Pro-Flo® System Compact Gun

Part 106 695E

NORDSON CORPORATION • AMHERST, OHIO • USA

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Pro-Flo System Compact 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.

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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.

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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.

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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.

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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.

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2. Description

The Nordson Pro-Flo system compact gun is typically used in robotic applications for precise, proportional dispensing of ambient-temperature adhesives and sealants.

The Pro-Flo controller (digital or analog) controls the Pro-Flo gun dispensing characteristics by using feedback from the robot controller and other sensors. By compensating for changes in robot speed and material delivery pressure, material deposition can be precisely controlled.

The compact gun is usually equipped as an air-spray gun. It can be fitted as an extrude gun for applications that require the robot to maneuver in tight space.

The air-spray gun is shipped with the following standard components:

- actuator fitting (Figure 1 (1))
- actuator (Figure 1 (2))
- air-spray fitting (Figure 1 (3))
- pressure transducer cordset (Figure 1 (5))
- material inlet fitting (Figure 1 (6))
- retaining ring (Figure 1 (9))
- muffler (Figure 3 (2))

The following components are supplied or sized according to your application:

- trimset valve (Figure 1 (4))
- air-spray proportioning valve (Figure 4 (13))
- opposite-hand pressure transducer cordset
- pressure transducers(Figure 7 (4))
- teaching tips (Figure 1 (10))
- fluid tips (Figure 1 (7))
- hoses

The extrude gun does not have an air-spray fitting, an air-spray proportioning valve, fluid tips, teaching tips, and a retaining ring. It comes with an extrude nozzle (11) and a nozzle nut (12). A material cut-off (MCO) assembly and solenoid are optional.

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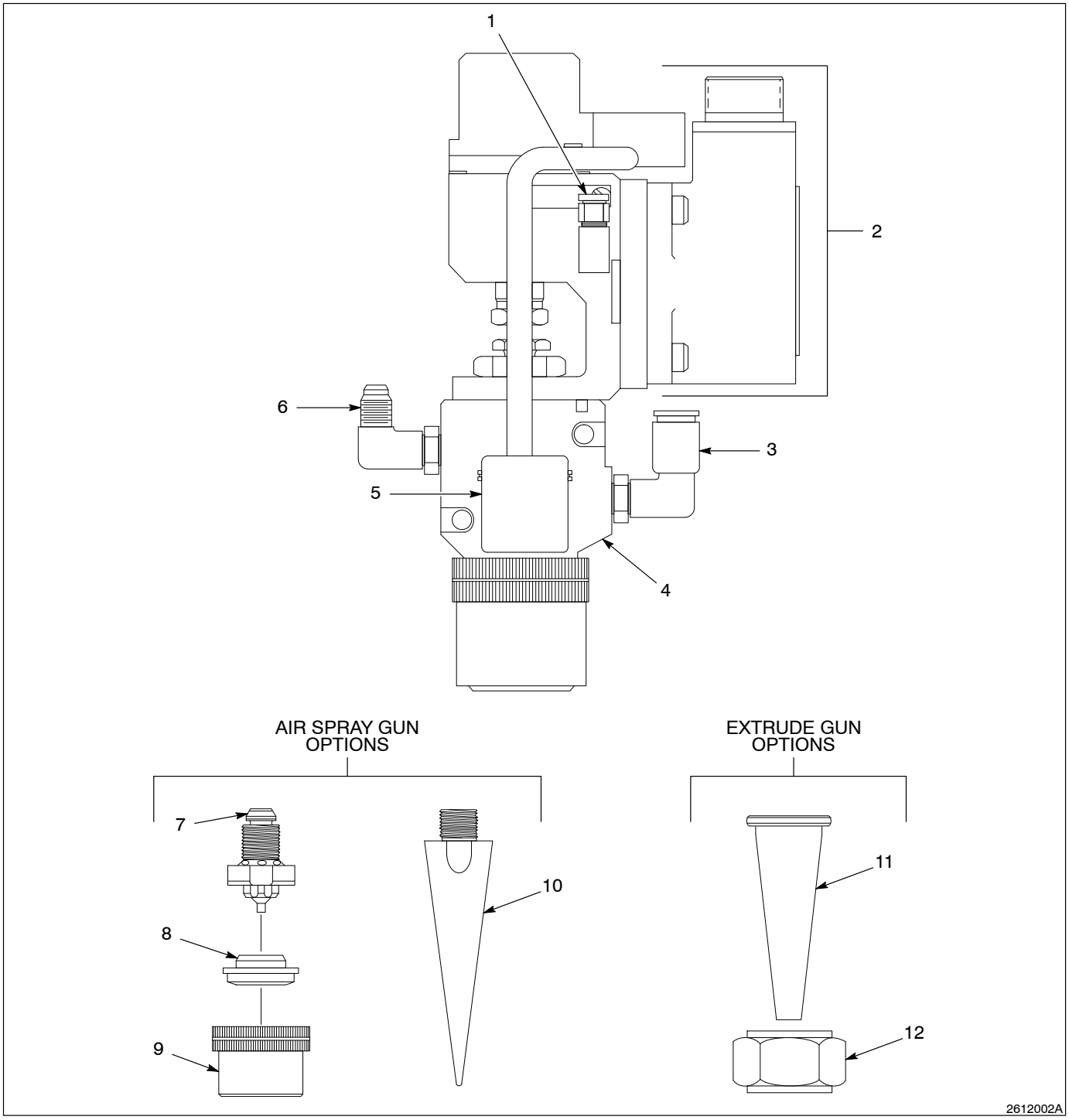

Fig. 1 Compact Air-Spray Gun

1. Actuator fitting
2. Actuator
3. Air-spray fitting
4. Trimset valve
5. Pressure transducer cordset
6. Material inlet fitting
7. Fluid tip
8. Air cap
9. Retaining ring
10. Teaching tip
11. Extrude nozzle
12. Nozzle nut

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Theory of Operation

See Figure 2. The Pro-Flo controller monitors robot speed and material pressure to control the flow of material from the gun. The robot controller sends an analog signal, directly proportional to the robot speed, to the Pro-Flo controller. The Pro-Flo controller senses material pressure through the pressure transducer port (4). The pressure transducer is installed in the gun's trimset valve (3), just ahead of the nozzle.

The Pro-Flo controller sends a low-current output signal to the gun actuator. The actuator controls the trimset valve orifice opening by regulating air flow to either side of the air cylinder piston (7). Material enters the trimset valve through the material inlet port (5) ahead of the valve seat (1). When the actuator opens the trimset valve, the material flows between the stem and seat, and into the nozzle for dispensing.

A coil (9) and armature (10) installed in the head of the actuator air cylinder (8) provide fine control of valve operation by supplying feedback to the Pro-Flo controller.

3. 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.

Inspection

Inspect the gun for dents, scratches, corrosion, and other physical damage. If any damage is visible, contact a Nordson Corporation representative immediately.

