A-1 Handgun (European Version)

Customer Product Manual
Part 303 834A

NORDSON CORPORATION • AMHERST, OHIO • USA

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Notice

Trademarks

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1. Safety

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

To use this equipment safely,

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

Safety Symbols

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

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

Safety Symbols *(contd)*

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

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

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

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

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

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

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

CAUTION: Failure to observe may result in equipment damage.

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

Qualified Personnel

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

Intended Use

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

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

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

Installation

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

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

Installation *(contd)*

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

Operation

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

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

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

- Never operate equipment with a known malfunction or leak.

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

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

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

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

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

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

Operation *(contd)*

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

Less-Obvious Dangers

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

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

Action in the Event of a System or Component Malfunction

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

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

Maintenance and Repair

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

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

Maintenance and Repair *(contd)*

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

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

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

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

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

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

Material and Solvent Precautions

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

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

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

Material and Solvent Precautions *(contd)*

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

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

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

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

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

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

- Use nonhalogenated solvents.

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

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

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

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

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

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

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

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

Material and Solvent Precautions *(contd)*

Table-1 Solvents Containing Halogenated Fluids

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

Disposal

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

2. Description

See Figure 1. The European version of the A-1 handgun is a heated, manual dispensing gun for applying high-viscosity materials onto a substrate at high flow rates.

The A-1 handgun features a cool handle design with no heated parts in the hand grip/trigger section.

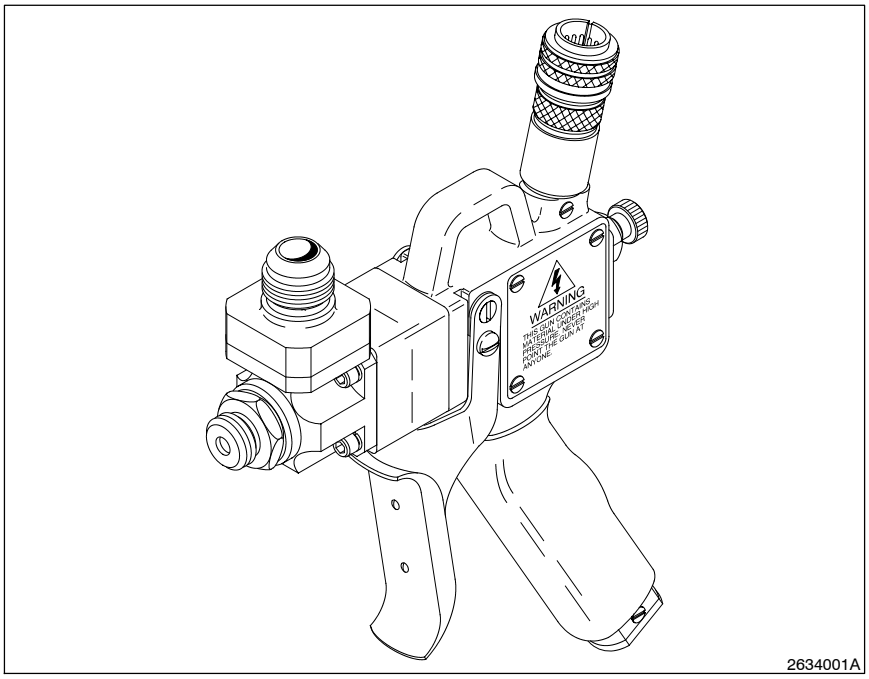

Fig. 1 A-1 Handgun

See Figure 2. A swivel (1) allows the gun to be rotated up to 340 degrees at the hose connection without twisting or damaging the hose.

The thumb screw (5) on the back of the gun handle adjusts trigger travel for constant bead size with every application. When the thumb screw is rotated fully clockwise, it locks the gun to prevent triggering when the gun is not in use.

A sub-miniature switch (6) on the trigger mechanism controls the operation of the material supply pump.

Two heater cartridges and a resistance temperature detector (RTD) (9) are located in the hydraulic body (8), which sense and control gun temperature.

The handgun is shipped in the top-feed configuration. The handgun can be converted to a left-, right-, or bottom-feed configuration by re-orienting the cordset (4) and swivel (1).

Optional Nozzles and Hoses

A wide variety of different nozzles, which allow for precise control of material deposition, are available for the A-1 handgun. Refer to the *Parts* section of this manual for lists of available nozzles, heated hoses, and replacement parts for the A-1 handgun.

Theory of Operation

Material is delivered under hydraulic pressure from the bulkmeter or unloader through a hose to the gun. Heated hoses are used with bulkmeters to keep the material at the proper application temperature. Hose and gun temperature is controlled by either the bulkmeter or a System Sentry control console.

The trigger (7) is connected to a ball and seat (10) in the hydraulic body (8). Squeezing the gun trigger pulls the ball away from the seat, allowing the pressurized material to be forced through the opening in the seat and out through the nozzle.

A sub-miniature switch (6) attached to the trigger mechanism closes and actuates a solenoid (on piston pump units), starting the pump.

When the gun trigger is released, a spring (3) forces the ball back against the seat to positively stop material flow. The sub-miniature switch opens, stopping the pump.

The gun must be hung by the loop (2) when it is not in use.

Theory of Operation *(contd)*

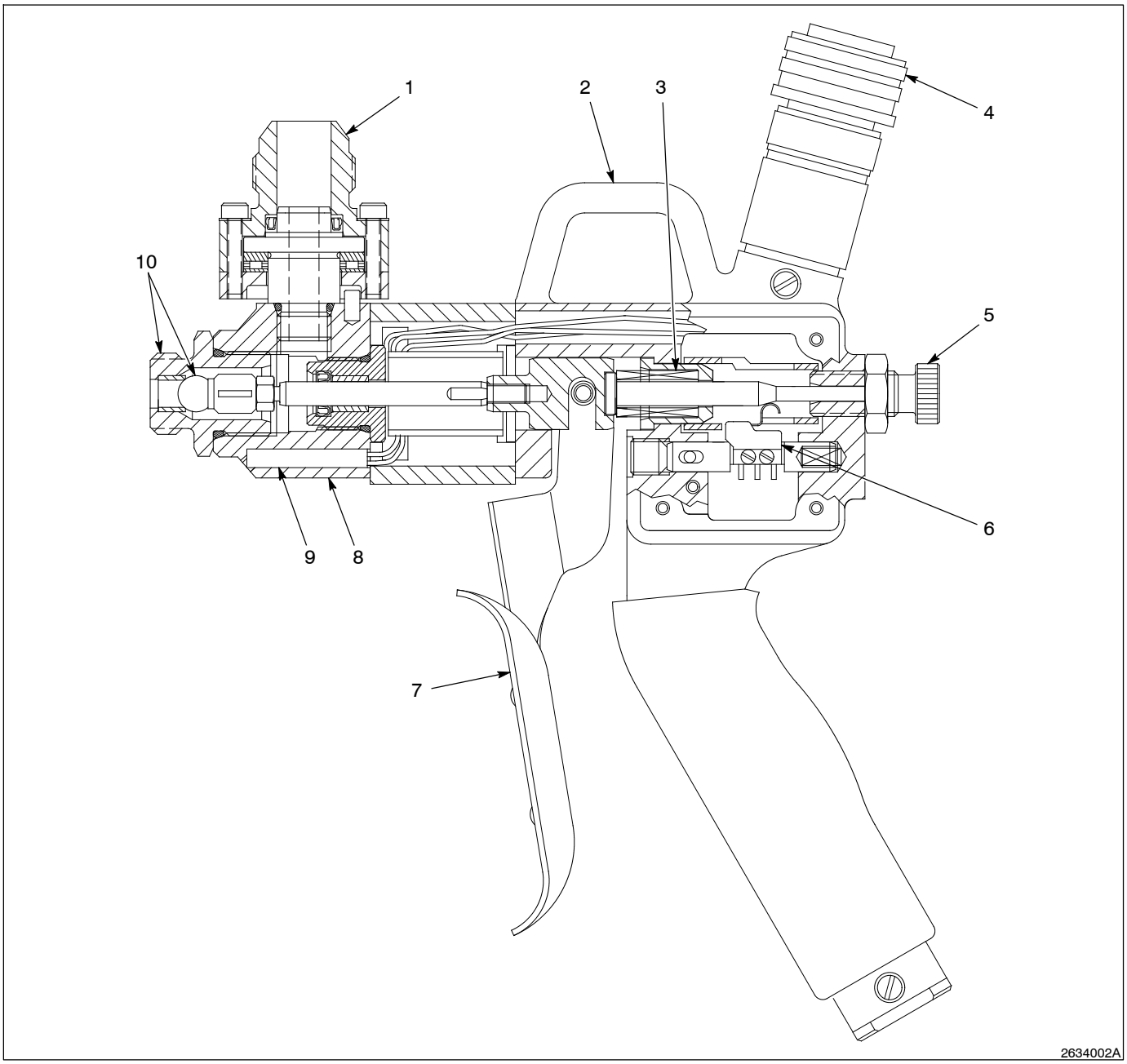

Fig. 2 A-1 Handgun Description and Operation

1. Swivel
2. Loop
3. Spring
4. Cordset
5. Thumb screw
6. Sub-miniature switch
7. Trigger
8. Hydraulic body
9. RTD
10. Ball and seat

Specifications

The following section lists the technical information needed to install and operate the A-1 handgun.

