Pro-Flo® III Hi-Flo Dispensing Gun

Customer Product Manual
Part 303 863C

NORDSON CORPORATION • AMHERST, OHIO • USA

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.

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Notice

Trademarks

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Pro-Flo III Hi-Flo Dispensing Gun

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 Hi-Flo 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.

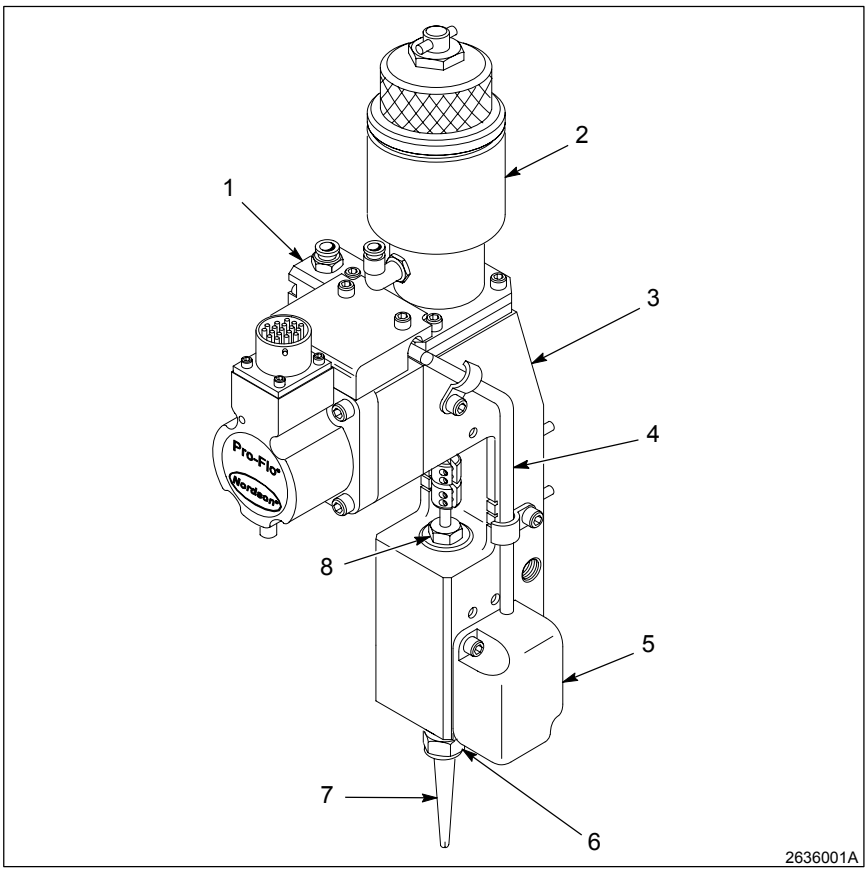

Fig. 1 Pro-Flo III Hi-Flo Dispensing Gun

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. Trimset cartridge

Gun Components

See Figure 1.

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

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

Some dispensing guns are equipped with the following optional components:

- 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 a 120-V or 240-V electric heater
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 Hi-Flo dispensing gun.

Weight	2.91 kg (6 lb 7 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

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 provides installation information for the Pro-Flo III Hi-Flo 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)

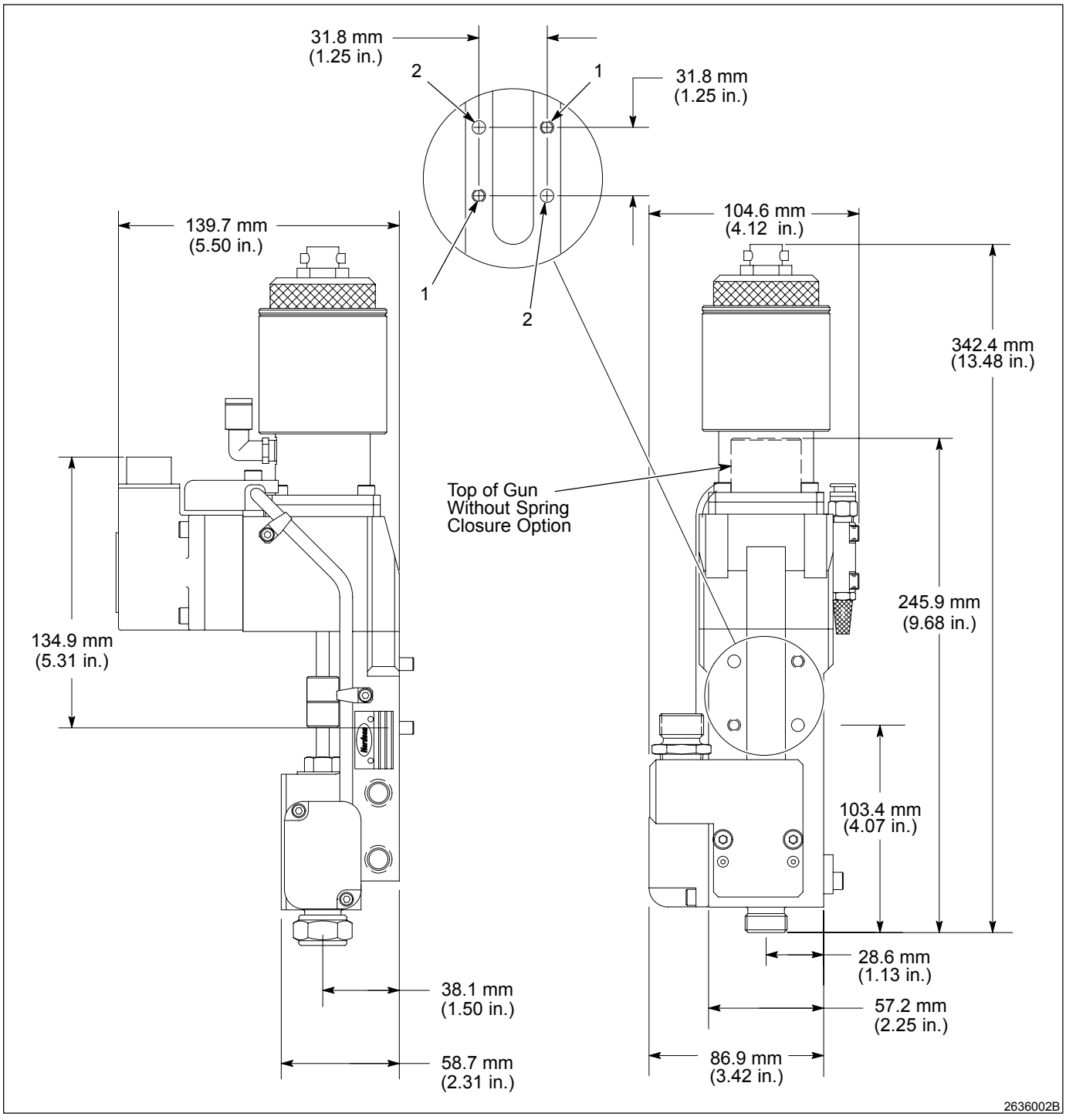

Fig. 2 Pro-Flo III Hi-Flo Dispensing Gun Dimensions

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 Hi-Flo dispensing gun.

