Troubleshooting Guide

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October 28, 2019

Qualified Persons

⚠ WARNING

Only qualified persons who are knowledgeable in the installation, operation, and maintenance of overhead and underground electric distribution equipment, along with all associated hazards, may install, operate, and maintain the equipment covered by this publication. A qualified person is someone who is trained and competent in:

- The skills and techniques necessary to distinguish exposed live parts from nonlive parts of electrical equipment
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed
- The proper use of special precautionary techniques, personal protective equipment, insulated and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment

These instructions are intended ONLY for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

Read this Instruction Sheet

NOTICE

Thoroughly and carefully read this instruction sheet and all materials included in the product's instruction handbook before installing or operating a Micro-AT Source-Transfer Control. Familiarize yourself with the Safety Information and Safety Precautions on pages 3 and 4. The latest version of this publication is available online in PDF format at **sandc.com/en/support/product-literature/**.

Retain this Instruction Sheet

This instruction sheet is a permanent part of the Micro-AT Source-Transfer Control. Designate a location where you can easily retrieve and refer to this publication.

Proper Application

⚠ WARNING

The equipment in this publication must be selected for a specific application. The application must be within the ratings furnished for the equipment.

Warranty

The warranty and/or obligations described in S&C's Price Sheet 150, "Standard Conditions of Sale–Immediate Purchasers in the United States," (or Price Sheet 153, "Standard Conditions of Sale–Immediate Purchasers Outside the United States"), plus any special warranty provisions, as set forth in the applicable product-line specification bulletin, are exclusive. The remedies provided in the former for breach of these warranties shall constitute the immediate purchaser's or end user's exclusive remedy and a fulfillment of the seller's entire liability. In no event shall the seller's liability to the immediate purchaser or end user exceed the price of the specific product that gives rise to the immediate purchaser's or end user's claim. All other warranties, whether express or implied or arising by operation of law, course of dealing, usage of trade or otherwise, are excluded. The only warranties are those stated in Price Sheet 150 (or Price Sheet 153), and THERE ARE NO EXPRESS OR IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. ANY EXPRESS WARRANTY OR OTHER OBLIGATION PROVIDED IN PRICE SHEET 150 (OR PRICE SHEET 153) IS GRANTED ONLY TO THE IMMEDIATE PURCHASER AND END USER, AS DEFINED THEREIN. OTHER THAN AN END USER, NO REMOTE PURCHASER MAY RELY ON ANY AFFIRMATION OF FACT OR PROMISE THAT RELATES TO THE GOODS DESCRIBED HEREIN, ANY DESCRIPTION THAT RELATES TO THE GOODS, OR ANY REMEDIAL PROMISE INCLUDED IN PRICE SHEET 150 (or PRICE SHEET 153).

Understanding Safety-Alert Messages

Several types of safety-alert messages may appear throughout this instruction sheet and on labels and tags attached to the Micro-AT Source-Transfer Control. Familiarize yourself with these types of messages and the importance of these various signal words:

⚠ DANGER

"DANGER" identifies the most serious and immediate hazards that will likely result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ WARNING

"WARNING" identifies hazards or unsafe practices that can result in serious personal injury or death if instructions, including recommended precautions, are not followed.

⚠ CAUTION

"CAUTION" identifies hazards or unsafe practices that can result in minor personal injury if instructions, including recommended precautions, are not followed.

NOTICE

"NOTICE" identifies important procedures or requirements that can result in product or property damage if instructions are not followed.

Following Safety Instructions

If you do not understand any portion of this instruction sheet and need assistance, contact your nearest S&C Sales Office or S&C Authorized Distributor. Their telephone numbers are listed on S&C's website **sandc.com**, or call the S&C Global Support and Monitoring Center at 1-888-762-1100.

NOTICE

Read this instruction sheet thoroughly and carefully before installing a Micro-AT Source-Transfer Control.

Replacement Instructions and Labels

If additional copies of this instruction sheet are needed, contact your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting your nearest S&C Sales Office, S&C Authorized Distributor, S&C Headquarters, or S&C Electric Canada Ltd.