Dimensions	
Length	26.7 cm (10.5 in.)
Depth	23.4 cm (9.2 in.)
Width	6.1 cm (2.4 in.)
Weight	1.58 kg (3.5 lb)
Electrical Requirements	240 Vac, 50/60 Hz, 60 W
Maximum Working Pressure	210 bar (3000 psi)

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.

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

WARNING: Risk of electrical shock. Complete the hose-to-gun hydraulic and electrical connections before connecting the hose to the bulkmeter to prevent electrical shock.

The following section describes the installation procedures for the A-1 handgun.

Circuit Breaker Retrofit Kits

Change the gun circuit breakers in the bulkmeter before using the A-1 handgun. Each bulkmeter kit for the A-1 handgun includes installation instructions.

Converting Connections to Left, Right, or Bottom Feed

See Figure 3. Use the following procedure to reconfigure the A-1 handgun to accommodate left-, right-, or bottom-feed material and electrical connections.

Material Inlet Conversion

The swivel connector can be re-oriented to accept either a left-, right-, or bottom-feed material connection. Use the following procedure to reposition the hydraulic body to accept the desired material connection.

1. Remove the screws (21) securing the trigger (22) to the gun handle (20). Remove the trigger from the gun handle.

2. Remove the screws (1) and lock washers (2) securing the hydraulic body (3) to the insulator block (5).

3. Pull the hydraulic body away from the insulator block. Gently pull enough of the heater cartridge and RTD leads (6) to reach to their new position.

4. Re-orient the hydraulic body to the desired position and place it back onto the insulator block.

5. Reinstall the screws (1) and lock washers (2) that secure the hydraulic body (3) and insulator block (5) to the gun handle (20).

Cordset Connection Conversion

See Figure 3. The cordset can be connected at the bottom of the gun handle. Follow these steps to reconfigure your A-1 handgun to accept the bottom-feed cordset.

1. Remove the screws (16) and lock washers (15) securing the warning plate (14) to the gun handle (20). Disconnect the wires from the terminal strip (10) and sub-miniature switch. Remove the screw (13) and lock washer (12) securing the ground (11) to the gun handle.

2. Remove the screws (7) and lock washers (8) securing the cordset (9) to the gun handle and remove the cordset.

3. Remove the screws (17) and lock washers (18) securing the handle closure (19) to the gun handle. Remove the handle closure and set it aside.

4. Feed the cordset wires through the bottom of the gun handle. Connect the leads to the terminal strip and sub-miniature switch as shown in Figure 4. Connect the ground (11) to the gun handle (20) with the screw (13) and lock washer (12).

5. Secure the cordset to the gun handle with the screws (17) and lock washers (18).

6. Install the warning plate (14) onto the gun handle (20) with the screws (16) and lock washers (15).

7. Install the handle closure (19) onto the cordset connection at the top of the gun handle and secure it with the screws (7) and lock washers (8).

Converting Connections to Left, Right, or Bottom Feed

(contd)

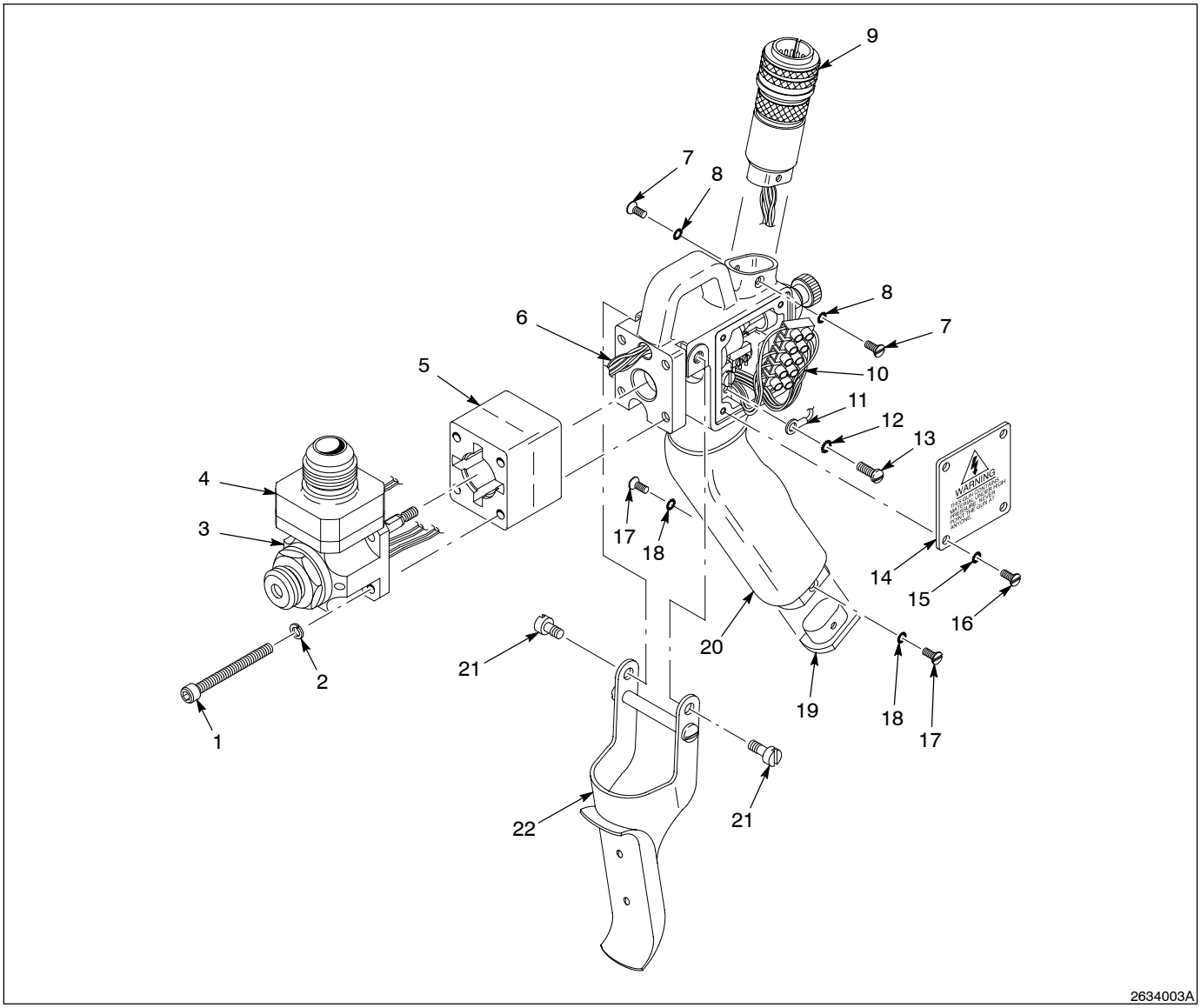

Fig. 3 Reconfiguring Material and Electrical Connections

1. Screws (4)
2. Lock washers (4)
3. Hydraulic body
4. Swivel
5. Insulator block
6. RTD leads
7. Screws (2)
8. Lock washers (2)
9. Cordset
10. Terminal strip
11. Ground
12. Lock washer
13. Screw
14. Warning plate
15. Lock washers (4)
16. Screws (4)
17. Screws (2)
18. Lock washers (2)
19. Handle closure
20. Gun handle
21. Screws (2)
22. Trigger

Material and Electrical Connections

Use the following procedures to make the necessary material and electrical connections to the A-1 handgun.

