Tribomatic
19 Inch Control Module

Customer Product Manual
Part 104 376C

NORDSON CORPORATION • AMHERST, OHIO • USA

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Notice

Trademarks

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Other Tribomatic Manuals:

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Safety
Powder Spray Systems

1. Introduction

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. Refer to the National Fire Protection Association (NFPA) standard 33 and to federal, state, regulatory agency, and local codes for rules and regulations covering installation and operation of powder spray systems.
- obtain and read Material Safety Data Sheets (MSDS) for all materials used.

2. 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.

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

CAUTION: Failure to observe may result in equipment damage.

3. 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.

4. 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

5. 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 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.
- 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.

5. Installation (contd.)

- 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 local codes.
- Ground all electrically conductive equipment within 10 feet (3 meters) of the spray area. 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, electrostatic cables, and air hoses and tubing along a protected path. Make sure they will not be damaged by moving equipment. Do not bend electrostatic cables around a radius of less than 6 in. (152 mm).
- Install safety interlocks and approved, fast-acting fire detection systems. These shut down the spray system if the booth exhaust fan fails, a fire is detected, or other emergency situation develops.
- Make sure the spray area floor is conductive to ground and that the operator's platform is grounded.
- 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.
- 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.
- If safety devices must be removed for installation, install them immediately after the work is completed and check them for proper functioning.

6. Operation

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

Read all component manuals before operating a powder spray system. A thorough understanding of all components and their operation will help you operate the system safely and efficiently.

- 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 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 or locked-out electrical disconnects or pneumatic valves.
- Know where EMERGENCY STOP buttons, shutoff valves, and fire extinguishers are located. Make sure they work. If a component malfunctions, shut down and lock out the equipment immediately.
- Before operating, make sure all conductive equipment in the spray area is connected to a true earth ground.
- Never operate equipment with a known malfunction or leak.
- Do not attempt to operate electrical equipment if standing water is present.
- Never touch exposed electrical connections on equipment while the power is ON.
- Do not operate the equipment at pressures higher than the rated maximum working pressure of any component in the system.
- Know the pinch points, temperatures, and pressures for all equipment that you are working with. Recognize potential hazards associated with these and exercise appropriate caution.
- Wear shoes with conductive soles, such as leather, or use grounding straps to maintain a connection to ground when working with or around electrostatic equipment.

6. Operation (contd.)

- Do not wear or carry metallic objects (jewelry or tools) while working with or around electrostatic equipment. Ungrounded metal can store a static charge and cause harmful shocks.
- Maintain skin-to-metal contact between your hand and the gun handle to prevent shocks while operating manual electrostatic spray guns. If wearing gloves, cut away the palm or fingers.
- Keep parts of the body or loose clothing away from moving equipment or parts. Remove personal jewelry and cover or tie back long hair.
- Wear National Institute of Occupational Safety and Health (NIOSH) approved respirators, safety glasses or goggles, and gloves, and while handling powder containers, filling hoppers, operating spray equipment, and performing maintenance or cleaning tasks. Avoid getting powder coatings on your skin.
- Never point manual guns at yourself or other persons.
- Do not smoke in the spray area. A lit cigarette could ignite a fire or cause an explosion.
- If you notice electrical arcing in a spray area, shut down the system immediately. An arc can cause a fire or explosion.
- Shut off electrostatic power supplies and ground gun electrodes before making adjustments to powder spray guns.
- Shut off moving equipment before taking measurements or inspecting workpieces.
- Wash exposed skin 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 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.

7. 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
- electrical equipment which may remain energized for a period of time 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

8. 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. Repair or replace the malfunctioning component.

9. Maintenance and Repair

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

- Always wear appropriate protective devices 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.

9. Maintenance and Repair *(contd.)*

- Disconnect, lock out, and tag electrical power at a disconnect or breaker in the service line ahead of electrical equipment before servicing.
- 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.
- Do not attempt to service a moving piece of equipment. Shut off the equipment and lock out power. Secure equipment to prevent uncontrolled movement.
- Relieve air pressures before servicing equipment. Follow the specific instructions in this manual.
- Make sure that the room where you are working is sufficiently ventilated.
- 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.
- Connect all disconnected equipment ground cables and wires after servicing the equipment. Ground all conductive equipment.
- Service lines connected to panel disconnect switches may still be energized unless they are disconnected. Make sure the power is off before servicing. Wait 5 minutes for capacitors to discharge after shutting off the electrical power.
- Turn off the electrostatic power supply and ground the gun electrode before adjusting or cleaning.
- Keep high-voltage connection points clean and insulated with dielectric grease or oil.
- Check all ground connections periodically with a megohm meter. Resistance to ground must not exceed one megohm. If arcing occurs, shut down the system immediately.

9. Maintenance and Repair (contd.)

- Check interlock systems periodically to ensure their effectiveness.

WARNING: Operating faulty electrostatic equipment is hazardous and can cause electrocution, fire, or explosion. Make resistance checks part of your periodic maintenance program.

- Do not store flammable materials in the spray area or room. Keep 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.

- Practice good housekeeping procedures. Do not allow dust or powder coatings to accumulate in the spray area or booth or on electrical equipment. Read this information carefully and follow instructions.

10. Disposal

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

SECTION 2
EQUIPMENT FAMILIARIZATION

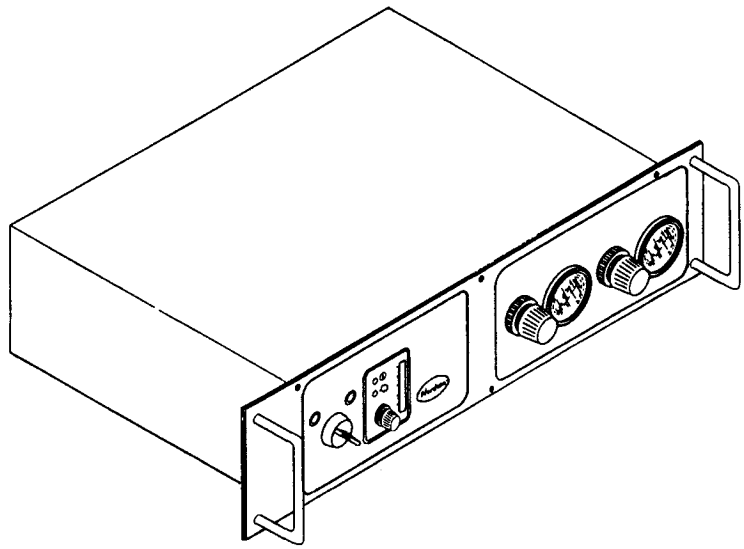

Figure 1 — TRIBOMATIC 19" Control Module

The TRIBOMATIC 19" Control Module houses the pneumatic and electrical controls for either an automatic Tribomatic powder spray gun or an electrically triggered Tribomatic handgun. A Tribomatic system uses the friction of the powder against the walls of tubes inside the gun to impart a positive charge to the powder. The 19" Control Module is designed to be mounted in a standard 19" (483 mm) equipment rack or into an AH type cabinet. It can be slaved to a master control unit when used in multiple gun systems. It can also be used as a stand-alone unit.