⚠ DANGER

The Micro-AT Source-Transfer Control operates equipment at high voltage. Failure to observe the precautions below will result in serious personal injury or death.

Some of these precautions may differ from your company's operating procedures and rules. Where a discrepancy exists, follow your company's operating procedures and rules.

1. **QUALIFIED PERSONS.** Access to a Micro-AT Source-Transfer Control must be restricted only to qualified persons. See the "Qualified Persons" section on page 2.
2. **SAFETY PROCEDURES.** Always follow safe operating procedures and rules.
3. **PERSONAL PROTECTIVE EQUIPMENT.** Always use suitable protective equipment, such as rubber gloves, rubber mats, hard hats, safety glasses, and flash clothing, in accordance with safe operating procedures and rules.
4. **SAFETY LABELS.** Do not remove or obscure any of the "DANGER," "WARNING," "CAUTION," or "NOTICE" labels.
5. **OPERATING MECHANISM AND BASE.** Do not remove or disassemble operating mechanisms or remove access panels on the Micro-AT Source-Transfer Control unless directed by S&C Electric Company.
6. **ENERGIZED COMPONENTS.** Always consider all parts live until de-energized, tested, and grounded.
7. **MAINTAINING PROPER CLEARANCE.** Always maintain proper clearance from energized components.

⚠ CAUTION

The equipment covered by this publication must be selected for a specific application and it must be operated and maintained by qualified persons who are thoroughly trained and who understand any hazards that may be involved. This publication is written only for such qualified persons and is not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment.

The publication provides a troubleshooting guide for diagnosing operating problems experienced with a Micro-AT Source Transfer Control that both:

- Was properly configured at the time of installation, including having had the sources normalized
- Had voltage-, current-, and time-related operating parameters properly set at the time of installation

Instructions for configuring and for setting voltage-, current-, and time-related operating parameters are provided in Instruction Sheet 515-500, "S&C Micro-AT Source-Transfer Control: *For use in S&C Metal-Enclosed Gear*," and Instruction Sheet 515-600, "S&C Micro-AT Source-Transfer Control: *In Weatherproof Enclosure*."

S&C assumes normal conditions existed on the high-voltage system at the time the Micro-AT Source-Transfer Control was programmed.

Where to Start . . .

Before using the troubleshooting guide, follow the inspection procedures relating to the switch operators; the clock; lamps, display, and keypad; transfer on loss of source and return of source; the event log; and the optional **Overcurrent Lockout** feature contained in one of the following:

- Instruction Sheet 620-592, "S&C Power-Operated Metal-Enclosed Switchgear: *Inspection Recommendations for Switchgear Equipped with Micro-AT Control*
- Instruction Sheet 663-590, "S&C Source-Transfer PMH Pad-Mounted Gear: *Inspection Recommendations for Units Equipped With Micro-AT or AT-12 Control*"

Then, if the nature of the problem still cannot be pinpointed, start at Chart 1 on page 6, "Diagnosing the Problem." But if the problem appears to be attributable to a specific cause, start at one of the following charts, as appropriate:

Chart 2. "Diagnosing Voltage Input Problems"

Chart 3. "Diagnosing Current Input Problems"

Chart 4. "Diagnosing Data-Line Circuit Problems"