CAUTION: Do not use extra fittings or nipples to connect this gun to a heated hose. A cold connection could result, adversely affecting material flow and deposition.

NOTE: Refer to the *Parts* section to select the proper material supply hose for your application.

1. See Figure 3. Connect the material supply hose to the swivel (4). The connection is a male $1^{1}/_{16}$-12 UN.

   This is an inline note used with a second level bullet. May have more than one line of text. Notes will be indented with their associated text.

   NOTE: Use the following guidelines to connect the material supply line to your A-1 handgun if it has been converted to left, right, or bottom feed configuration:

   - Bottom Feed: Connect in the same manner as the top feed configuration.
   - Right or Left Side Feed: Install the 90° elbow shipped with the gun onto the swivel connector. Connect the material supply hose to the 90° elbow. The connection is a male $1\ ^{1}/_{16}$-12 UN.
   - Guns without Swivels: Connect the material supply hose directly to the hydraulic body. The connection is a female $^{9}/_{16}$-18 UNF.

   NOTE: To ensure a tight hose-to-gun hydraulic connection, hold the swivel joint in place with a wrench across the swivel flat while using another wrench to tighten the hose fitting.

CAUTION: Orient the gun-to-hose cable connector pins correctly before completing the electrical connection. Damage to the equipment could result.

2. Connect the hose electrical plug into the socket at the end of the A-1 handgun cordset (9).

4. Operation

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

WARNING: Wear safety glasses, safety gloves, and protective clothing to prevent injury from bulkmeter parts, splashed hot adhesives/sealants, and hot gun surfaces.

The following section describes the A-1 handgun operating procedures.

NOTE: The following factors can affect the material output rate from the handgun nozzle:

- Change in hydraulic pressure
- Change in application temperature
- Change to a lower or higher viscosity material
- Change in nozzle orifice size
- Change in hose length
- Change in the trigger-adjust thumb screw

Setup and Initial Operation

The A-1 handgun receives input power from a bulkmeter. The handgun will not extrude material until the entire system reaches application temperature. Use the following procedure to startup the system.

NOTE: Ensure that the circuit breakers in the bulkmeter or System Sentry control console have been changed before using the A-1 handgun. Refer to the *Parts* section for retrofit kit part numbers.

1. Start up the bulkmeter system in accordance with the bulkmeter system manual.

2. Check the settings and factors that influence the discharge force of material through the handgun nozzle.

3. Trigger the gun to purge air from the hose and gun.

Adjustment

Use the following procedures to make material flow adjustments to the A-1 handgun.

Increase Deposition

Make one or more of the following adjustments to increase the amount of material being deposited onto the substrate.

- Increase the hydraulic pressure.
- Install a nozzle with a larger orifice.
- Rotate the trigger-adjust thumb screw counter-clockwise and lock it with the jam nut.

Decrease Deposition

Make one or more of the following adjustments to decrease the amount of material being deposited onto the substrate.

- Decrease the hydraulic pressure.
- Install a nozzle with a smaller orifice.
- Rotate the trigger-adjust thumb screw clockwise and lock it with the jam nut.

System Shutdown

Use the following procedure to shutdown the A-1 handgun and bulkmeter system.

1. Shut down the bulkmeter system as described in the bulkmeter service manual.
2. Rotate the trigger-adjust thumb screw fully clockwise.

WARNING: Do not hang the A-1 handgun by the trigger. Hanging the gun by its trigger may cause an accidental discharge of hot adhesive/sealant, resulting in burns.

3. Hang the A-1 handgun by the loop at the top of the gun handle.

5. Maintenance

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 and lock out line voltage before servicing. Failure to observe this warning may result in personal injury, equipment damage, or death.

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

Perform the following maintenance procedures as directed.

Gun Cleaning

Clean the A-1 handgun daily, following the guidelines described in *Daily*. Follow the guidelines described in *Weekly* once every week to keep the A-1 handgun operating properly.

Daily

Clean all exterior gun and nozzle surfaces. Material accumulating on the nozzle can cause erratic operation. Do not clean the gun exterior with anything stronger than mineral spirits.

Weekly

Clean the nozzle bore. Refer to *Nozzle Cleaning* in this section. More or less frequent nozzle cleaning may be required depending on the application and materials used.

Gun Inspection

Follow this procedure to semiannually inspect the A-1 handgun's wiring.

1. Relieve system pressure by turning the bulkmeter selector switch to the OFF position. Trigger the gun to relieve any residual pressure.
2. Disconnect the hose electrical plug from the cordset connector.
3. Remove the screws and lock washers securing the data plate to the gun handle.

WARNING: Vibration and heating/cooling cycles may loosen electrical connections, resulting in possible electric shock or equipment damage.

4. Inspect the wiring insulator for signs of wear or other damage. Check all electrical connections for tightness.
5. Inspect the sub-miniature switch on the trigger mechanism for loose, damaged, or worn parts. Replace if malfunctioning or damaged.
6. Re-install the data plate on the gun handle.
7. Connect the hose to the gun.
8. Connect the hose electrical plug to the cordset connector.

CAUTION: Orient the gun-to-hose connector pins correctly before completing the connection or equipment damage could result.

9. Restore the system to normal operation as described in the bulkmeter service manual.

Swivel Connector Thrust Bearing Lubrication

Lubricate the swivel connector thrust bearing with high-temperature silicone grease semiannually. Refer to *Swivel Rebuild* in the *Repair* section for swivel disassembly, lubrication, and re-assembly instructions.

Nozzle Cleaning

WARNING: Wear safety glasses, safety gloves, and protective clothing to prevent injury from hot bulkmeter parts, material, and gun surfaces.

WARNING: System or material pressurized. Relieve system pressure. Failure to observe this warning may result in personal injury, equipment damage, or death.

Nozzle clogging occurs when there is reacted or charred material in the hose or gun that works its way into the nozzle orifice. Reacted or charred material may form if the material is heated above the application temperature recommended by the manufacturer, or if the material remains at an elevated temperature for an extended period of time. If this does occur, it may even be necessary to replace the hose and/or gun.

Use the following procedure to clean the A-1 handgun's nozzle whenever it becomes clogged.

1. Bring the gun to application temperature as described in the bulkmeter manual.
2. Relieve system pressure by turning the bulkmeter selector switch to the OFF position. Trigger the gun to relieve any residual pressure.
3. Unscrew the nozzle retaining nut from the seat and remove the nozzle.
4. Clean out the nozzle bore by inserting a pin-type probe through the nozzle in the same direction as material flow.
5. Re-install the nozzle to the seat using the nozzle retaining nut.
6. Restore the system to normal operation as described in the bulkmeter manual.
7. Trigger the gun to ensure that material flows properly.

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.

6. Troubleshooting

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

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

WARNING: Hot! Risk of burns. Wear heat-protective clothing, safety goggles, and heat-protective gloves.

Problem	Possible Cause	Corrective Action
1. Material does not flow when gun triggered	Bulkmeter failed to heat	Refer to the *Troubleshooting* section of the bulkmeter manual.
	Hose failed to heat	Refer to *Hose or gun fails to heat* in this section.
	Dirty nozzle or ball and seat	Clean the nozzle and/or ball and seat.
	Trigger-adjust thumb screw is at full stop position	Rotate the trigger-adjust thumb screw counterclockwise to obtain the desired material flow.
	Hose clogged	Replace the hose.
2. Material leaks from nozzle	Foreign material in ball and seat area	Clean the ball and seat.
	Faulty sub-miniature switch	Adjust the sub-miniature switch as described in the *Repair* section. If the problem still exists, replace the sub-miniature switch.
	Worn ball tip	Replace the ball tip and shaft.
3. Material leaks from swivel connector	Loose socket head screws	Tighten the socket head screws.
	Worn swivel connector O-ring or seal	Replace the worn O-ring or seal.