The pneumatic controls include diffuser (atomizing) and ejector (flow rate) air pressure regulators and gauges. Air to the regulators is controlled by two electro-pneumatic solenoid valves located inside the cabinet.

The electrical controls include an ON-OFF switch, a vertical LED bar scale charge meter, a low charge alarm sensitivity potentiometer and two LEDs, green for power ON and red for low charge

alarm. When a handgun is installed, the green power ON LED glows steadily when the trigger is depressed, and flashes when the trigger is not depressed. An input voltage selector switch, transformer, fuse, and circuit boards are inside the cabinet. The selector switch allows a choice of 100, 115, 200, 220 or 240VAC nominal input voltage @ 50/60 HZ.

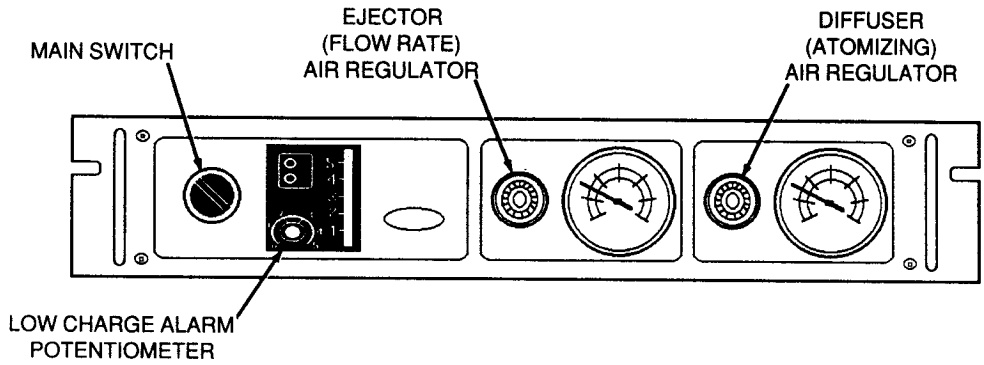

Figure 2 — Front View Of 19" Control Module

Connections at the rear of the module consist of input power, gun ground terminal, cabinet ground terminal, and supply, ejector, and diffuser air push-pull couplings. A fourth coupling is used to exhaust solenoid actuating air externally. Maximum air input is 145 psi (10 bar). A separate knock out is provided for an electrically triggered handgun control cable.

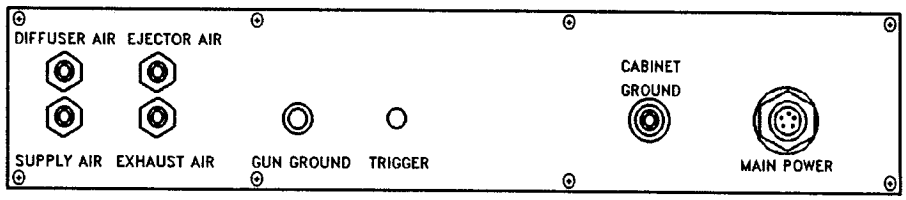

Figure 3 — Rear View Of 19" Control Module

OPERATION

Turning the main switch to the ON position closes a circuit, allowing input power to flow to the transformer, which converts input power to 24VDC to operate the circuit boards and electro-pneumatic solenoid valves. The green LED on the display panel will light when the main switch is turned ON.

The circuit board will then actuate the electro-pneumatic solenoid valves upon receiving a trigger signal from the master control console or handgun, if used. The solenoid valves control air delivery to the powder pump (ejector air) and diffuser (diffuser air). The circuit board delays actuating the ejector air solenoid for approximately one second until the diffuser air has stabilized. This prevents powder puffing from the gun.

The gun ground terminal provides a path back to the circuit board and on to a true earth ground for the negative charge imparted to the gun by the friction of the powder flowing through it. The circuit board measures the charge flowing back to ground and sends a signal to the charge meter. The charge meter gives a relative reading of the strength of the charge imparted to the powder.

The display panel on the front of the module includes an alarm sensitivity potentiometer and an LED which lights if the charge sensed by the circuit board falls below the level set by the operator. This signal is also sent to the master control console (if used), which triggers a visible and audible alarm to alert the operator so that the problem can be corrected, preventing unnecessary rework.

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SECTION 3
INSTALLATION

The Tribomatic 19" Control Module can be mounted in either a standard 19" equipment cabinet or in a Tribomatic AH type cabinet, or used as a stand alone unit. The AH type cabinet can hold up to twelve 19 Inch Control Modules, a Master Control Console and either a blank panel or an optional air control panel with air regulators and gauges. As part of a multiple gun system, the 19 Inch Control Modules are slaved to the Master Control Console so that when the master control main switch is turned to the full ON position, all the 19 Inch Control Modules and Automatic Guns will be activated simultaneously.

Multiple Automatic Gun Systems

WARNING: All automatic gun systems must be protected by an approved fast acting flame detection system arranged to shut down all application equipment and actuate an alarm within one half second in the event of a fire.

1. Remove eight (8) socket head screws from front and back of 19 Inch Control Module cabinet and lift cover off cabinet. Check position of voltage selector switch and set to the correct input voltage.

2. Install the individual 19 Inch Control Modules in the 19" cabinet or AH type cabinet, using the 1/4" (6 mm) slots in the front panel and screws and lockwashers to secure the console to the cabinet.

3. Connect 1/4" I.D. (6 mm) poly supply air tubing between the push-pull coupling marked "Supply" (bottom left coupling) and the distribution manifold mounted at the rear of the cabinet.