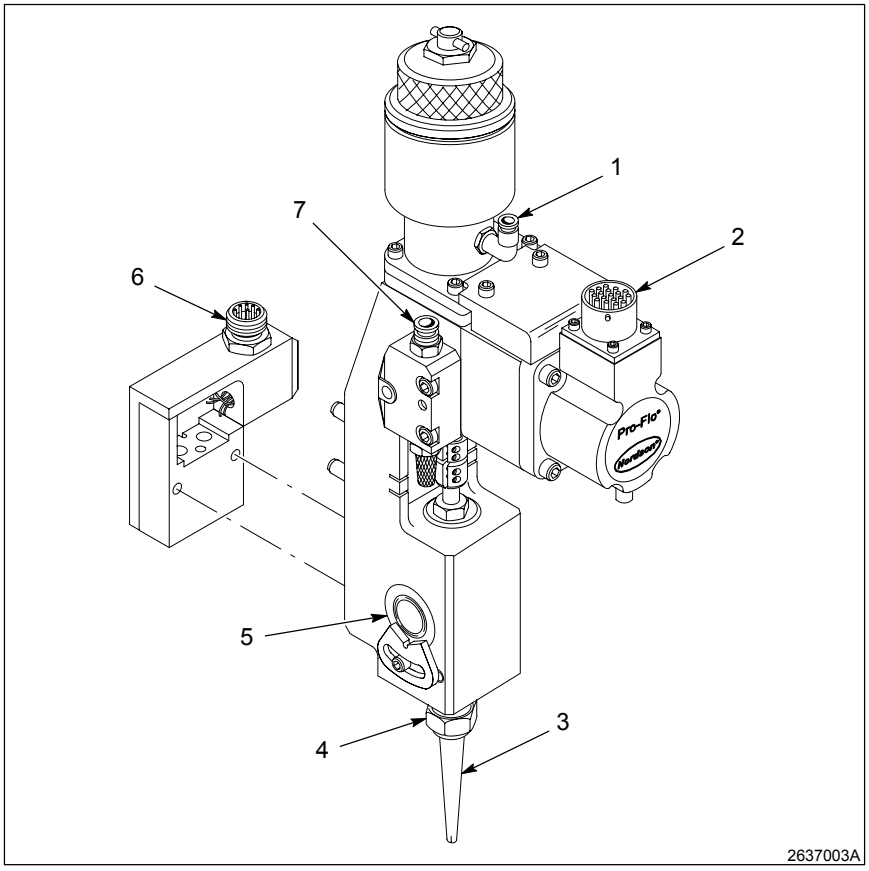

Fig. 3 Connection Requirements (Heated Gun Shown)

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

Material Supply Line

Install a 90° elbow, JIC-10, $^{7}/_{8}$-14 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 (7). Supply air must be oil-free and maintain a pressure of 4.8–8.4 bar (70–120 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.

Heater or Temperature Conditioner

Heated guns: If your gun is equipped with an electric heater, install the heater cable to the heater receptacle (6). Refer to *Installing a Heater* if you require detailed procedures for installing a heater.

Unheated guns: To install the temperature conditioning fittings shipped with all guns ordered without an electric heater, install the fittings into the temperature conditioning ports opposite from the material inlet connections. Refer to *Installing Temperature Conditioning Fittings* if you require detailed procedures for installing temperature conditioning fittings.

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 actuator body.

Heater and Temperature Conditioning Fittings

This section provides information about heaters and temperature conditioning fittings used with Pro-Flo III Hi-Flo dispensing guns.

Heater

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

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

2. See Figure 4.

   Align the heater (1) on the back of the actuator body and tighten the screws (2).

3. Attach the heater cable to the heater receptacle (3).

   See Figure 18 in the *Parts* section for the heater kit wiring diagram.

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

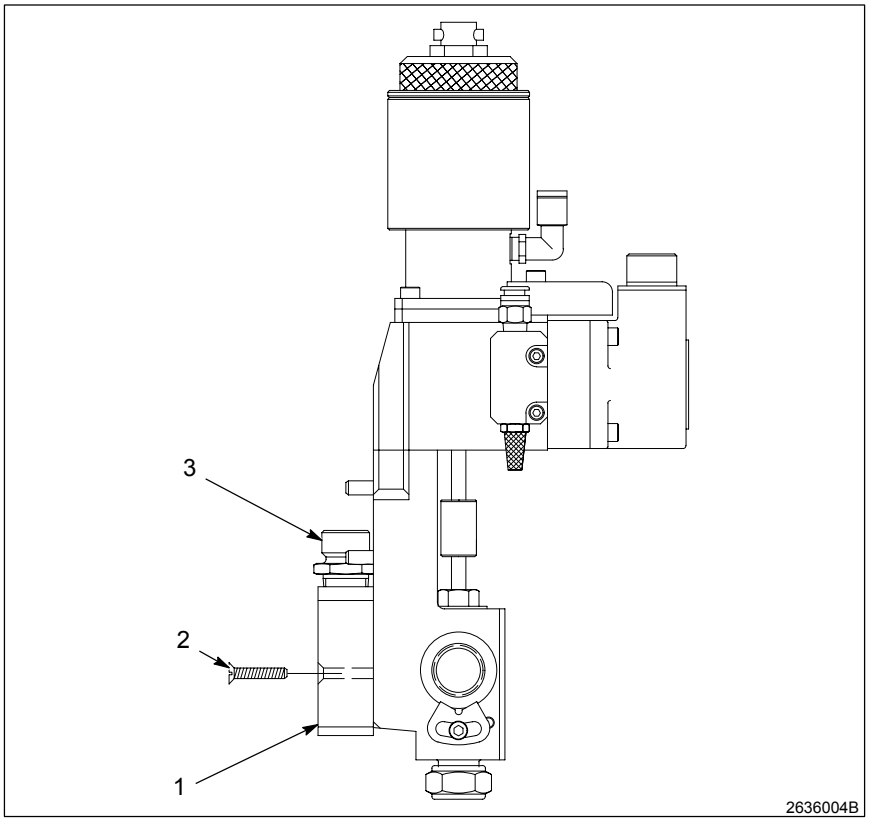

Fig. 4 Installing a Heater

1. Heater
2. Screw
3. Receptacle

Temperature Conditioning Fittings

Follow these procedures to install the temperature conditioning fittings. These fittings are shipped with all unheated Pro-Flo III Hi-Flo dispensing guns.

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

NOTE: Both sides of the actuator 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 pneumatic actuator body (1).

3. Install the temperature conditioning fittings in the ports.

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

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

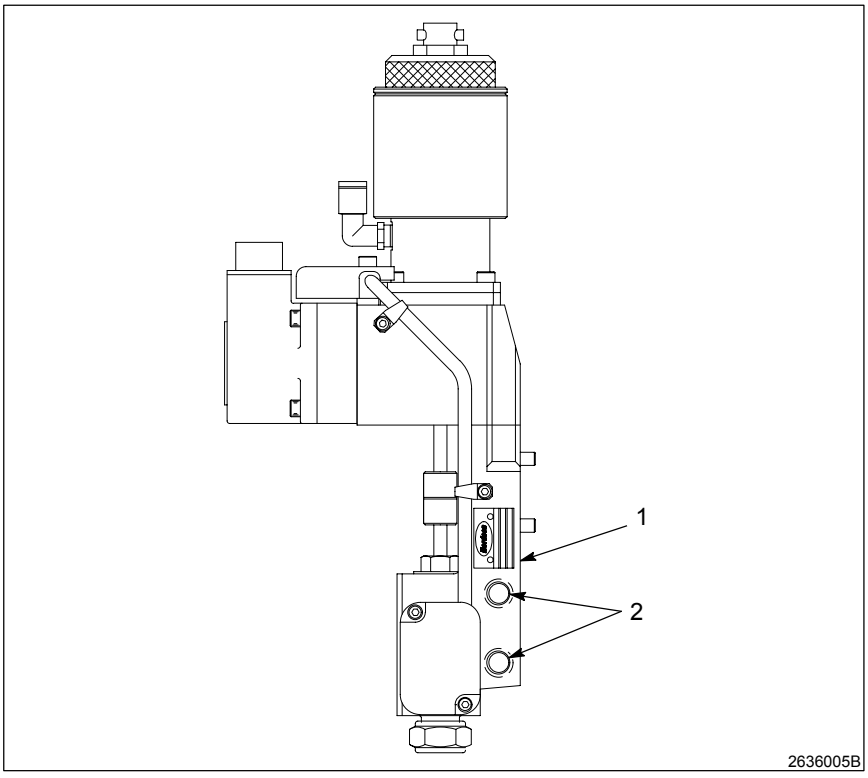

Fig. 5 Install the Temperature Conditioning Fittings

1. Pneumatic actuator body
2. Temperature conditioning ports

5. Operation

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

Pro-Flo III Hi-Flo 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 required.

6. Maintenance

Follow a preventive maintenance schedule to keep your Pro-Flo III Hi-Flo 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	Control 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 the material supply hose. Refer to *Clearing 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 *Checking 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.
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.

