

Electrical Tools and Test Equipment in Electronic/Digital Equipment Areas

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1 . General

1.1

Purpose

This practice:

- Describes precautions that must be observed to avoid interference in electronic/digital equipment when using electrical tools and test equipment.
- Provides procedures for investigating and reporting interference.

1.2 filing

Instructions and Supersedures

Discard all previous issues and associated addenda of this practice and file this issue numerically in your GE Telephone Operations practices set.

This practice supersedes and cancels:

- All policies, procedures, general instructions, letters, and memoranda which address this subject.
- Any document which provides information contrary to the information contained in this practice.

1.3

Reason for Reissuing

This practice has been reissued to:

- Clarify the use of battery or hand-operated wire wrap tools when working on electronic/digital frames and backplanes.
- Include information on working within the Maintenance Window (11 p.m. to 6 a.m.)
- Include the use of the High Risk Activity Notice procedure.

Read this entire practice to ensure your familiarity with the new information.

1.4

Responsibility

This practice was published by the GTE Telephone Operations Administrative Services Department. For more information about this practice, contact the Headquarters COE Construction Department.

1.5

Disclaimer

This practice was prepared solely for the use of GTE Telephone Operations. It must be used only by its employees, contractors, customers, and end users when installing, operating, maintaining, and repairing GTE Telephone Operations' equipment, facilities and services. Any other use of this practice is forbidden. The information contained in this practice may not be applicable in all circumstances and is subject to change without notice. By using this practice the user agrees that GTE Telephone Operations will have no liability (to the extent permitted by applicable law) for any consequential, incidental, special, or punitive damages that may result.

2. Overview

2.1

Introduction

Central Office (CO) systems that use electronic/digital circuitry components **might** be susceptible to influence from electromagnets in electrical equipment, radio waves, and static discharge. Observe proper precautions to prevent interference or damage to electronic equipment.

2. Overview, continued

2.2 Definitions

The following chart provides definitions for the acronyms and terms used in this practice.

Acronym or Term	Definition
AC	Alternating Current
CO	Central Office
COPE	Central Office Power Evaluation
EMI	Electrical Magnetic Inductance
Induction	The electrical and magnetic interaction process by which a charging current in one circuit produces a voltage change not only in its own circuit (self-inductance) but also in other circuits to which it is linked magnetically.
Influence	The tendency of a power supply system to induce hum or noise into a voice frequency transmission line (Le., telephone line).
PWC	Printed Wiring Card
SCR	Silicon Controlled Rectifier. A transistor (PNP type) device which operates as a gate and is used in solid-state relays.
UCR	Unsatisfactory Condition Report

2. Overview, continued

2.3 References

The following chart provides sources of supplementary information relating to this practice. The documents could be required for performing certain tasks.

See...	For Information About...
007-005-015	Handling Static-Sensitive Materials
007409401	Report Unsatisfactory Condition
200-001-000	Safety Precautions - Central Office
200-001-004	Equipment Rooms Housekeeping
220-001-001	Central Office Equipment Installation Activity Procedures
220-001-002	High Risk Activity Notice
795-805-071	Central Office Grounding Systems - Engineering Applications
795-805-072	AC Service Grounding Engineering Applications
867-800-040	Inductive Coordination for Communication Circuits

3. Interference in Electronic/Digital Equipment Areas

- 3.1 Symptoms of Interference** me primary symptoms of interference are:
- Static.
 - Noise.
 - Low-frequency induction.
- 3.2 Devices/ Equipment Susceptible to Interference and Damage** Devices which are susceptible to interference and damage [e.g., static discharges from people or insulation materials, Alternating Current (AC), foreign voltages, etc.] include:
- Broadband carrier equipment containing quartz crystals.
 - Transmitting equipment containing electron tubes.
 - Any other susceptible equipment containing these components:
 - Quartz crystals.
 - Electron tubes.
 - Printed Wiring Card (PWC) assemblies.
 - Static-sensitive devices (e.g., metal-oxide semiconductors, integrated circuits).
- 3.3 Factors Affecting Interference** Interference can develop as a result of:
- The poor maintenance condition of tools and janitorial equipment.
 - The type of electrical tools and janitorial equipment being used near electronic components (e.g., backplanes, PWCs).
 - Dirt, dust, metal particles, and moisture present due to poor housekeeping practices (see GTE Telephone Operations Practice 200-001-004 for information on equipment rooms housekeeping).
 - Site-specific conditions, such as:
 - Equipment location patterns.
 - Violation of zoning in cabling and wiring.
 - Lack of cable shielding where required.
 - Improper installation and utilization of AC outlets.
 - Ineffective grounding.
 - Static wrist straps not used.
 - Plastic sheeting.
- 3.4 Sources of Interference** Possible sources of interference include:
- Magnets.
 - Radio frequencies.
 - Static discharges from people and miscellaneous conductive materials.
 - Electromagnets in AC-powered electrical equipment, including:
 - Motor-driven tools such as drills, vacuums, and AC-powered saws.
 - Janitorial cleaning equipment such as floor buffers.
 - Fluorescent lighting not grounded or working correctly.

