Pro-Flo® III Standard Flow Dispensing Gun

Customer Product Manual
Part 303 862B

NORDSON CORPORATION • AMHERST, OHIO • USA

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Table of Contents

1. Safety 1
Qualified Personnel 1
Intended Use 1
Regulations and Approvals 1
Personal Safety 2
High-Pressure Fluids 3
Fire Safety 3
Halogenated Hydrocarbon Solvent Hazards 5
Action in the Event of a Malfunction 5
Disposal 5
2. Description 6
Gun Components 7
3. Specifications 8
Weight 8
Air Pressure 8
Fluid Pressure Rating, Static 8
Maximum Operating Temperature of Material 8
Material Viscosity Range 8
Flow Range 8
4. Installation 9
Gun Mounting and Dimensions 9
Gun Connections 11
Material Supply Line 12
Supply Air 12
Gun Control Cable/Controller 12
Spring Closure Assembly 12
Material Cutoff Module (MCO) 12

Nozzle 13
Heater 13
Temperature Conditioning Fittings 15
Pressure Transducer 17
5. Operation 17
Gun Purging 17
Pressure Transducer Calibration 17
6. Maintenance 17
7. Troubleshooting 18
Checking Cable Continuity 21
8. Repair 22
Material Blockages 22
Clear a Blocked Nozzle 22
Clear a Blocked Material Supply Hose 24
Gun-to-Robot Connections 24
Remove the Gun from the Robot 24
Install the Gun on the Robot 25
Trimset Cartridge 26
Remove the Trimset Cartridge 26
Install the Trimset Cartridge 28
Spring Closure Assembly 29
Pressure Transducer 31
Replace the Pressure Transducer 31
Replace the Cordset 32
Change the Cordset Wiring Orientation 35
Material Cutoff Module 35
Remove the MCO Plug 36
Remove the MCO 37
Install the MCO 38

9. Parts 39
Using the Illustrated Parts List 39
Gun Options 40
Pneumatic Actuator 41
Temperature Conditioning Fittings 43
Miscellaneous Parts and Ship-With Items 43
Air Manifold 45
Spring Closure Assembly 46
Trimset Cartridges 48
Material Cutoff Modules (MCOs) 49
No MCO (Port Plug) 49
MCO for Unheated and Heated Guns 50
H200 Gun or Auto-Flo Modules 52
Pressure Transducer and Cordset 54
Heater Kits 55

Pro-Flo III Standard Flow Dispensing Gun

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

1. Safety

Read and follow these safety instructions. Task- and equipment-specific warnings, cautions, and instructions are included in equipment documentation where appropriate.

Make sure all equipment documentation, including these instructions, is accessible to persons operating or servicing equipment.

Qualified Personnel

Equipment owners are responsible for making sure that Nordson equipment is installed, operated, and serviced by qualified personnel. Qualified personnel are those employees or contractors who are trained to safely perform their assigned tasks. They are familiar with all relevant safety rules and regulations and are physically capable of performing their assigned tasks.

Intended Use

Use of Nordson equipment in ways other than those described in the documentation supplied with the equipment may result in injury to persons or damage to property.

Some examples of unintended use of equipment include

- using incompatible materials
- making unauthorized modifications
- removing or bypassing safety guards or interlocks
- using incompatible or damaged parts
- using unapproved auxiliary equipment
- operating equipment in excess of maximum ratings

Regulations and Approvals

Make sure all equipment is rated and approved for the environment in which it is used. Any approvals obtained for Nordson equipment will be voided if instructions for installation, operation, and service are not followed.

Personal Safety

To prevent injury follow these instructions.

- Do not operate or service equipment unless you are qualified.
- Do not operate equipment unless safety guards, doors, or covers are intact and automatic interlocks are operating properly. Do not bypass or disarm any safety devices.
- Keep clear of moving equipment. Before adjusting or servicing moving equipment, shut off the power supply and wait until the equipment comes to a complete stop. Lock out power and secure the equipment to prevent unexpected movement.
- Relieve (bleed off) hydraulic and pneumatic pressure before adjusting or servicing pressurized systems or components. Disconnect, lock out, and tag switches before servicing electrical equipment.
- While operating manual spray guns, make sure you are grounded. Wear electrically conductive gloves or a grounding strap connected to the gun handle or other true earth ground. Do not wear or carry metallic objects such as jewelry or tools.
- If you receive even a slight electrical shock, shut down all electrical or electrostatic equipment immediately. Do not restart the equipment until the problem has been identified and corrected.
- Obtain and read Material Safety Data Sheets (MSDS) for all materials used. Follow the manufacturer's instructions for safe handling and use of materials, and use recommended personal protection devices.
- Make sure the spray area is adequately ventilated.
- To prevent injury, be aware of less-obvious dangers in the workplace that often cannot be completely eliminated, such as hot surfaces, sharp edges, energized electrical circuits, and moving parts that cannot be enclosed or otherwise guarded for practical reasons.

High-Pressure Fluids

High-pressure fluids, unless they are safely contained, are extremely hazardous. Always relieve fluid pressure before adjusting or servicing high pressure equipment. A jet of high-pressure fluid can cut like a knife and cause serious bodily injury, amputation, or death. Fluids penetrating the skin can also cause toxic poisoning.

If you suffer a fluid injection injury, seek medical care immediately. If possible, provide a copy of the MSDS for the injected fluid to the health care provider.

The National Spray Equipment Manufacturers Association has created a wallet card that you should carry when you are operating high-pressure spray equipment. These cards are supplied with your equipment. The following is the text of this card:

WARNING: Any injury caused by high pressure liquid can be serious. If you are injured or even suspect an injury:

- Go to an emergency room immediately.
- Tell the doctor that you suspect an injection injury.
- Show him this card.
- Tell him what kind of material you were spraying.

MEDICAL ALERT—AIRLESS SPRAY WOUNDS: NOTE TO PHYSICIAN

Injection in the skin is a serious traumatic injury. It is important to treat the injury surgically as soon as possible. Do not delay treatment to research toxicity. Toxicity is a concern with some exotic coatings injected directly into the bloodstream.

Consultation with a plastic surgeon or a reconstructive hand surgeon may be advisable.

The seriousness of the wound depends on where the injury is on the body, whether the substance hit something on its way in and deflected causing more damage, and many other variables including skin microflora residing in the paint or gun which are blasted into the wound. If the injected paint contains acrylic latex and titanium dioxide that damage the tissue's resistance to infection, bacterial growth will flourish. The treatment that doctors recommend for an injection injury to the hand includes immediate decompression of the closed vascular compartments of the hand to release the underlying tissue distended by the injected paint, judicious wound debridement, and immediate antibiotic treatment.

Fire Safety

To avoid a fire or explosion, follow these instructions.

- Ground all conductive equipment in the spray area. Use only grounded air and fluid hoses. Check equipment and workpiece grounding devices regularly. Resistance to ground must not exceed one megohm.

- Shut down all equipment immediately if you notice static sparking or arcing. Do not restart the equipment until the cause has been identified and corrected.

- Do not smoke, weld, grind, or use open flames where flammable materials are being used or stored.

- Do not heat materials to temperatures above those recommended by the manufacturer. Make sure heat monitoring and limiting devices are working properly.

- Provide adequate ventilation to prevent dangerous concentrations of volatile particles or vapors. Refer to local codes or your material MSDS for guidance.

- Do not disconnect live electrical circuits while working with flammable materials. Shut off power at a disconnect switch first to prevent sparking.

- Know where emergency stop buttons, shutoff valves, and fire extinguishers are located. If a fire starts in a spray booth, immediately shut off the spray system and exhaust fans.

- Shut off electrostatic power and ground the charging system before adjusting, cleaning, or repairing electrostatic equipment.

- Clean, maintain, test, and repair equipment according to the instructions in your equipment documentation.

- Use only replacement parts that are designed for use with original equipment. Contact your Nordson representative for parts information and advice.

Halogenated Hydrocarbon Solvent Hazards

Do not use halogenated hydrocarbon solvents in a pressurized system that contains aluminum components. Under pressure, these solvents can react with aluminum and explode, causing injury, death, or property damage. Halogenated hydrocarbon solvents contain one or more of the following elements:

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

Check your material MSDS or contact your material supplier for more information. If you must use halogenated hydrocarbon solvents, contact your Nordson representative for information about compatible Nordson components.

Action in the Event of a Malfunction

If a system or any equipment in a system malfunctions, shut off the system immediately and perform the following steps:

- Disconnect and lock out system electrical power. Close hydraulic and pneumatic shutoff valves and relieve pressures.
- Identify the reason for the malfunction and correct it before restarting the system.

Disposal

Dispose of equipment and materials used in operation and servicing according to local codes.

2. Description

See Figure 1.

The Nordson Pro-Flo III standard flow dispensing gun is used in the robotic application of sealants and adhesives. The gun is part of the Pro-Flo system, which consists of a gun and controller used in conjunction with a robot and its controller.

A Pro-Flo controller, using feedback from the robot controller and other sensors, controls the gun dispensing rate. Consistent bead size is maintained by adjusting the module dispensing rate due to changes in robot speed, material viscosity, and material delivery pressure.

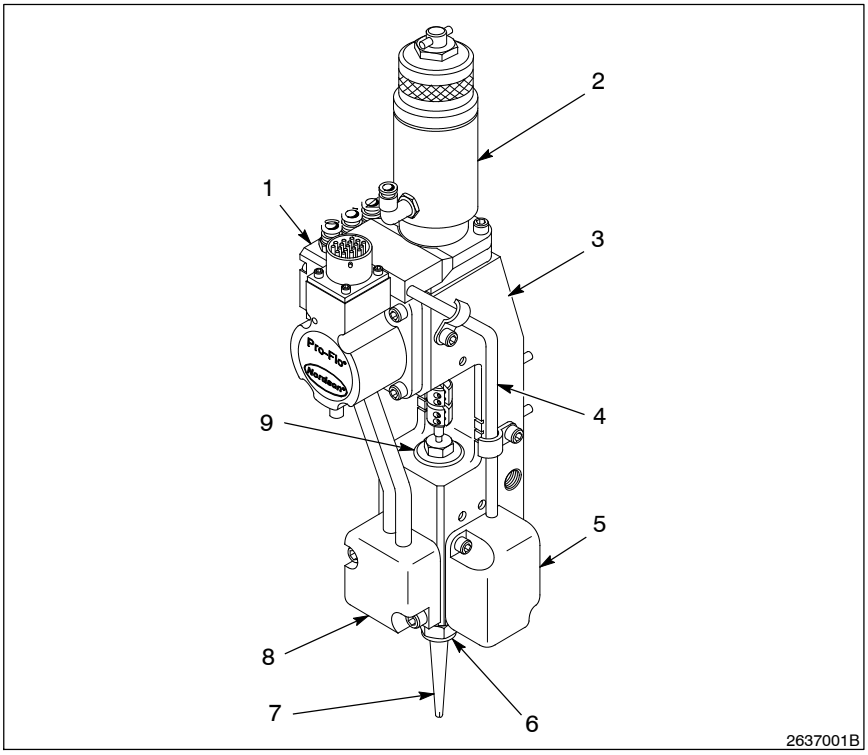

Fig. 1 Pro-Flo III Standard Flow Dispensing Gun

1. Air manifold
2. Spring closure assembly
3. Pneumatic actuator and frame assembly
4. Pressure transducer cordset
5. Pressure transducer (cover)
6. Nozzle nut
7. Customer-supplied nozzle
8. Material cutoff module (MCO)
9. Removable trimset cartridge

Gun Components

See Figure 1.

The Pro-Flo III standard flow dispensing gun consists of the following main components:

- Air manifold (1)
- Spring closure assembly (2)
- Pneumatic actuator and frame assembly (3)
- 2000-psi pressure transducer (5) with left- or right-hand pressure transducer cordset (4)
- Nozzle nut (6)
- Material cutoff module (MCO) (8)
- Removable trimset cartridge (9)
- Temperature conditioning fittings (shipped with all unheated guns)

Some dispensing guns are equipped with the following optional component:

- 500- or 1000-psi pressure transducer with left- or right-hand pressure transducer cordset

NOTE: For description purposes throughout this manual, the following definitions will be followed:

Term	Meaning
Heated guns	Guns that require an electric heater (120-V or 240-V)
Unheated guns	Guns ordered and shipped with • pipe plugs in the temperature conditioning ports, • temperature conditioning fittings (shipped loose) to be installed at the customer's discretion, or • without an electric heater.

3. Specifications

Following are the specifications for the Pro-Flo III standard flow dispensing gun.

Weight	2.22 kg (4 lb 14 oz)
Air Pressure	Operating: 4.8–8.4 bar (70–120 psi) Maximum airflow: 0.023 m^3/min (0.8 scfm) Ambient air temperature: 4–71 °C (40–160 °F)
Fluid Pressure Rating, Static	207 bar (3000 psi), maximum
Maximum Operating Temperature of Material	Unheated guns with polymyte seals: 49 °C (120 °F) Heated guns with peek seals: 149 °C (300 °F)
Material Viscosity Range	10,000–3,000,000 cps
Flow Range	0–158 kg/hr (0–350 lb/hr)

4. Installation

This section provides installation information for the Pro-Flo III standard flow dispensing gun.

WARNING: Disconnect the equipment from the line voltage. Failure to do so may result in serious personal injury.

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

CAUTION: Carefully route cables, air lines, and the material supply hose to avoid contact with the workpiece and damage from robot movement.

Gun Mounting and Dimensions

Figure 2 shows the basic overall clearance dimensions for a Pro-Flo III standard flow dispensing gun without a customer-supplied nozzle.

NOTE: Clearance dimensions will vary based on gun nozzle or material control device, heaters, temperature conditioning fittings, and any other devices installed.

Mount the gun to the robot arm using an adapter designed for the application. The adapter must accept two $^{1}/_{4}$-20 threaded mounting bolts (1) and two $^{1}/_{4}$ in., nominal, dowel pins (2) spaced in a square pattern as shown.