Problem	Possible Cause	Corrective Action
4. Material leaks around seat or insulator block	Worn O-ring between hydraulic body and seat	Replace the O-ring.
	Worn packing cartridge seal	Replace the packing cartridge seal.
5. Hose or gun fails to heat	Faulty bulkmeter circuitry	Refer to the *Troubleshooting* section of the bulkmeter manual.
	Faulty hose	Replace the hose.
	Faulty gun heater cartridges	Disconnect the cordset from the gun. Using a multimeter set for ohms, check the resistance across cordset pins A and B. Refer to *Resistance and Continuity Checks* for resistance and continuity values. Replace the heater(s) if the resistance check fails.
	Open or short in wiring	Check the cordset wiring for continuity between the connector pins and the terminal strip. If an open or short circuit exists, replace the cordset.
6. Gun overheats	Faulty RTD	Disconnect the cordset from the gun. Using a multimeter set for ohms, check for resistance across cordset pins C and D. Refer to *Resistance and Continuity Checks* for resistance and continuity values. If the resistance check fails, replace the RTD.
	Open or short in cordset wiring	Check the cordset wiring for continuity between the connector pins and the terminal strip. If an open or short circuit exists, replace the cordset.

Resistance and Continuity Checks

Refer to Table 1 for resistance values. See Figure 4 for the A-1 handgun's wiring diagram.

Table 1 Resistance and Continuity Checks

Cordset Pins or Gun Parts 25	Resistance or Continuity
A and B	240 Vac gun: 324.9–376.2 ohms @ 50–100 °F
C and D	133–137.5 ohms @ 65–75 °F
Swivel connector and cordset connector	Less than 0.015 ohms
A and/or B and H, gun body, handle, or trigger	No continuity
C and/or D or E and H, gun body, handle, or trigger	No continuity
H and gun body, handle or trigger	Continuity
F and G	Trigger depressed—Continuity Trigger released—No continuity

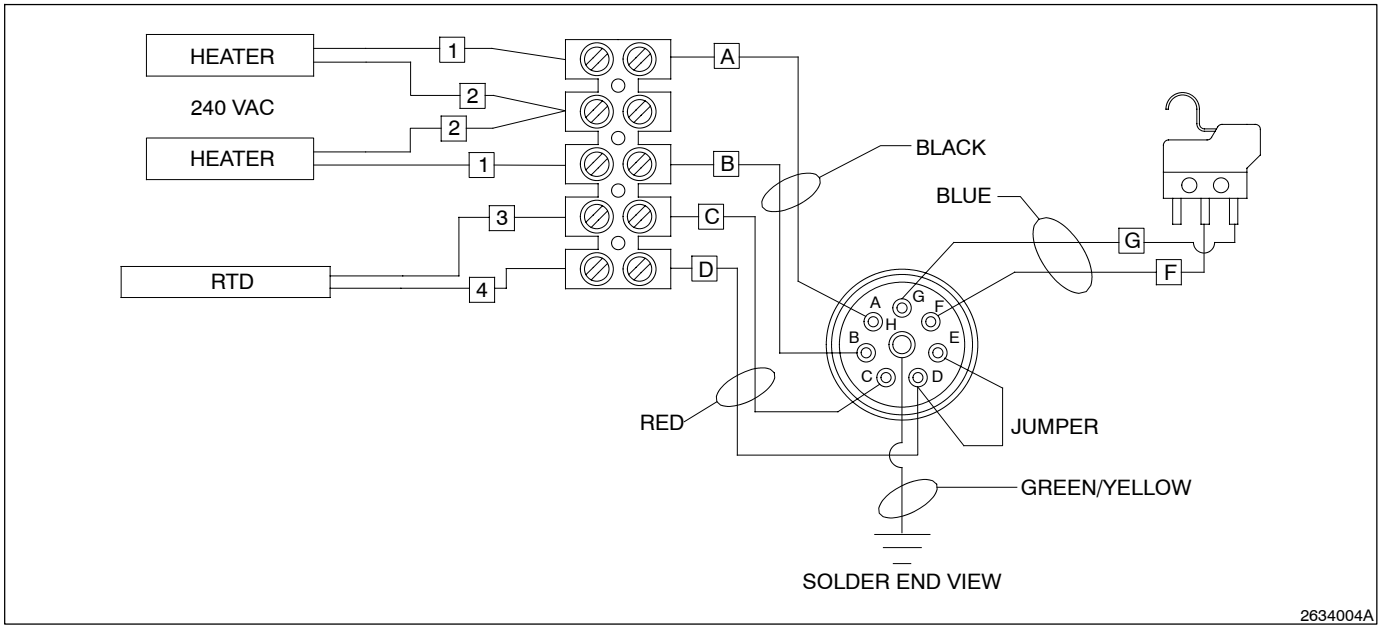

Fig. 4 Cordset Wiring Diagram

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, equipment damage, or death.

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

WARNING: System or material pressurized. Relieve system pressure before servicing.

This section provides common repair procedures for the A-1 handgun.

Heater Cartridge and RTD Replacement

See Figure 5. Use the following procedure to replace the heater cartridges and RTD.

1. Remove the screws (13) and lock washers (12) securing the warning plate (11) to the gun handle (9). Disconnect the heater cartridge and RTD leads from the terminal strip (10).
2. Remove the screws (14) securing the trigger (15) to the gun handle and remove the trigger.
3. Remove the screws (1) and lock washers (2) securing the hydraulic body (3) and the insulator block (6) to the gun handle.

Heater Cartridge and RTD Replacement (contd)

4. Pull the hydraulic body, insulator block, and puller (8) away from the gun handle. Pull the heater cartridge and RTD leads through the gun handle and insulator block.

5. Pull the heater cartridges (4) and RTD (5) from the hydraulic body, noting the locations of each.

6. Coat the new heater cartridges and RTD with heat sink compound and install them in the hydraulic body.

7. Feed the leads of the new heater cartridges and RTD around the insulator sleeve (7), through the insulator block (6), and gun handle (9). Connect the leads to the terminal strip (10) as shown on Figure 4.

8. Install the warning plate (11) on the gun handle (9) using the lock washers (12) and screws (13). Tighten the screws securely.

CAUTION: Ensure that the wire leads do not get kinked when installing the hydraulic body and insulator block onto the gun.

9. Guide the puller (8) into the gun handle (9) and install the insulator block (6) and hydraulic body (3) onto the gun handle using the lock washers (2) and screws (1). Torque the screws to 8.8 N•m (78 in. lb).

10. Install the trigger (15) on the gun handle (9) with the screws (14).

Heater Cartridge and RTD Replacement (contd)