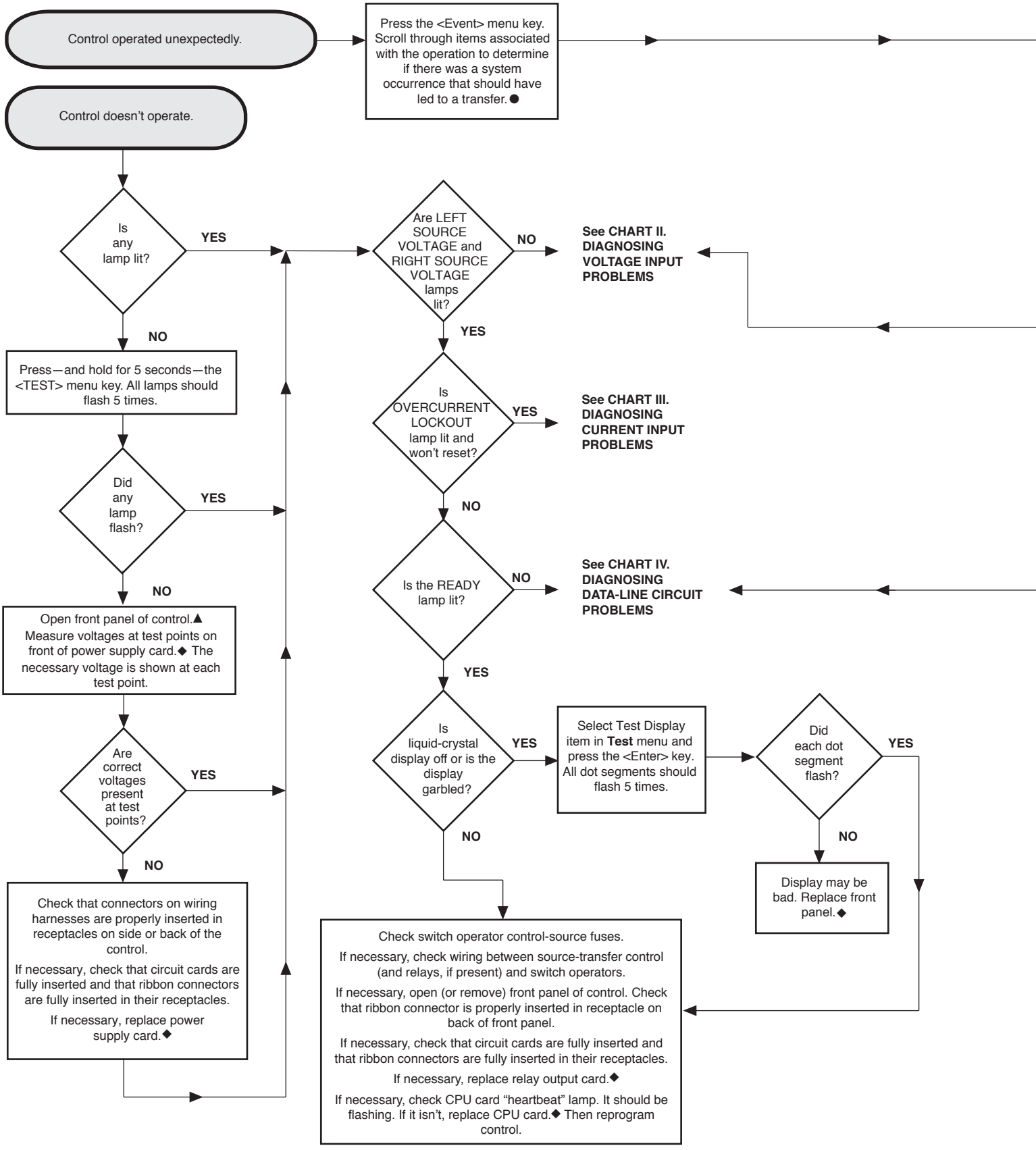
If the problem appears to involve the remote indication feature—and the control is otherwise operating as expected—replace the remote indication card. The positions of the various circuit cards are illustrated in the "Layout of Circuit Cards" section on page 12.

Instructions for replacing a circuit card or front panel assembly of a Micro-AT Source-Transfer Control are provided in Instruction Sheet 515-525. As that instruction sheet points out, during the replacement procedure, precautions should be taken to prevent static charges, which can damage not only the existing component but the replacement component as well. Although spare circuit cards and front panel assemblies are furnished in static-shielded bags, the use of a static-dissipative work surface, such as the 3M 8501 Portable Static-Dissipative Field Service Kit (available from S&C as catalog number 9931-218), is highly recommended. This kit includes a static-dissipative work mat and a ground cord assembly with wrist strap for connecting the mat—along with the person changing the component—to the same ground point.

