTE: See Figure B 4-4, item 5 for the location of the F1/F2 valve.

Item	Part	Description	Quantity	Note
—	333668	SERVICE KIT, F1/F2 valve	1	
1	- - - - - -	• SPRING	1	
2	1027108	• SERVICE KIT, seal, spool, valve	1	
NS	- - - - - -	• • SEAL, tee	7	A
NS	- - - - - -	• • LUBRICANT	1	
3a	- - - - - -	• SPOOL, 5/2, molded	1	
4	- - - - - -	• O-RING, piston	1	

NOTE A: The valve seal service kit, part 1027108, includes seven tee seals. Only six tee seals are needed to rebuild the auxiliary F1/F2 valve. Discard the spare tee seal.

NS: Not Shown