Gun Mounting and Dimensions *(contd)*

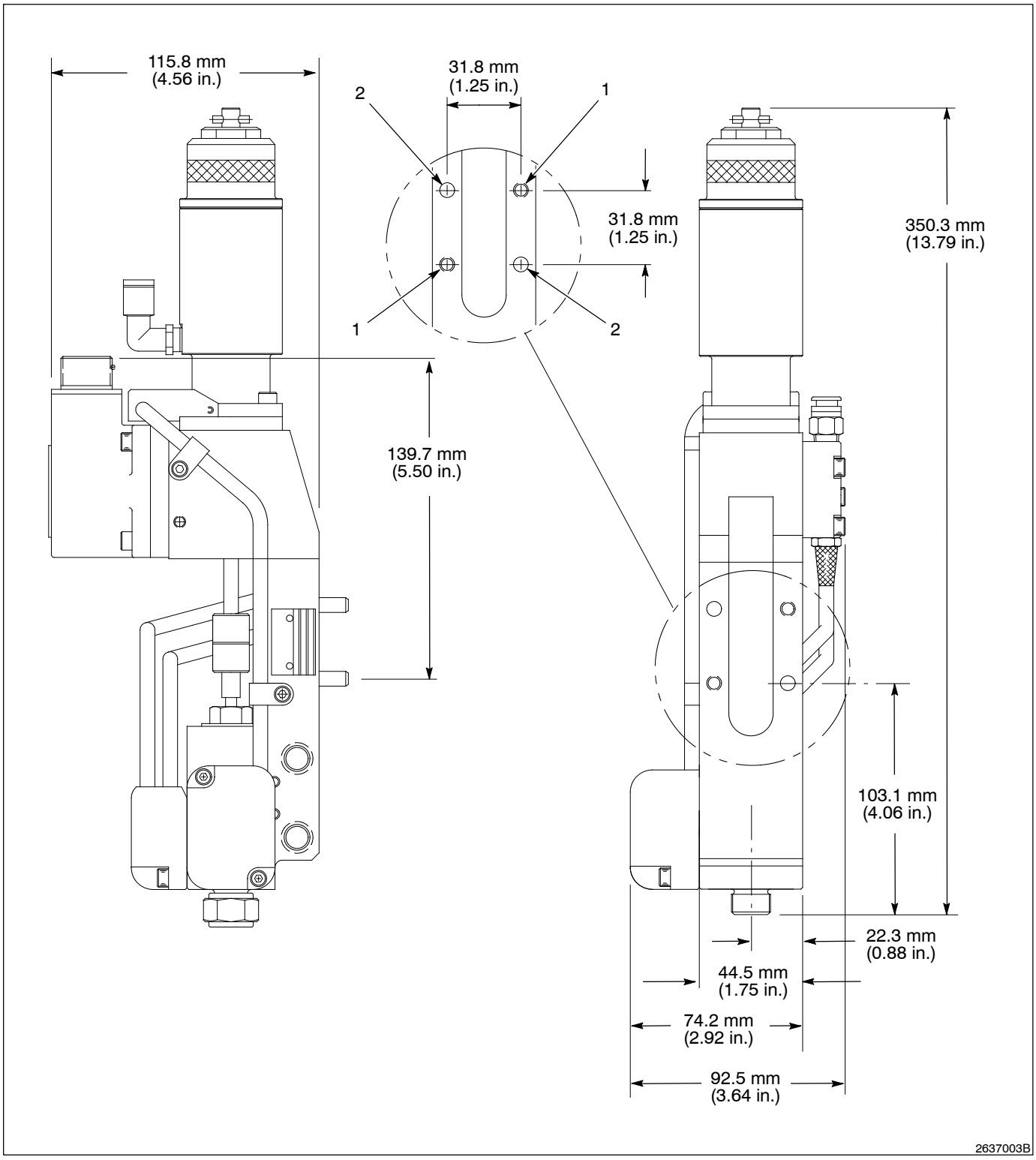

Fig. 2 Pro-Flo III Standard Flow Dispensing Gun Dimensions

1. Mounting bolts ($^1/_4$-20)
2. Dowels ($^1/_4$-in.)

Gun Connections

See Figure 3.

Follow these procedures to make the necessary connections for the Pro-Flo III standard flow dispensing gun.

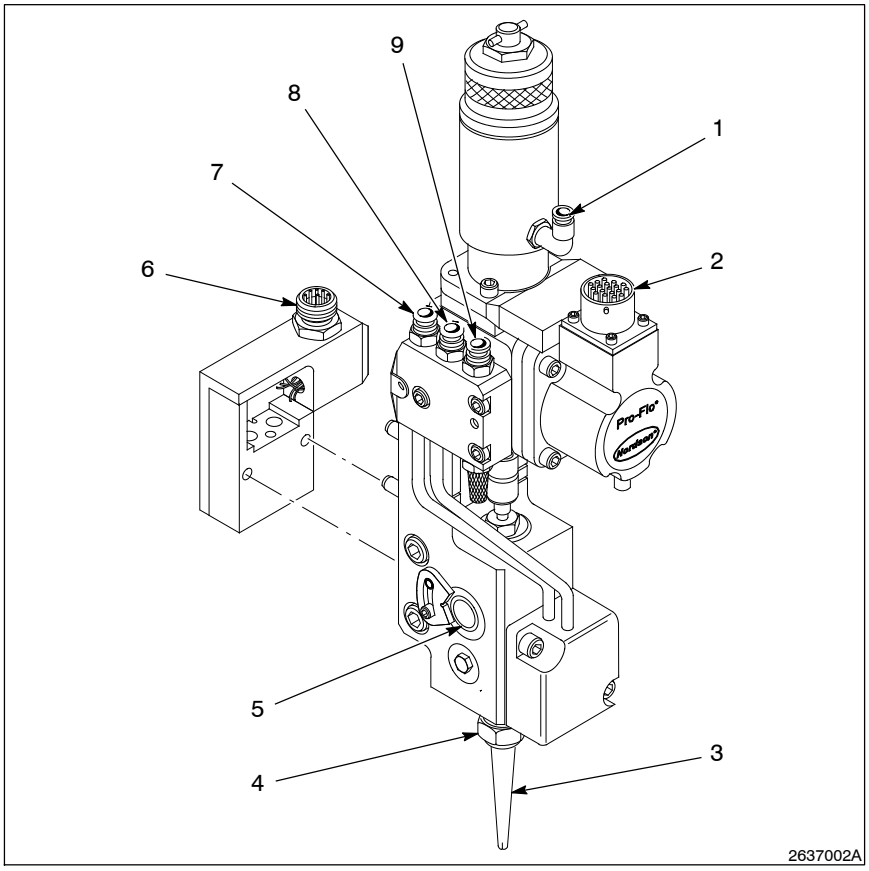

Fig. 3 Connection Requirements (Heated Gun Shown)

1. Spring closure air inlet
2. Gun control receptacle
3. Customer-supplied nozzle
4. Nozzle nut
5. Material inlet
6. Heater receptacle
7. MCO retract air inlet
8. MCO extend air inlet
9. Control air inlet

Note: Item 6, heater receptacle, shown for visual reference only.

Material Supply Line

Install a 90° elbow, JIC-6, $^{9}/_{16}$-18 thread fitting or swivel connector to the material inlet (5). Contact your Nordson representative for assistance in selecting a swivel connector. Connect the material supply line.

Supply Air

Connect a supply air line to the control air inlet (9). Supply air must be oil-free and maintain a pressure of 4.8–8.4 bar (70–20 psi).

Gun Control Cable/Controller

Connect the gun control cable to the gun control receptacle (2). Route the cable carefully around the robot arm to the controller to avoid damage to the cable.

Spring Closure Assembly

Connect a line supplying filtered shop air, 4.8–8.4 bar (70–120 psi) to the spring closure air inlet (1). If your application requires you to retrofit to the early-style air cap and spring, refer to the *Pro-Flo III Gun Air Cap Retrofit Procedures* instruction sheet shipped with the gun.

Material Cutoff Module (MCO)

Guns with the MCO option installed: Connect air supply lines carrying filtered shop air, 4.8–8.4 bar (70–120 psi), to the MCO extend air inlet (8) and MCO retract air inlet (7). For more detailed MCO installation procedures, refer to *Install the MCO* in the *Repair* section.

Nozzle

See Figure 3.

Contact a Nordson representative to select the correct nozzle (3) for your application. Place the nozzle nut (4) over the nozzle and tighten securely to the gun body.

Heater

Heaters are available in 120- and 240-volt line voltages. Use the following instructions to install a heater on the Pro-Flo III standard flow dispensing gun.

1. Remove the gun from the robot. Refer to *Remove the Gun from the Robot* in the *Repair* section.
2. See Figure 4.

   Align the heater (1) on the back of the gun body and tighten the screws (2).
3. Attach the heater cable to the receptacle (3).

   See Figure 23 in the *Parts* section for the heater kit wiring diagram.
4. Install the gun on the robot. Refer to *Install the Gun on the Robot* in the *Repair* section.

Heater *(contd)*

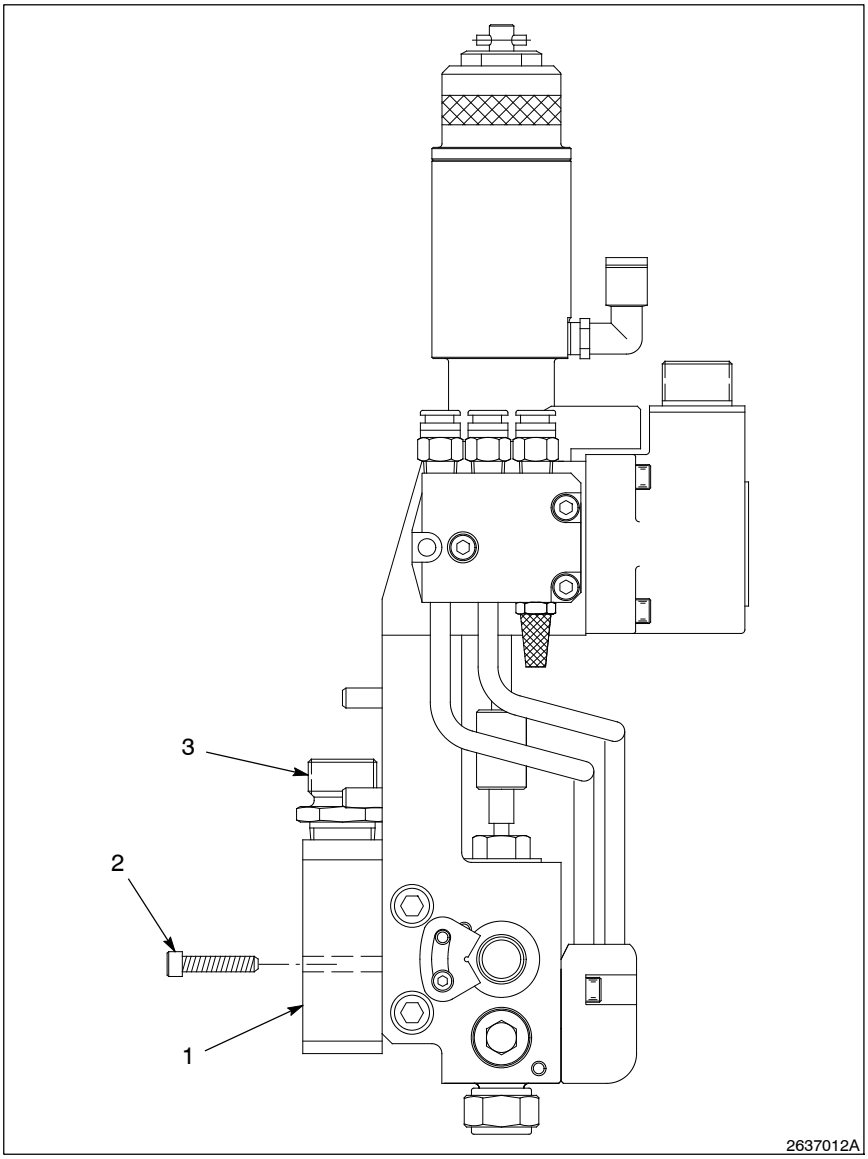

Fig. 4 Install a Heater

1. Heater
2. Screw
3. Receptacle

Temperature Conditioning Fittings

All non-heated Pro-Flo III standard flow dispensing guns are shipped with temperature conditioning fittings that may be installed at the customer's discretion. Follow these procedures to install the temperature conditioning fittings.

1. Remove the gun from the robot. Refer to *Remove the Gun from the Robot* in the *Repair* section.

NOTE: Both sides of the gun body have temperature conditioning ports. Remove the pipe plugs and install the temperature conditioning fittings in the ports opposite the material inlet fitting, to allow for clearance of the swivel and material supply hose.

2. See Figure 5.

   Remove the pipe plugs from the temperature conditioning ports (2) in the gun body (1).

3. Install the temperature conditioning fittings in the ports.

4. Install the gun on the robot. Refer to *Install the Gun on the Robot* in the *Repair* section.

5. Make the necessary fluid line connections from the temperature controller to the temperature conditioning fittings.

Temperature Conditioning Fittings *(contd)*

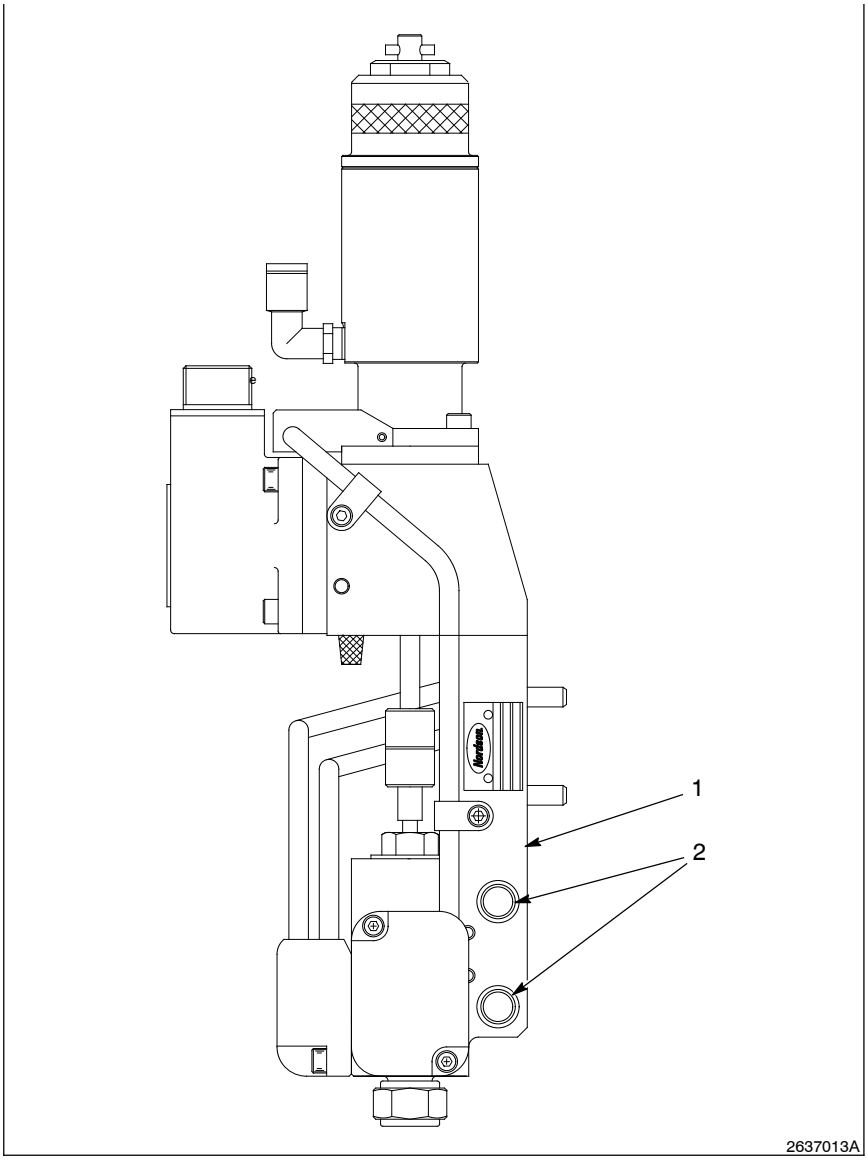

Fig. 5 Install the Temperature Conditioning Fittings

1. Gun body
2. Temperature conditioning ports

Pressure Transducer

Refer to *Pressure Transducer* in *Repair* for detailed procedures to install a pressure transducer and change pressure transducer cordset orientation.