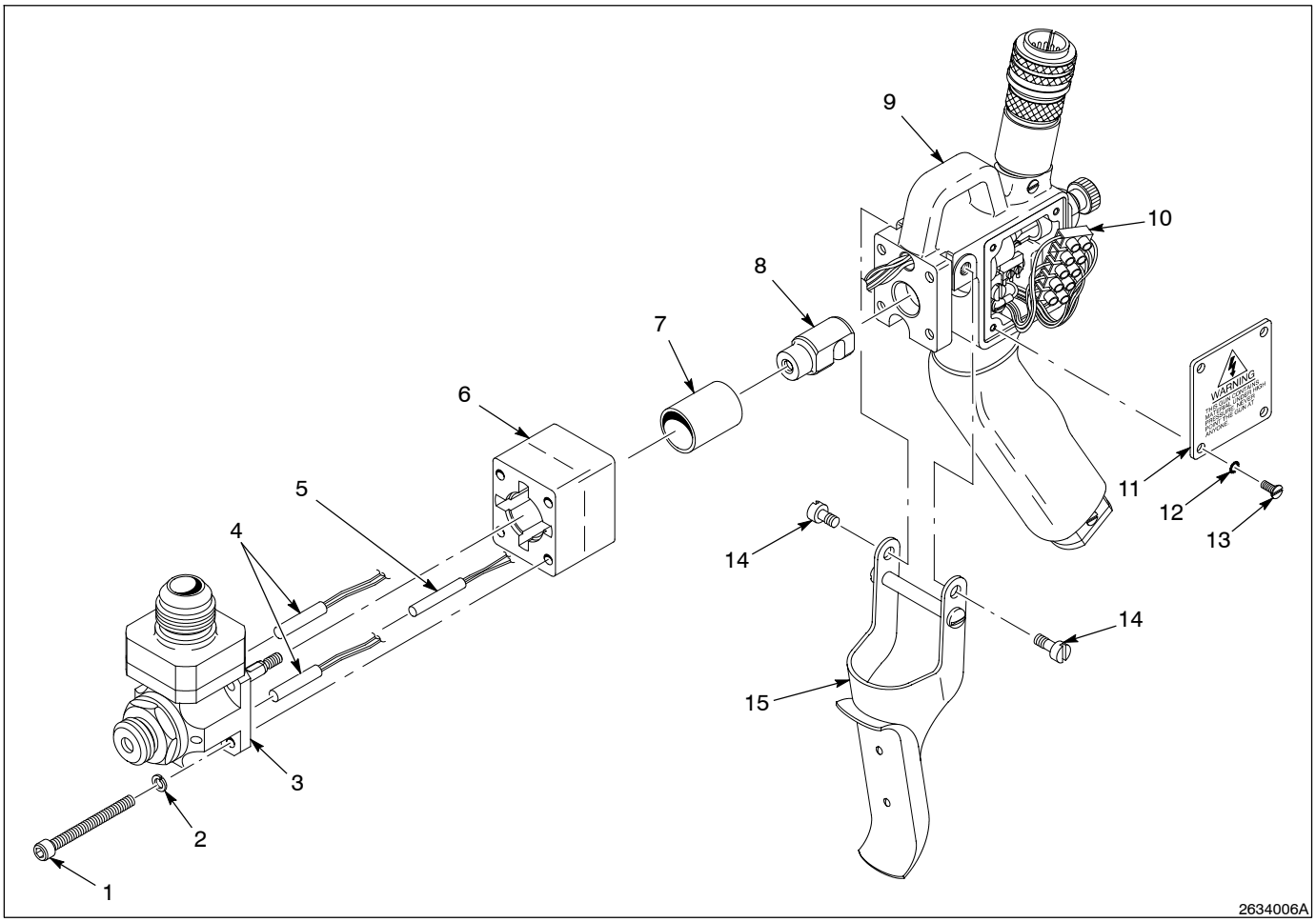

Fig. 5 Heater Cartridge and RTD Replacement

1. Screws (4)
2. Hydraulic body
3. Lock washers (4)
4. Heater cartridges (2)
5. RTD
6. Insulator block
7. Insulator sleeve
8. Puller
9. Gun handle
10. Terminal strip
11. Warning plate
12. Lock washers (4)
13. Screws (4)
14. Screws (2)
15. Trigger

Swivel Rebuild

See Figure 6. Use the following procedure to rebuild the swivel connector.

1. Remove the screws (1) and lock washers (2) from the swivel connector (3). Remove the swivel connector from the swivel body joint (5). Remove the shaft seal (4) from the swivel connector.

2. Using a $^{5}/_{16}$ hex key, remove the swivel body joint (5) from the hydraulic body (11).

3. Remove the O-ring (9), swivel support plate (10), thrust washers (6, 8), and thrust bearing (7) from the swivel body joint (5).

4. Apply a thin coat of high-temperature silicone grease to the thrust bearing (7).

5. Install the thrust washer (6), thrust bearing (7), thrust washer (8), and swivel support plate (10) on the swivel body joint (5).

6. Lubricate the O-ring (9) and install it onto the swivel body joint (5).

   NOTE: Ensure that the hydraulic body roll pin (12) fits into the groove in the swivel support plate (10) before tightening the swivel body joint (5).

7. Apply Loctite to the swivel body joint threads and install the swivel body joint (5) into the hydraulic body (11) using a $^{5}/_{16}$ hex key.

8. Apply a thin coat of PTFE grease to the shaft seal (4) and install it in the swivel connector (3). Make sure the shaft seal's open end is facing away from the thrust bearing (7).

9. Install the swivel connector (3) over the swivel body joint (5). Secure the swivel connector to the support plate (10) using lock washers (2) and screws (1). Torque the screws to 4.4 N•m (39 in. lb).

Swivel Rebuild *(contd)*

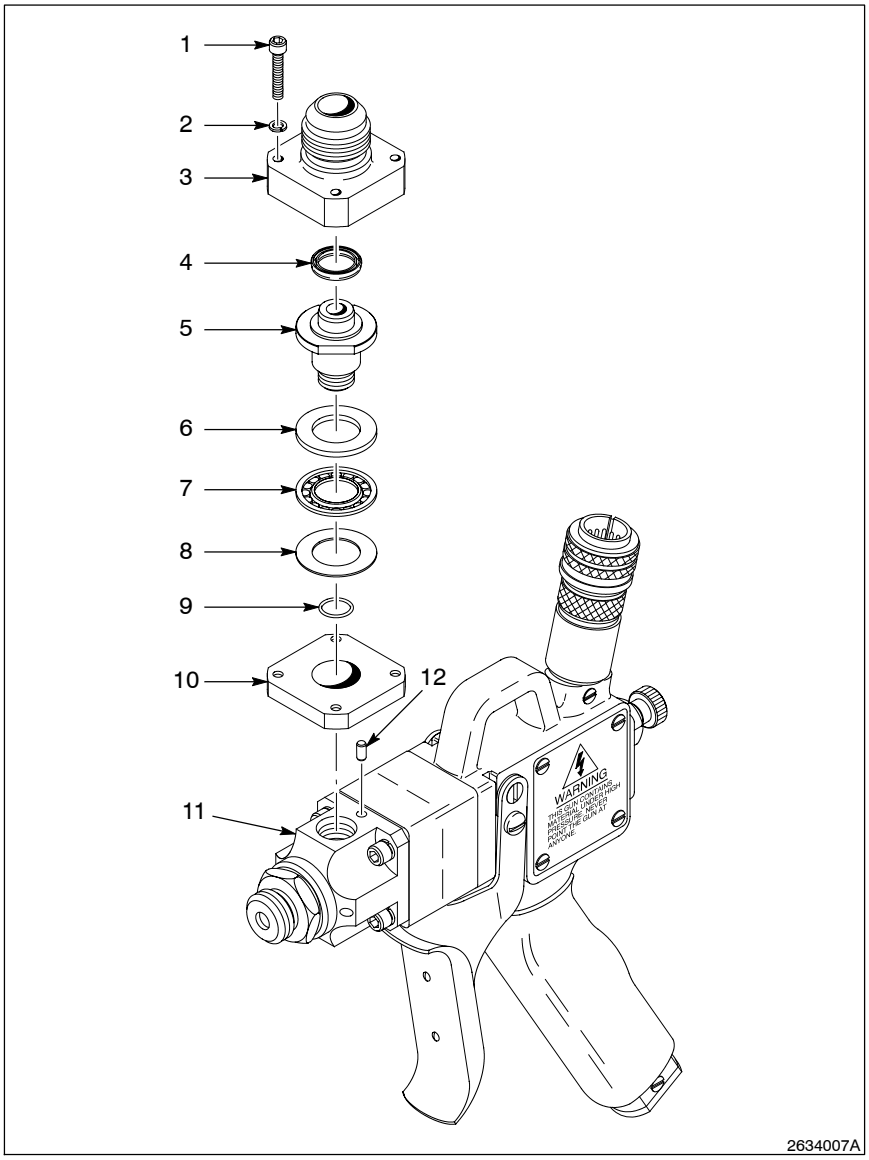

Fig. 6 Swivel Rebuild

1. Screws (4)
2. Lock washers (4)
3. Swivel connector
4. Shaft seal
5. Swivel body joint
6. Thrust washer
7. Thrust bearing
8. Thrust washer
9. O-ring
10. Swivel support plate
11. Hydraulic body
12. Roll pin

Sub-Miniature Switch Replacement

See Figure 7. Use the following procedure to replace the sub-miniature switch.

1. Remove the screws (5) and lock washers (6) securing the warning plate (7) to the gun handle (8).
2. Carefully move the terminal strip (2) aside to expose the sub-miniature switch (3).
3. Remove the screws (4) securing the sub-miniature switch (3) to the sub-miniature switch shaft (1).
4. Disconnect the leads from the old sub-miniature switch and connect them to the new sub-miniature switch posts.
5. Install the new sub-miniature switch (3) on the sub-miniature switch shaft (1) with the screws (4). Tighten the screws securely.
6. Install the warning plate (7) on the gun handle (8) with the lock washers (6) and screws (5). Tighten the screws securely.
7. Adjust the new sub-miniature switch to achieve the desired flow rate. Refer to *Sub-Miniature Switch Adjustment*.