Installation

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

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

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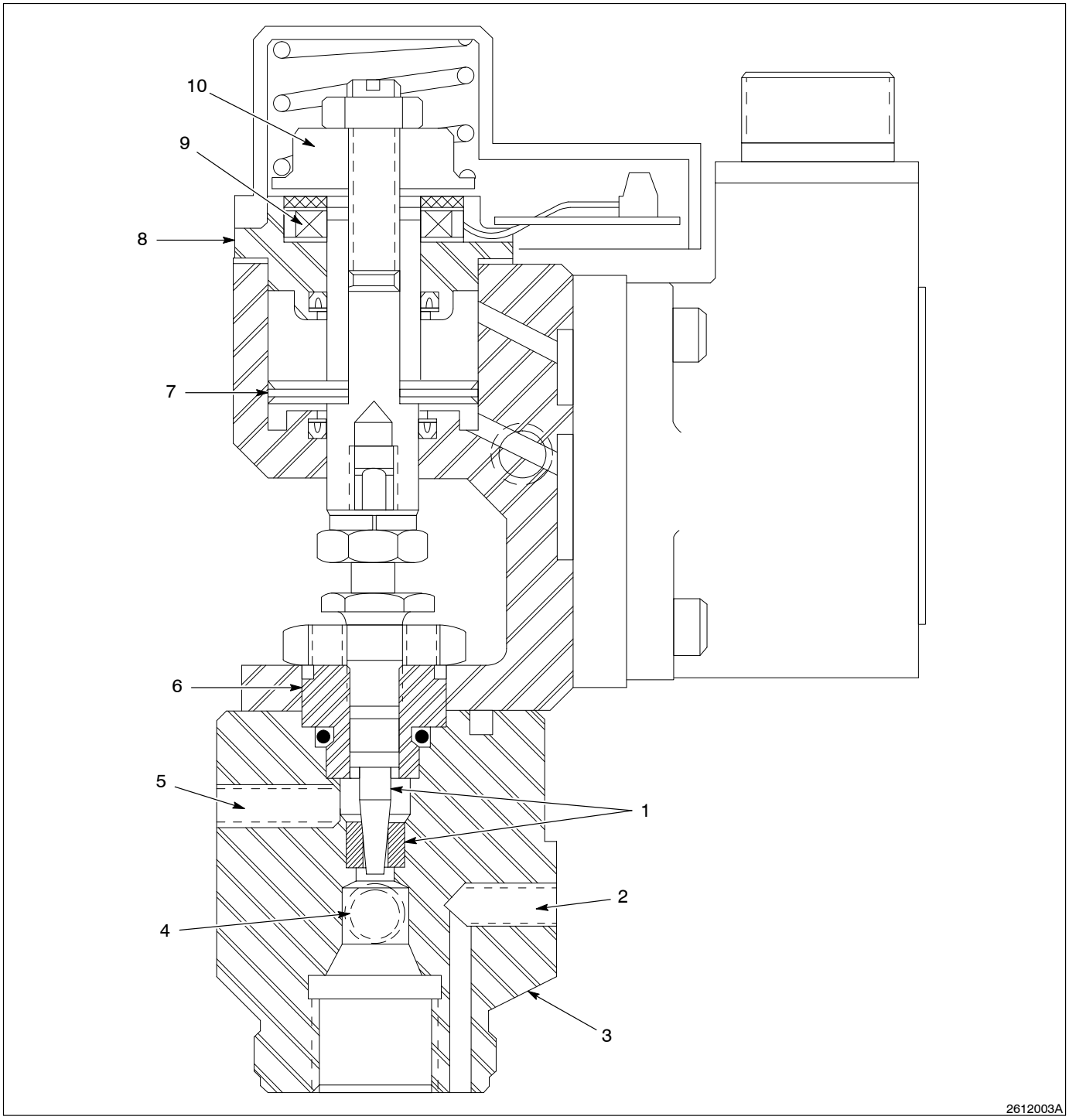

Fig. 2 Typical Compact Air-Spray Gun

1. Stem and seat
2. Air-spray inlet port
3. Trimset valve
4. Pressure transducer port
5. Material inlet port
6. Packing-type bonnet
7. Air cylinder piston
8. Cylinder head
9. Coil
10. Armature

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Gun Mounting

See Figure 3. Mount the gun to a robot arm by using a customer-supplied adapter specifically designed for the application. The adapter must provide two $^{1}/_{4}$-20 in. or M6 threaded bolts to accept the hollow dowels (3) on the trimset valve.

Most applications require precise mounting of the gun on the robot. Consider the clearances necessary for cables, air lines, and material supply hoses and their fittings when calculating the robot and gun path.

NOTE: Route cables, air lines, and the material supply hose to avoid contact with workpieces and damage from robot movement.

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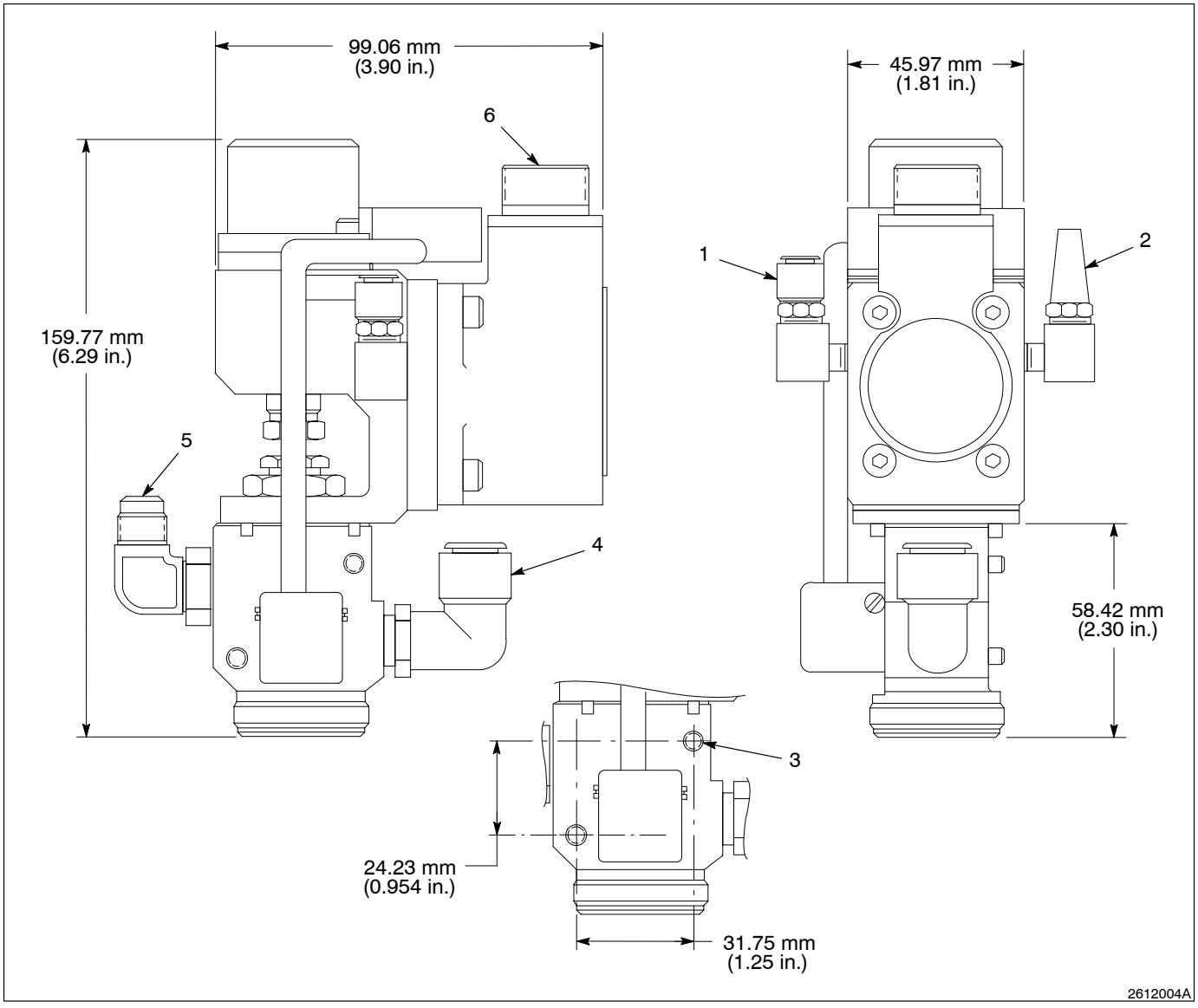