Continued on next page

Problem	Possible Cause	Corrective Action
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	Purge the gun.
	Stem and trimset value 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 *Clearing 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 actuator body to 27.1 N•m (20 ft-lb).
10. 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 is centered over the needle and shaft joint. Tighten the coupling screws to 0.9–1.1 N•m (8–10 in.-lb). Reinstall the spring closure assembly.

Check 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.

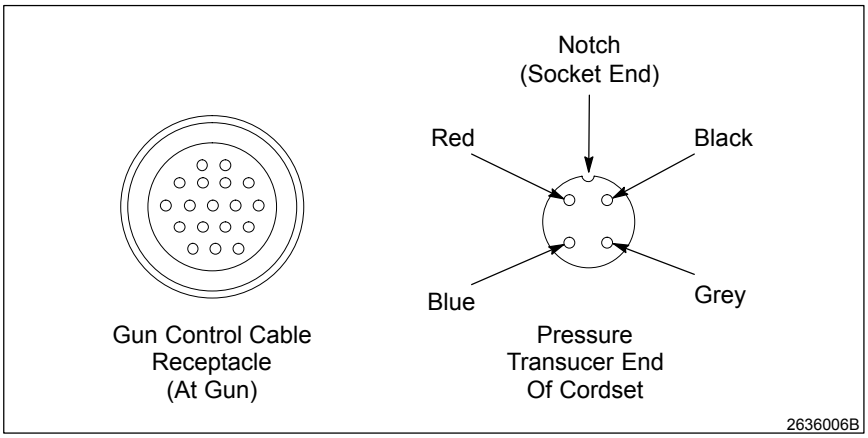

Fig. 6 Wiring Continuity

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. Observe and 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 Hi-Flo dispensing gun. Follow the necessary procedures to remove the gun from operation, replace various components, and check for electrical continuity or 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.

Clear a Blocked Nozzle (contd)

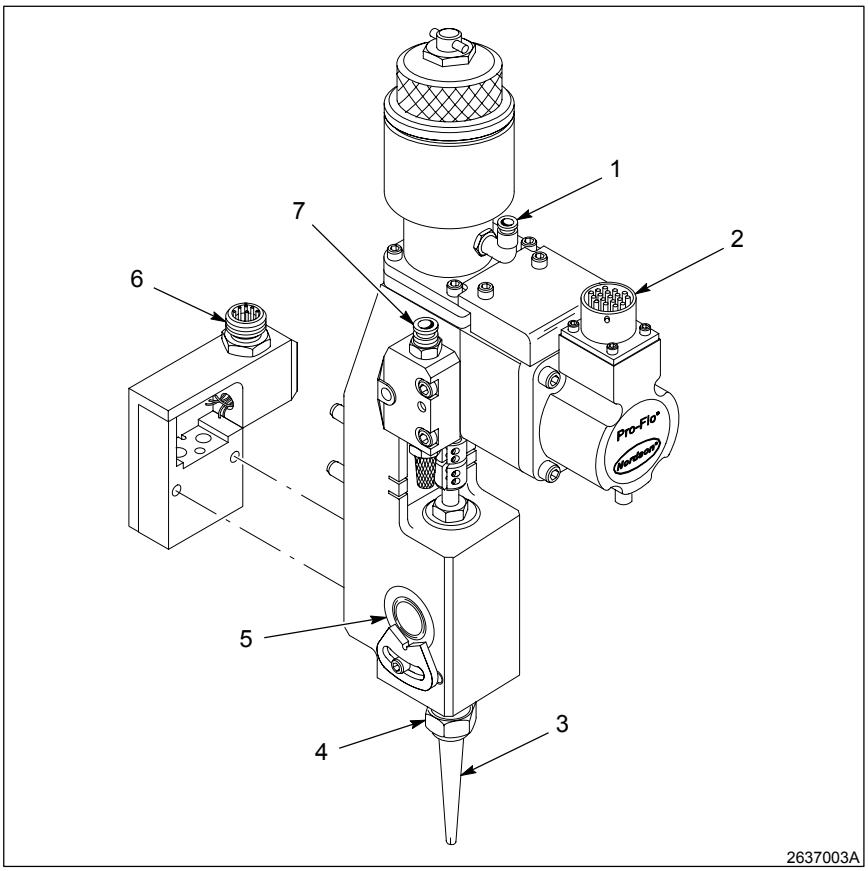

Fig. 7 Pro-Flo III Hi-Flo Dispensing Gun Basic Repair

1. Spring closure air inlet
2. Gun control receptacle
3. Customer-supplied nozzle
4. Nozzle nut
5. Material inlet
6. Heater receptacle
7. 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 on the drum unloader pump body.

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).

Remove the Gun from the Robot (contd)

5. Mark the control air inlet tubing and disconnect it from the control air inlet (7) on the air manifold.

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

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

8. 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.

9. 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 screws.

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 (7).

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

6. 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.

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.

Trimset Cartridge

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

Remove the Trimset Cartridge

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

NOTE: Be sure to note whether your gun is equipped with a spring closure assembly or with an armature cover. 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) of the spring closure assembly to reveal the entire yellow band (1). Make sure that the threads are fully disengaged.

   Guns with Armature Cover: Remove the screws (3) and armature cover (4) from the armature (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 bottom out in the actuator frame.

7. Using an $^{11}/_{16}$ open-end wrench, loosen and remove the trimset cartridge (11) from the lower portion of the actuator body (6).