5. Operation

Pro-Flo III standard flow dispensing gun operation is controlled by the Pro-Flo system controller.

Gun Purging

Purge the gun before operation to remove air from the material hose, trimset valve, and nozzle. To purge the gun,

1. Place a material waste container under the gun.
2. Initiate a purge from the Pro-Flo controller or robot controller.
3. Purge the gun until material flows freely from the nozzle.

Pressure Transducer Calibration

No calibration is needed.

6. Maintenance

Follow a preventive maintenance schedule to keep your Pro-Flo III standard flow dispensing gun operating efficiently.

Frequency	Component	Maintenance Task
Daily	Customer-supplied nozzle	Check the nozzle for wear and replace as needed.
	Cable connections	Check and secure all cable connections, as needed.
Weekly	Trimset cartridge	Check the trimset cartridge for leaks. Replace as needed.
	Cable connectors	Check the cable connectors for wear and replace as needed.
Periodically	Gun mounting	Check and secure the gun mounting, as needed.
	Cables	Check the cables for wear and replace as needed.
	Air supply line filter	Clean the air supply line filter.
	Pressure transducer	Remove and clean the pressure transducer.

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.

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.

Problem	Possible Cause	Corrective Action
1. Gun not dispensing material and not opening	Supply air pressure absent or low	Check the supply air pressure. Increase the air pressure if necessary.
	Stem binding	Remove the trimset cartridge. Check and replace the cartridge, if necessary.
	Pneumatic actuator malfunctioning	Replace the pneumatic actuator assembly.
	Spring closure not actuated	Check the air supply to the spring closure assembly, which requires a minimum of 4.8 bar (70 psi).
2. Gun not dispensing material but opens fully	Trimset cartridge blocked	Remove and clean the trimset cartridge.
	Material supply pressure low	Increase the material supply pressure.
	Nozzle blocked	Remove and clean the nozzle.
	Material supply hose blocked	Check and unblock material supply hose. Refer to *Clear a Blocked Material Supply Hose* in the *Repair* section.
3. Gun not changing dispensing rate to control bead size	Cordset damaged	Check the continuity of the cordset. Replace the cordset, if necessary. Refer to *Check Cable Continuity* in this section.
	Gun control or extension cable damaged	Check the continuity and replace the cables, if necessary.
	Analog signal malfunctioning	Refer to your controller manual for troubleshooting procedures.

Continued on next page

Problem	Possible Cause	Corrective Action
4. Gun not changing dispensing rate to control bead size but opens fully	Pressure transducer in controller malfunctioning	Check the pressure output voltage of the controller board. Replace the pressure transducer if necessary.
5. Gun continuing to dispense after cycle; controller indicating that gun is closed	Control air pressure low	Check the supply air pressure and increase, if necessary.
	Needle not seating due to contamination	Purge the gun.
	Stem and trimset valve seats worn	Replace the trimset cartridge.
6. Dispensing starting late	GUN ON signal from robot controller to Nordson controller timed improperly (digital controller only)	Set the proper timing sequence.
	Stem binding	Remove the trimset cartridge. Check and replace the trimset cartridge, if necessary.
7. Bead deposition wiggling	Nozzle too high above workpiece	Lower the nozzle.
	Material velocity through nozzle too high	Decrease the bead size or install a larger nozzle.
8. Bead size changing unexpectedly	Nozzle partially blocked	Clean the nozzle. Refer to *Clear a Blocked Nozzle* in the *Repair* section.
	Material has exceeded shelf life	Purge the gun and begin using new material.
9. Material leaking from bonnet	Trimset cartridge worn	Replace the trimset cartridge.
	Trimset cartridge loose	Tighten the trimset cartridge in the gun body to 27.1 N•m (20 ft-lb).

Continued on next page

7. Troubleshooting (contd)

Problem	Possible Cause	Corrective Action
10. Material drooling from gun after shutoff (guns with MCO only)	Air supply to MCO not connected	Connect air supply to MCO extend and retract the line.
	MCO piston stuck or seals leaking	Replace the MCO piston assembly.
11. Gun won't open fully	Needle does not pull completely out of the seat; upper and lower shafts not touching within coupling	Use this procedure to join the coupling shafts: 1. Unscrew the top portion of the spring closure assembly until the yellow band is fully visible. 2. Loosen the coupling screws and slide the coupling up the actuator shaft as far as it will go. 3. Pull the needle out of seat enough to touch actuator shaft. 4. Reinstall the coupling by sliding it down until it hits the shoulder on the lower shaft. Tighten the coupling screws to 0.9–1.1 N•m (8–10 in.-lb). Reinstall the spring closure assembly.

Checking Cable Continuity

See Figure 6 and refer to Table 1.

1. Remove the pressure transducer cover and unplug the cordset.
2. Disconnect the gun control cable from the gun.
3. Using an ohmmeter, check the continuity of each wire from the cordset plug to the gun control cable receptacle.
4. Replace the cordset if the wiring is not continuous.

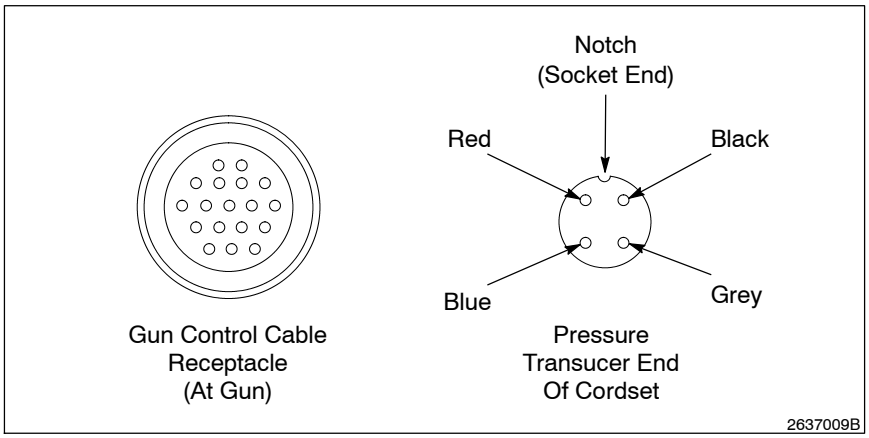

Fig. 6 Wiring Continuity

Table 1 Wire Connections on Cordset

Gun Control Cable Receptacle Pin	Pressure Transducer Cordset Plug	Wire Color
K	45° counterclockwise from notch	Red
M	135° counterclockwise from notch	Blue
L	135° clockwise from notch	Gray
J	45° clockwise from notch	Black

8. Repair

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

This section contains detailed disassembly and repair instructions for the Pro-Flo III standard flow dispensing gun. Follow the necessary procedures to remove the gun from operation, replace various components, and check and clear material blockages.

Material Blockages

The following procedures detail how to clear material blockages from nozzles and from material supply hoses.

Clear a Blocked Nozzle

Use the following procedures to clear a blocked nozzle.

1. Shut off the air pressure to the drum unloader.
2. Bleed off the residual pressure using the pressure relief valve in the material supply line. The valve is located on the drum unloader pump body.
3. Shut off and lock out all power to the system.
4. See Figure 7.

   Remove the nozzle nut (4) and nozzle (3).
5. Clean the nozzle thoroughly with an appropriate solvent.
6. Install the nozzle and secure in place with the nozzle nut.

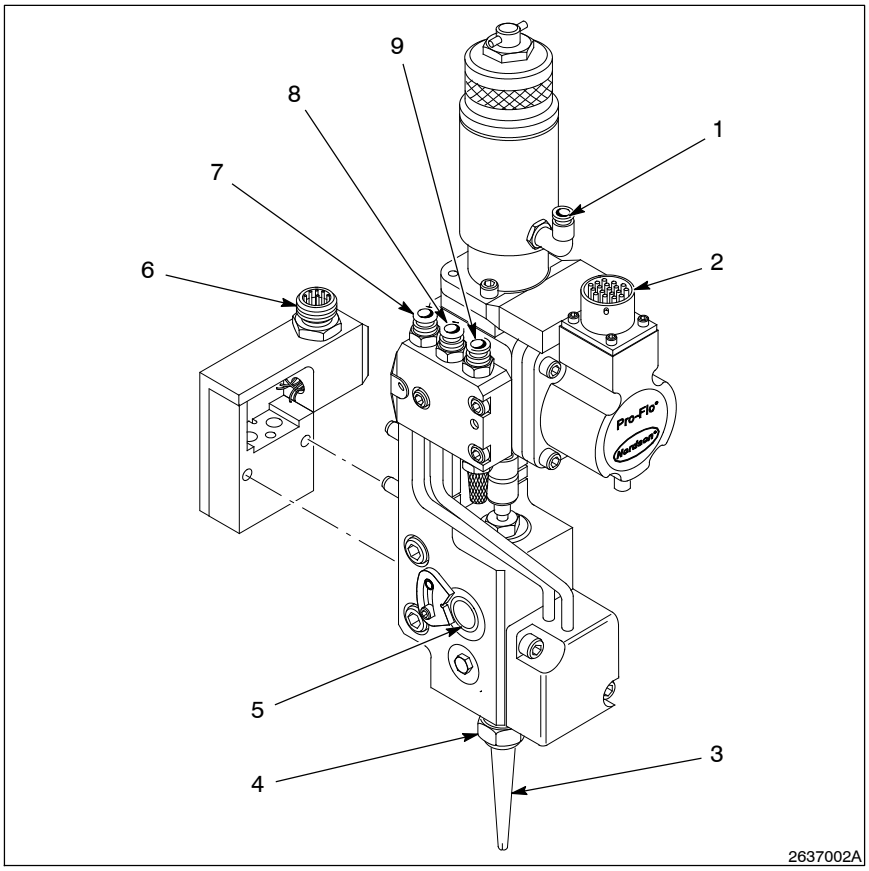

Fig. 7 Pro-Flo III Standard Dispensing Gun Basic Repair

1. Spring closure air inlet
2. Gun control receptacle
3. Customer-supplied nozzle
4. Nozzle nut
5. Material inlet
6. Heater receptacle
7. MCO retract air inlet
8. MCO extend air inlet
9. Control air inlet

Clear a Blocked Material Supply Hose

Use the following procedures to clear a blocked material supply hose.

NOTE: When clearing a blocked material supply hose, start at the drum unloader and work toward the gun. Repeat the procedure for each connection in the material supply hose.

1. Shut off the air pressure to the drum unloader.
2. Bleed off the residual pressure using the pressure relief valve in the material supply line. The valve is located near the drum unloader.
3. Disconnect the material supply hose.
4. Turn on the drum unloader and check the flow.
   a. If the flow is good, turn off the drum unloader and relieve the system pressure. Reconnect the hose. Repeat steps 1 through 4 as needed for the next connection.
   b. If the flow is not good, turn off the drum unloader and relieve the system pressure. Remove the hose and clear the blockage or replace. Reconnect the hose.

Gun-to-Robot Connections

The following sections detail the gun-to-robot connections. Follow these procedures, as necessary, to remove and install the gun to the robot adapter.

Remove the Gun from the Robot

It may be necessary to remove the gun from the robot for repairs. To remove the gun from the robot, follow these steps:

1. Shut off the drum unloader.
2. Purge the gun to relieve the pressure in the hose and gun.
3. Shut off and lock out all power to the system.
4. See Figure 7.

   Disconnect the material supply hose from the material inlet (5).
5. Mark the control air inlet tubing and disconnect it from the control air inlet (9) on the air manifold.
6. If the gun has an MCO, disconnect the MCO retract air (labeled B) (7) and MCO extend air (labeled A) (8) supply lines from the air manifold.

7. Disconnect the gun control cable from the gun control receptacle (2).

8. If the gun has the spring closure option, disconnect the air supply tubing from the spring closure air inlet (1).

9. If the gun is equipped with a heater, disconnect the heater cable from the heater receptacle (6).

   Or, if the gun is equipped with temperature conditioning fittings, remove the temperature conditioning supply lines.

10. Remove the two bolts securing the gun to the robot arm adapter.

Install the Gun on the Robot

Use the following procedures to install the gun to the robot.

1. Mount the gun on the robot arm adapter. Secure with the two $^{1}/_{4}$-20 screws and tighten to 8.5 N•m (75 in.-lb).

2. See Figure 7.

   Connect the material supply hose to the material inlet (5) on the gun.

3. Connect the gun control cable to the gun control receptacle (2).

4. Connect the control air supply line to the air manifold control air inlet (9).

5. If the gun has an MCO, connect the MCO retract air (7) and extend air (8) supply lines to the air manifold.

6. If the gun has the spring closure option, connect the air supply tubing to the spring closure air inlet (1).

7. If the gun is equipped with a heater, connect the heater cable to the heater receptacle (6).

   Or, if the gun is equipped with temperature conditioning fittings, reinstall the temperature conditioning supply lines.

8. Turn on the drum unloader and check for leaks in the hose and fittings.

9. Purge the gun to remove air from the hoses and gun.

Trimset Cartridge

The following section provides procedures to replace the trimset cartridge in your Pro-Flo III standard flow dispensing gun.

Remove the Trimset Cartridge

Follow these procedures to remove the trimset cartridge from the gun body.

NOTE: Be sure to note whether your gun is equipped with a spring closure assembly or with an air cap and spring. Follow the correct procedures based on gun type.

1. Shut off the drum unloader.

2. Purge the gun to relieve the pressure in the hose and gun.

3. Shut off and lock out all power to the system.

NOTE: Be careful not to let the spring closure assembly come off the gun.

4. See Figure 8.

   Guns with Spring Closure Assembly: Unscrew the knurled cap (2) to reveal the entire yellow band (1). Make sure that the threads are fully disengaged.

   Guns with Air Cap and Spring: Remove the screws (4), air cap (3), and spring (5).

5. Using a 2.5-mm hex key, loosen but do not remove the four set screws (9) in the coupling (8).

6. Slide the coupling and upper shaft (7) all the way up until they both bottom out in the actuator frame.

7. Using a $^{5}/_{8}$ open-end wrench, loosen and remove the trimset cartridge (12) from the lower portion of the gun body (6).