Fig. 3 Compact Gun Dimensions

1. Actuator fitting
2. Muffler
3. Hollow dowels
4. Air-spray fitting
5. Material inlet fitting
6. Gun control cable receptacle

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Cable Connections

The type of cables used to hook the gun to the controller vary slightly, depending on the controller being used, and the optional equipment supplied with the gun.

1. See Figure 4. Connect a Y-cable (6) to the Pro-Flo controller (7).

2. Connect the other end of the Y-cable to the gun control cable (5).

If your gun is equipped with an air-spray proportioning valve, the other end of the gun control cable has two plugs: one for the gun control extension cable (10) and one for the air proportioning valve extension cable (1).

3. Route the cables through the carrier on the robot and connect the gun control plug to the gun. Use a gun control extension cable, if needed to allow free robot movement of the compact gun (9).

4. If your gun is equipped with an air-spray proportioning valve, connect the air proportioning plug to the air-spray proportioning valve (13).

Make sure the cables will not bind as the robot moves.

NOTE: Cables may be purchased in different lengths. Contact your Nordson Corporation representative for more information.

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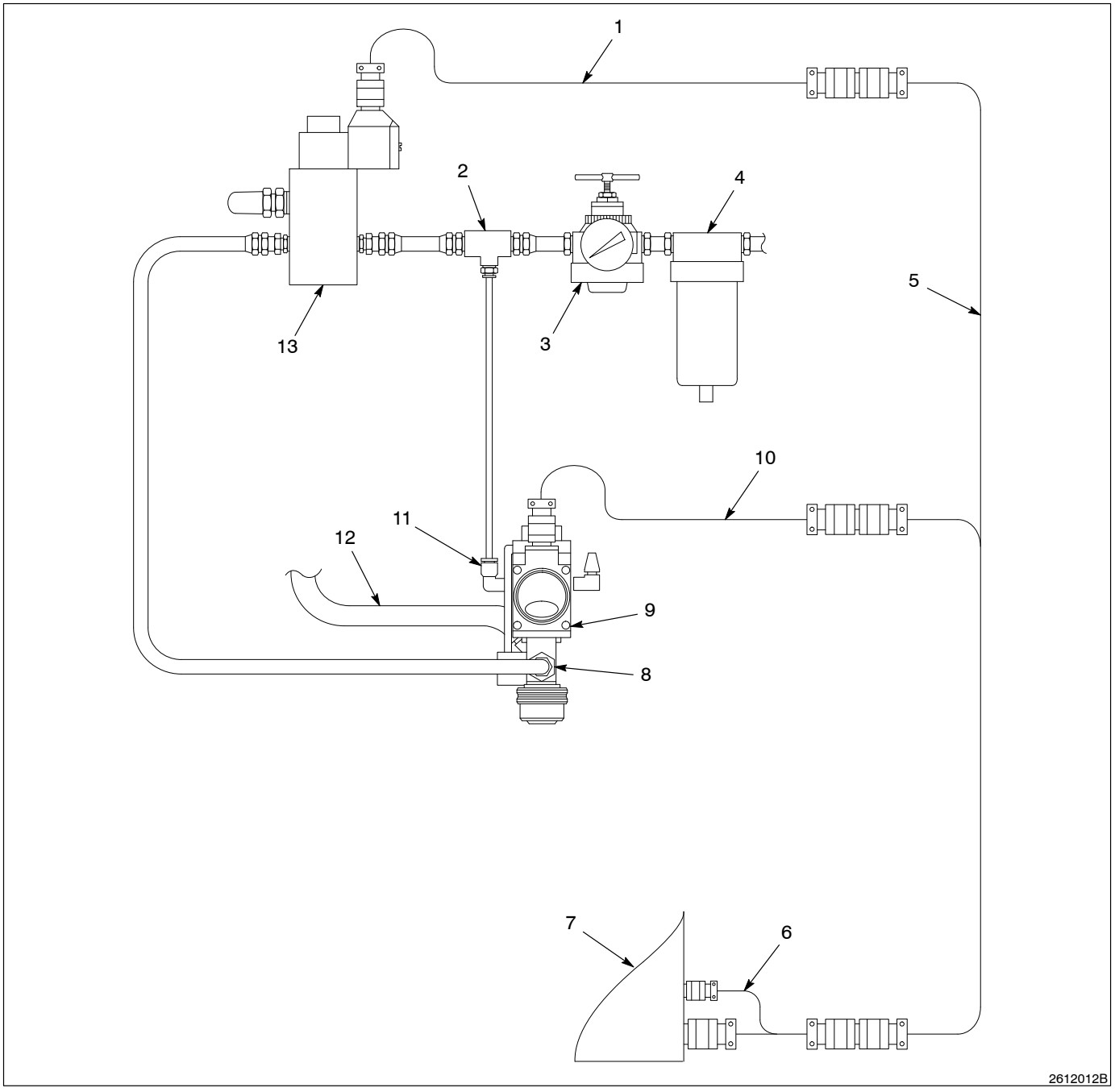

Fig. 4 Cable Connections

1. Air proportioning valve extension cable
2. Air line tee connector
3. Regulator
4. Filter
5. Gun control cable
6. Y-cable
7. Pro-Flo controller
8. Air-spray fitting
9. Compact gun
10. Gun control extension cable
11. Actuator fitting
12. Material supply hose
13. Air-spray proportioning valve

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Supply Air Connection

See Figure 4. Supply air must be taken from an oil-free shop air outlet that will maintain a pressure of at least 4.83 bar (70 psi). The gun will not operate properly without the required amount of air pressure (4.83–8.28 bar (70–120 psi)). Gun performance will increase at higher pneumatic pressures.

1. Install a filter (4) and a regulator (3) in a convenient location near the robot.

2. If installing a gun equipped with an air-spray proportioning valve (13), install an air line tee connector (2) on the regulator output. The air line tee connector should accommodate a $^1/_4$-in. and $^1/_2$-in. tubing connection.