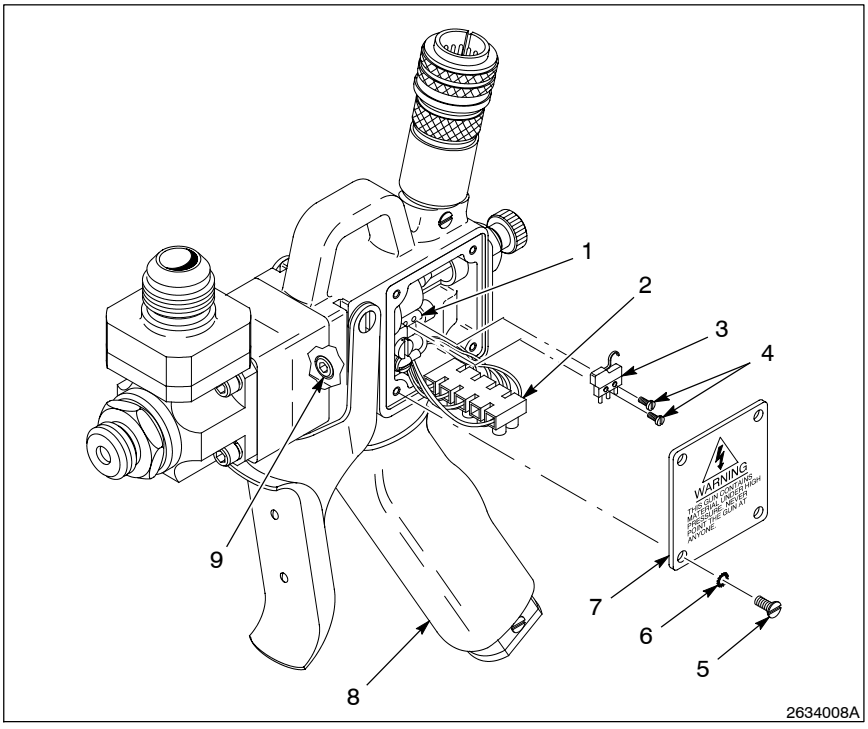

Fig. 7 Sub-Miniature Switch Replacement

1. Sub-miniature switch shaft
2. Sub-miniature switch
3. Terminal strip
4. Screws (2)
5. Screws (4)
6. Lock washers (4)
7. Warning plate
8. Gun handle
9. Set screw

Sub-Miniature Switch Adjustment

See Figure 7. Adjust the sub-miniature switch using the set screw (9) located behind the trigger on the gun handle (8). Follow this procedure to adjust the sub-miniature switch to the desired setting.

NOTE: The set screw must be adjusted to achieve an open circuit (trigger disengaged) and a closed circuit (trigger engaged). Some trial and error is required to achieve both conditions.

1. Disconnect the cordset.
2. See Figure 4. Use a multimeter to check for an open circuit across cordset connector pins F and G with the trigger disengaged. If an open circuit does not exist, use the supplied hex key to rotate the set screw clockwise until an open circuit is obtained.
3. Use a multimeter to check for a closed circuit across cordset connector pins F and G with the trigger engaged. If a closed circuit does not exist, use the supplied hex key to rotate the set screw counterclockwise until a closed circuit is obtained.
4. Recheck for open and closed circuits, repeating the preceding procedure as necessary until the sub-miniature switch is properly adjusted.

Cordset Replacement

See Figure 8. Use the following procedure to replace the A-1 handgun's cordset.

1. Remove the screws (11) and lock washers (10) securing the warning plate (9) to the gun handle (12).
2. Disconnect the wires from the terminal strip (8) and sub-miniature switch. Remove the screw (7) and lock washer (6) securing the ground (5) to the gun handle (12).
3. Remove the screws (3) and lock washers (2) securing the cordset (1) to the gun handle (12) and remove the cordset.

   NOTE: If the handgun has been converted to a bottom feed configuration, tie a line around the cordset wires before pulling them through the gun handle. The line going through the gun handle will aid in pulling the new cordset through.

Cordset Replacement (contd)

4. Feed the cordset leads through the top or bottom of the gun handle (12) and connect them to the terminal strip (8) and sub-miniature switch (4) according to Figure 4.

5. Attach the ground (5) to the gun handle (12) using the lock washer (6) and screw (7).

6. Secure the cordset (1) to the gun handle (12) with the lock washers (2) and screws (3).

7. Install the warning plate (9) on the gun handle (12) with the lock washers (10) and screws (11).

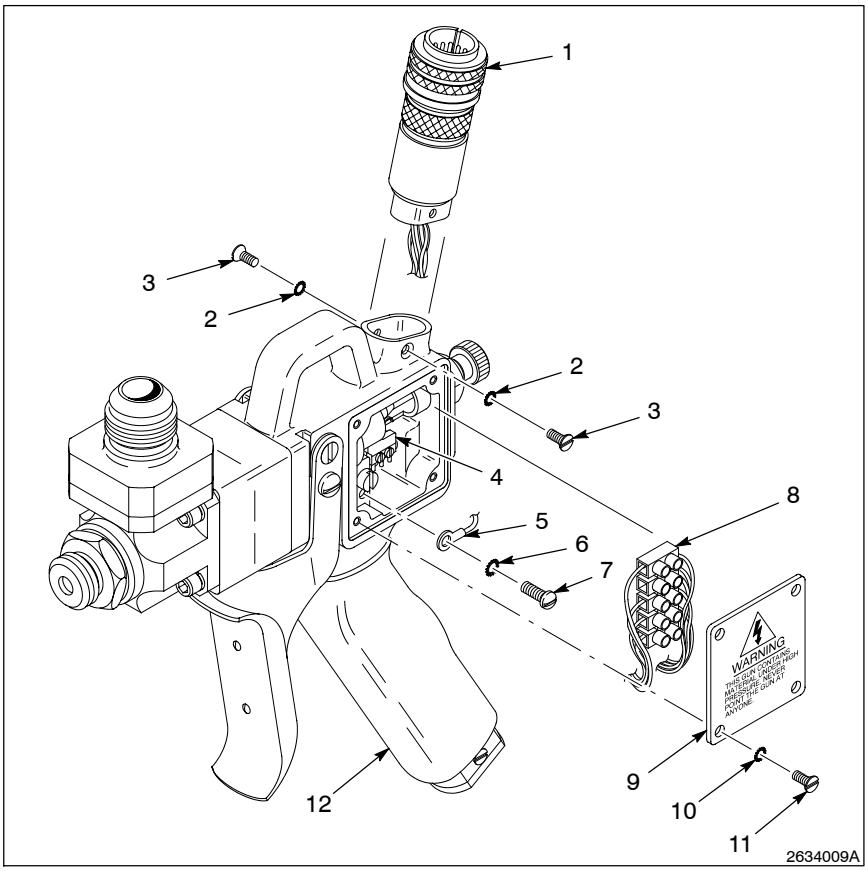

Fig. 8 Cordset Replacement

1. Cordset
2. Lock washers (2)
3. Screws (2)
4. Sub-miniature switch
5. Ground
6. Lock washer
7. Screw
8. Terminal strip
9. Warning plate
10. Lock washers (4)
11. Screws (4)
12. Gun handle

Ball and Seat Replacement

See Figure 9. Use the following procedure to replace the A-1 handgun's ball and seat assembly.

NOTE: The ball and seat are only available as a matched set. Refer to the *Parts* section for ball and seat assembly kit part number.

1. Remove the screws and lock washers securing the warning plate to the gun handle.

2. Disconnect the heater cartridge and RTD leads from the terminal strip.

3. While pulling back on the trigger, unscrew and remove the seat (1) from the hydraulic body (3). Inspect the O-ring (2) and replace it if damaged.

4. Remove the screws (13) securing the trigger (14) to the gun handle (14). Remove the trigger from the gun handle.

5. Remove the screws (4) and lock washers (5) securing the hydraulic body (3) and insulator block (6) to the gun handle (12).

6. Remove the hydraulic body (3), insulator block (6), insulator sleeve (10), and ball shaft (7) from the gun handle (12), carefully pulling the heater cartridge and RTD leads through the gun handle. The ball shaft, packing cartridge (9), and puller (11) will come out of the insulator block and hydraulic body as an assembly.

7. Place the puller (11) in a soft-jawed vise. Place a wrench on the flats on the ball shaft (7) and unscrew the ball shaft from the puller.