4. Connect 1/8" (4 mm) I.D. poly air tubing to the couplings marked "Ejector" and "Diffuser" from the cabinet multi-coupling. Ejector and diffuser air tubing should be numbered to avoid confusion when troubleshooting.

5. Connect gun ground wire to the ground terminal. Secure in place with red plastic knob. Make sure other end of ground wire is connected to gun ground stud. Gun ground wires should also be numbered to avoid any confusion when troubleshooting.

WARNING: Always make sure gun is grounded before beginning spray operations. Operating without a ground connection will result in the build up of a potentially dangerous charge on gun.

6. Connect 19 Inch Control Module cabinet ground stud to 19" equipment cabinet ground or AH type cabinet ground. Make sure cabinet ground is connected to a true earth ground.

WARNING: All equipment in spray area must be connected to a true earth ground. Periodically inspect all grounds. Sparks which can result from a poor ground can cause a fire or explosion.

7. Make sure input power to cabinet is disconnected. Connect 5 lead input power/control cable to 19 Inch Control Module plug and secure in place with nut on end of cable. Route cable through cabinet and connect to Master Control Module. Refer to Nordson Manual No. 37-9, Master Control Module, for instructions.

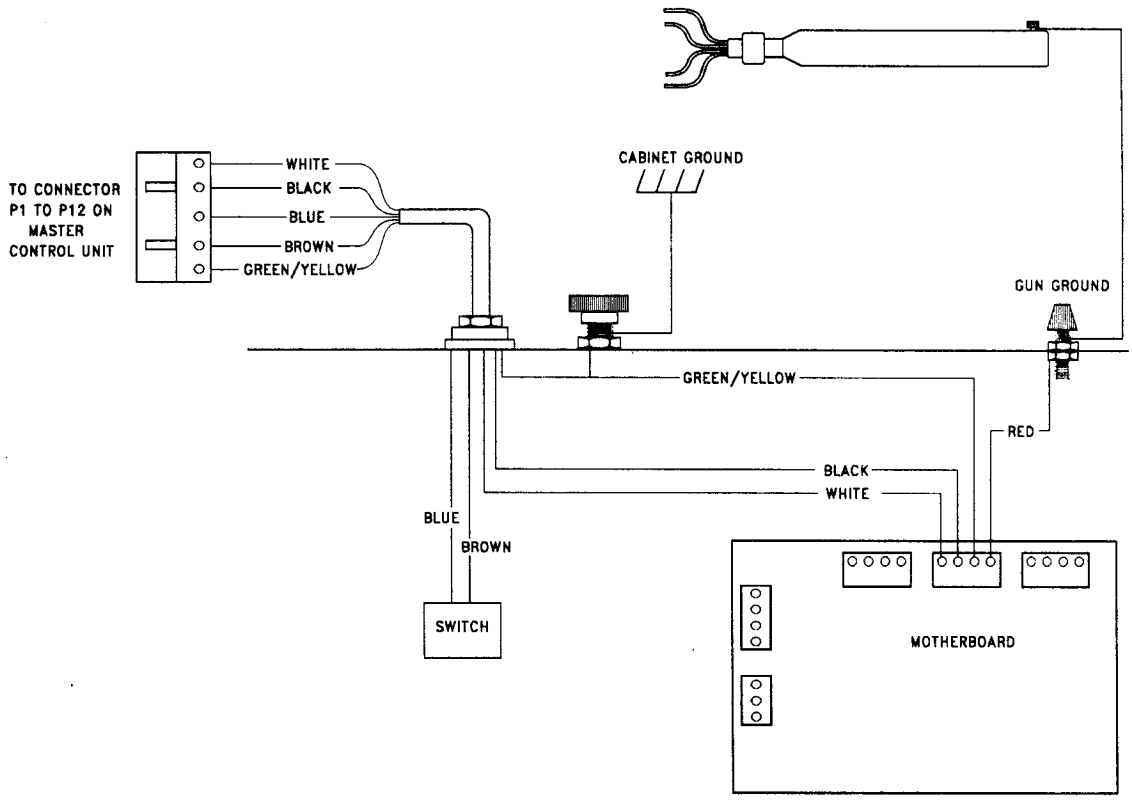

Figure 4 — Multiple Automatic Gun Installation

Optional Trigger Connector Kit for Hand Gun - Multiple Gun Systems

1. An application which employs a hand gun requires a trigger connector kit and a handgun cable for installation. See Section 8 of this manual. The trigger connector kit consists of a female four pin panel connector, a three pin female printed circuit board connector, and a 1K ohm resistor. The trigger connector kit is installed as follows:

   a) Before installing the 19 Inch Control Module in a 19" equipment cabinet or AH type cabinet, remove the rubber plug from the pre-punched hole in rear panel. Install the female 4 pin panel connector included in the trigger connector kit in this hole.

   b) Refer to Figure 5. Connect the green, brown, yellow, and white wires from the female four pin panel connector to the female three pin printed circuit board connector and cabinet gun ground.