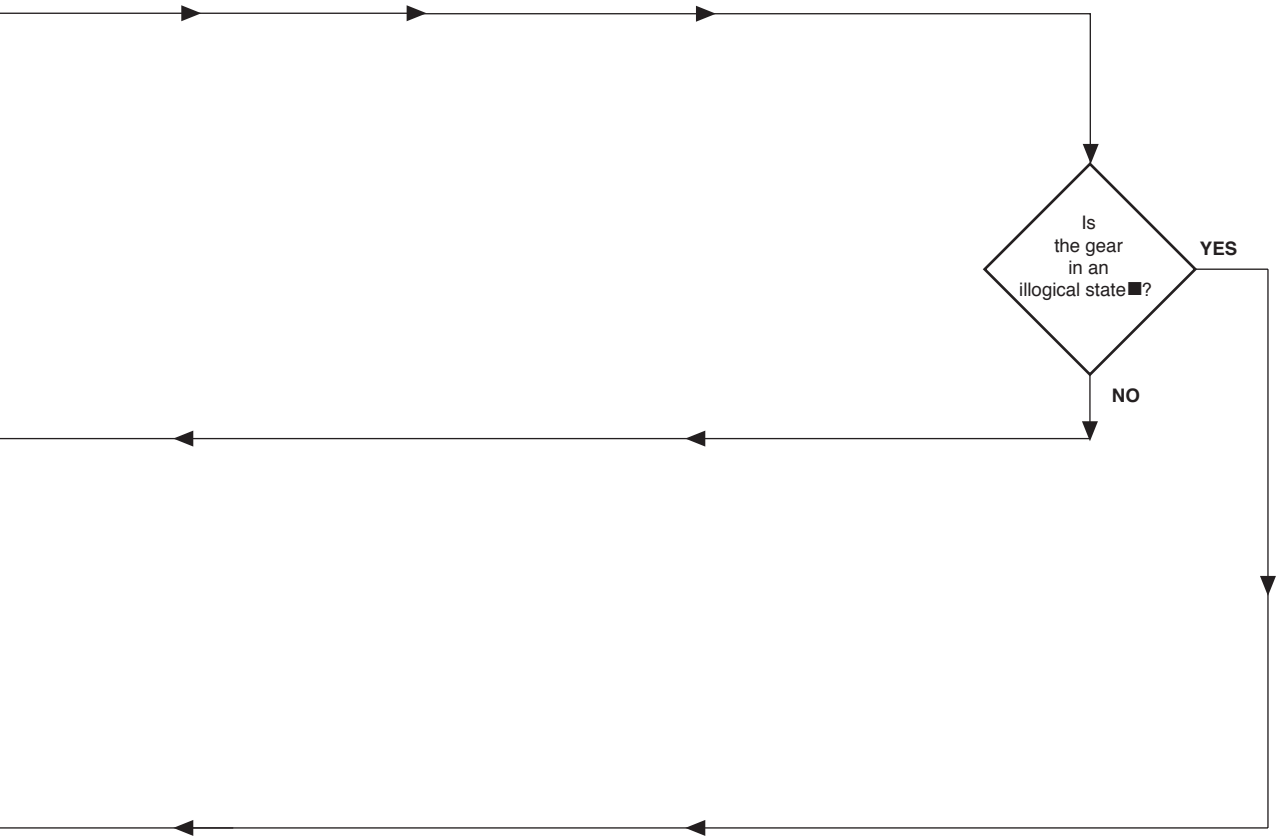
If, after following the diagnostic procedure the problem still can't be resolved or if the problem is intermittent in nature, contact the nearest S&C Sales Office. Should the problem turn out to be the result of nuisance voltage-excursion related events on the high-voltage system, do either of the following:

- Lower the **Loss-Of-Source Voltage** level setting and/or raise the **Unbalance-Detect Voltage** level setting on the Micro-AT Source-Transfer Control
- Investigate and remedy the system condition(s) causing these voltage excursions