8. Push the ball shaft (7) through the packing cartridge (9). Inspect the packing cartridge seal (8) and replace it if damaged. Refer to the *Parts* section for part numbers.

Ball and Seat Replacement
(contd)

9. Lubricate the packing cartridge seal (8) with PTFE grease and install it into the packing cartridge (9).

10. Push the new ball shaft (7) through the packing cartridge (9).

11. Apply thread locking adhesive to the ball shaft threads and install the puller (11) on the threaded end. Tighten the puller securely.

12. Re-assemble the insulator sleeve (10), insulator block (6), and hydraulic body (3) to the gun handle (12). Ensure that the heater cartridges and RTD are in place in the hydraulic body and that the leads are routed properly. Feed the leads and puller through the gun handle.

13. Secure the hydraulic body (3) and insulator block (6) to the gun handle (12) using the lock washers (5) and screws (4). Torque the screws to 8.8 N•m (78 in.-lb).

14. Connect the heater cartridge and RTD leads to the terminal strip as shown in Figure 4.

15. Install the warning plate on the gun handle using the four screws and lock washers.

16. Install the trigger (14) on the gun handle (12) with the screws (13).

17. Lubricate the new O-ring (2). While pulling back on the trigger to release the ball, thread the new seat (1) into the hydraulic body (3) and tighten the seat securely.

Ball and Seat Replacement

(contd)

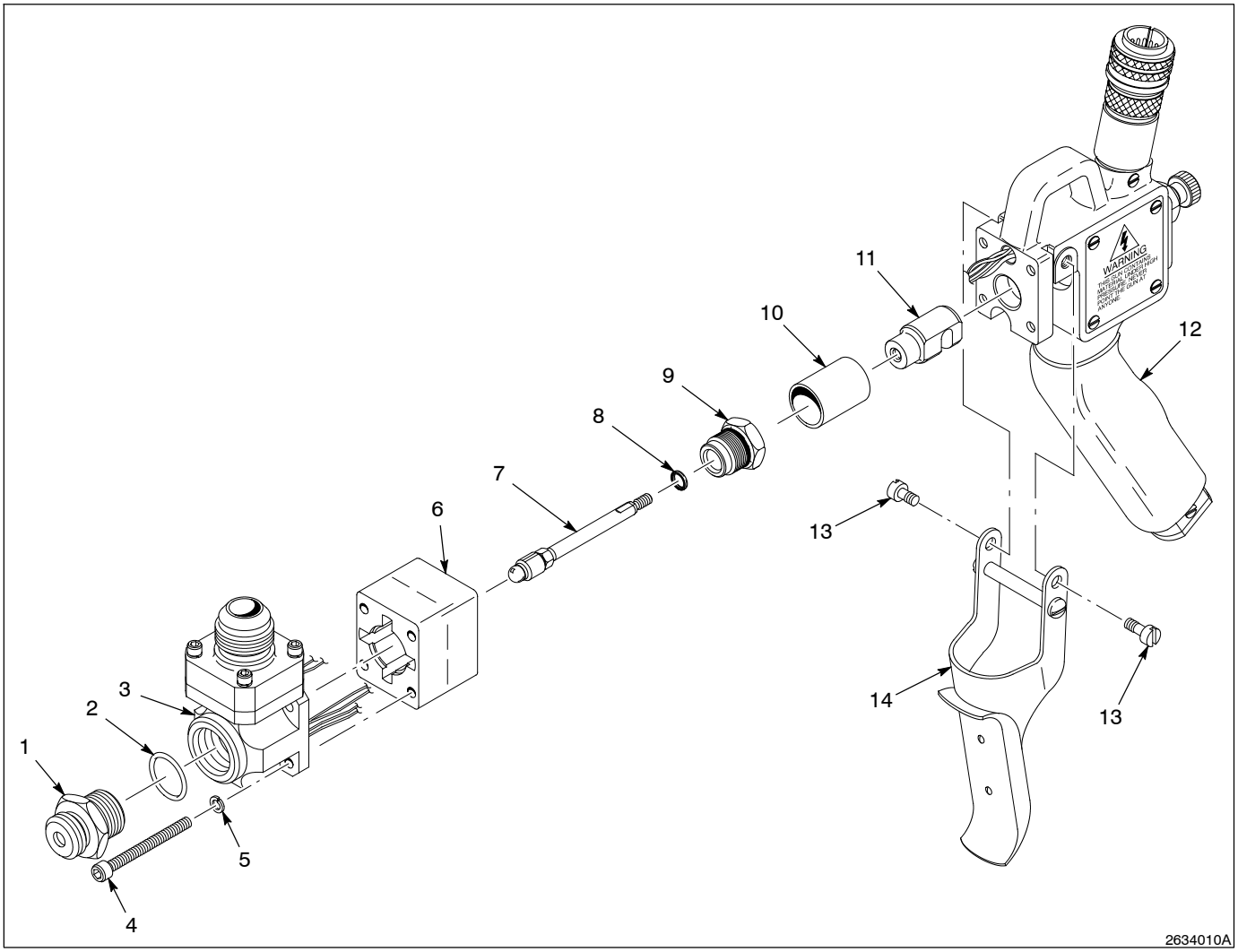

Fig. 9 Ball and Seat Replacement

1. Seat
2. O-ring
3. Hydraulic body
4. Screws (4)
5. Lock washers (5)
6. Insulator block
7. Ball shaft
8. Packing cartridge seal
9. Packing cartridge
10. Insulator sleeve
11. Puller
12. Gun handle
13. Screws (2)
14. Trigger

8. 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 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.

A-1 Handgun (European Version)

See Figure 10. Use the following charts to order replacement parts for your A-1 handgun.

Item	Part	Description	Quantity	Note
—	308 550	Handgun, A-1, $^3/_8$, top feed, 240V	1	
1	129 635	• Kit, 1.06–12 swivel, A-1	1	
2	982 271	• • Screw, socket head, M4 x 20	4	
3	983 011	• • Washer, lock, E, internal, #8	4	
4	127 361	• • Connector, swivel, 1.06–12	1	
5	324 759	• • Seal, shaft, 0.56 ID x 0.80 OD x 0.1	1	
6	127 359	• • Body, joint, swivel	1	
7	324 761	• • Washer, thrust, 0.750 x 1.25 x 0.095	1	
8	324 762	• • Bearing, thrust, 0.750 x 1.25 x 0.078	1	
9	324 763	• • Washer, thrust, 0.750 x 1.25 x 0.032	1	
10	945 082	• • O-ring, Viton, black, $^3/_8$, tube	1	
11	127 367	• • Plate, support, swivel	1	
NS	985 232	• Pin, roll, 4 x 8 mm	1	
12	129 631	• Service kit, 0.375 ball and seat	1	
13	945 084	• • O-ring, Viton, black, $^5/_8$, tube	1	
14	129 628	• Kit, body, hydraulic, body, A-1	1	
15	938 090	• Heater, cartridge, 120V, 80W, 0.25 x 1.00	2	
16	127 358	• Block, insulator, handgun	1	
17	129 632	• Service kit, packing cartridge	1	
18	324 776	• • Seal, shaft, 0.25 ID x 0.430 OD x 0.093	1	
19	324 767	• • Bearing, shaft, 0.251 ID x 0.380 OD x 0.375	1	
20	945 083	• • O-ring, Viton, black, 0.500, tube	1	
21	140 305	• Sensor, RTD, 100 ohm, with 10 in. leads	1	
22	983 124	• Washer, lock, internal, #10	4	
23	982 168	• Screw, socket head, M5 x 55	4	
24	133 814	• Sleeve, insulator, handgun	1	
25	127 374	• Puller, needle	1	