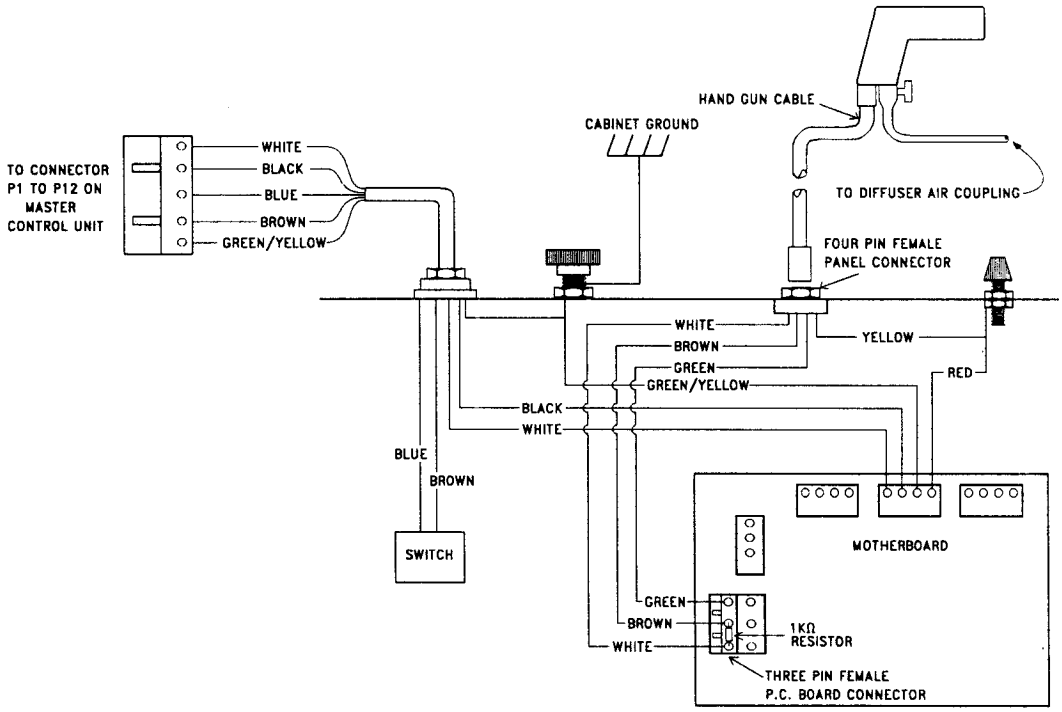

Figure 5 — Handgun Kit Installation

c) Install the 1K ohm resistor between the white and brown wires at the printed circuit board connector.

d) Plug female three pin printed circuit board connector into main circuit board.

2. If 19 Inch Control Module is slaved to a Master Control Module, open P17 switch on power distribution board corresponding to connector to which 19 Inch Control Module is wired. Refer to Nordson Manual No. 37-9, Master Control Module, for instructions.

3. Connect 7 meter handgun cable (see Kit List) to 4 pin female panel connector previously installed on the 19 inch Control Module rear panel and to hand gun connector.

4. Connect air tubing included in kit to quick disconnect marked "Diffuser" (refer to Figure 3) and to Hand Gun Diffuser air fitting.

Refer to instructions given for multiple automatic gun systems previously to complete 19 Inch Control Module installation.

Stand-Alone Installation (Automatic gun)

WARNING: All automatic gun systems must be protected by an approved fast acting flame detection system arranged to shut down all application equipment and actuate an alarm within one half second in the event of a fire.

1. A stand alone installation requires the use of a stand alone kit. See Kit Lists in Section 8 of this manual. The stand alone kit consists of a three pin female printed circuit board connector and a 1k ohm resistor. Refer to Figure 6. The stand alone kit is installed as follows:

a) Connect the orange 5 lead input power/control cable to 19 Inch Control Module rear panel plug and secure in place with nut on end of cable.

b) Cut the black and white wires on the unconnected end of the input power/control cable.

WARNING: Customer connections to the 19 inch Control Module must be made in such a way as to insure that power to the 19 inch Control Module can be applied only when powder booth fans are running. Improper installation may lead to a catastrophic failure, including explosion, fire, destruction of property, or death.

c) Connect neutral input lead (blue), live input lead (brown), and ground lead (green/yellow) to connection points which allow power to be applied to the 19 inch Control Module only when booth fans are running.

d) Make sure input power to cabinet is disconnected. Remove top cover of 19 inch Control Module.

e) Install the 1K ohm resistor on the three pin printed circuit board connector as shown in Figure 6. Plug the female three pin printed circuit board connector into main circuit board. Reinstall top cover to unit.

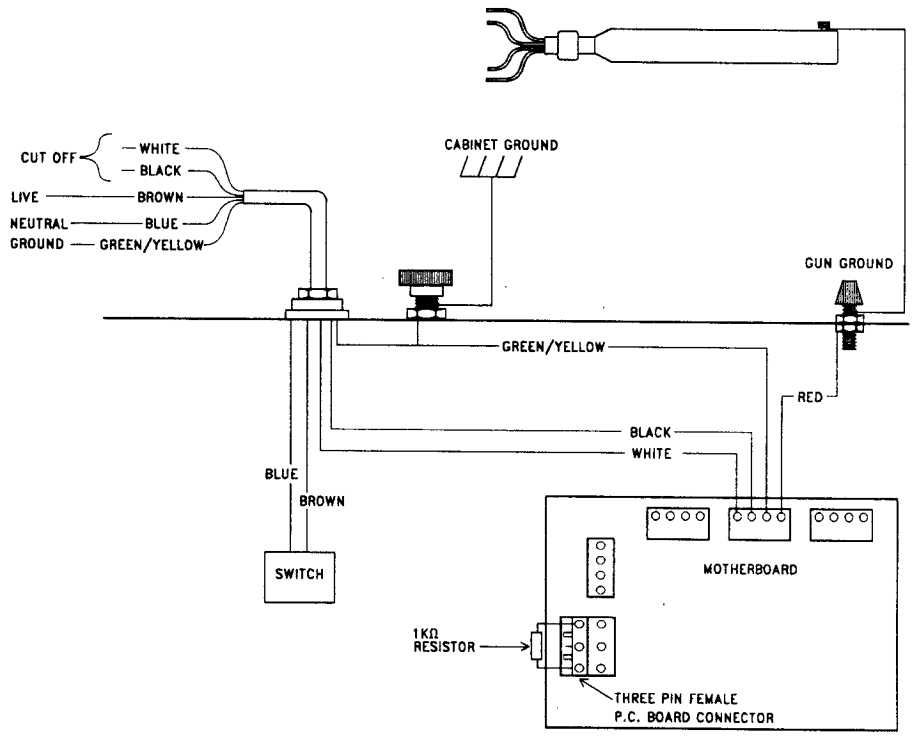

Figure 6 — Stand Alone Kit Installation (Automatic Gun)

Stand-Alone Installation (Hand gun)

1. A stand alone hand gun installation requires the use of a trigger connector kit and a handgun cable. See Section 8 of this manual. The trigger connector kit consists of a female four pin panel connector, a three pin female printed circuit board connector, and a 1k ohm resistor. The trigger connector kit is installed as follows:

   a) Before installing the 19 Inch Control Module in a 19" equipment cabinet or AH type cabinet, remove the rubber plug from the pre-punched hole in rear panel. Install the female 4 pin panel connector included in the trigger connector kit in this hole.

   b) Refer to Figure 7. Connect the green, brown, yellow, and white wires from the female four pin panel connector to the motherboard as shown.