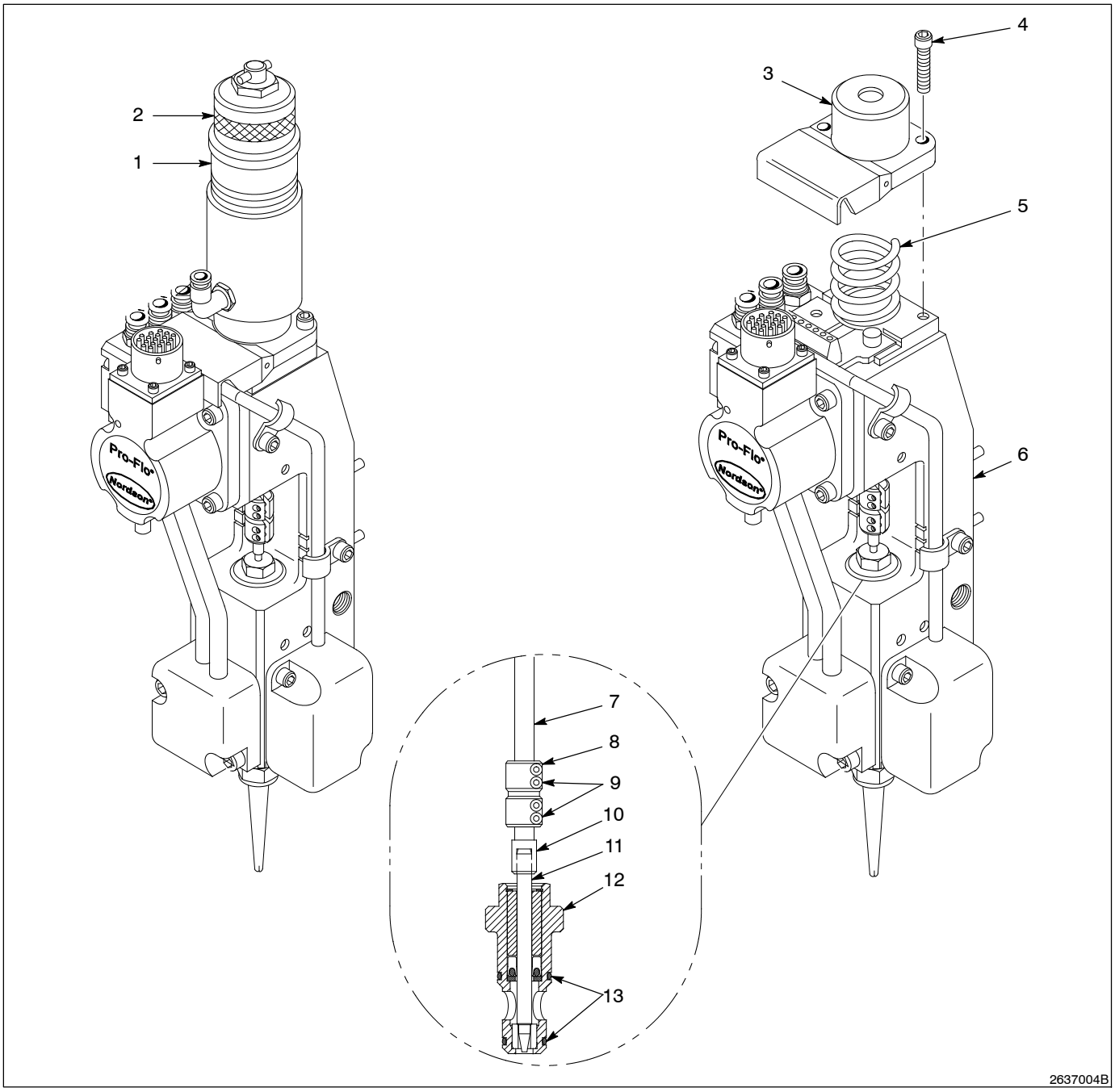

Fig. 8 Replace the Trimset Cartridge

1. Yellow band
2. Knurled cap (spring closure assembly)
3. Air cap
4. Screws
5. Spring
6. Gun body (lower portion)
7. Upper shaft
8. Coupling
9. Set screws
10. Shoulder
11. Needle shaft
12. Trimset cartridge
13. O-rings

Install the Trimset Cartridge

See Figure 8.

Follow these procedures to install a new trimset cartridge in the gun body.

1. Lubricate all external O-rings (13) on the trimset cartridge (12) with O-ring lubricant.

2. Using a $^{5}/_{8}$ open-end wrench, reinstall the trimset cartridge in the lower portion of the gun body (6). Tighten the trimset cartridge to a torque of 27.1 N•m (20 ft-lb).

WARNING: Make sure the knurled cap is fully threaded into the spring closure assembly before re-applying air to the gun. The yellow band must not be visible after the following step. Failure to observe this warning may result in equipment damage or personal injury.

3. **Guns with Spring Closure Assembly**: Re-engage the threads and screw the knurled cap of the spring closure (2) down until it bottoms out hand tight. Be sure that the yellow band is completely hidden by threading the spring closure in all the way.

   Guns with Air Cap and Spring: Install the spring (5) and air cap (3). Tighten the screws (4).

4. Lower the upper shaft (7) until it fully contacts the trimset needle shaft (11).

5. Push the coupling (8) down until it bottoms on the shoulder (10) of the needle shaft.

6. Tighten the set screws (9) to 0.9–1.1 N•m (8–10 in-lb).

7. Turn on the drum unloader and check for leaks in the hose and fittings.

8. Purge the gun to remove air from the hoses and gun.

Spring Closure Assembly

Follow these procedures to remove and replace the spring closure assembly.

1. Shut off the drum unloader.
2. Purge the gun to relieve the pressure in the hose and gun.
3. Shut off and lock out all power to the system.
4. See Figure 9.

   Disconnect the air supply hose from the spring closure air inlet (4).
5. Remove the screws (2) that secure the spring closure assembly (1) to the gun body (3).
6. Remove the spring closure assembly.
7. Install a new spring closure assembly on the gun body.
8. Tighten the screws to 6.2–6.8 N•m (55–60 in-lb).
9. Reattach the air supply hose to the spring closure assembly air inlet.
10. Turn on the drum unloader and check for leaks in the hose and fittings.

Spring Closure Assembly

(contd)

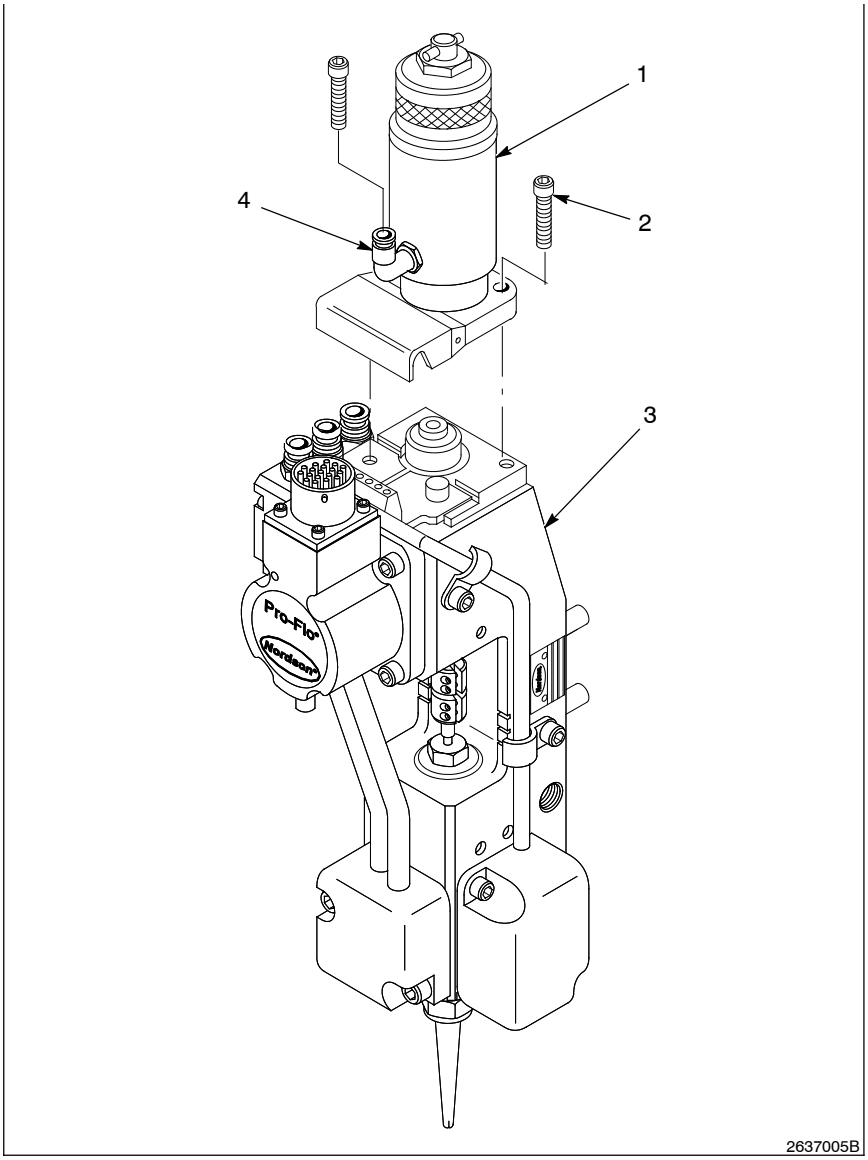

Fig. 9 Replace the Spring Closure Assembly

1. Spring closure assembly
2. Screws
3. Gun body
4. Spring closure air inlet

Pressure Transducer

This section provides information about the pressure transducer and cordset used with the Pro-Flo III standard flow dispensing gun. This section describes how to:

- replace the pressure transducer
- replace the cordset
- change the cordset orientation

Replace the Pressure Transducer

The pressure transducer is available in several pressure ratings. Refer to the *Parts* section for the part number corresponding to your pressure transducer.

1. See Figure 10.

   Using a 4-mm hex key, remove the screws (4) and remove the pressure transducer cover (3).

2. Unscrew the cordset plug (5).

3. Using a $^{7}/_{16}$ open-end wrench, remove the pressure transducer (2) and O-ring (1) from the gun body.

4. Coat the pressure transducer O-ring with O-ring lubricant. The new pressure transducer will have the O-ring already installed.

5. Install and tighten the new pressure transducer and O-ring.

6. Connect the cordset plug.

7. Replace the pressure transducer cover and secure with the screws.

Replace the Pressure Transducer (contd)

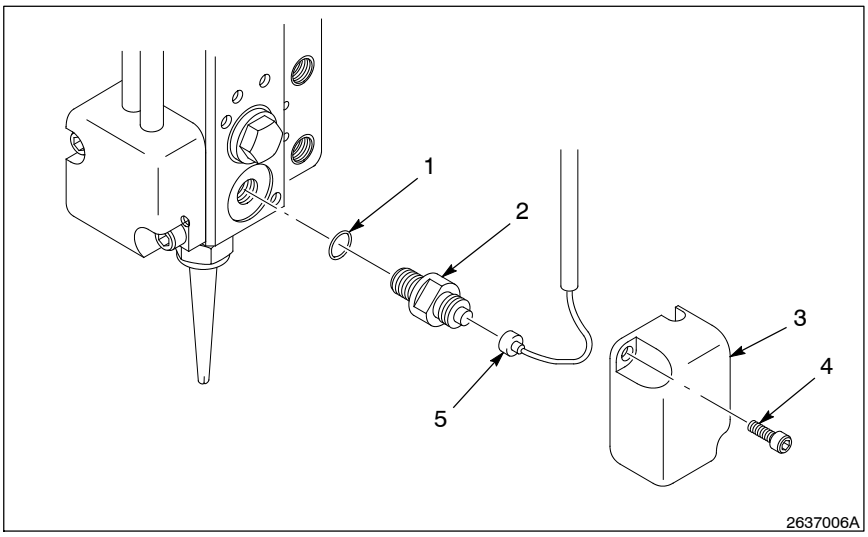

Fig. 10 Replace the Pressure Transducer

1. O-ring
2. Pressure transducer
3. Pressure transducer cover
4. Screw
5. Cordset plug

Replace the Cordset

NOTE: See Figure 12 for the cordset wiring diagram.

Use the following procedures to replace the pressure transducer cordset.

1. Remove the gun from the robot. *Refer to Remove the Gun from the Robot* in this section.

2. See Figure 11.

   Remove the screws (1) and remove the spring closure assembly (2).

3. Loosen the terminal block (3) set screws that secure the four colored wires from the cordset (7).

4. Remove the cordset and its wires from the terminal block.

5. Remove the screws (11) securing the pressure transducer cover (10).

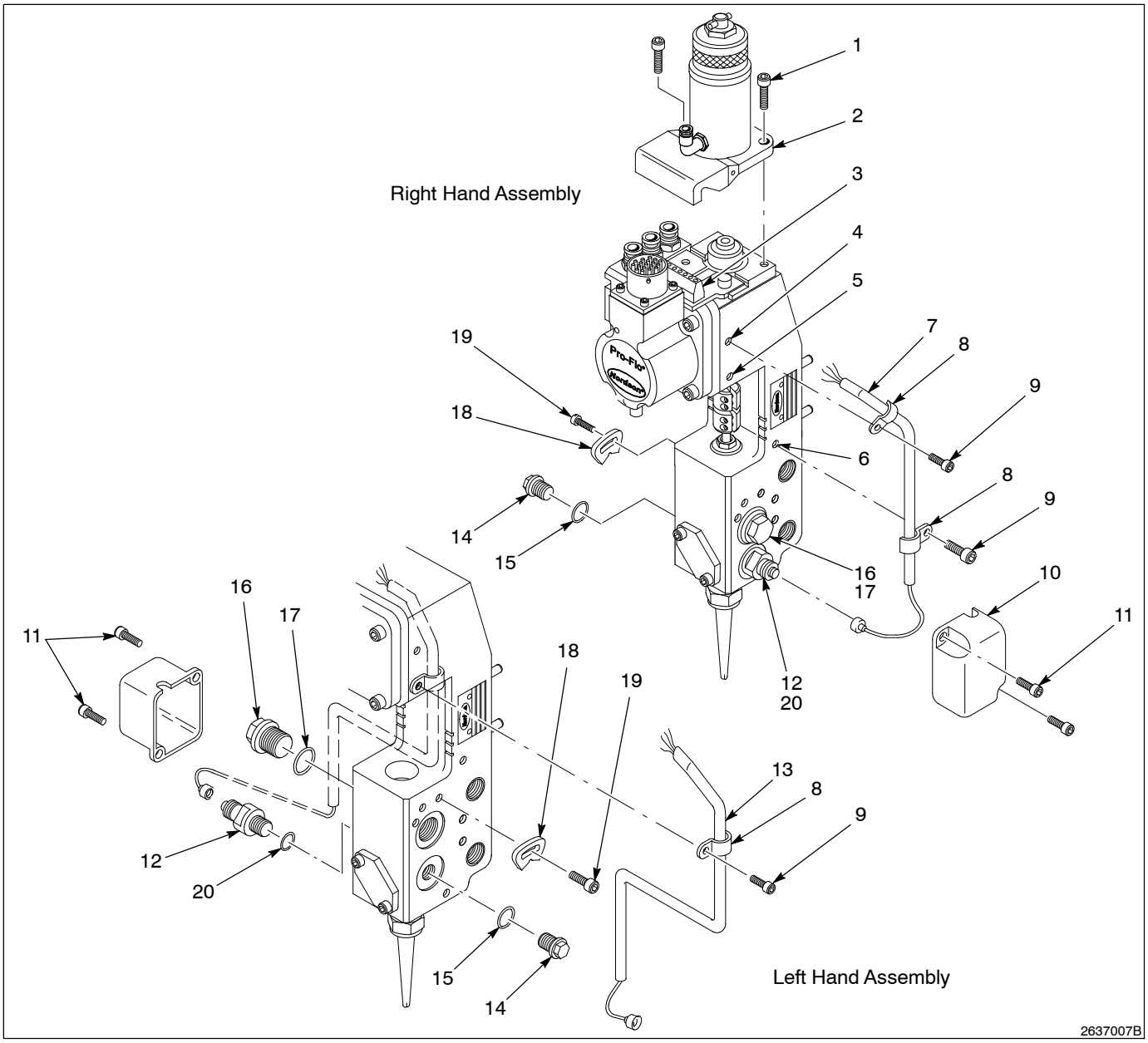

Fig. 11 Replace or Change the Pressure Transducer Cordset

1. Screw
2. Spring closure assembly
3. Terminal block
4. Mounting hole for left- and right-handed cordset
5. Mounting for left-handed cordset
6. Mounting for right-handed cordset
7. Right-handed cordset
8. Clamp
9. Screw
10. Pressure transducer cover
11. Screw
12. Pressure transducer
13. Left-handed cordset
14. Trimset plug
15. O-ring
16. Trimset plug
17. O-ring
18. Swivel lock
19. Screw
20. O-ring

Note: The mounting holes (items 4, 5, and 6) are shown for visual reference only.