Chart 1. Diagnosing The Problem



SEE FOOTNOTES ON PAGE 7 ►



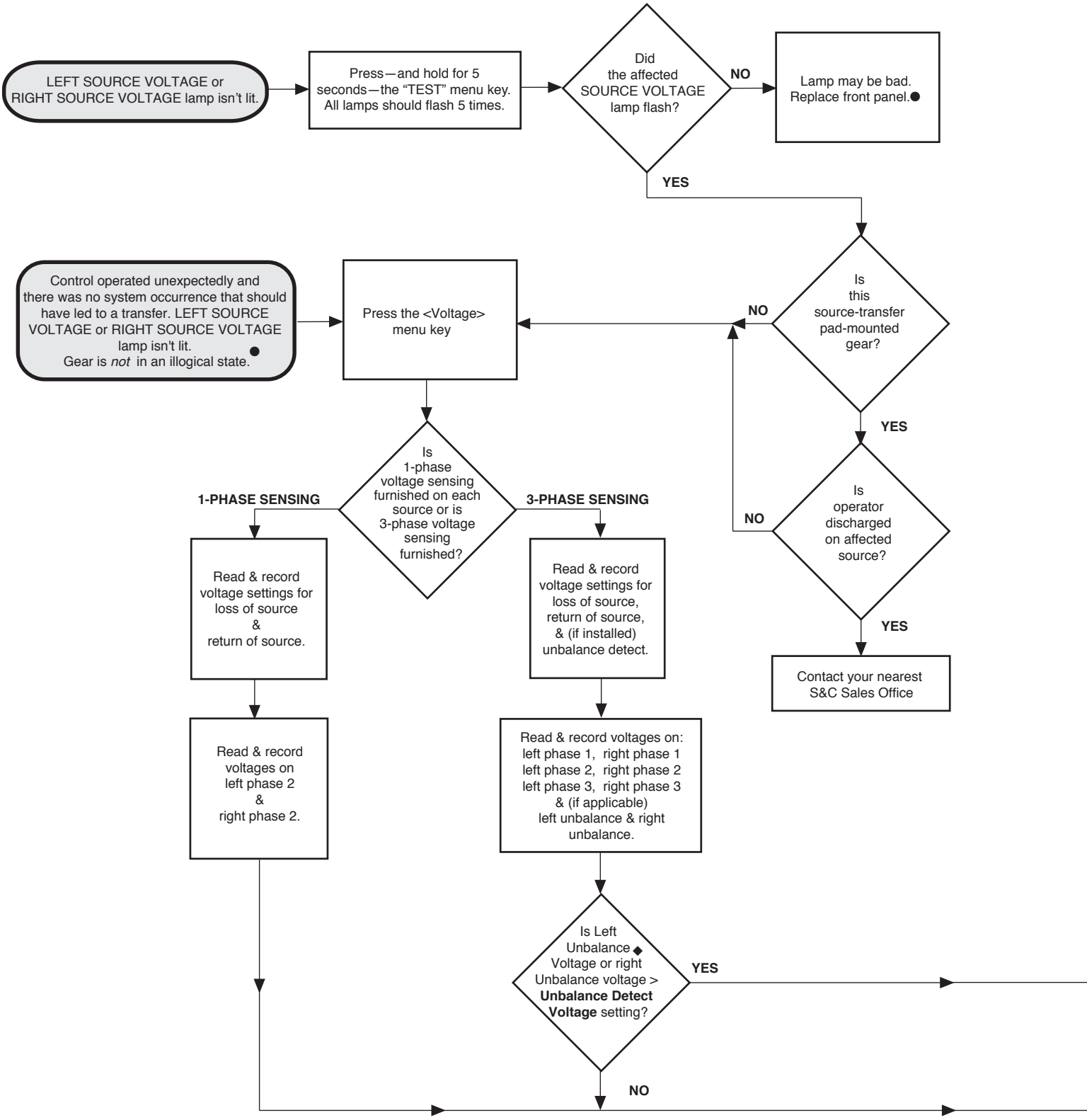
● Refer to the Appendix in Instruction Sheet 515-500 or 515-600 for event identification code numbers.