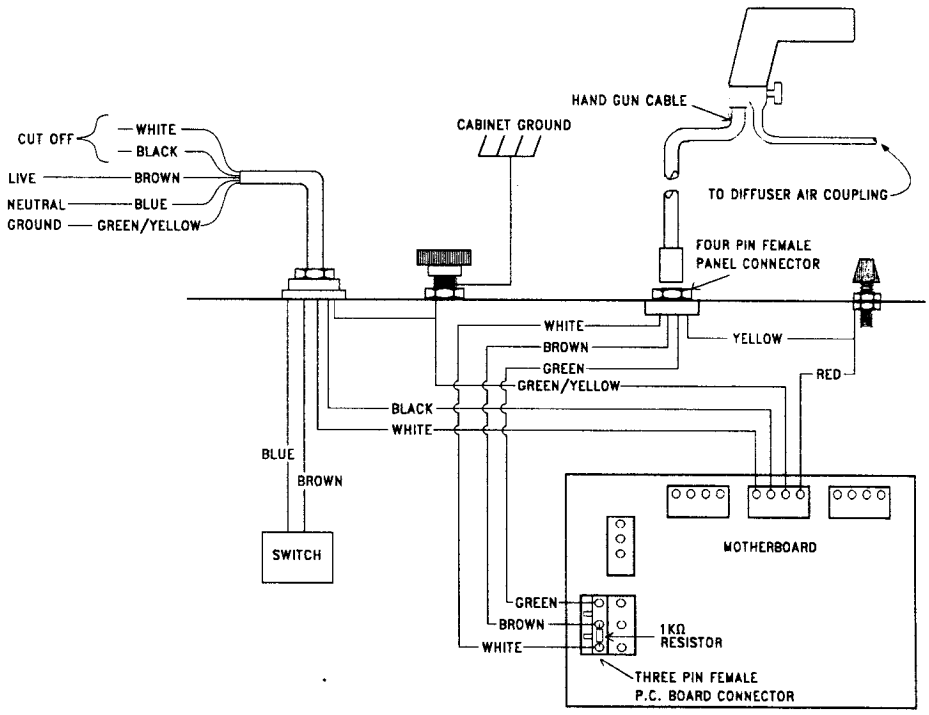

Figure 7 — Stand Alone Kit Installation (Handgun)

c) Connect the orange 5 lead input power/control cable to 19 Inch Control Module rear panel plug and secure in place with nut on end of cable.

d) Cut the black and white wires on the unconnected end of the input power/control cable.

WARNING: Customer connections to the 19 inch Control Module must be made in such a way as to insure that power to the 19 inch Control Module can be applied only when powder booth fans are running. Improper installation may lead to a catastrophic failure, including explosion, fire, destruction of property, or death.

e) Connect neutral input lead (blue), live input lead (brown), and ground lead (green/yellow) to connection points which allow power to be applied to the 19 inch control module only when booth fans are running.

f) Make sure input power to cabinet is disconnected. Remove top cover of 19 inch control module.

g) Install a green wire between the cabinet ground and the motherboard as shown in Figure 7.

h) Install the 1K ohm resistor the motherboard as shown.

i) Plug the hand gun cable into the female four pin panel connector, then plug the cable into the handgun

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SECTION 4
OPERATION

START-UP

Before starting spray operations, check air supply filters and separators and air dryer and make sure they are operating properly.

Check all equipment grounds in spray area, safety interlocks, and fire detection equipment.

Make sure the booth vent fans are on, the powder recovery system is operating, feed hopper is filled to capacity with clean, dry powder, fluidizing air has been turned on, and powder in feed hopper is fluidized properly.

WARNING- Breathing certain airborne dusts (including finishing powders) may be hazardous to your health. Ask the manufacturer of the powder being used for a MSDS (Material Data Safety Sheet) for specific guidance. Use appropriate respiratory protection.

1. Turn ON main switch. Power On LED indicator will light.

2. When control console receives trigger signal from master control, solenoid valves will be actuated, allowing diffuser air to flow to diffuser. Then, after a one second delay, ejector air will be allowed to flow to powder pump. Adjust ejector air to approximately 2 bar (29 psi) and diffuser air to 3 bar (44 psi).

Note: The air pressures given above are average operating pressures. Adjust for economical powder use and deposition requirements, type of powder, humidity, and other operating variables.

3. Test spray workpieces and adjust air pressures to achieve desired results.

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SECTION 5
PREVENTIVE MAINTENANCE

DAILY

1. Before starting spray operations, check air supply filters and separators and air dryer and make sure they are operating properly.

2. Check all equipment grounds in spray area, safety interlocks, and fire detection equipment.

WARNING: Never blow out charge tube with ground wire disconnected. A potentially dangerous charge will build up in charge tube, which can cause severe electric shock.

3. Remove feed hose from powder pump. Blow out hose, diffuser, and charge tube. Disassemble diffuser and clean parts. Check pump and diffuser parts for wear and replace any worn parts. Never use a sharp object to clean parts, as scratches will contribute to powder buildup and affect gun operation.

4. With booth fans running, clean powder booth with squeegee or other non-sparking device. Do not scratch booth walls while cleaning. Check final filters and filter cartridges.

5. Clean optical fire detector lenses at least every four hours, or more often if needed. Check operation of safety interlock systems at the beginning of each shift.