3. Connect tubing from a shop air supply to the input of the filter.

4. Connect $^1/_4$-in. tubing from the air output to the actuator fitting (11).

5. On guns equipped with air-spray proportioning valve, connect $^1/_2$-in. tubing from the air line tee connector output to the input of the proportioning valve (13).

6. Connect $^1/_2$-in. tubing from the output of the air-spray proportioning valve to the air-spray fitting (8).

Material Supply Line

1. See Figure 3. Connect a Nordson swivel (purchased separately) to the material inlet fitting (5) on the trimset valve. Refer to the manual, *Nordson High Pressure Fluid Swivel Connections* for appropriate part numbers, connector sizes, and possible configurations. If additional assistance is needed, contact your Nordson Corporation representative.

NOTE: If a standard material inlet fitting is required, a 90° elbow can be used. This fitting features a JIC-6 hose connection ($^9/_{16}$-18 thread).

2. See Figure 4. Connect the material supply hose (12) to the compact gun.

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Nozzles and Fluid Tips

Your Nordson Corporation representative can help select the correct nozzles and fluid tips for your applications. Nozzle or fluid tip selection depends on the type of material to be dispensed, the desired bead size, and your production rate requirements.

To install a fluid tip, perform the following procedure:

1. See Figure 1. Screw the fluid tip (7) into the bottom of the trimset valve (4).
2. Place the air cap (8) inside the retaining ring (9).
3. Install the retaining ring over the fluid tip. Tighten securely.

To install an extrude nozzle (11), place the nozzle nut (12) over the extrude nozzle and tighten securely to the trimset valve (4).

Purging

Purge the gun before operating to avoid trapping air in the valve. Trapped air may create erroneous transducer readings and can release unexpectedly, causing irregular bursts of material and air from the nozzle. Purging procedures are given in the *Operation* section.

4. 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.

Introduction

The Pro-Flo system compact guns have no operating controls of their own. Gun operation is controlled by a Pro-Flo system controller, along with the robot controller.

Before operating a Pro-Flo system, read all related component manuals and be familiar with the operating characteristics of each component in the system. A thorough understanding of system operation will help you adjust the proper system settings to obtain desired results.

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Gun Purging

After the gun has been installed, purge the gun to remove air from the material hose, trimset valve, and nozzle. Place a material waste container under the gun.

Purging may be initiated from either the robot controller or the Nordson controller. Purge the gun until material flows freely from the nozzle. Refer to your Pro-Flo controller manual for purging procedures.

Pressure Transducer Calibration

NOTE: If your system is equipped with a Nordson digital controller, do not calibrate the pressure transducer. It is automatically calibrated by the digital controller.

If your system is equipped with an analog controller, the pressure transducer must be calibrated after any of the following procedures:

- a new gun is installed
- the transducer is replaced
- the pressure transducer cable is replaced by a longer or shorter one

Refer to the *Pro-Flo Analog Controller* manual for pressure transducer calibration procedures.

5. Maintenance

Follow a preventive maintenance schedule to keep your Pro-Flo system compact guns operating efficiently.

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

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

Daily

- Check the nozzle for wear. Replace it when necessary.
- Make sure the cable connections are tight.

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Weekly

- Check the gun for leaks at the bonnet. Tighten the bonnet screw if necessary.
- Check the cable connectors for damage. Replace cables if necessary.
- Calibrate the pressure transducer (analog controller only).

Periodically

- Make sure the gun is mounted securely.
- Check the cables for wear. Replace any damaged or frayed cables.
- Clean the filter in the air supply line.
- Remove and clean the pressure transducer.

6. 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.

Introduction

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 Corporation representative for help.

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Troubleshooting Charts

Problem	Possible Cause	Corrective Action
1. Gun does not dispense material	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.
2. Gun does not dispense material, and does not open	Control air pressure absent or low	Check supply air pressure. Increase air pressure if necessary.
	Stem binding	Remove the trimset valve and loosen the bonnet screw on a packing-type bonnet. Check and replace the stem and bonnet, if necessary.
	Actuator malfunctioning	Replace the actuator.
3. Gun does not dispense material, but opens fully	Trimset valve blocked	Remove and clean the trimset valve.
4. Gun does not change dispensing rate to control bead size	Cordset damaged	Check the continuity of cordset. Replace cordset if necessary.
	Gun control, Y-, or extension cable damaged	Check the continuity and replace cables if necessary.
5. Gun does not change dispensing rate to control bead size, but opens fully	Pressure transducer in controller malfunctioning	Check the pressure output voltage of the controller board.

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Problem	Possible Cause	Corrective Action
6. Gun continues to dispense after cycle, and controller indicates that gun is closed	Control air pressure low	Check supply air pressure and increase it if necessary.
	Needle not seating	Purge the gun.
	Stem and trimset valve seat worn	Replace trimset valve.
7. Dispensing starts late	Gun On signal from robot controller to Nordson controller timed improperly (digital controller only)	Set the proper timing sequence.
	Stem binding (packing-type bonnet only)	Loosen bonnet screw.
8. Bead deposition "wiggles"	Nozzle too high above workpiece	Lower nozzle.
	Material velocity through nozzle too high	Decrease the bead size.
		Install larger nozzle.
9. Bead size changes unexpectedly	Nozzle partially blocked	Clean nozzle.
	Material exceeded shelf life	Use new material.
10. Material leaks from bonnet	Bonnet screw loose	Tighten bonnet screw.
	Bonnet packing worn	Replace bonnet.

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7. 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.

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

Disconnect, lock out, and tag electrical power at a disconnect or breaker in the service line ahead of electrical equipment before servicing.

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

Tools and Supplies Required

The following tools are required for servicing the compact gun:

- wrench
- slotted screwdriver
- torque wrench
- O-ring removal tool
- trimset nut wrench
- adjustment wrench
- MCO piston seal forming tool (for guns equipped with an MCO assembly)

The following supplies are recommended for use during repair procedures:

- PTFEgrease
- threadlock adhesive

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Clearing a Blocked Nozzle

To clear a blocked nozzle, perform the following procedure:

1. Shut off air pressure to the drum unloader.
2. Bleed off residual pressure through the in-line pressure relief valve in the material supply line. This valve should be located near the drum unloader.
3. Shut off and lock out all power to the system.
4. Remove the retaining ring and fluid tip or the nozzle nut and nozzle. Clean the fluid tip or nozzle thoroughly with an appropriate solvent.
5. Reinstall the fluid tip or nozzle.

Clearing a Blocked Material Supply Hose

NOTE: For this procedure, start at the drum unloader and work toward the gun. Repeat this procedure at each connection in the material supply hose.

To clear a blocked material supply hose, perform the following procedure:

1. Shut off air pressure to the drum unloader.
2. Bleed off residual pressure through the in-line pressure relief valve in the material supply line. This valve should be located near the drum unloader.
3. Disconnect the hose.
4. Turn on the drum unloader and check the flow.
5. Turn off the drum unloader and relieve the system pressure if necessary.
6. If no flow was seen, unblock this section of the hose.
7. If no blockage was found, reconnect the hose and repeat this procedure at the next connection.