Remove the Trimset Cartridge *(contd)*

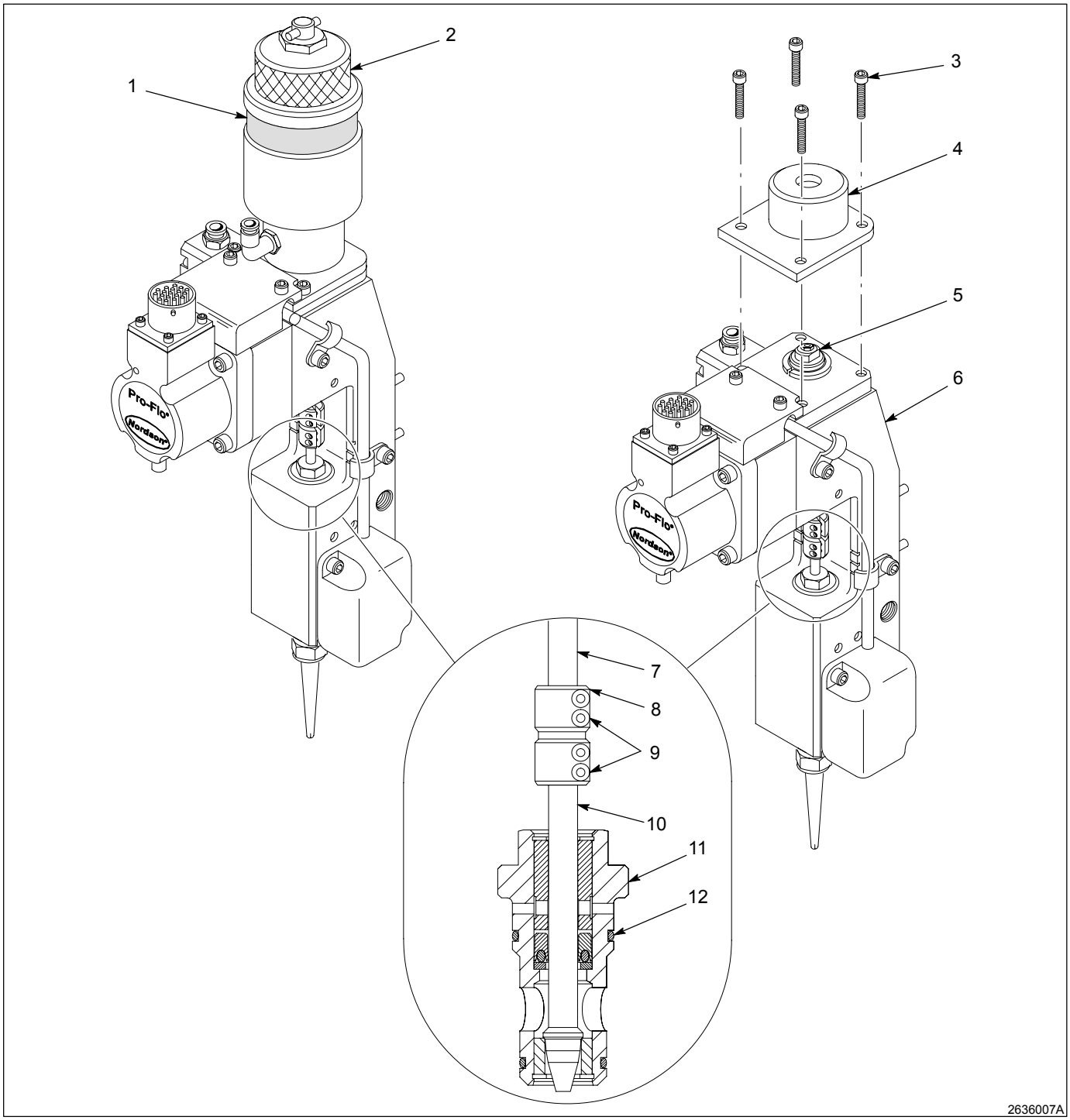

Fig. 8 Replace the Trimset Cartridge

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

Install the Trimset Cartridge

See Figure 8.

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

1. Lubricate all external O-rings (12) on the trimset cartridge (11) with lubricant.

2. Using an $^{11}/_{16}$ open-end wrench, reinstall the trimset cartridge in the lower portion of the actuator body (6). Tighten the trimset cartridge to 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 Armature Cover: Install the armature cover (4) over the armature (5). Tighten the screws (3).

4. Lower the upper shaft (7) until it fully contacts the trimset needle shaft (10).

5. Push the coupling (8) down until it is centered over the joint between the upper shaft and needle shaft.

6. Tighten the lower coupling 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. Disconnect the air supply hose from the spring closure air inlet (Figure 7 (1)) of the spring closure assembly.
5. See Figure 9.

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

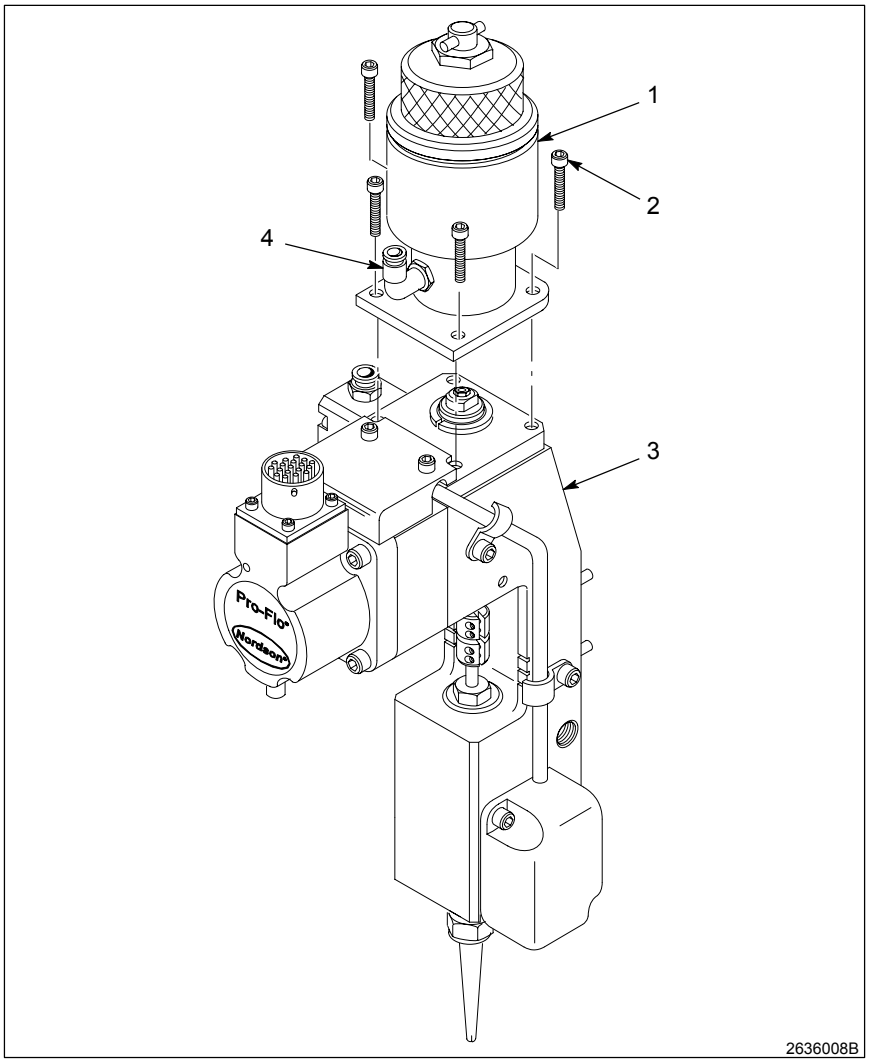

Fig. 9 Replace the Spring Closure Assembly

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

Pressure Transducer

This section provides information about the Pro-Flo III Hi-Flo dispensing gun pressure transducer and cordset. It describes how to:

- replace the pressure transducer
- replace the cordset
- check cable continuity

Replace the Pressure Transducer

See Figure 10.

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

1. Using a 4-mm hex key, loosen 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 actuator body.
4. Coat the pressure transducer O-ring with 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.

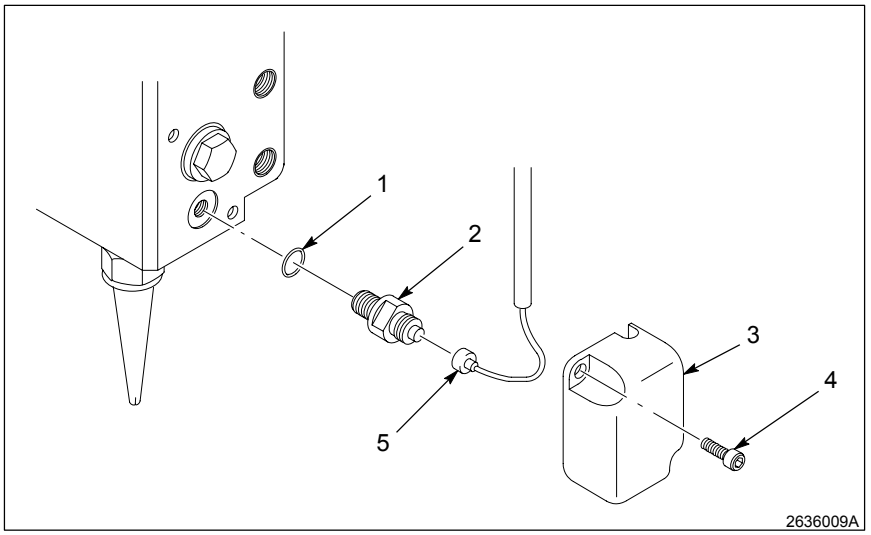

Fig. 10 Replace the Pressure Transducer

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 (12) and actuator leads cover (11).

3. Loosen the terminal block (3) set screws that secure the four colored wires from the cordset (4).

Replace the Cordset (contd)

4. Remove the cordset wires from the terminal block.
5. Remove the screws (8) securing the pressure transducer cover (7).
6. Unplug the cordset from the pressure transducer (9).
7. Remove the screws (6) securing the cordset clamps (5).
8. Install the wires of the new cordset (4) in the proper terminal block slots and tighten the screws.
9. Mount the new cordset and loosely install the cordset clamp and screws.
10. Connect the cordset plug to the pressure transducer and replace the pressure transducer cover and screws.
11. Install the spring closure assembly and tighten the screws to 6.2–6.8 N•m (55–60 in-lb).
12. Align the cordset and tighten the cordset set screws.
13. Replace and tighten the actuator leads cover and screws.
14. Install the gun on the robot. Refer to *Install the Gun on the Robot* in this section.