Replace the Cordset *(contd)*

6. Unplug the cordset from the pressure transducer (12).
7. Remove the screws (9) securing the cordset clamps (8).
8. Install the wires of the new cordset in the proper terminal block slots and tighten the screws.
9. Mount the new cordset and loosely install the cordset clamps and screws.
10. Connect the cordset plug to the pressure transducer and replace the pressure transducer cover and screws.
11. Replace and tighten the spring closure assembly and screws.
12. Align the cordset and tighten the cordset set screws to 6.2–6.8 N•m (55–60 in-lb).
13. Install the gun on the robot. Refer to *Install the Gun on the Robot* in this section.

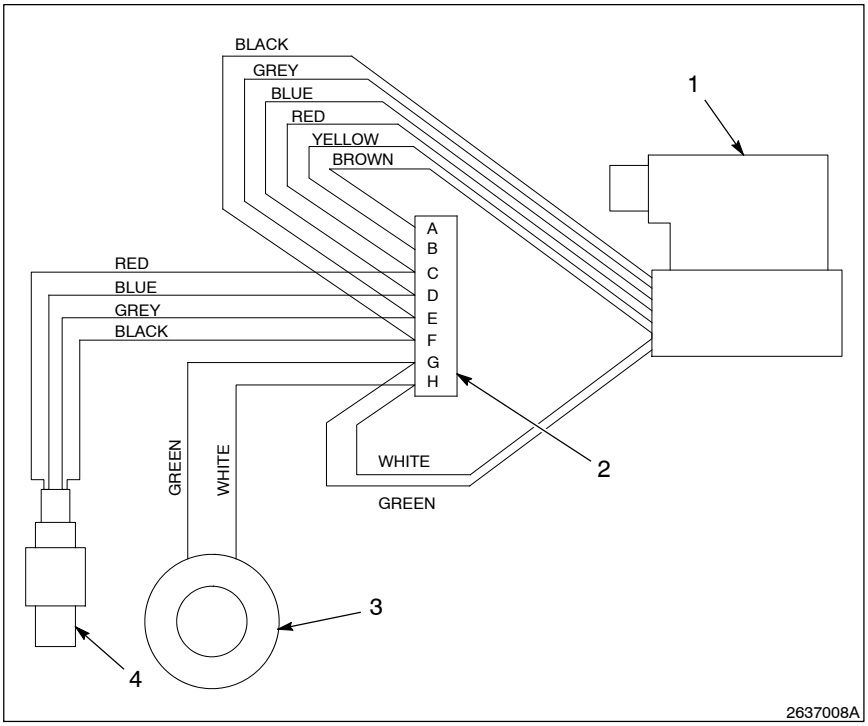

Fig. 12 Cordset Wiring

1. Gun
2. Terminal block
3. Coil
4. Pressure transducer

Note: The terminal block (item 2) and coil (item 3) are shown for visual reference only.

Change the Cordset Wiring Orientation

The pressure transducer cordset is available in a right- and left-hand orientation. To change from a right-handed orientation to a left-handed orientation, follow these steps:

1. Remove the gun from the robot. Refer to *Remove the Gun from the Robot* in this section.

2. Remove the pressure transducer cordset, as detailed in steps 1–7 of *Replace the Cordset* in this section.

3. See Figure 11.

   Loosen and remove the following items from one side of the gun and replace them on the opposite side of the gun:

   - trimset plugs (14,16) and O-rings (15, 17)
   - swivel lock (18) and screw (19)
   - material supply fitting (not illustrated)
   - pressure transducer (12) and O-ring (20)

4. Install the wires of the left-handed cordset (13) in the proper terminal block (3) slots and tighten the screws.

5. Mount the new cordset and loosely install the cordset clamps (8) and screws (9).

6. Connect the cordset plug to the pressure transducer and replace the pressure transducer cover (10) and screws (11).

7. Replace and tighten the spring closure assembly (2) and screws (1) to 6.2–6.8 N•m (55–60 in-lb).

8. Align the left-handed cordset and tighten the cordset clamps (8).

9. Install the gun on the robot. Refer to *Install the Gun on the Robot* in this section.

Material Cutoff Module

The following section provides repair procedures for Pro-Flo III standard flow dispensing guns equipped with a material cutoff module (MCO). The MCO provides precise cutoff of dispensed materials in Pro-Flo system applications.

The following paragraphs are instructions for installing or replacing the material cutoff module, including removing the MCO plug, removing an existing MCO, and installing a new MCO.

Remove the MCO Plug

To install an MCO for the first time, follow these steps to remove the MCO plug:

1. See Figure 13.

   Remove the screws (5) in the MCO plug (4).

2. Remove the plug and O-ring (3) from the gun body.

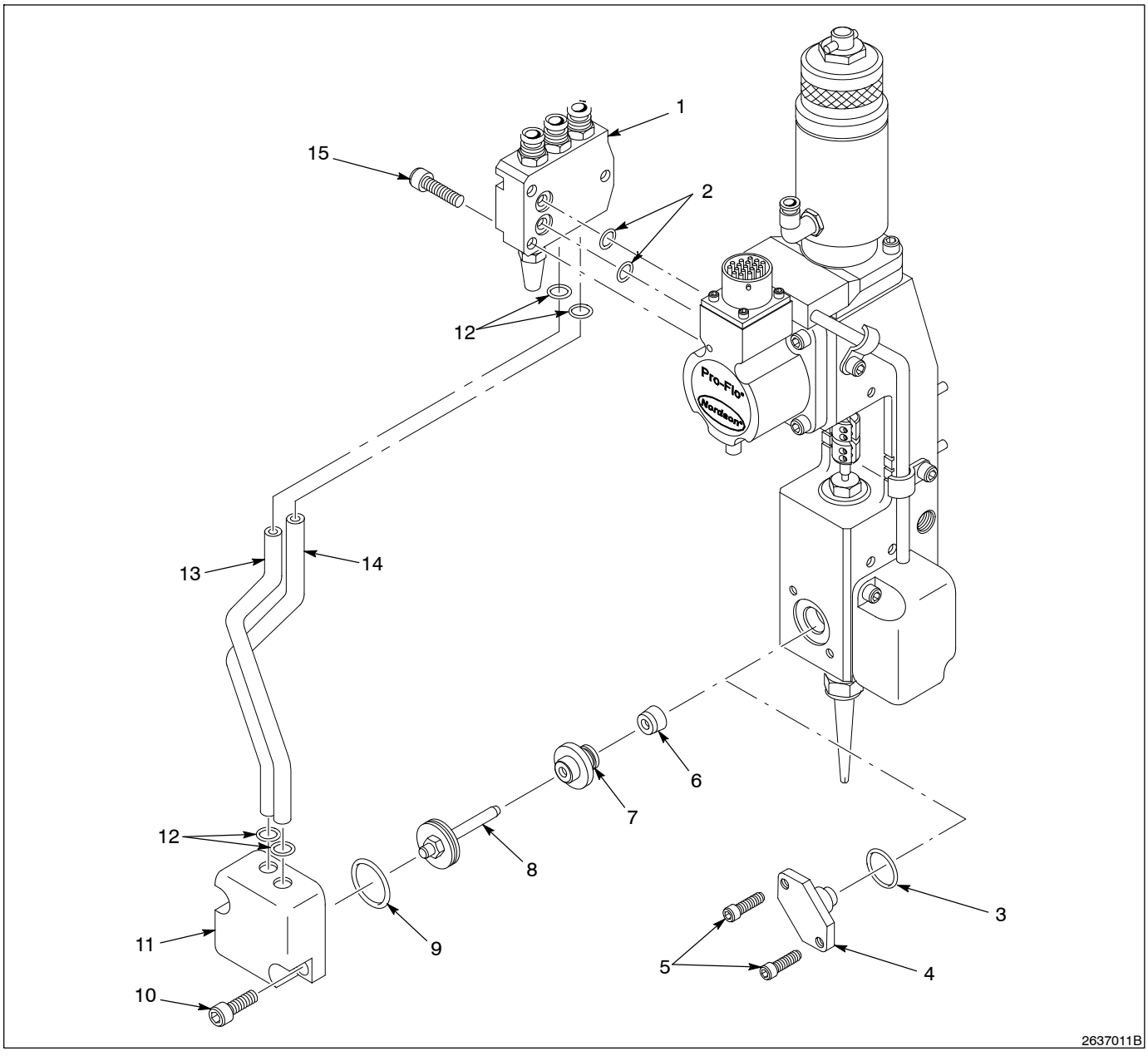

Fig. 13 Replace the MCO Assembly

1. Air manifold
2. Manifold O-rings
3. O-ring
4. Plug
5. Screw
6. MCO seal
7. Seal housing
8. MCO piston
9. O-ring
10. Screw
11. MCO housing
12. Air line O-ring
13. MCO extend air line
14. MCO retract air line
15. Screw

Remove the MCO

Follow these procedures to remove the MCO from the gun body.

1. Remove the gun from the robot. Refer to *Remove the Gun from the Robot* in this section.

2. See Figure 13.

   Remove the screws (15) securing the air manifold (1) to the gun body. Remove the air manifold and air manifold O-rings (2) from the gun body.

3. Remove the MCO extend (13) and retract air lines (14) and the upper air line O-rings (12) from the air manifold.

4. Loosen the screws (10) and remove the MCO housing (11).

5. Remove the extend and retract air lines and the lower air line O-rings (12) from the MCO housing.

6. Remove the MCO piston (8) from the gun body.

7. Remove the MCO seal (6) and seal housing (7) from the gun body.

8. Remove dispensing material from the trimset cavity using a clean, lint-free cloth.

Install the MCO

Follow these procedures to install a new MCO piston, the MCO housing, and the air manifold to the gun body.

1. See Figure 13.

   Install the MCO seal (6) in the gun body with the flared edge inward.

2. Push the seal housing (7) into the gun body.

3. Lubricate the O-ring (9) with O-ring lubricant and place it on the seal housing.

4. Coat the glide ring and shaft of the MCO piston (8) with O-ring lubricant and push the piston shaft into the seal housing until it bottoms.

5. Reinstall the MCO housing (11) on the gun body and tighten the screws (10) to 6.2–6.8 N•m (55–60 in.-lb).

6. Coat both ends of the extend (13) and retract (14) air lines and the air line O-rings (12) with O-ring lubricant. With the O-rings in place, insert the air lines in the air manifold (1) and MCO housing.

7. Lubricate the manifold O-rings (2). Install the O-rings and tighten the screws (15) to secure the air manifold (1) to the actuator.

8. Install the gun on the robot. Refer to *Install the Gun on the Robot* in this section.

9. Parts

To order parts, call the Nordson Customer Service Center or your local Nordson representative. Use the 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 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 0000	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.

Gun Options

Refer to Table 1 and to the corresponding parts lists in this section for ordering information.

NOTE: Heater kits are ordered separately. For more information, refer to *Heater Kits* in this section.

Table 1 Gun Options

		100 8390	100 8392	100 8393	100 8394	100 8395	100 8396	100 8397	100 8398	322 920	327 497
Pneumatic Actuator		X	X	X	X	X	X	X	X	X	X
Misc Parts		X	X	X	X	X	X	X	X	X	X
Air Manifold		X	X	X	X	X	X	X	X	X	X
Spring Closure		X	X	X	X	X	X	X	X	X	X
Transducer Cordset	**Right-Hand**	X	X	X	X						X
	Left-Hand					X	X	X	X	X	
Trimset Cartridge	**Poly**	X			X	X			X	X	X
	Peek		X	X			X	X			
Material Cutoff Modules	**Port Plug**	X		X		X		X			
	Poly Port									X	X
	Peek Port		X				X				
	Optional H200 Adapter Kit				A				A		
	Optional Auto-Flo Adapter Kit				A				A		
Temp Cond Fittings		X			X	X			X	X	X
Heater Kit Required			X	X			X	X			

NOTE A: Optional adapter kits mount either Auto-Flo or H200 guns to the Pro-Flo III standard flow dispensing gun. Order these kits separately.

Pneumatic Actuator

See Figure 14.

Following are the parts in the pneumatic actuator service kit and miscellaneous gun parts.

Item	Part	Description	Quantity	Note
—	322 777	Kit, service, actuator, Pro-Flo III	1	
1	982 028	• Screw, socket, M5 x 20, black	6	
2	- - - - - -	• Frame, gun, Pro-Flo III	1	
3	327 545	• Coupling, clamp, $^1/_4$-in. bore	1	
4	982 028	• Screw, socket, M5 x 12, black	2	A
5	- - - - - -	• Valve, servo, 18 p, Pro-Flo	1	
6	- - - - - -	• Board, with junction block, 8-pin	1	
7	940 101	• O-ring, Viton, 0.239 ID x 0.070 wide, brown	4	
8	973 402	• Plug, pipe, socket, flush, $^1/_8$, zinc	1	
NS	900 349	• Lubricant, TFE grease, 0.75-oz tube	AR	
9	152 444	Clamp, tube, Pro-Flo	2	
10	152 290	Nut, retaining	1	B
11	247 642	Plug, O-ring, straight thread, $^3/_8$-24	1	
12	100 3182	Connector, nozzle, Pro-Flo, $^3/_8$ NPSM, breakaway	1	
13	156 208	Key, locking swivel	1	

NOTE A: A total of five socket screws, part 982 372, are used with the actuator body, the locking swivel key, and the pressure transducer cordset tube clamps. The actuator service kit only includes two screws. Order additional screws, as necessary.

B: Shipped with the gun.