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Removing Gun from Robot

To remove the gun from the robot, perform the following procedure:

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 material supply hose from the material inlet fitting on the trimset valve.
5. Disconnect the air lines from the actuator fitting and the air-spray fitting.
6. If the gun is equipped with an MCO assembly, mark the extend and retract air lines and disconnect them from the air manifold.
7. Disconnect the gun control cable from the gun.
8. Remove the two bolts securing the gun to the robot arm adapter.

Removing the Trimset Valve

To remove the trimset valve, perform the following procedure:

1. Remove the gun from the robot.
2. If the gun is equipped with a pressure transducer, remove the transducer cover from the side of the trimset valve and unplug the cordset.
3. See Figure 5. Use a trimset nut wrench to remove the locknut (12) that secures the trimset valve (15) to the actuator frame (7).
4. Separate the trimset valve and the actuator.
5. Slide the adjustment wrench on the flats of the actuator piston shaft (8) to prevent it from turning. Use another wrench to loosen the hex nut (9) and remove it from the stem (10).
6. Remove the pressure transducer from the trimset valve.

Replacing the Actuator

Replace the actuator with a new one if it is malfunctioning. The entire actuator assembly is replaced by a new one. Install an existing or new trimset valve by following the procedure *Installing the Trimset Valve* later in this section.

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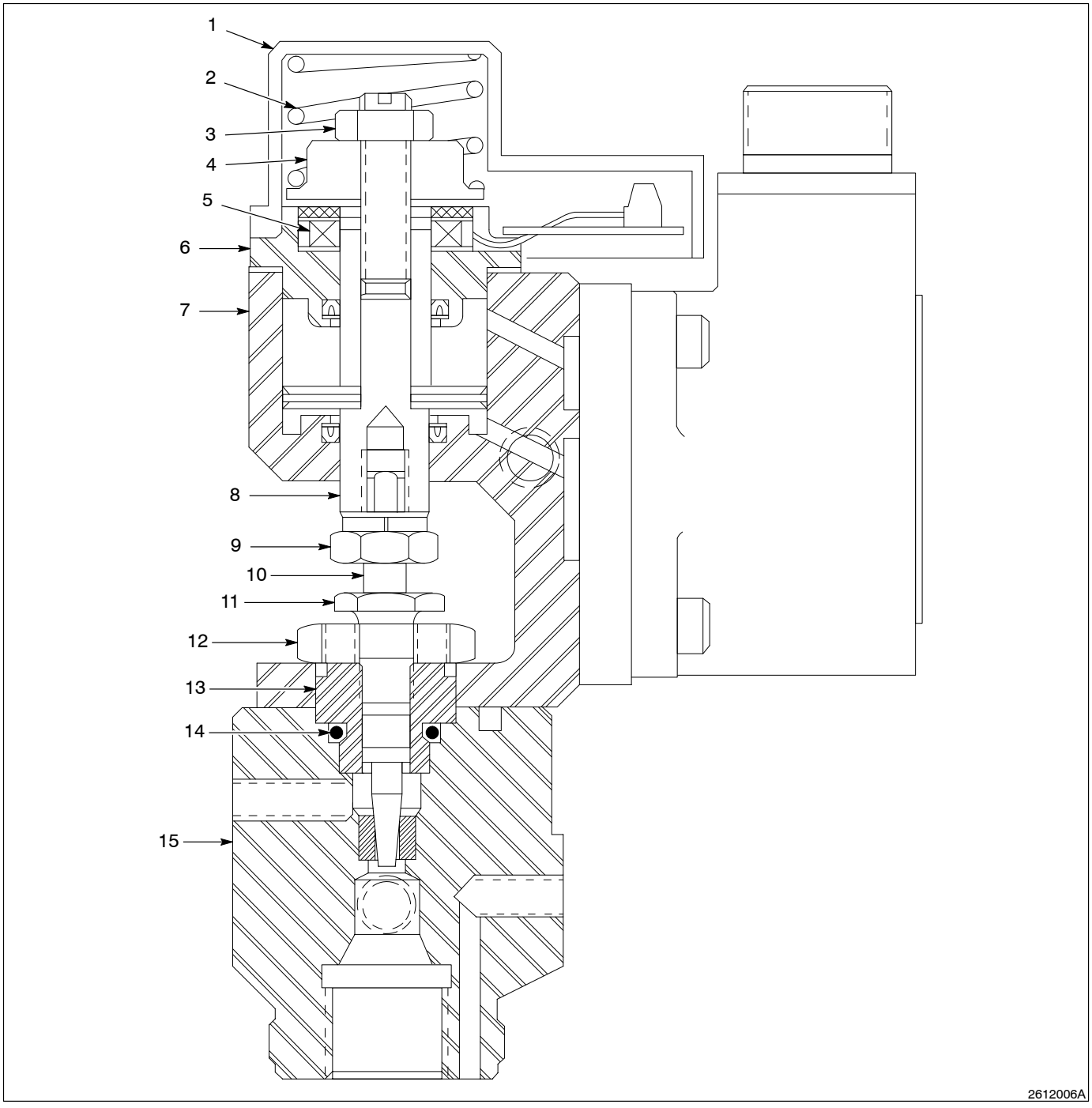

Fig. 5 Typical Compact Gun

1. Spring cover
2. Compression spring
3. Locknut
4. Armature
5. Coil
6. Cylinder head
7. Actuator frame
8. Actuator piston shaft
9. Hex nut
10. Stem
11. Bonnet screw
12. Locknut
13. Bonnet
14. O-ring
15. Trimset valve

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Replacing the Bonnet

To replace the bonnet, perform the following procedure:

1. See Figure 5. Unscrew the old bonnet (13) from the trimset valve (15).

2. Coat the bonnet O-ring (14) with PTFE grease. Install the bonnet in the trimset valve. Use a torque wrench to tighten the bonnet to 47.5 N•m (35 lb-ft). Make sure it is fully seated.

3. If you have a bonnet with adjustable packings, loosen the bonnet screw (11). Tighten the bonnet screw (11) finger tight.

   NOTE: This step is not required if using a lip seal bonnet.

   NOTE: Do not tighten the bonnet screw more than $^1/_2$ turn beyond finger tight. Over-tightening may cause the valve stem to bind causing the trimset valve to open slowly, or not at all.

Installing the Trimset Valve

To install the trimset valve, perform the following procedure:

1. See Figure 5. Attach the trimset valve (15) to the actuator. Feed the stem (10) through the bottom of the actuator frame (7). Place the locknut (12), then the hex nut (9), over the stem.

   NOTE: The trimset valve can be rotated by 180°, relative to the actuator, to accommodate an opposite-handed cordset.

2. Thread the stem into the actuator shaft (8) until it is fully seated.

3. Tighten the locknut (12) to secure the trimset valve to the actuator.

4. Hold the actuator piston shaft (8) with an adjustment wrench to keep it from turning. Tighten the hex nut (9) on the actuator shaft.