WEEKLY

1. Thoroughly clean booth, powder feed hoppers, distribution hoppers, and collectors.

2. Blow out exhaust vent hose from feed hopper into booth.

3. Thoroughly clean spray area. Wipe down control module with clean cloth.

4. Clean or replace final filters and filter cartridges as necessary.

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SECTION 6
TROUBLESHOOTING

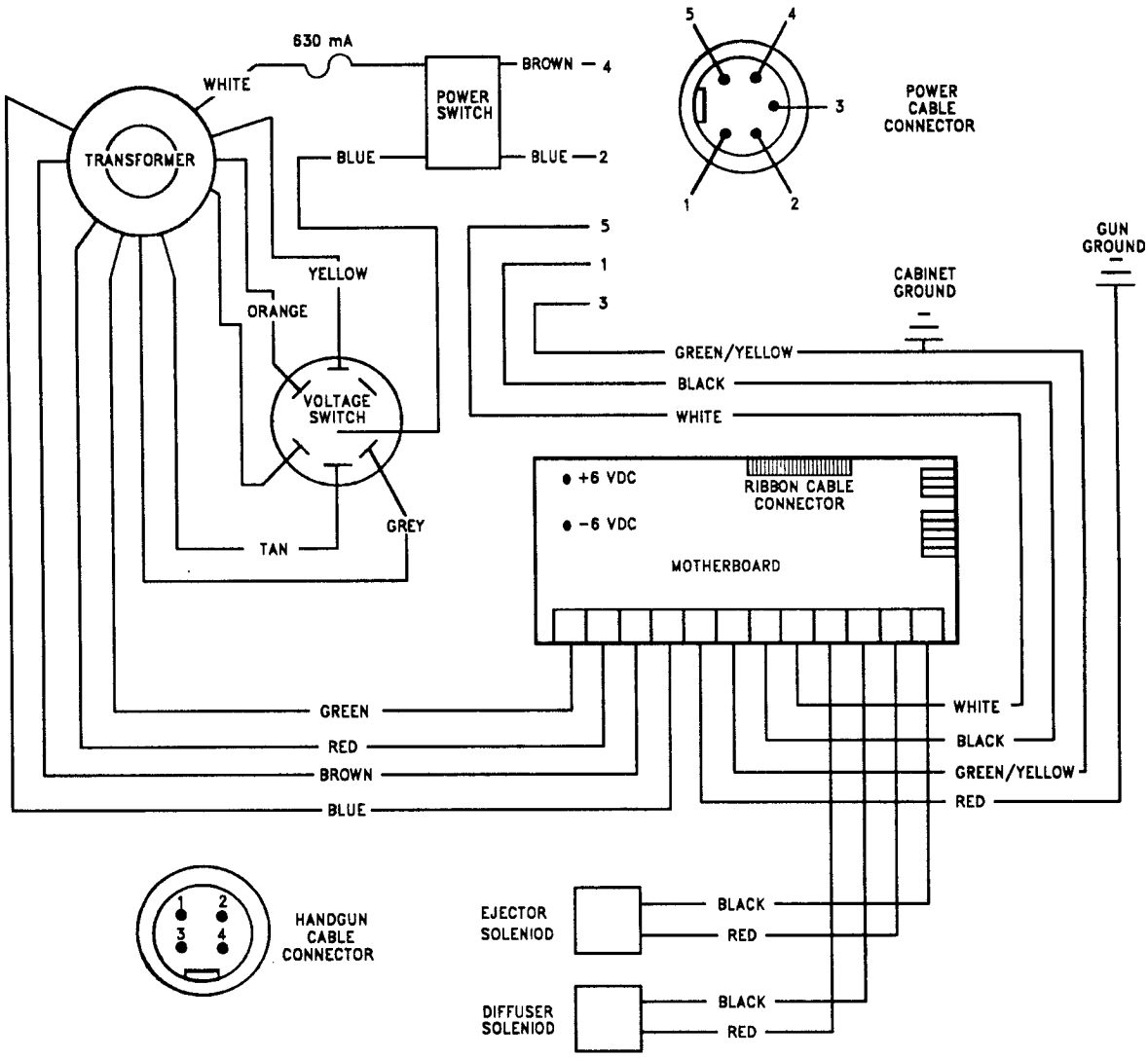

Figure 8 — Electrical Schematic

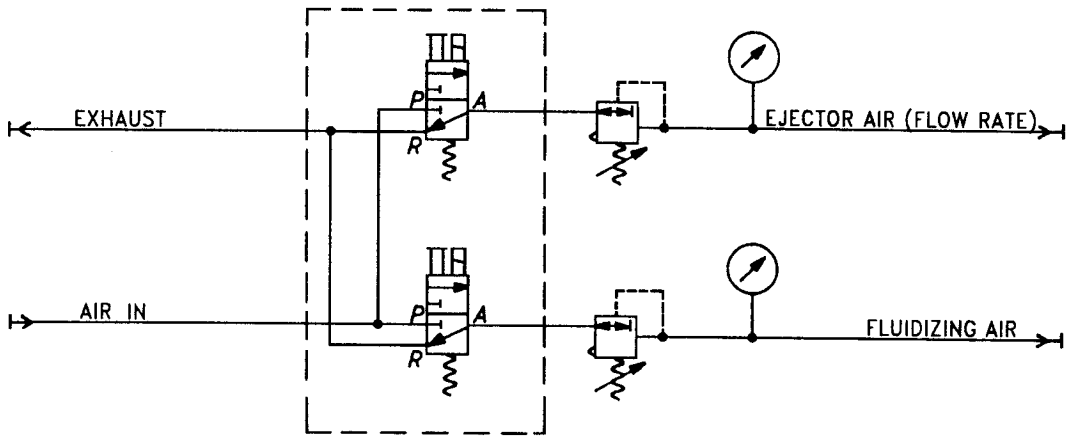

Figure 8 — Pneumatic Schematic

PROBLEM:
Powder does not flow when gun triggered.

Probable Cause:

1. No air supply or flow rate air pressure set too low.
2. Blockage in system.
3. Poor trigger cable connection, trigger malfunction or circuit board malfunction.

Suggested Correction:

1. Check air supply to system. Increase flow rate air pressure.
2. Disconnect powder feed tubing at pump, blow out with compressed air. Disassemble pump and diffuser and clean if necessary. Check powder supply in hopper for dampness and replace if necessary. Check air dryer and filters.
3. Check trigger cable connection. Trigger microswitch should click when depressed. Check continuity between pins 1 & 3 or 3 & 4 with trigger depressed. If trigger switch has malfunctioned ohmmeter will show open circuit. Refer to Figure 8 for pin designations. Check for 24VDC across trigger leads at circuit board. Replace circuit board if voltage not present.
4. Check for air output from electro-pneumatic solenoid valve when gun is triggered.

a). If no air is felt at exhaust port at the rear of the unit when the gun is triggered, remove cover of unit. With supply air supplied, press the orange test button on the solenoid, located on the right as seen from the front of the unit. Replace valve if valve does not open on trigger signal.

b). If valve triggers when test button is pushed, check voltage output to solenoid. Voltage across solenoid connector terminals should be 24VDC when gun is triggered. If voltage is present, replace solenoid valve. If no voltage is seen, check for proper wiring or replace printed circuit board.

5. Check for air output from regulator. Replace regulator if no air flows from regulator with trigger depressed

PROBLEM:

Powder puffing from gun.