AR: As Required

NS: Not Shown

Pneumatic Actuator *(contd)*

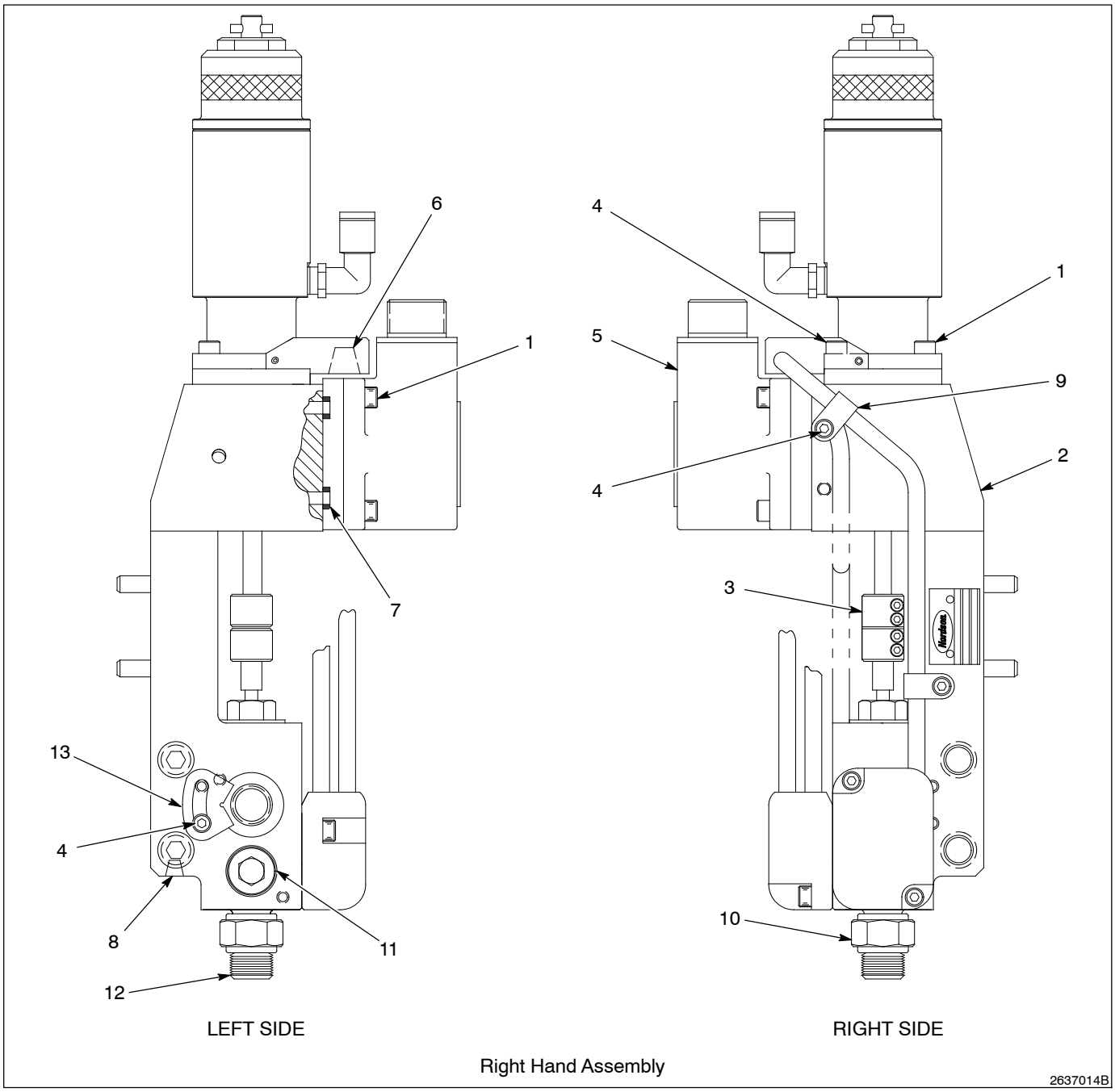

Fig. 14 Pneumatic Actuator

Temperature Conditioning Fittings

These fittings, shipped with all unheated guns, are used for temperature conditioning.

Item	Part	Description	Quantity	Note
NS	971 266	Elbow, male, $^1/_4$ tube x $^1/_4$ NPT	2	
NS: Not Shown				

Miscellaneous Parts and Ship-With Items

See Figure 15.

Following are the extra parts shipped with the gun.

Item	Part	Description	Quantity	Note
—	322 755	Kit, ship with, cover, Pro-Flo III	1	
1	- - - - - -	• Cover, spring, Pro-Flo	1	
2	987 071	• Spring, comp, 1.50 x 1.10 x 0.085	1	
3	973 411	Plug, pipe, socket, flush, $^1/_4$, zinc	4	

***Miscellaneous Parts and Ship-With Items** (contd)*

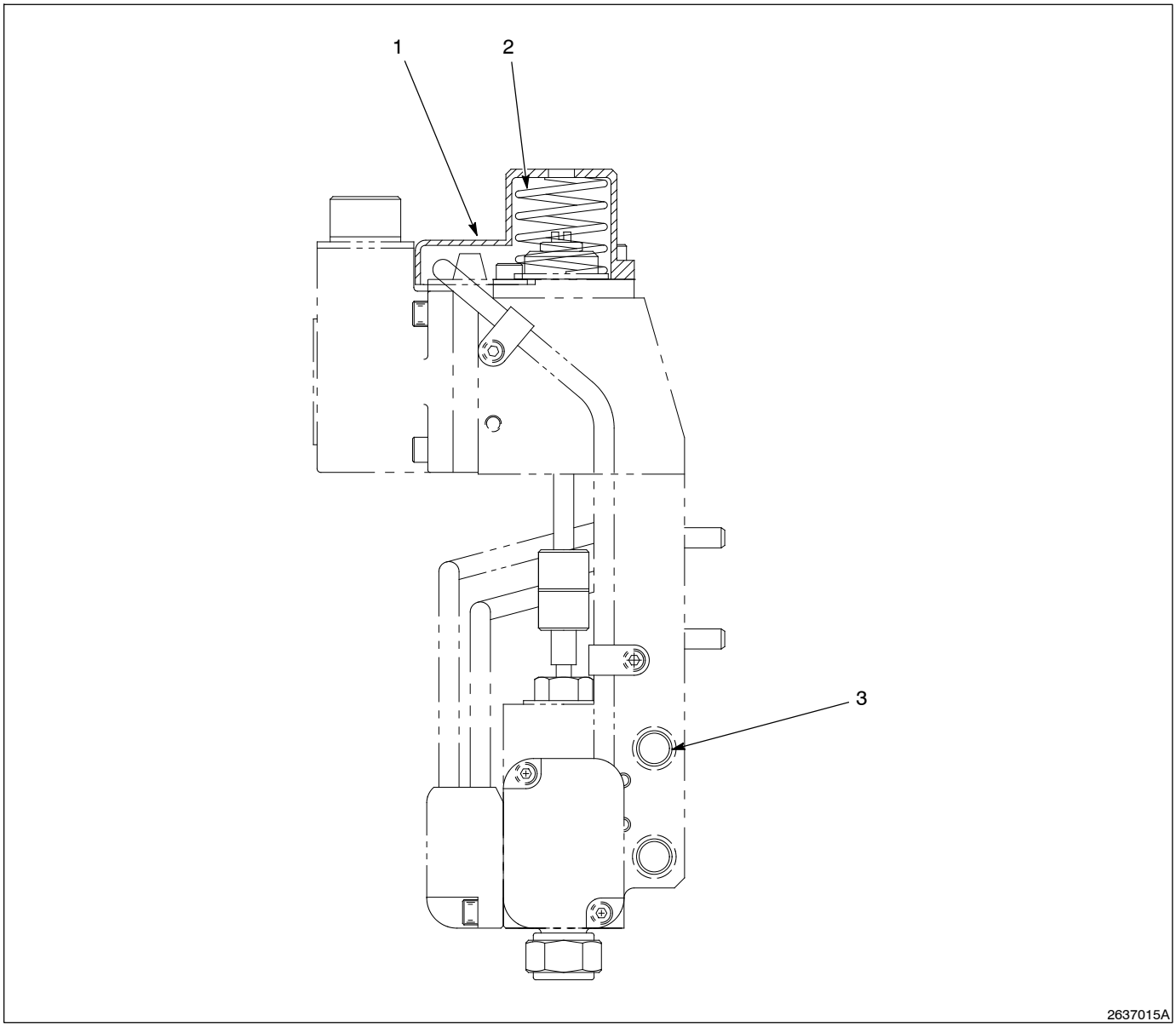

Fig. 15 Miscellaneous Parts and Ship-With Items

Air Manifold

See Figure 16.

Following are the parts for the air manifold.

Item	Part	Description	Quantity	Note
—	- - - - - -	Module, manifold, Pro-Flo, extrude	1	
1	972 716	• Connector, male, $^1/_4$ tube x $^1/_8$ NPT	3	
2	940 101	• O-ring, Viton, 0.239 ID x 0.070 wide, brown	2	
3	241 040	• Muffler, air $^1/_8$ NPT	1	A
4	982 028	• Screw, socket, M5 x 20, black	3	
5	152 388	• Manifold, air, Pro-Flo	1	
NS	900 236	• Sealant, paste, PTFE	AR	

NOTE A: Apply sealant paste, part 900 236.
AR: As Required
NS: Not Shown

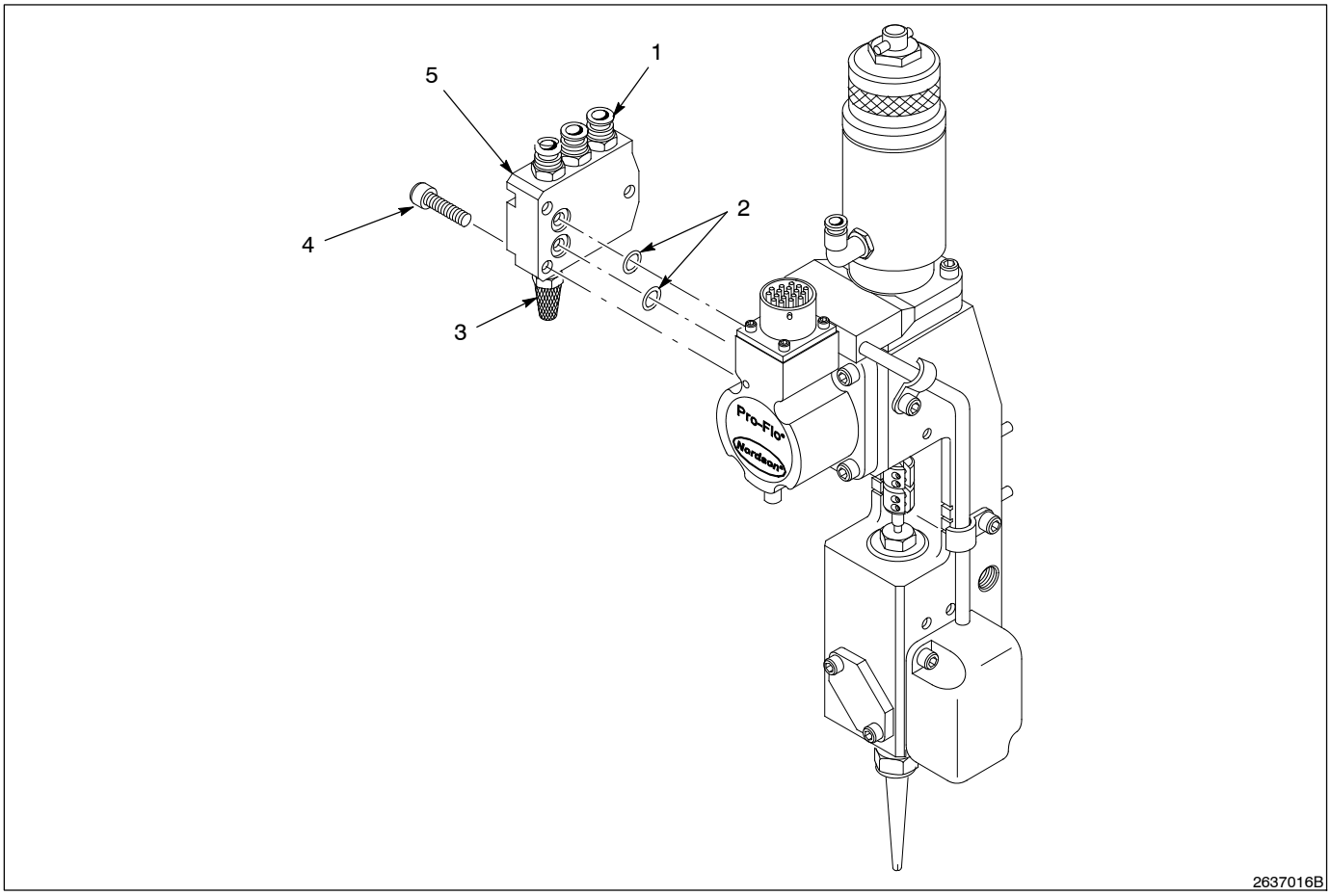

Fig. 16 Air Manifold

Spring Closure Assembly

See Figure 17.

The spring closure assembly is not serviceable. Order a new spring closure assembly, as required.

Item	Part	Description	Quantity	Note
—	322 774	Kit, service, spring closure, Pro-Flo III	1	
1	- - - - - -	• Module, spring closure	1	
2	982 028	Screw, socket, M5 x 20, black	2	A
NOTE A: Replacement screws are not included in the spring closure service kit. Order new screws as needed.				

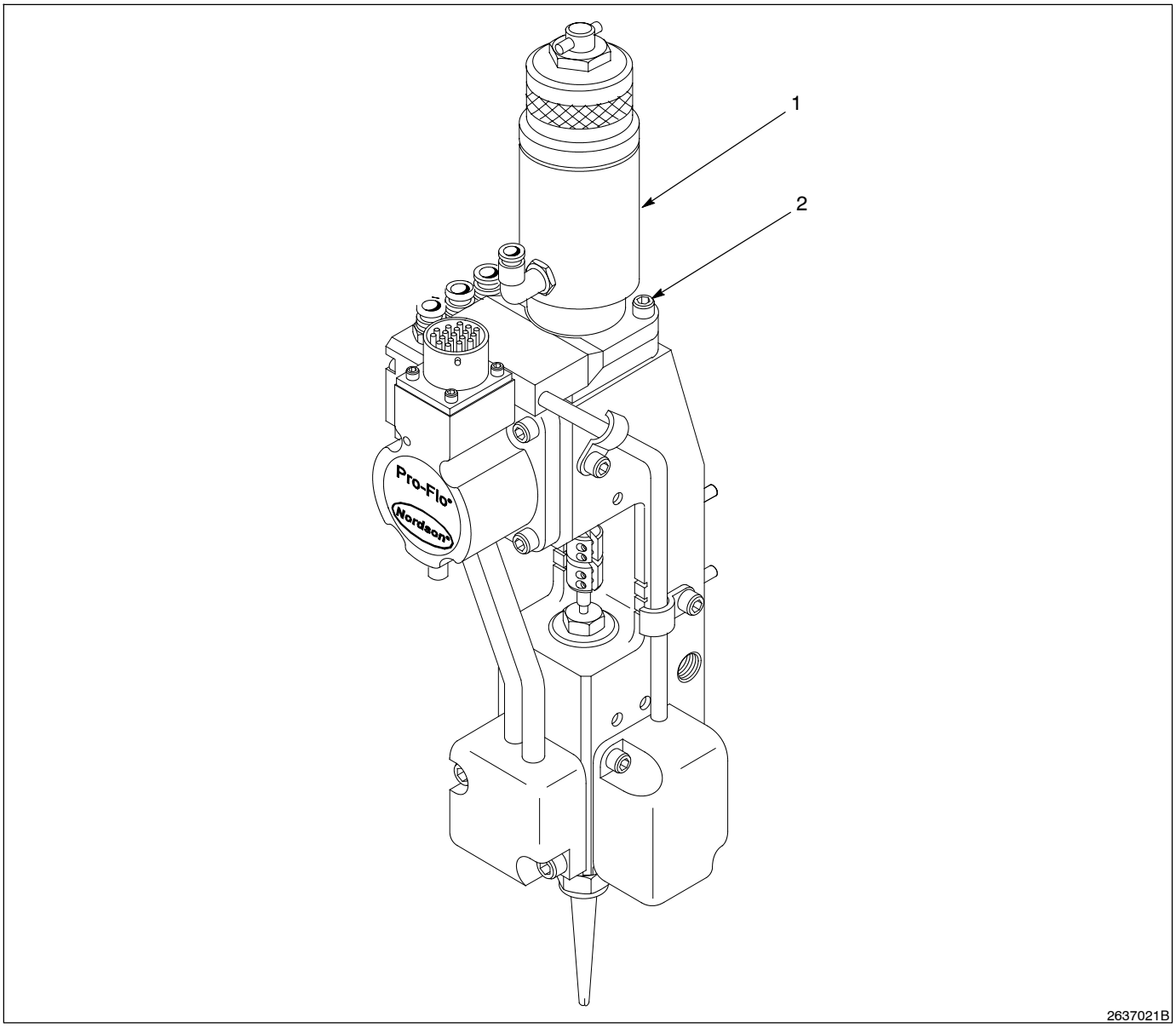

Fig. 17 Spring Closure Assembly

Trimset Cartridges

See Figure 18.