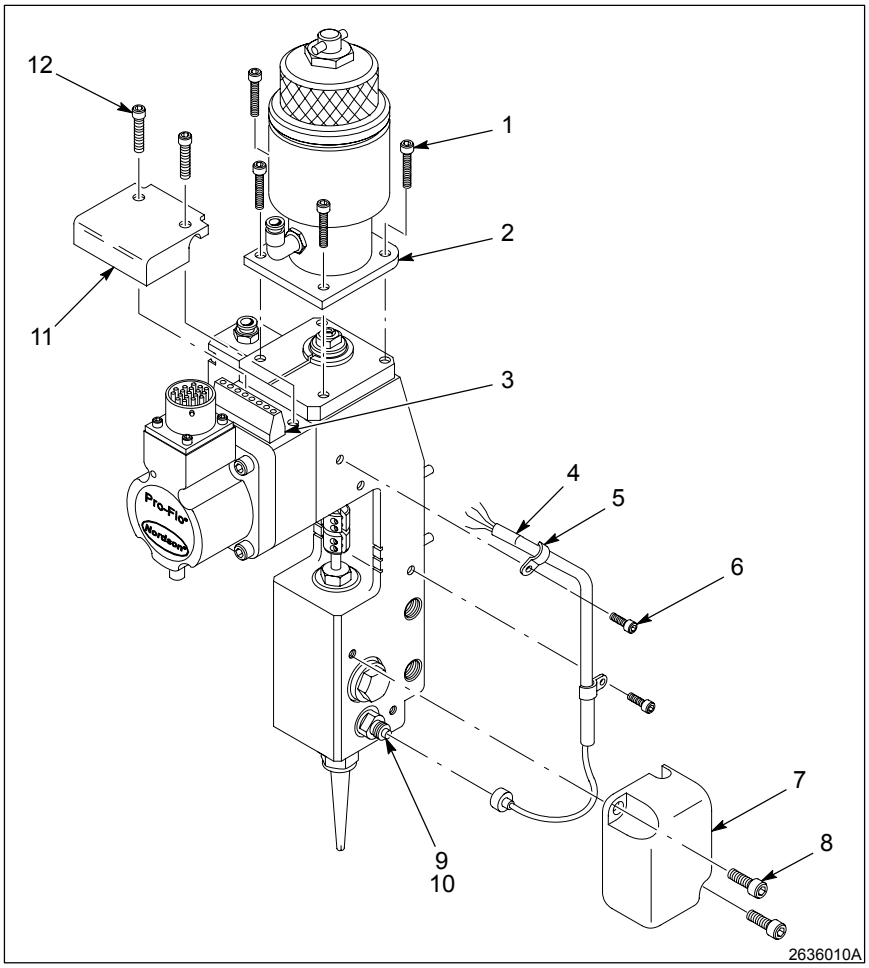

Fig. 11 Replace or Change the Pressure Transducer Cordset (Right-Hand Version Shown)

1. Screw
2. Spring closure assembly
3. Terminal block
4. Cordset
5. Clamp
6. Screw
7. Pressure transducer cover
8. Screw
9. Pressure transducer
10. O-ring
11. Actuator leads cover
12. Screws

Replace the Cordset *(contd)*

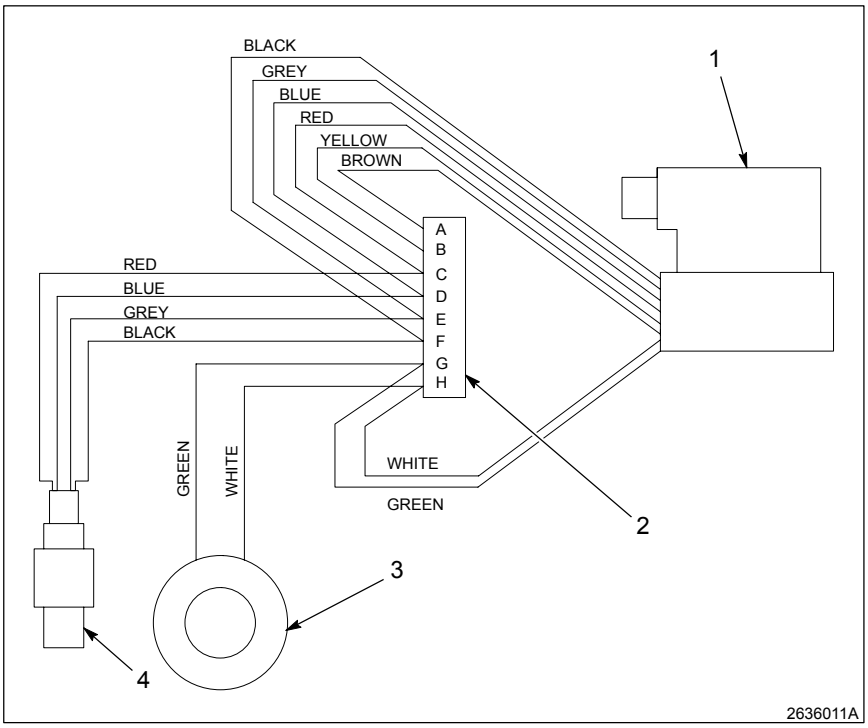

Fig. 12 Cordset Wiring

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.

9. Parts

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 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.

The headings in this table correspond to the individual parts lists that make up each gun.

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

Table 1 Gun Options

		100 8865	100 8866	322 921	329 603
Pneumatic Actuator		X	X	X	X
Miscellaneous Parts		X	X	X	X
Air Manifold		X	X	X	X
Spring Closure		X	X	X	X
Transducer Cordset	**Right-Hand**		X		X
	Left-Hand	X		X	
Trimset Cartridge	**Polymyte**			X	X
	Peek	X	X		
Temperature Conditioning Fittings				X	X
Heater Kit Required		X	X		

Pneumatic Actuator

See Figure 13.

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

Item	Part	Part	Description	Quantity	Note
—	332 873		Kit, service, actuator, Hi-Flo, right-hand	1	
—		332 874	Kit, service, actuator, Hi-Flo, left-hand	1	
1	163 460	163 460	• Valve, servo, Pro-Flo	1	
2	329 700	329 700	• Cover, actuator leads	1	
3	982 028	982 028	• Screw, socket, M5 x 20, black	4	
4	- - - - - -		• Frame, body, Hi-Flo, right-hand	1	
4		- - - - - -	• Frame, body, Hi-Flo, left-hand	1	
5	327 545	327 545	• Coupling, clamp, $^1/_4$-in. bore	1	
6	982 386	982 386	• Screw, socket, M5 x 35, black	4	
7	982 201	982 201	• Screw, socket, M5 x 8, black	2	
8	- - - - - -	- - - - - -	• Standoff, Hi-Flo	2	
9	- - - - - -	- - - - - -	• Board, w/junction block, 8-pin	1	
10	940 101	940 101	• O-ring, Viton, 0.239 ID x 0.070 w, brown	4	
11	973 403	973 403	• Plug, pipe, socket, flush, $^1/_{16}$, zinc	1	
NS	900 349	900 349	• Lubricant, TFE grease, 0.75 oz tube	AR	
12	982 372	982 372	Screw, socket, M5 x 12, black	3	
13	325 104	325 104	Nut, nozzle, $^1/_2$ npsm	1	
14	152 444	152 444	Clamp, tube, Pro-Flo	2	
15	156 208	156 208	Key, locking swivel	1	