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Checking the Armature Clearance

To check the armature clearance, perform the following procedure:

1. See Figure 5. Remove the spring cover (1) and compression spring (2).
2. Push down on the top of the armature (4).

   See Figure 6. There should be a gap of 0.43–0.88 mm (0.017–0.035 in.) between the armature (3) and the cylinder head (4). If the gap is more or less, refer to the procedure *Adjusting the Armature Clearance* in this section.
3. Replace the compression spring and spring cover.
4. Plug the cordset connector into the pressure transducer and replace the pressure transducer cover.

Adjusting the Armature Clearance

To adjust the armature clearance, perform the following procedure:

1. See Figure 5. Remove the spring cover (1) and compression spring (2).
2. Hold the actuator piston shaft (8) with an adjustment wrench to prevent it from turning. Use a second wrench to loosen the locknut (3).
3. Loosen the armature (4) by turning it counter-clockwise. Move it to the end of the actuator shaft.
4. See Figure 6. Push down on top of the actuator shaft (1) until the stem is seated.
5. Turn the armature (3) clockwise until it comes into light contact with the cylinder head (4).
6. Turn the armature counter-clockwise by $^1/_2$ to 1 turn and tighten the locknut (2). This will produce a gap of approximately 0.43 to 0.88 mm (0.017 to 0.035 in.) between the armature and cylinder head.
7. Replace the compression spring and spring cover.

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Adjusting the Armature Clearance (contd)

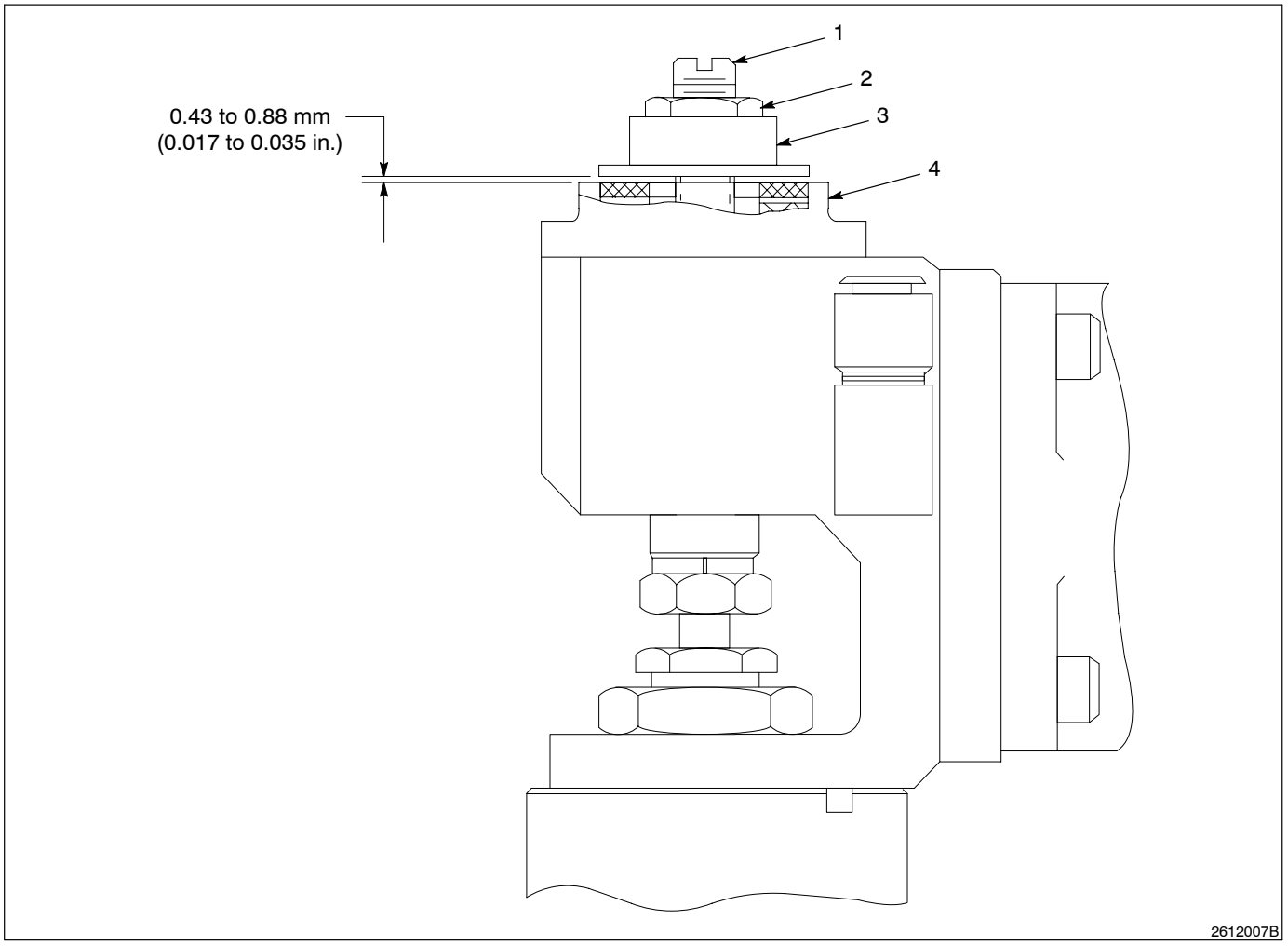

Fig. 6 Armature Clearance

1. Top of actuator shaft
2. Locknut
3. Armature
4. Cylinder head

Converting the Gun to the Opposite Hand

The cordset is the only side specific part of the gun. All other components are interchangeable and can simply be moved from one side to the other. See the *Parts* section for information on ordering the correct cordset.

To convert the gun to the opposite hand, perform the following procedure:

1. See Figure 7. Remove the spring cover from the top of the gun.

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2. Loosen the terminal block set screws that secure the pressure transducer (4) and coil (3) cordset wires. Remove the wires from the terminal block (2).

3. Remove the pressure transducer cover, unplug the cordset, and remove the pressure transducer (4) with a wrench.

4. Remove cord clamp and cordset.

5. Swap the trimset plugs, swivel lock, materials supply fitting, and transducer from one side of the gun to the other.

6. Install the opposite sides cordset and wires in the proper terminal block slots. Tighten the terminal block set screws.