Probable Cause:

1. Ratio of diffuser air to ejector air incorrect.
2. Diffuser filter clogged.
3. Powder feed hose too short.
4. Venturi plug worn out.

Suggested Correction:

1. Adjust diffuser to ejector air pressure ratio. Refer to Section 4, Operation, for instructions.
2. Disassemble diffuser and clean.
3. Install longer powder feed hose.
4. Change venturi throat.

PROBLEM:

Poor powder charging (no electrostatic wrap or adhesion).

Probable Cause:

1. Ejector air pressure too high in relation to diffuser air, powder velocity prevents efficient charging.
2. Powder not suitable for tribo charging.
3. Workpiece not properly grounded.

Suggested Correction:

1. Reduce ejector air pressure while maintaining proper ejector to diffuser air ratio.
2. Consult with powder manufacturer.
3. Check conveyor rollers and hangers for coating buildup that could affect ground. Resistance between workpiece and earth ground should not exceed one megohm.

PROBLEM:

Inadequate powder flow.

Probable Cause:

1. Wet powder causing blockage in system.
2. Poor fluidization of powder.
3. Ratio of diffuser to ejector air incorrect.

Suggested Correction:

1. Check powder in feed hopper for dampness. Check air dryer and filters for proper operation. Clean system components and feed tubing.
2. Increase or decrease fluidizing air pressure. Allow powder enough time to fluidize properly before beginning spray operations.
3. Adjust diffuser and ejector air pressure settings. Refer to Section 4, Operation, for instructions.

PROBLEM:

No Power. All LED's off.

Probable Cause:

1. Input power failure.
2. Loose connection or short.
3. Fuse blown.
4. Transformer failure.
5. Main circuit board failure.

Suggested Correction:

1. Check input power supply and interlock system.
2. Insure that internal power connections are secure, check for signs of shorts.
3. Replace fuse.
4. Check for 7-10 VAC between red and green wires and brown and blue wires at main circuit board connection.
5. Replace main circuit board.

PROBLEM:

One or more LED's off.

Probable Cause:

1. Loose connection or short.
2. Display board failure.
3. Main circuit board failure.

Suggested Correction:

1. Insure that internal power connections are secure, check for signs of shorts.
2. Replace display board.
3. Replace main circuit board.

PROBLEM:
No output air, LED's on.

Probable Cause:

1. Loose connection or short.
2. Solenoid failure.
3. Main circuit board failure.

Suggested Correction:

1. Insure that internal power connections are secure, check for signs of shorts.
2. Disconnect solenoid. Reading across solenoid leads should be approximately 345 ohms. Replace if reading is high or low.
3. Check for 24 VDC at solenoid connections. Replace main circuit board if reading is high or low.

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SECTION 7
PARTS LISTS

INTRODUCTION

The Tribomatic 19 inch control module is shown in Figure 10 within this section. This illustration is accompanied by a parts list. Following the control module parts list are optional kit lists.

USING THE PARTS LIST

The number in the **REF.** column indicates the number assigned to the part in the associated figure. A dash or the code **NS** (Not Shown) are used for parts that are not shown.

The letter in the **NOTE** column is a reference to an unusual circumstance for this particular part, and it is explained further at the end of the list.

The number in the **PART NO.** column indicates the Nordson part number for the part. A series of dashes here signifies that the item is a nonsaleable part or a nonsaleable subassembly of a saleable assembly.

The **DESCRIPTION** column gives the name of the part together with its dimensions and other physical properties, where appropriate. Indented parts are subgroups of a major assembly or sub-assembly. For example:

Ref.	Part No.	Description
1	630 820	Module, Control, 19 inch
2	630 550	• Gauge
3	940 090	• • O-Ring, Viton

If you order number 1, items 2 and 3 will be included.
If you order number 2, item 3 will be included.
If you order number 3, you will receive only number 3.

The number in the **QTY.** column indicates the quantity required per unit or assembly. An "**ASR**" in this column indicates that the part number given is a bulk quantity and is to be ordered "as required" by the installation. When the quantity is not applicable, a dash appears in the column.