AR: As Required
NS: Not Shown

Pneumatic Actuator *(contd)*

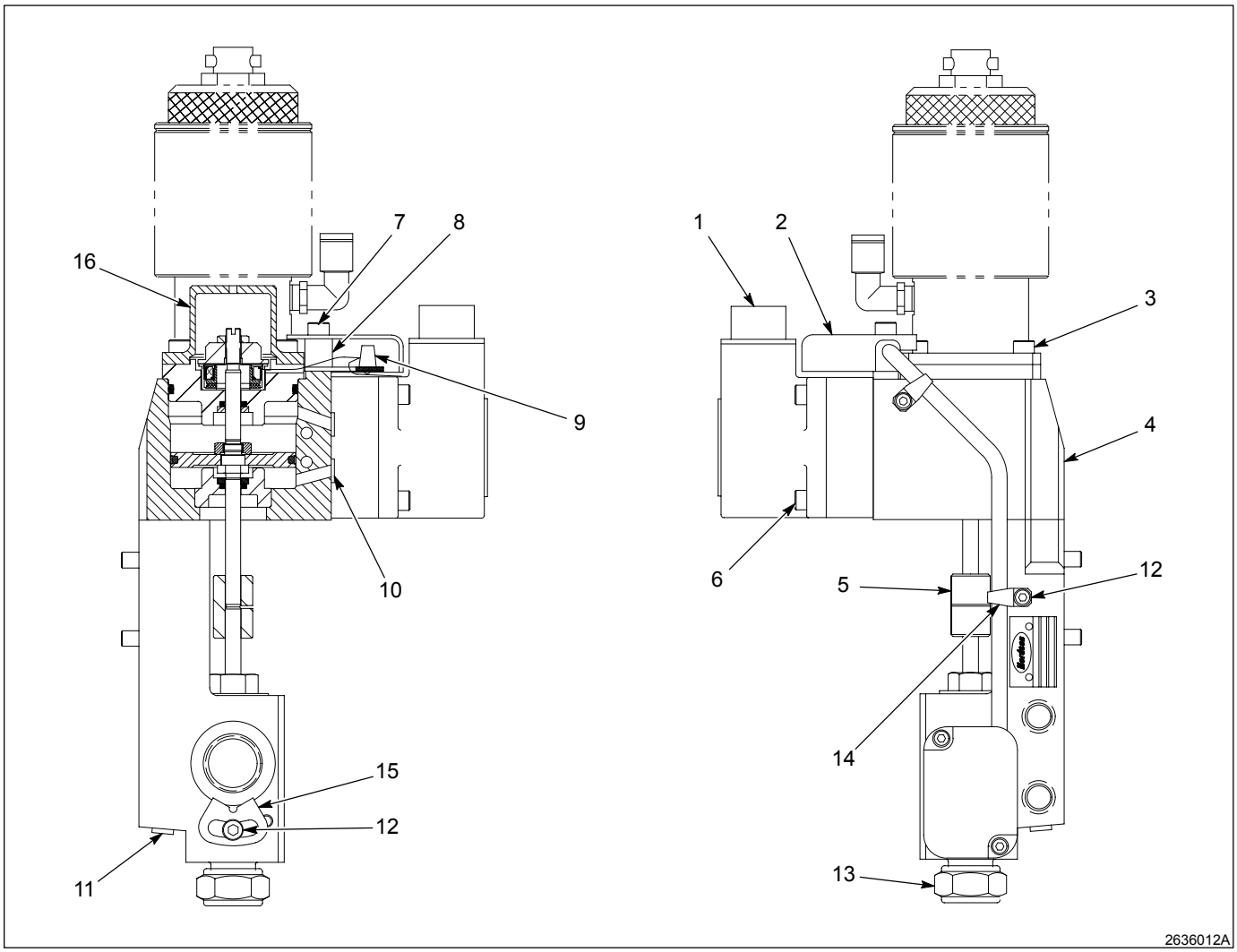

Fig. 13 Pneumatic Actuator

Temperature Conditioning Fittings

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

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

Miscellaneous Parts and Ship-With Items

See Figure 13.

Item	Part	Part	Description	Quantity	Note
—	331 750	331 750	Kit, ship with, cover, Hi-Flo III	1	
16	331 751	331 751	• Cover, armature, Hi-Flo III	1	

Air Manifold

See Figure 14.

Following are the parts for the air manifold.

Item	Part	Description	Quantity	Note
—	329 708	Module, manifold, Pro-Flo, extrude	1	
1	972 716	• Connector, male, $^1/_4$ tube x $^1/_8$ NPT	1	
2	940 101	• O-ring, Viton, 0.239 ID x 0.070 w, brown	2	
3	241 040	• Muffler, air $^1/_8$ NPT	1	A
4	982 028	• Screw, socket, M5 x 20, black	2	
5	- - - - - -	• Manifold, air, Hi-Flo	1	
NS	900 236	• Sealant, paste, PTFE	AR	

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

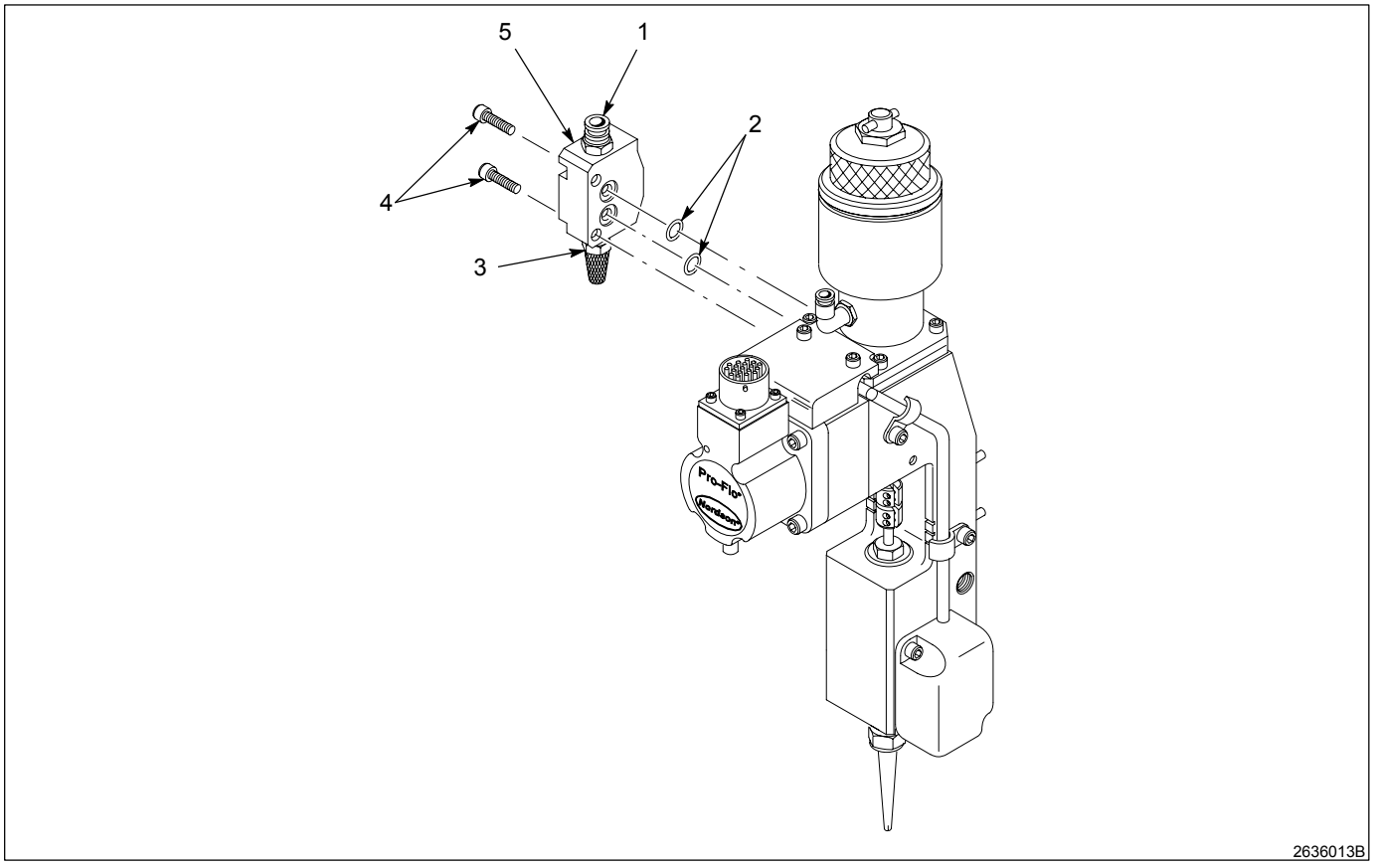

Fig. 14 Air Manifold

Spring Closure Assembly

See Figure 15.

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

Item	Part	Description	Quantity	Note
1	332 872	Kit, service, spring closure, Hi-Flo III	1	
2	982 028	Screw, socket, M5 x 20, black	4	A
NOTE A: Replacement screws are not included in the spring closure service kit. Order new screws as needed.				