7. Loosely install cord clamp to hold the cordset.

8. Connect the cordset plug and replace the transducer cover. Tighten the cap screws to 8.47 N•m (75 lb-in.).

9. Replace the spring cover.

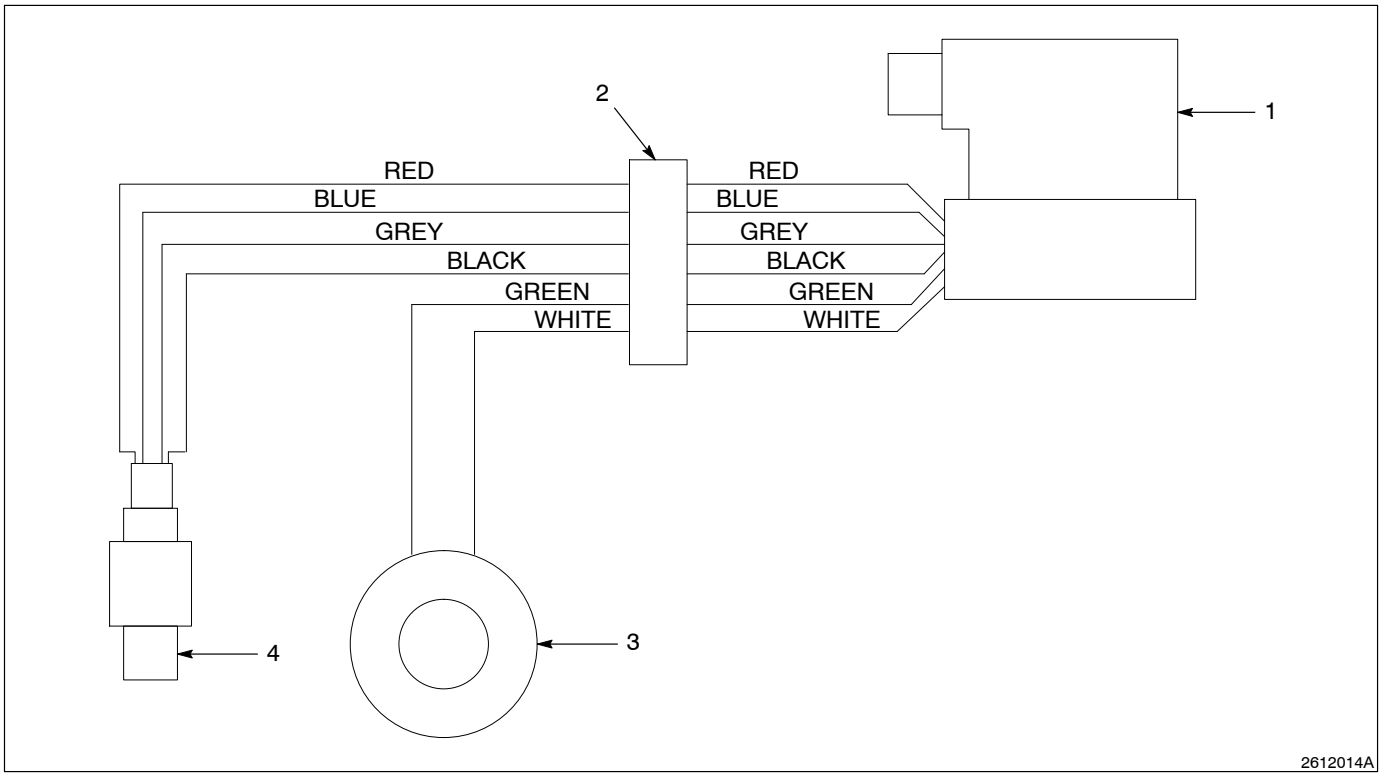

Fig. 7 Cordset Wiring

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

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Checking the Continuity of the Cordset Cord

See Figure 8. To check the continuity of the cordset cord, perform the following procedure:

1. Remove the pressure transducer cover and unplug the cordset. Disconnect the gun control cable from the gun.

2. Check the continuity of each wire with an ohmmeter. The wires are connected as shown in Table 1.

3. Replace the cordset if it is defective.

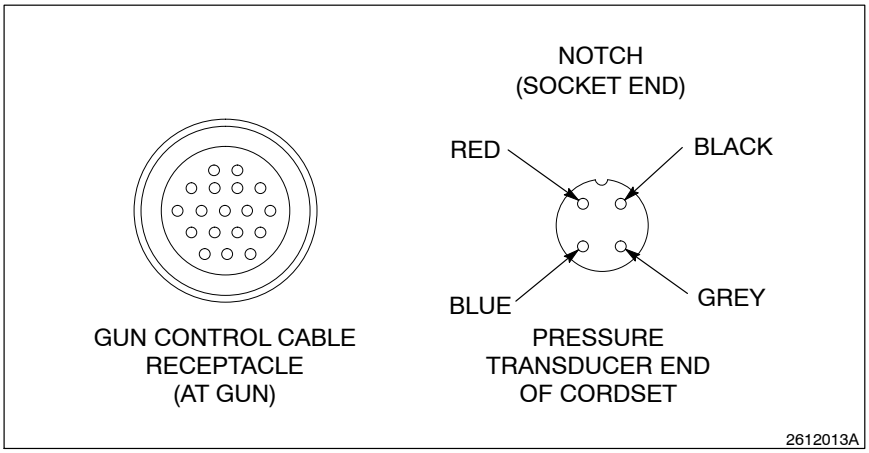

Fig. 8 Pin Locations of Cordset

Table 1 Wire Connections on Cordset

Gun Connector End Pin	Transducer End Pin	Wire Color
K	45° CCW from notch	Red
M	135° CCW from notch	Blue
L	135° CW from notch	Grey
J	45° CW from notch	Black

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Installing Gun on Robot

To install the gun on the robot, perform the following procedure:

1. Install the gun on the robot arm adapter. Secure with two $^1/_4$-in. (M6) bolts.

2. See Figure 1. Connect the material supply hose to the material inlet fitting (6). If you are using high pressure fluid swivels, remove the swivel lock, tighten the fluid swivel, and tighten the swivel lock.

3. Connect the gun control cable to the gun.

4. Connect the air supply line to the actuator fitting (1).

5. If your gun is equipped with an air-spray proportioning valve, connect the air supply line to the air-spray fitting (3).

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

7. Purge the gun to remove trapped air from the hoses and gun. Refer to your controller manual for purging procedures.

8. While purging the gun, check for leaks around the stem. If your trimset valve has a packing-style bonnet and is leaking, remove the trimset valve and tighten the bonnet screw slightly, by hand. Refer to the procedure *Removing the Trimset Valve* in this section. If this does not stop the leakage, tighten the bonnet screw an additional $^1/_8$ turn and test the gun again. Tighten the bonnet again if required, but do not turn the bonnet screw more than $^1/_2$ turn beyond finger tight.

CAUTION: Do not tighten the bonnet screw more than $^1/_2$ turn beyond finger tight. Over-tightening the bonnet screw may bind the valve stem so that the trimset valve opens slowly or not at all.

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8. Parts List

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

Using the Illustrated Parts List

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

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

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

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

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

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

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

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Compact Gun Parts List

See Figure 9.