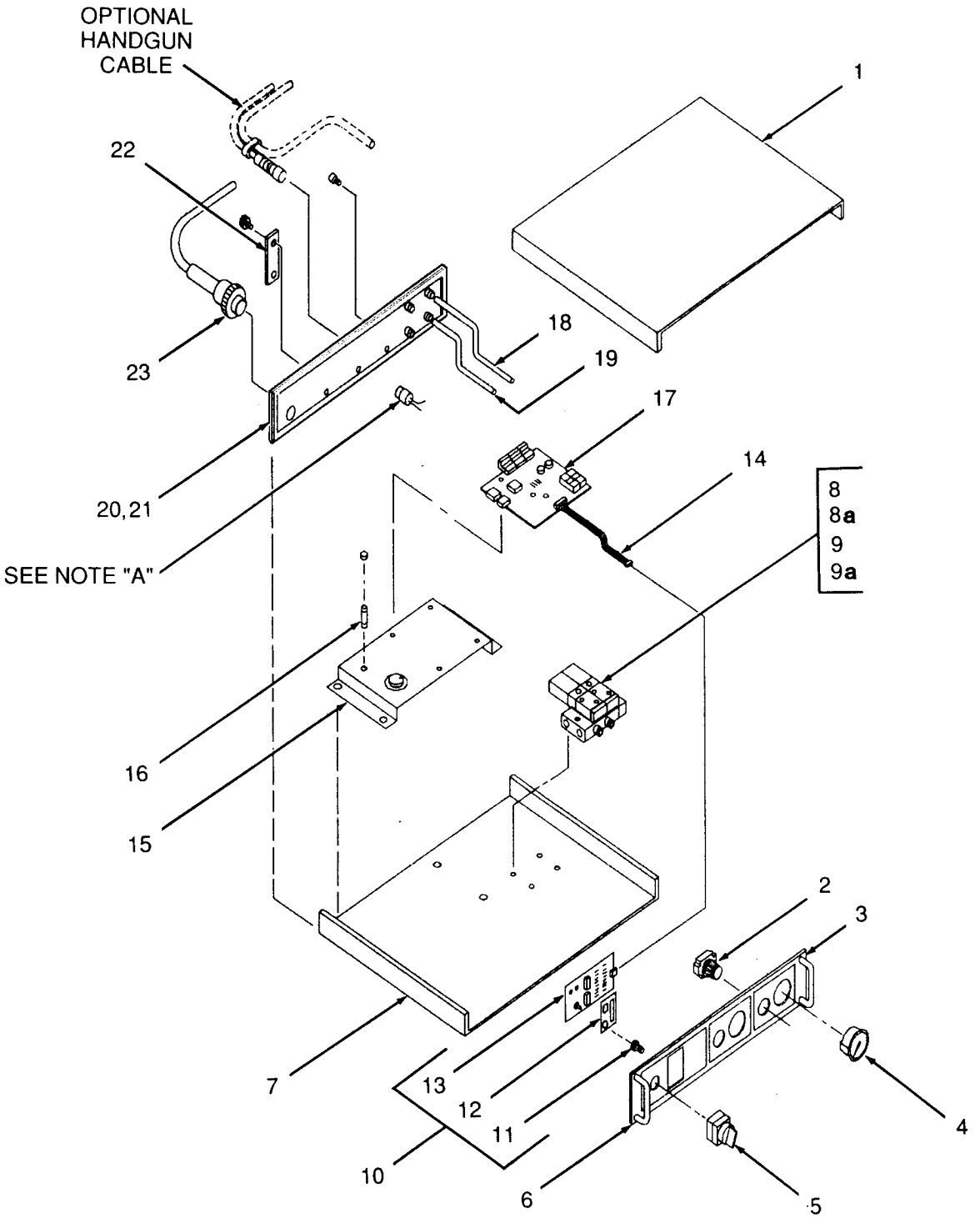


Figure 10 — Exploded View Of 19" Control Module

Note: Names of parts included in an assembly are indented after each assembly or sub-assembly.

Ref	Note	Part No	Description	Qty
---	A	630 810	Module, Handgun, 19 inch	-
---		630 820	Module, Control, 19 inch (Automatic Gun)	-
1		630 824	• Plate, Top	1
2		630 082	• Valve, Regulator	2
3		630 821	• Plate, Front	1
4		630 550	• Gauge, 0-4 Bar, 50mm Dia.	2
5		630 844	• Switch, Main	1
6		630 849	• Handle	2
7		630 823	• Plate, Bottom	1
8		630 827	• Solenoid Valve Assy	1
8a		630 853	• • Gasket, Valve/Base	1
9		630 829	• • Solenoid Valve	2
9a		630 852	• • • Gasket, Valve	1
10		630 838	• Display Board Assy	1
11		630 840	• • Knob	1
12		630 839	• • Window	1
13		630 841	• • Board, Circuit, Display	1
14		630 842	• Cable, Ribbon	1
15		630 837	• Transformer Assy	1
16		630 576	• • Fuse, 630 mA, 250V	1
17		630 573	• Board, Circuit	1
18	B	630 597	• Tubing, 4mm, Blue	ASR
19	B	630 599	• Tubing, 6mm, Blue	ASR
20		638 826	• Gasket	2
21		630 822	• Plate, Back	1
22		630 885	• Plate, Ground	1
23		630 845	• Cable, Power	1

Note (A) - This part number consists of P/N 630 820 Module, Control, 19 inch with P/N 630 843 Connector, Trigger installed.

Note (B) - Bulk quantity part number. Order in quantity required.

KITS

HandGun Kit

If desired, a handgun can be used with the 19 Inch Control Module. Order one P/N 630 143 Kit, Handgun for each Control Module . Refer to Section 3, Installation for installation instructions.

Part No.	Description	Qty.
630 143	Kit, Hand Gun, 19 Inch, RAC	1
630 034	• Pump, Powder	1
630 402	• Extension, Hand Gun	1
630 403	• Support, Deflector	1
630 404	• Deflector, Pen. 2,5mm	1
630 425	• Diffuser, Hand Gun, Straight	1
630 410	• Hand Gun, Gen. 2	1
630 810	• Module, Hand Gun, Control, 19"	1
630 848	• Cable, Hand Gun	1
630 061	• Tubing, Powder, Feed, 12mm	10M

Automatic Gun Kit

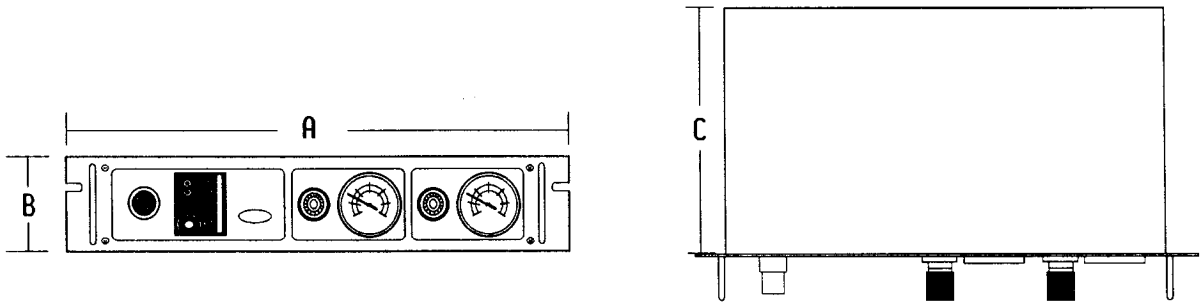
This kit is used to add an automatic gun to an existing system. The equipment rack or cabinet must have room for another gun control module and the master control module, which can control 12 gun control modules, must have unused connectors.

Part No.	Description	Qty.
630 141	Kit, Tribomatic, 19 Inch, RAC	1
630 011	• Spacer, L=82 mm	1
630 013	• Nut, Ring	1
630 014	• Chargetube, Tribomatic	1
630 292	• Diffuser, Gun, Gen. 2	1
630 034	• Pump, Powder	1
630 820	• Module, Control, 19 Inch	1

Stand Alone Kit

This kit allows a 19" Control Module to be operated without being slaved to a Master Control Module. Order 630 847 Kit, Stand Alone.

SECTION 8
TECHNICAL DATA



Dimensions:

A: 19 in. (483 mm)
B: 3.5 in. (88.9 mm)
C: 8.81 in. (223.7 mm)

Electrical:

Nominal input voltage 100, 115, 200, 220 or 240VAC @ 50/60 HZ.

Air:

Maximum Supply Pressure: 145 psi (10 bar)
Minimum Supply Pressure: 87 psi (6 bar)

Weight:

13.7 lbs (6240.0 grams)