Following are the trimset cartridges available for the Pro-Flo III guns.

Item	Part	Part	Description	Quantity	Note
1	322 917		Kit, service, trimset, 200/2k, polymyte	1	
1		322 918	Kit, service, trimset, 200/2k, peek	1	
NS	900 349	900 349	• Lubricant, TFE grease, 0.75 oz tube	AR	A

NOTE A: Lubricate the packing cartridge before installing a new one in the actuator frame.
AR: As Required
NS: Not Shown

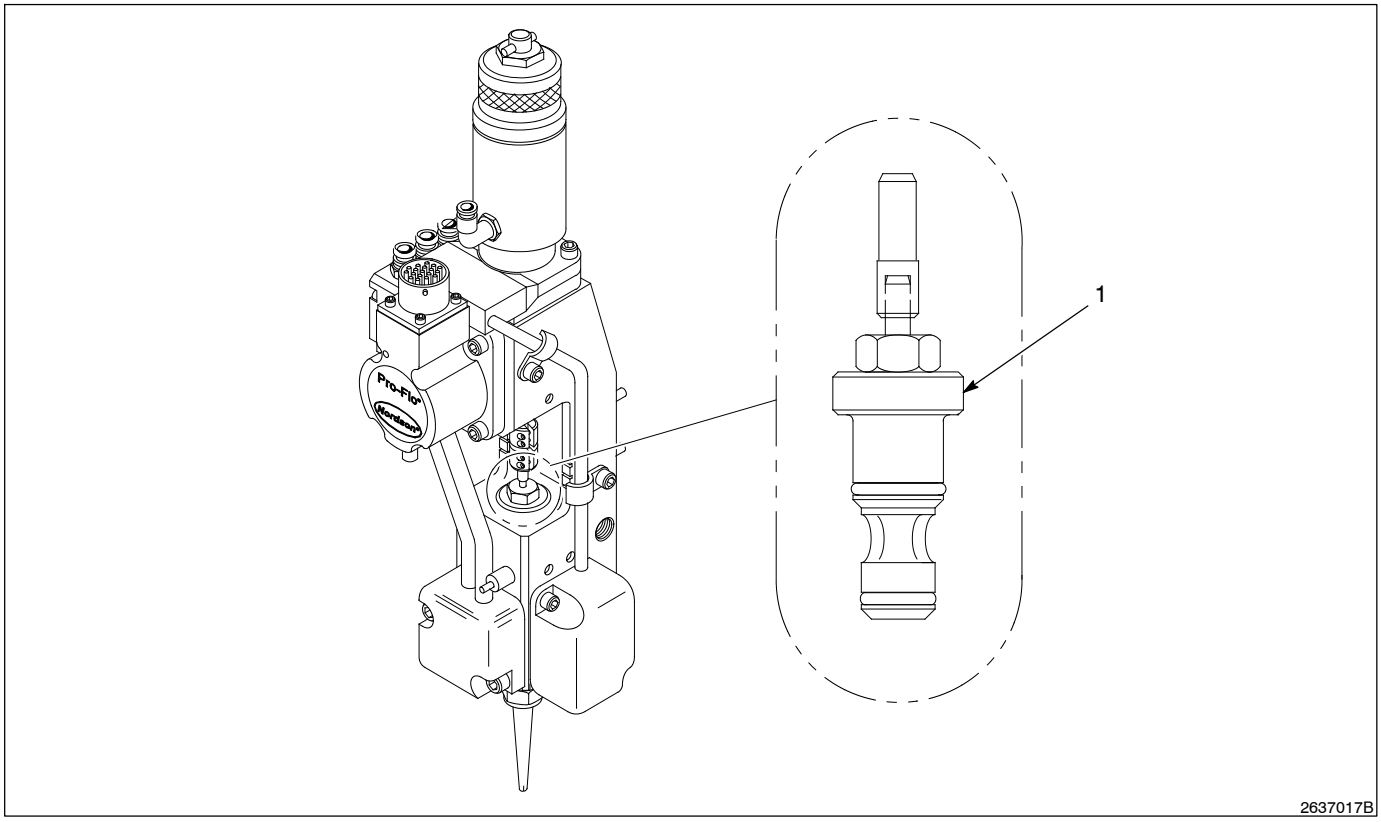

Fig. 18 Trimset Cartridges

Material Cutoff Modules (MCOs)

Following are the various material cutoff modules available for the Pro-Flo III gun.

No MCO (Port Plug)

See Figure 19.

Item	Part	Description	Quantity	Note
—	- - - - - -	Module, plug, MCO port, Pro-Flo III, extrude	1	
1	982 166	• Screw, socket, M5 x 16, black	2	
2	158 990	• Plug, MCO, Pro-Flo	1	
3	940 111	• O-ring, Viton, 0.301 ID x 0.070 wide, brown	1	A
NS	900 349	• Lubricant, TFE grease, 0.75-oz tube	AR	

NOTE A: Coat this part with TFE lubricant, part 900 349, prior to assembly.
AR: As Required
NS: Not Shown

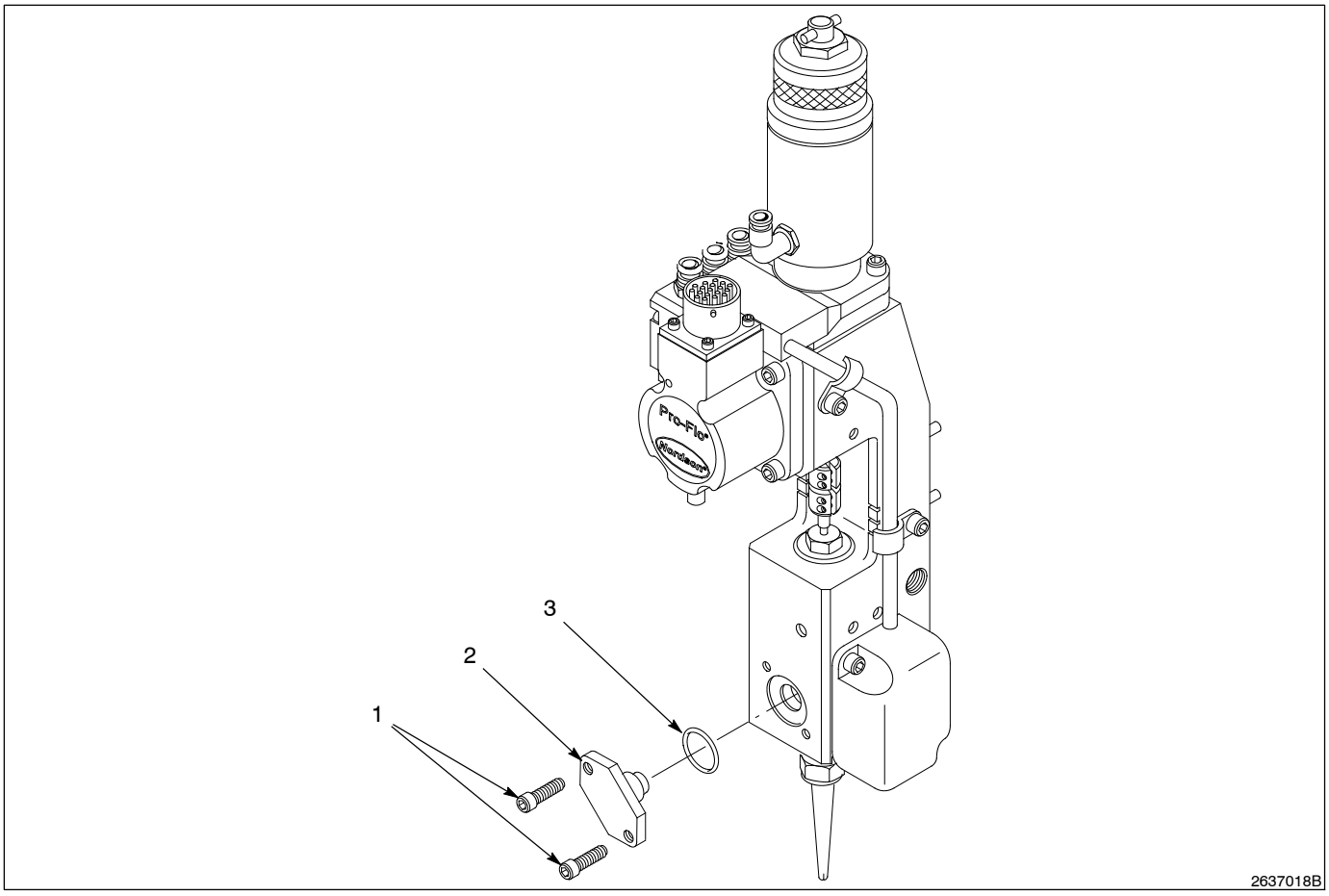

Fig. 19 No MCO (Port Plug)

MCO for Unheated and Heated Guns

See Figure 20.

Item	Part	Part	Description	Quantity	Note
—	- - - - - -		Module, MCO, Pro-Flo, polymyte	1	
—		- - - - - -	Module, MCO, Pro-Flo, peek	1	
1	322 775		• Kit, service, unheated, MCO, Pro-Flo	1	A
1		322 776	• Kit, service, heated, MCO, Pro-Flo	1	A
2	982 166	982 166	• Screw, socket, M5 x 16, black	2	
3	152 394	152 394	• Housing, MCO, Pro-Flo	1	
—	162 758	162 758	• Service kit, tube assembly, MCO	1	
4	940 101	940 101	• • O-ring, Viton, 0.239 ID x 0.070 wide, brown	4	
5	- - - - - -	- - - - - -	• • Tube, air, extend, MCO, Pro-Flo	1	
6	- - - - - -	- - - - - -	• • Tube, air, retract, MCO, Pro-Flo	1	
NS	900 349	900 349	• • Lubricant, TFE grease, 0.75-oz tube	AR	B

NOTE A: MCO service kits include all MCO piston parts as well as item 4 (quantity 4) and PTFE lubricant, part 900 349.

B: Apply PTFE lubricant to the O-rings, items 4 and 5.

AR: As Required

NS: Not Shown

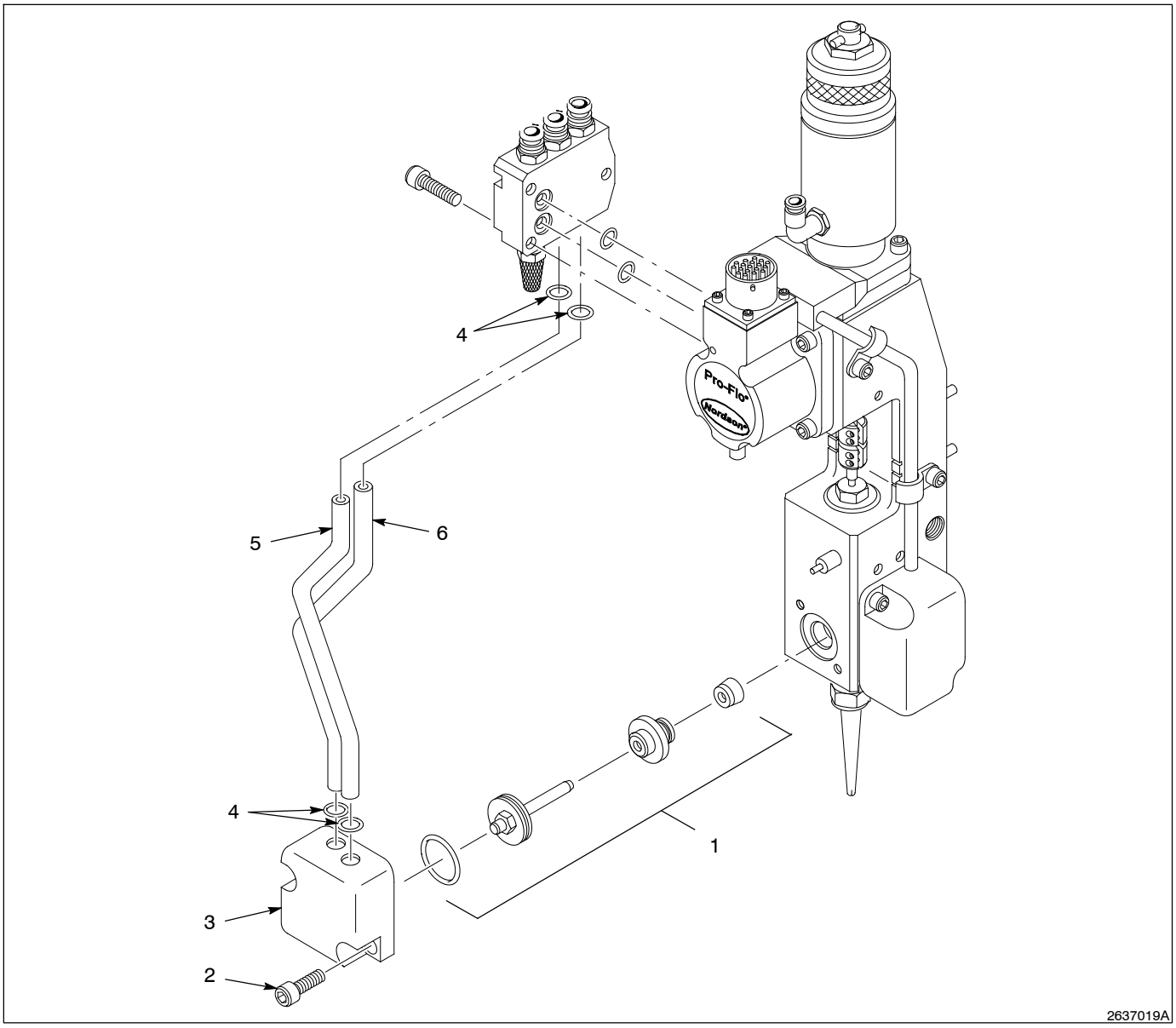

Fig. 20 Material Cutoff Modules

H200 Gun or Auto-Flo Modules

See Figure 21.