Item	Part	Description	Quantity	Note
—	- - - - - -	Module, compact gun	1	
NS	126 736	• Kit, service, pneumatic actuator	1	
1	- - - - - -	• • Actuator, pneumatic	1	
2	126 733	• • Cover, spring	1	
NS	900 352	• • Sealant, general purpose, 1 oz	1	
NS	901 911	• • Wrench, actuator adjustment	1	
3	972 716	• Connector, $^1/_8$ in. NPT x $^1/_4$ in. OD air tube	1	
4	973 156	• Elbow, $^1/_4$ in. NPT x $^1/_8$ in. NPT	2	
5	972 727	• Elbow, 90°, Hyd, $^9/_{16}$-18 material inlet	1	
6	945 032	• O-ring, Viton, $^3/_8$-in. material inlet fitting	1	
7	972 192	• Elbow, air, $^1/_4$ in. NPT x $^1/_2$-in. tube	1	A
8	972 615	• Muffler, filter, $^1/_4$ in. NPT	1	
9	163 196	• Bonnet, packing-style	AR	
10	239 814	• Bonnet, lip seal-style, poly	AR	
11	117 287	• Nut, trimset retaining	1	
12	900 223	• Lubricant, O-ring, 4 oz tube	1	
13	163 197	• Cordset, RH	AR	
14	163 198	• Cordset, LH	AR	

NOTE A: Used on air-spray guns only.
NS: Not Shown
AR: As Required

Continued on next page

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Compact Gun Parts List (contd)

Item	Part	Description	Quantity	Note
15	- - - - - -	• Transducer, pressure	1	B
16	945 032	• • O-ring, Viton	1	
17	244 971	• Ring, air-spray retaining	1	A
18	152 290	• Nut, extrude nozzle	1	C
19	126 738	• Cover, transducer, LH or RH	1	
20	981 569	• Screw, trans cover, #10-32	1	
21	322 607	• Trimset, 200/2000 Vohm ext, lip seal bonnet, poly	AR	C
21	126 734	• Trimset, 200/2000 Vohm ext, packing bonnet, pack	AR	C
21	322 608	• Trimset, 200/2000 Vohm, airless manifold mount, lip seal, poly	AR	C
21	165 144	• Trimset, 200/2000 Vohm, airless manifold mount, pack	AR	C
22	322 609	• Trimset, 200/2000 Vohm A/S, lip seal bonnet, poly	AR	A
22	155 459	• Trimset, 200/2000 Vohm A/S, packing bonnet, pack	AR	A
23	155 465	• Plug assembly, MCO	AR	C
24	945 017	• • O-ring, $^3/_8$-in. tube	1	
25	163 199	• MCO assembly	AR	C
26	945 032	• • O-ring, Viton	1	
27	972 716	• • Connector, $^1/_8$ in. NPT x $^1/_4$ in. OD air tube	2	

NOTE A: Used on air-spray guns only.
B: Pressure transducer part numbers are given in *Pressure Transducer Parts List*.
C: Used on extrude guns only.
AR: As Required

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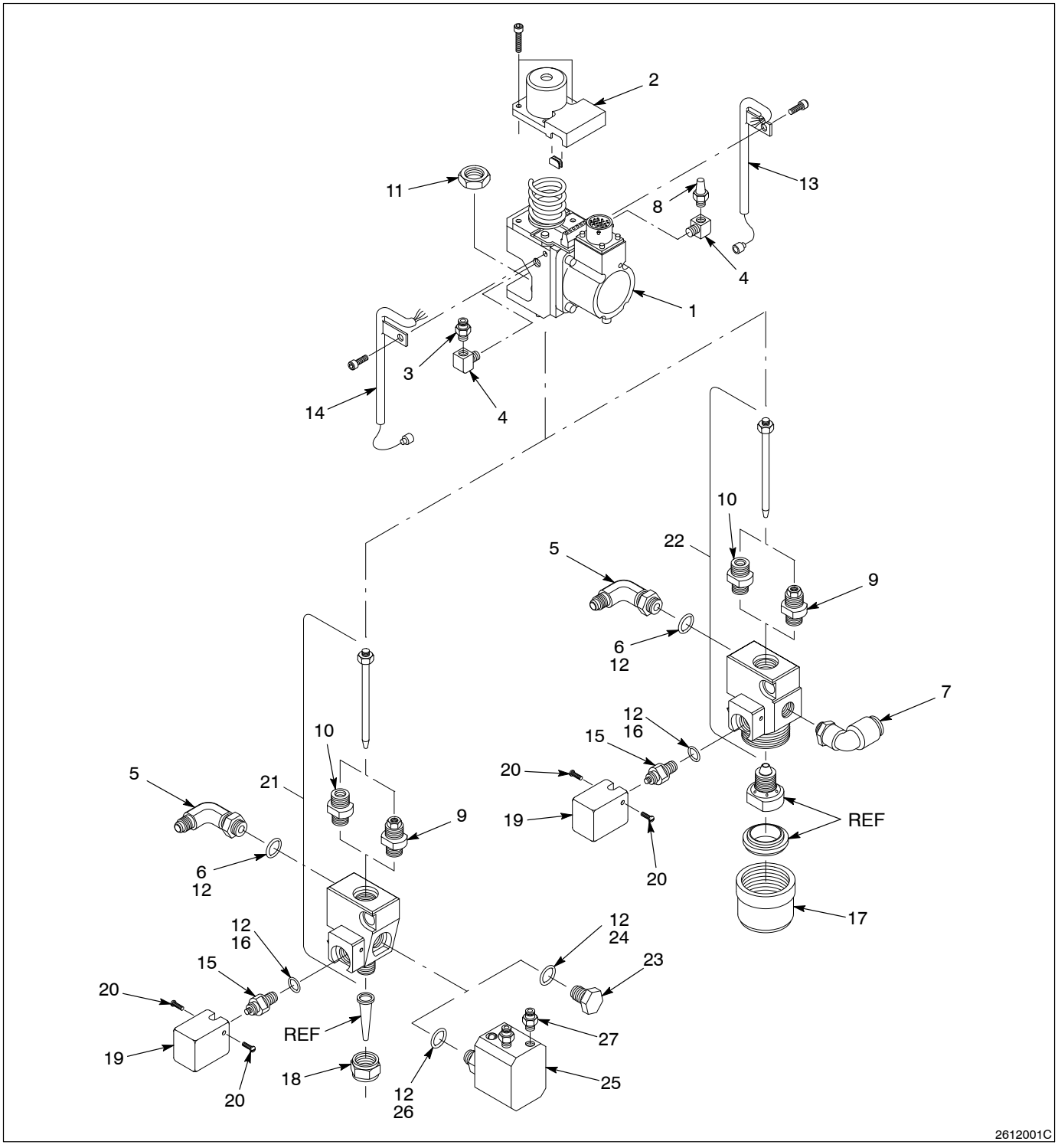

Fig. 9 Pro-Flo System Compact Gun

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Pressure Transducer Parts List

See Figure 9.

Item	Part	Description
15	139 578	Transducer, pressure, 500 psi
15	139 582	Transducer, pressure, 1000 psi
15	139 596	Transducer, pressure, 2000 psi
15	139 603	Transducer, pressure, 3000 psi

Special Service Tools Parts List

Item	Part	Description	Quantity	Note
NS	901 911	Wrench, actuator adj		A
NS	136 150	Wrench, trim set nut		

NOTE A: Included with your actuator assembly, part 126 736.
NS: Not Shown

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9. Specifications

Dimensions	See Figure 3.
Weight	1.13 kg (2 lb 8 oz)
Air Pressure	Operating: 4.83–8.38 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	Maximum of 206.90 bar (3000 psi)
Maximum Operating Temperature of Material	48 °C (120 °F)
Material Viscosity Range	10,000–3,000,000 cps
Flow Range	0–158 kg/hr (0–350 lbs/hr)

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