NS: Not Shown

Continued on next page

A-1 Handgun (European Version) *(contd)*

Item	Part	Description	Quantity	Note
30	983 412	• Washer, lock, external, M3.5	12	
31	982 265	• Screw, flat head, M3.5 x 8	12	
32	- - - - - -	• Plate, data, A-1	1	
33	129 637	• Cordset, A-1, 240V, top feed	1	
26	127 373	• Stem, spring	1	
27	987 039	• Spring, compression, 1.25 x 0.480 OD x 0.052	1	
28	127 372	• Retainer, stop, spring	1	
29	133 767	• Sleeve, handle leads	1	
34	984 710	• Nut, hex, jam, M12	1	
35	127 375	• Screw, stop	1	
36	127 381	• Screw, anti-rotation, M4	1	
37	933 149	• Strip, terminal, 5 station, eurostyle	1	
38	983 524	• Washer, lock, external, #6	2	
39	982 099	• Screw, pan head, M3.5 x 6	1	
40	127 365	• Plate, warning, A-1	1	
41	127 371	• Closure, handle	1	
42	127 355	• Handle, handgun, A-1	1	
43	901 941	• Grip, handle, 1.00 ID x 4.5 long	1	
44	987 059	• Spring, compression, 0.560 x 0.180 OD x 0.032	1	
45	127 364	• Shaft, switch	1	
46	981 453	• Screw, socket, set, $^{3}/_{8}$-24 x 0.375	1	
47	937 240	• Switch, subminiature, with lever	1	
48	982 242	• Screw, chez head, M2 x 12	2	
49	127 383	• Screw, pivot, trigger	2	
50	129 630	• Kit, trigger, A-1	1	
51	982 000	• Screw, pan head, M5 x 10	2	
52	127 382	• Pivot, trigger	1	
NS	325 104	• Nut, nozzle, $^{1}/_{2}$ in. NPSM	1	
NS	901 942	• Key, hex, 0.187 in., special	1	
NS: Not Shown				

A-1 Handgun (European Version) *(contd)*

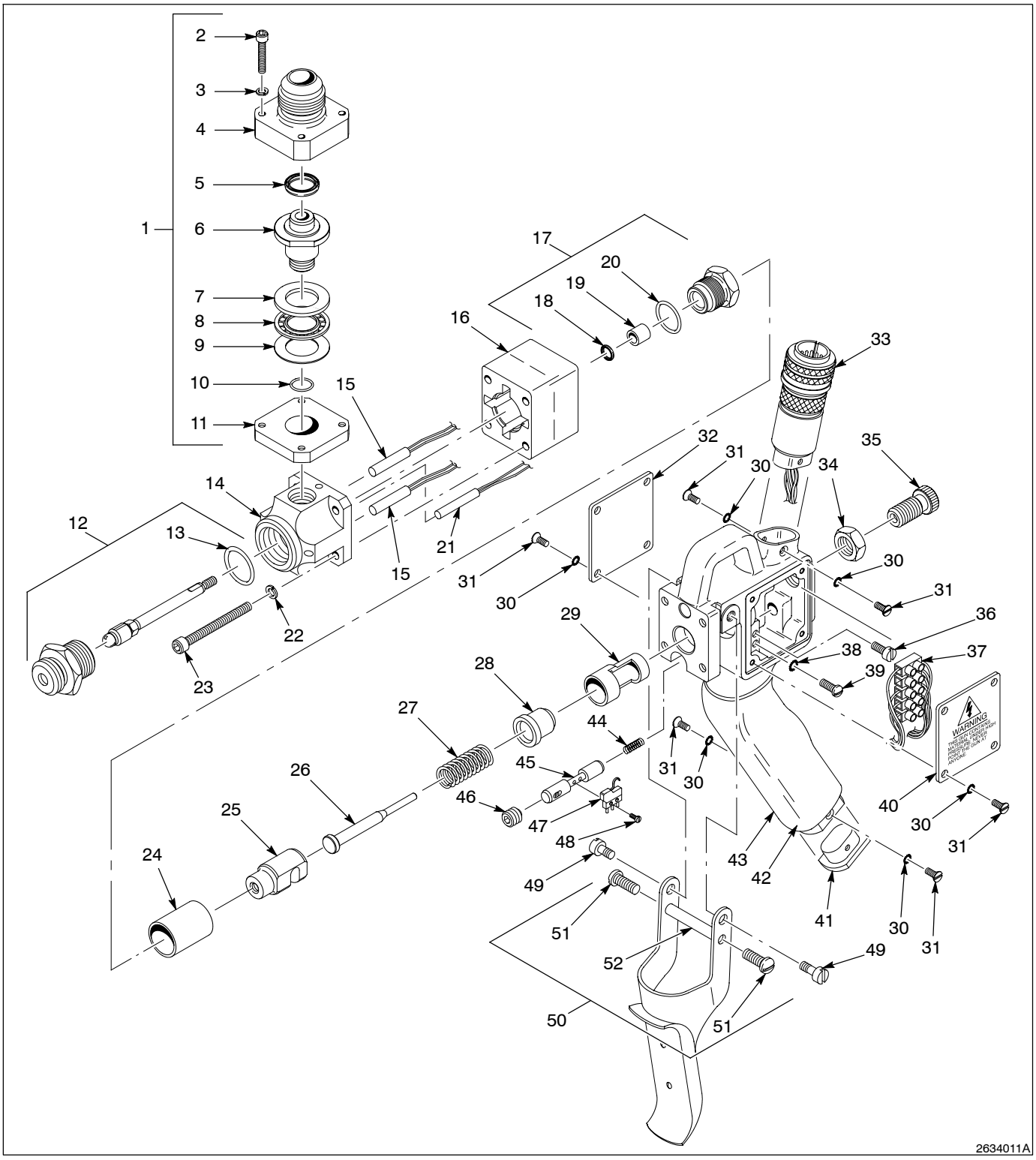

Fig. 10 A-1 Handgun Parts

Hoses

Use the following charts to select a hose for your A-1 handgun.

Low-Pressure

Part	Description	Quantity
127 317	Hose, low pressure, $^5/_8$ in. dia x 10 ft, 240 Vac	1
127 318	Hose, low pressure, $^5/_8$ in. dia x 16 ft, 240 Vac	1
127 319	Hose, low pressure, $^5/_8$ in. dia x 24 ft, 240 Vac	1

High-Pressure

Part	Description	Quantity
105 988	Hose, high pressure, $^3/_8$ in. dia x 10 ft, 240 Vac	1
106 039	Hose, high pressure, $^3/_8$ in. dia x 24 ft, 240 Vac	1
324 745	Hose, high pressure, $^3/_4$ in. dia x 10 ft, 240 Vac	1
324 746	Hose, high pressure, $^3/_4$ in. dia x 16 ft, 240 Vac	1
324 747	Hose, high pressure, $^3/_4$ in. dia x 24 ft, 240 Vac	1

Nozzles

Use the following charts to order the correct nozzle for your application.

Straight

Part	Orifice Diameter, in.	Length, in.	Material	Note
803 632	0.023	0.825	Brass	A
270 593	0.025	2.50	Copper w/steel insert	A
809 186	0.032	0.825	Brass	A
270 594	0.032	2.50	Copper w/steel insert	A
324 493	0.040	2.50	Copper w/steel insert	A
103 838	0.040	2.50	Steel	A
270 595	0.042	2.50	Copper w/steel insert	A
324 494	0.050	2.50	Copper	A
804 585	0.052	2.50	Copper w/steel insert	A
324 495	0.060	2.50	Copper	A
804 578	0.061	2.50	Copper w/steel insert	A
324 496	0.080	2.50	Copper	A
271 683	0.093	2.53	Copper	B
324 497	0.100	2.50	Copper	
324 498	0.122	2.50	Copper	
804 489	0.125	1.00	Stainless Steel	
271 684	0.125	2.53	Copper	B
805 395	0.130	2.50	Copper	
324 499	0.150	2.50	Copper	
271 685	0.156	2.53	Copper	B
703 223	0.187	2.125	Copper	
106 006	0.275	2.00	Brass	
106 007	0.275	2.00	Brass	
106 016	0.275	5.00	Brass	
126 982	0.312	2.00	Copper	
126 981	0.312	3.00	Copper	
126 980	0.312	4.00	Copper	

NOTE A: These nozzles may not achieve full shut off when used with materials having a viscosity greater than 1,000,000 centipoise.

B: These nozzles must be used with the nozzle adapter, part 111 987.

30° Angled

Part	Orifice Diameter, in.	Length, in.	Material
106 017	0.275	2.00	Brass
106 018	0.275	3.00	Brass
106 019	0.275	5.00	Brass
126 979	0.312	3.00	Copper
126 978	0.312	4.00	Copper
126 977	0.312	5.00	Copper

Nozzle Adapter

Order the nozzle adapter if the nozzle that you have selected from the preceding charts have a note B following its description.

Part	Description	Quantity
111 987	Adapter, nozzle, H20 to $^{3}/_{8}$–24 thread	1