These modules are used for material control instead of an MCO and are ordered separately from the Pro-Flo III gun.

The modules are used only on Pro-Flo III guns, parts 100 8394 and 100 8398.

Item	Part	Part	Description	Quantity	Note
—	100 8420		Module, Pro-Flo to H200	1	
—		100 8419	Module, Pro-Flo to Auto-Flo	1	
1	982 166	982 166	• Screw, socket, M5 x 16, black	2	
2	165 179		• Manifold, Pro-Flo to H200	1	
2		322 769	• Manifold, Pro-Flo to Auto-Flo	1	
3	940 115	940 115	• O-ring, Buna-N, 0.312 x 0.438 x 0.063 in.	2	
4	165 177	165 177	• Plug, manifold, module, zero cavity, Pro-Flo	1	
5	100 2161	100 2161	• Plug, $^3/_8$ NPSM x $^3/_4$ hex, Pro-Flo, stainless steel	1	
6	- - - - - -	- - - - - -	• Tube, air, retract, MCO, Pro-Flo	1	A
7	940 101	940 101	• O-ring, Viton, 0.239 ID x 0.070 wide, brown	2	B
NS	900 349	900 349	• Lubricant, TFE grease, 0.75-oz tube	1	

NOTE A: The retract air tube is included in the air tube assembly kit, part 162 758.
B: Coat the O-rings with PTFE lubricant, part 900 349.
AR: As Required
NS: Not Shown

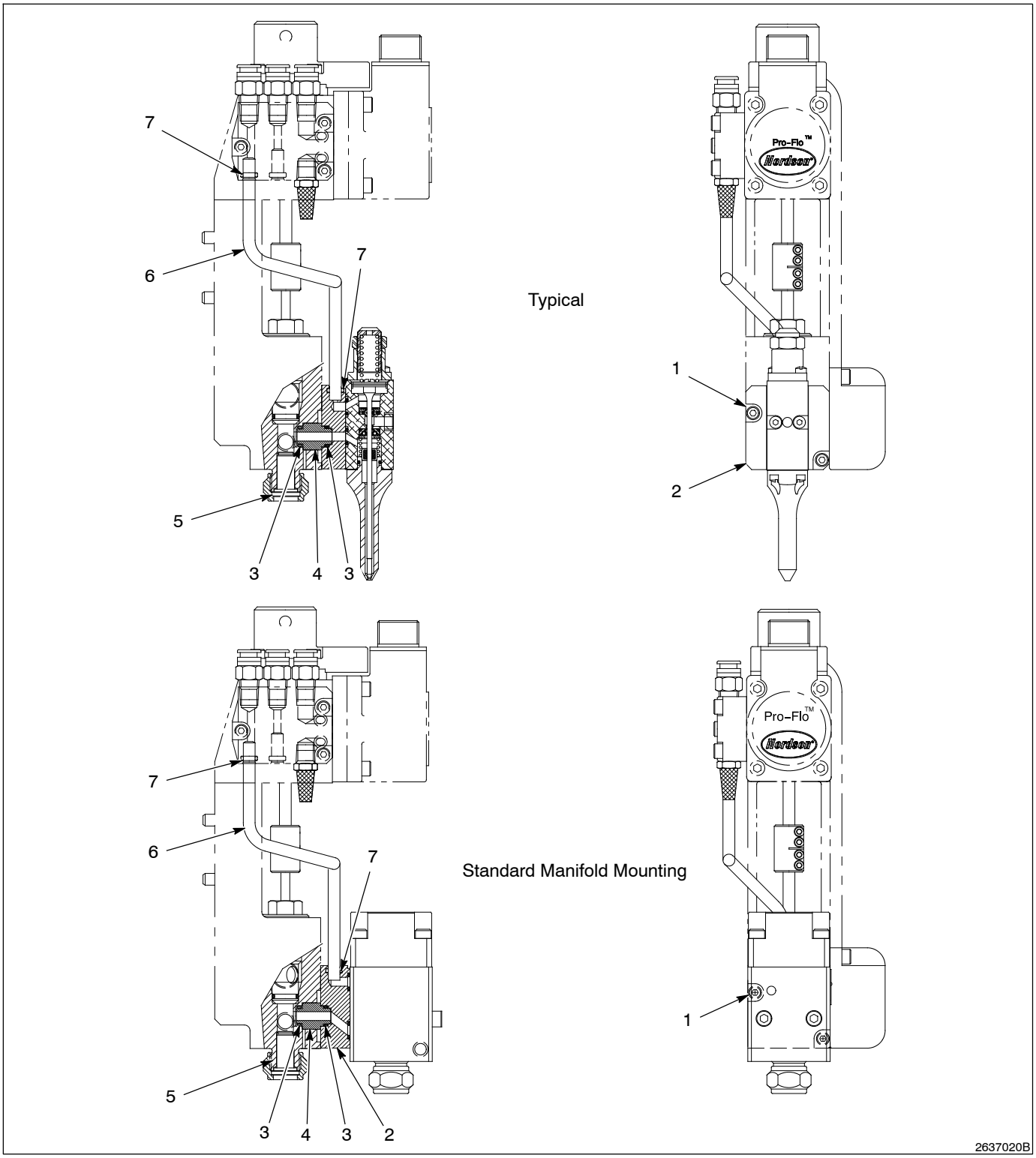

Fig. 21 Typical H200 and Auto-Flo Gun Modules

Pressure Transducer and Cordset

See Figure 22.

Item	Part	Description	Quantity	Note
1	973 574	Plug, O-ring, straight thread, $^{9}/_{16}$-18	1	
2	945 038	O-ring, Viton, $^{3}/_{16}$ tube	1	
3	139 596	Transducer, with tag, 2000 psi	1	A
3	139 578	Transducer, with tag, 500 psi	1	B
3	139 582	Transducer, with tag, 1000 psi	1	B
4	152 403	Cover, transducer, Pro-Flo	1	
5	982 166	Screw, socket, M5 x 16, black	2	
6	153 078	Cordset, transducer, right-hand, Pro-Flo	1	
6	153 079	Cordset, transducer, left-hand, Pro-Flo	1	

NOTE A: Shipped with all guns.
B: Optional part ordered separately.

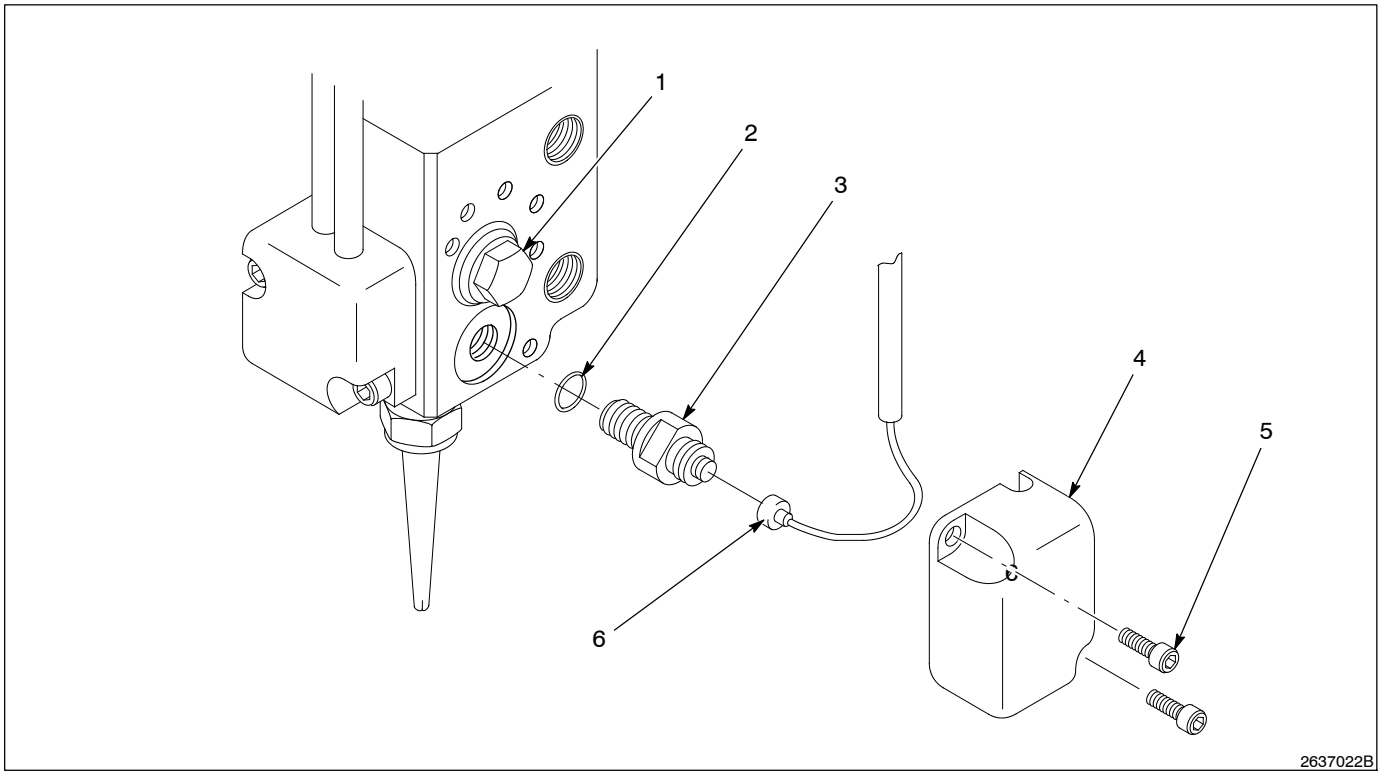

Fig. 22 Pressure Transducer and Cordset

Heater Kits

See Figure 23.

Heater kits are not included with the Pro-Flo III gun and must be ordered separately. Refer to the following table to order the appropriate heater kit.

Item	Part	Part	Part	Description	Quantity	Note
	281 619			Heater kit, 120 V, Pro-Flo	1	
		282 819		Heater kit, 240 V, Pro-Flo	1	
			282 818	Heater kit, 240 V, pt 100	1	
1	- - - - - -			• Receptacle, input, hi temp, 5-wire	1	
1		- - - - - -	- - - - - -	• Cable, input, 6-soc, hi temp, 12-in. long	1	
2	- - - - - -	- - - - - -	- - - - - -	• Heater, body	1	
3	- - - - - -	- - - - - -	- - - - - -	• Body, housing and insulator	1	
4	860 539	860 539	860 539	• Screw, flat, slotted, M5 x 40 long	2	
5	933 056	933 056	933 056	• Connector, wire, porcelain	4 or 5	A
6	938 161	938 161	938 161	• Heater, cartridge, 0.375 d, 1.28 l, 150 w, 120 V	2	
7	939 523	939 523		• Sensor, temp, gun	1	
7			140 305	• Sensor, RTD, 100 ohm, platinum, 10-in. lead	1	
8	- - - - - -	- - - - - -	- - - - - -	• Terminal, ring tong, non, 22-18, 4	1	
9	983 526	983 526	983 526	• Lockwasher, e, split, #4, steel, zinc	1	
10	981 014	981 014	981 014	• Screw, pan, 4-40 x 0.250, steel, zinc	1	
11	982 454	982 454	982 454	• Screw, button head, M3 x 10	2	

NOTE A: The 120 V heater, part 281 619, uses 4 porcelain wire connectors. The 240 V heaters, parts 282 818 and 282 819, use 5 porcelain wire connectors.

Heater Kits *(contd)*

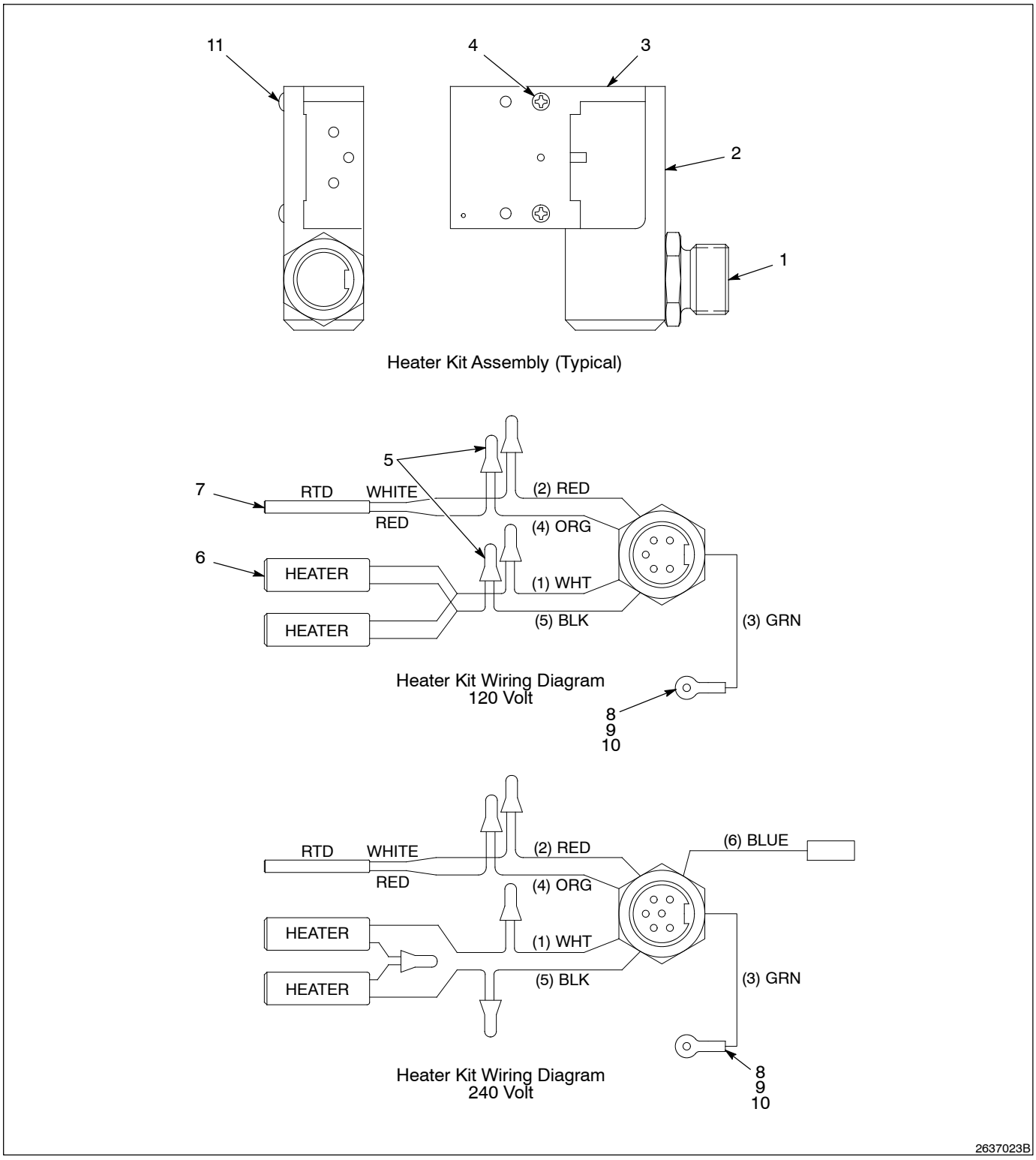

Fig. 23 Heater Kits