3. Interference in Electronic/Digital Equipment Areas,

continued

3.5 Investigating and Reporting Interference

Whenever you detect interference in a CO, investigate and report it to me Central Office Maintenance Supervisor, Central Office Power Evaluation (COPE), and possibly generate an Unsatisfactory Condition Report (UCR).

NOTE: See GTE Telephone Operations Practice 007-009-001 for information on the UCR procedure.

Include a detailed record of:

- Description of the interference.
- Events that occurred when the interference was detected.
- Equipment frames and equipment involved, supplying part numbers and issues.
- Software version of the switch.
- Suspected cause of the interference.

NOTE: See GTE Telephone Operations Practice 887-800-040 for details about inductive coordination of power and telephone lines.

4. Precautions

4.1 Observations

Observe precautions when using foreign **devices** and electrical tools in electronic/digital equipment areas.

4.2 Installing Equipment

When working within six feet of powered equipment containing electronic components normally found **in** electronic offices, radio equipment, and transmission systems:

- Work within the Maintenance Window (11 p.m. to 6 a.m.).
- Generate a High Risk Activity Notice (refer to GTE Telephone Operations Practice 220-001-002 for information on how to generate this notice).
- Do **not** use AC-powered tools such as the:
 - Electric drills.
 - Vacuums.
 - Electric wire wrap guns.

NOTE: **Battery-operated, manual, or pneumatic tools can be used.**

- Use static-sensitive wrist straps when handling electronic components.

4. Precautions, continued

4.3

Switchroom Environment

When working in the switchroom:

- Use the **orange** electrical AC outlets (isolated) for test equipment only.
- Use the **brown** electrical AC outlets (nonisolated) for tools and janitorial equipment.
- Do **not** use dry cloths or sponge material for dusting equipment as static discharges could occur. Use an approved oil-treated cloth or a type that guards against static buildup. Also, use a wrist strap prior to cleaning around electronic equipment.
- Do **not** use steel wool, steel wool pads, or dry or untreated cloths and mops for floor maintenance.
- Do **not** use electrical wire wrap guns, when wire wrapping on powered electronic/digital equipment frames and backplanes. Only three types of wire wrap tools can be used on the equipment frame:
 - Battery-operated tools.
 - Manual (pencil-type, not squeeze-type) tools.
 - Pneumatic tools.

The battery operated tool is the preferred method for all powered electronic/digital frame wiring modifications. Use the manual tool only on an exception basis (for a small number of wires). If a manual tool is used, take extreme caution to ensure a quality wire wrap connection is made. See Section 5.1 for ordering information on battery-operated wire wrap tools.

- Replace defective fluorescent lighting components such as tubes, starters, and ballast transformers immediately.

NOTE: Failure to replace defective components might introduce noise transients.

4.4

Printed Wiring Cards (PWCs)

Certain systems and equipment use components and PWC assemblies that are susceptible to damage as a result of static discharge from people, plastics, and electrical tools.

To avoid problems while working with PWCs:

- All PWCs should be handled as if they contained static-sensitive components.
- Refer to GTE Telephone Operations Practice 007-005-015 for requirements in removing, handling, transporting, and installing PWCs containing sensitive components.
- Always use static-sensitive wrist straps.

4.5

Motor-Driven Devices

When using motor-driven devices in and around electronic equipment, follow these guidelines:

- Use only motor-driven tools and janitorial equipment that are in good working order. Worn motor brushes are a high source of noise.
- Use only AC devices that have grounded three-conductor cords which bleed off any static charges or radio frequency noise transients.

CAUTION: Do not use double-insulated tools. The noise generated by these devices might damage electronic equipment.

- Do not start or stop AC motor-driven devices within six feet of electronic equipment.

4. Precautions, continued

4.6 Magnetic Tapes and Memory Devices

When working around magnetic tapes and memory devices:

- Avoid positioning motor-driven devices next to tape transports or memory devices.
- Position the vacuum no closer than six feet to the equipment and use an extra length hose.
- Do **not** expose magnetic tapes to any kind of magnet device including, but not limited to:
 - Magnetic clips used to hold drawings.
 - Flashlights with magnets on the handle.
 - Magnetic screwdrivers.
 - Magnetic employee ID card holders.

Store magnetic tapes in a grounded cabinet, which must be located away from magnetic fields.

5. Ordering Information

5.1 Battery- Operated Wire Wrap Tools

The following ordering information is provided if new battery-operated wire wrap tools are required:

Item ID	Part Number	Description	cost
377167	W3795	Tool Wire Wrap Battery Low EMI- Black	\$235.00

NOTE 1: Item ID 377167 comes with a charger and extra battery.

NOTE 2: Older battery wire wrap guns (Item ID 866597) can be used. When replacement or new battery wire wrap guns are required, order the low Electrical Magnetic Inductance (EMI) gun listed above.