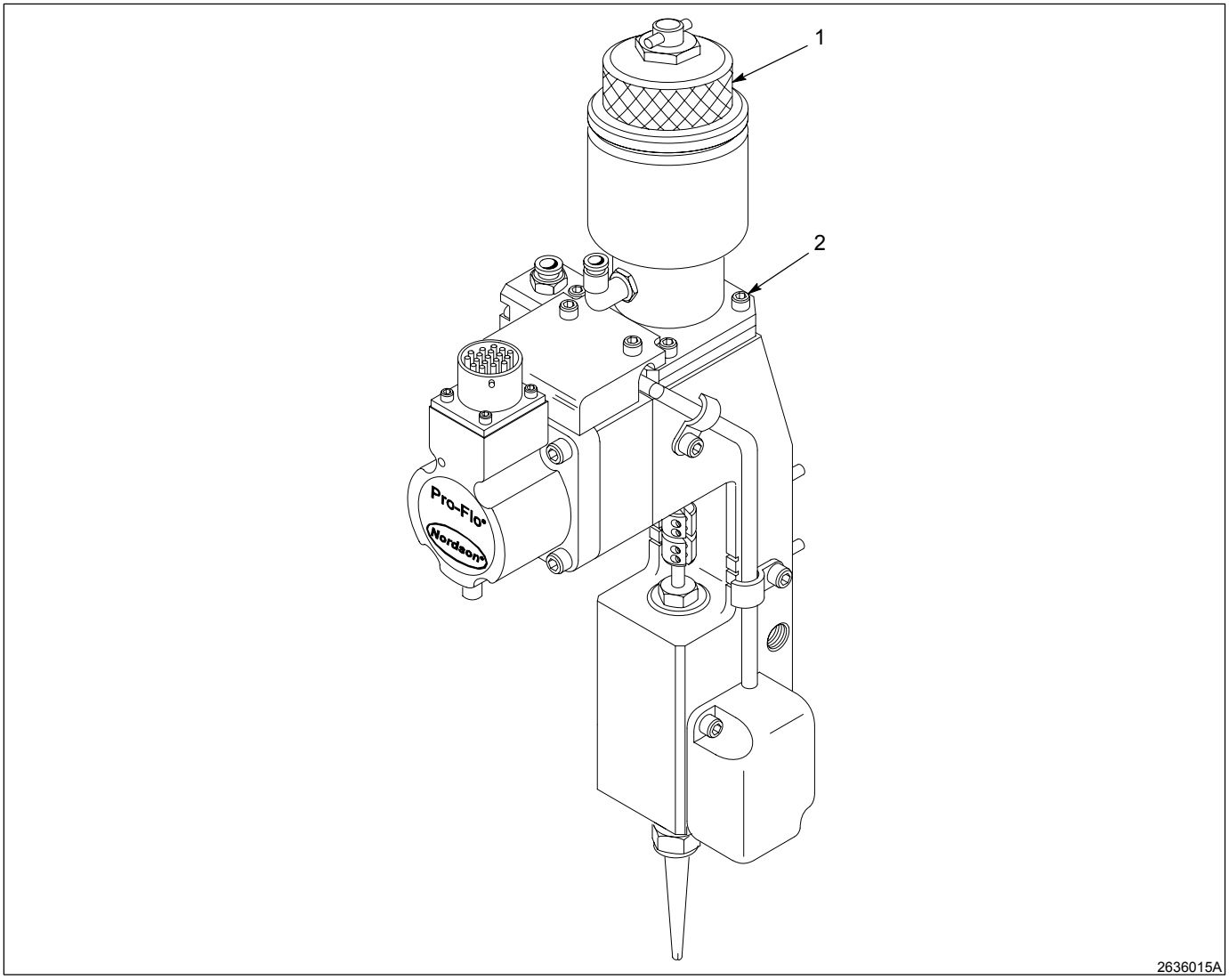

Fig. 15 Spring Closure Assembly

Trimset Cartridges

See Figure 16.

Following are the trimset cartridge service kits available for the Pro-Flo III Hi-Flo guns.

Item	Part	Part	Description	Quantity	Note
1	332 875		Kit, service, trimset cartridge, Hi-Flo, polymyte	1	
1		332 876	Kit, service, trimset cartridge, Hi-Flo, 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

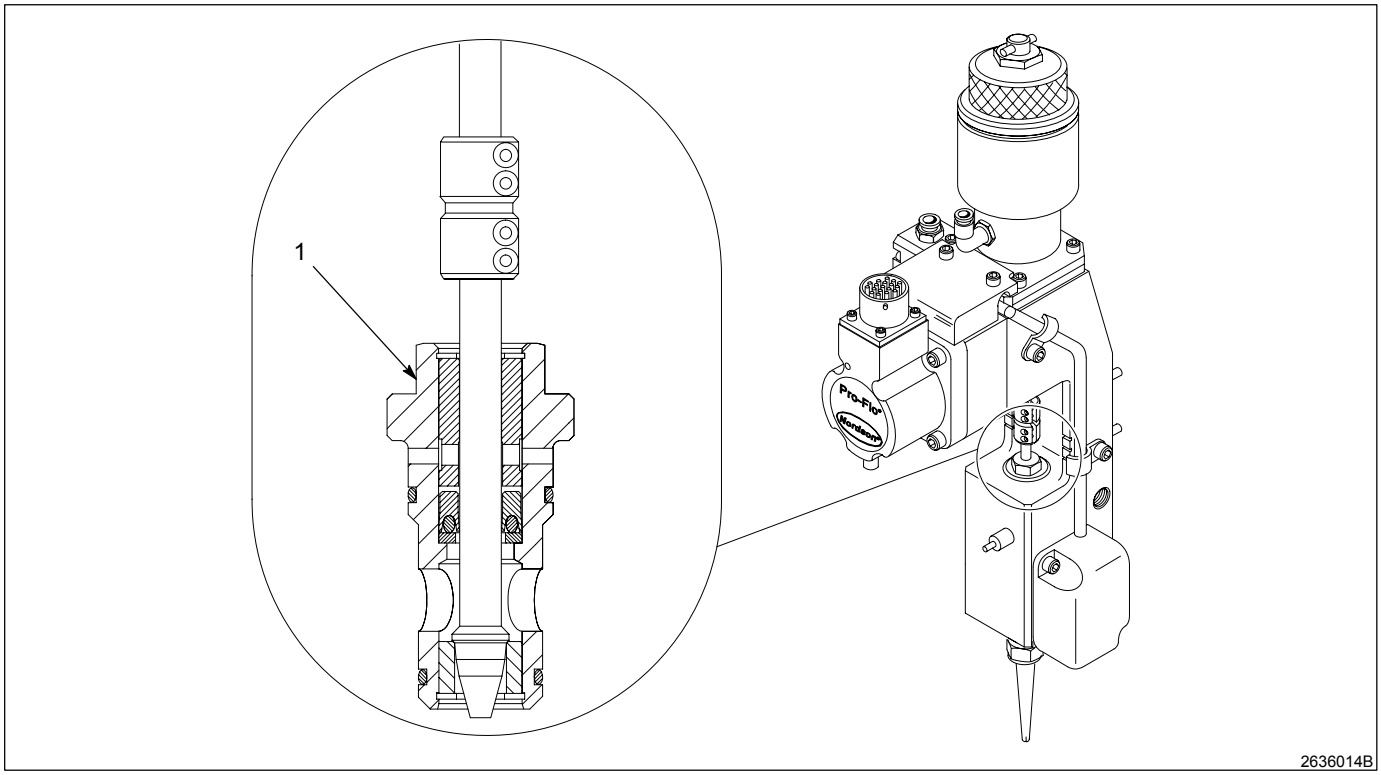

Fig. 16 Trimset Cartridges

Pressure Transducer and Cordset

See Figure 17.

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, $^{3}/_{8}$-24	1	A
3	139 578	Transducer, with tag, 500 psi, $^{3}/_{8}$-24	1	B
3	139 582	Transducer, with tag, 1000 psi, $^{3}/_{8}$-24	1	B
4	152 403	Cover, transducer, Pro-Flo	1	
5	982 166	Screw, socket, M5 x 16, black	2	
6	329 706	Cordset, transducer, right-hand, Hi-Flo	1	
6	322 923	Cordset, transducer, left-hand, Hi-Flo	1	

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

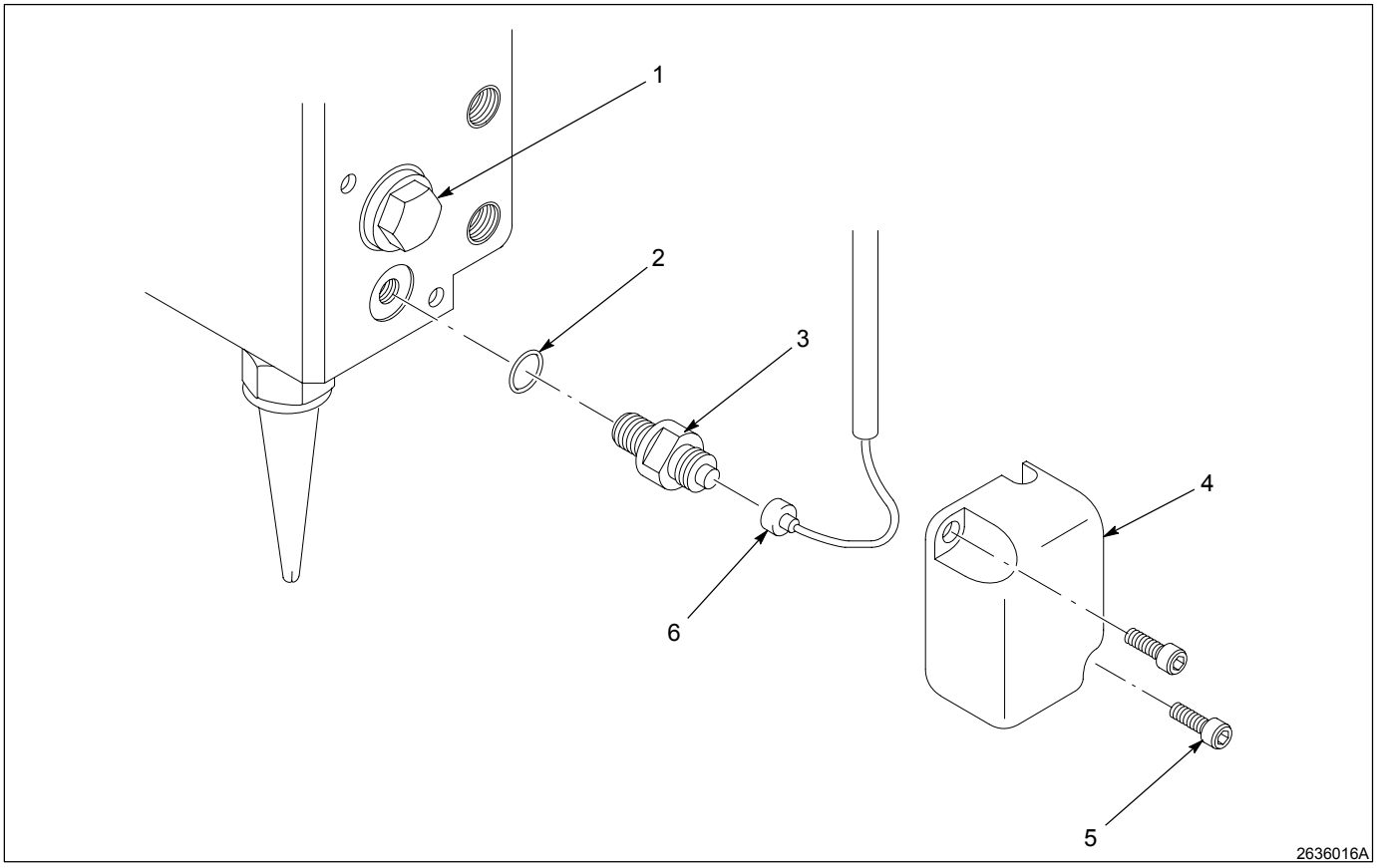

Fig. 17 Pressure Transducer and Cordset

Heater Kits

See Figure 18.

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, bl	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)*

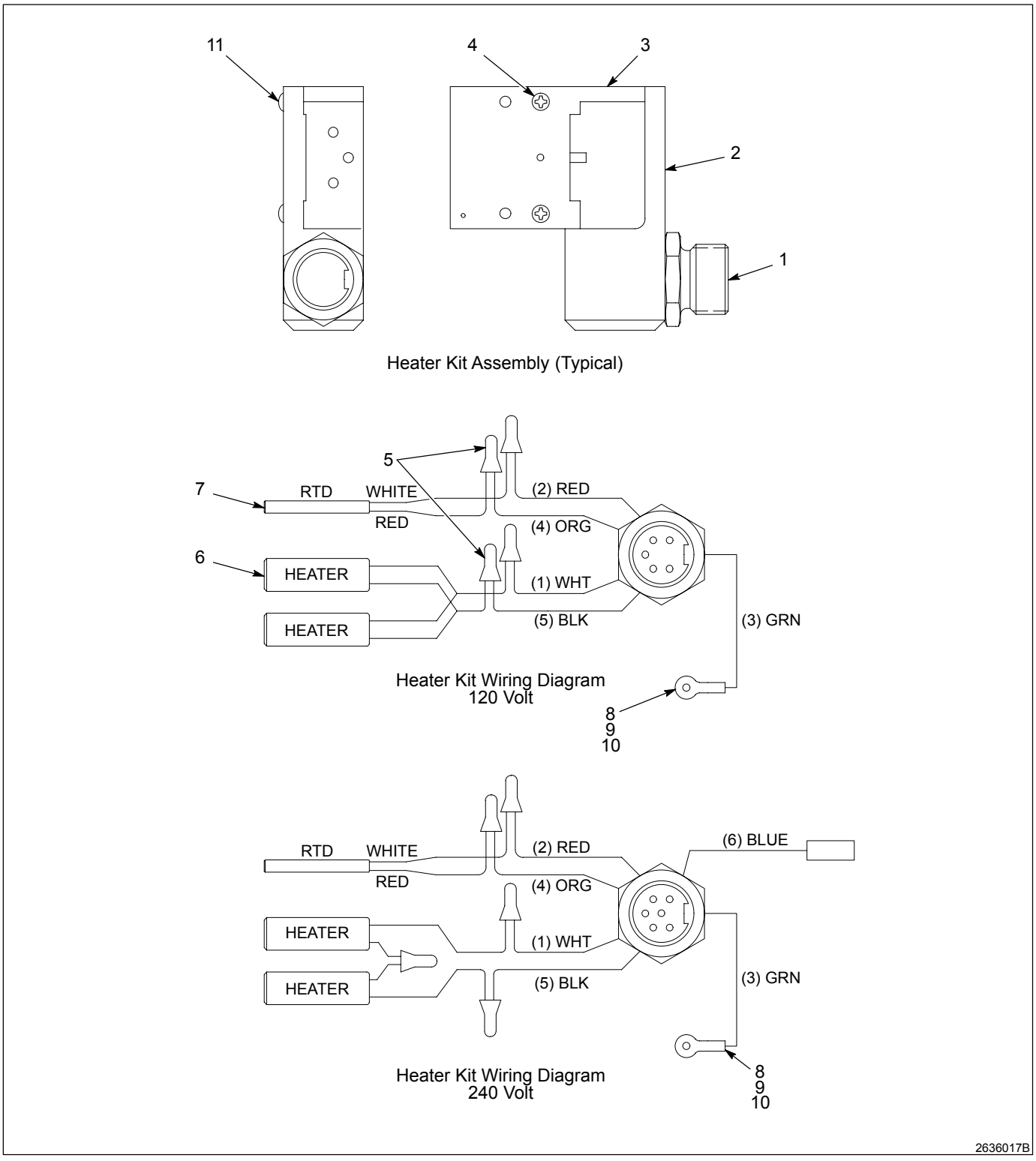

Fig. 18 Heater Kits