■ For example, are switch operators cycling? Or is a switch operator in an improper position?

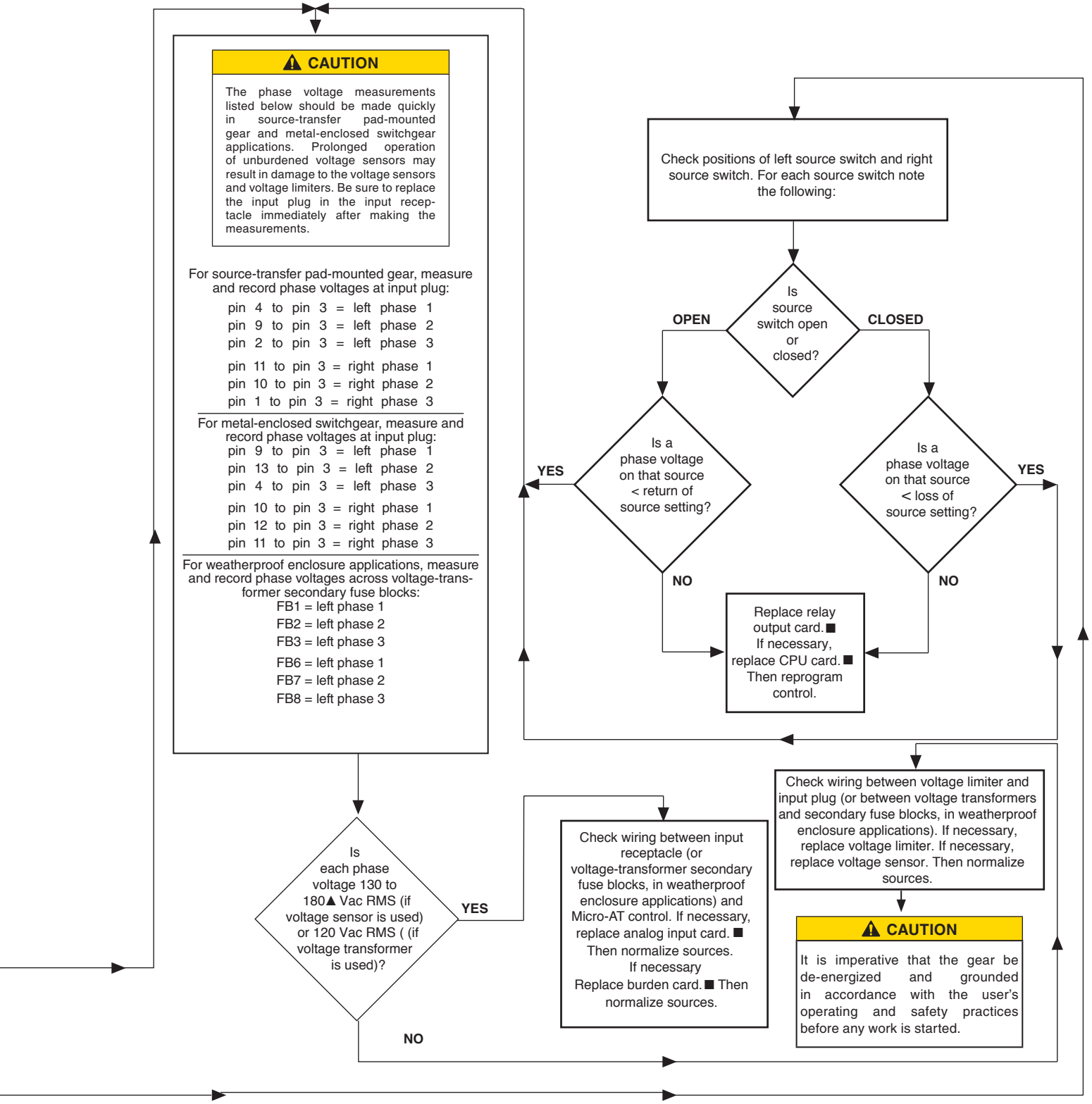
▲ In pad-mounted gear that was originally furnished with a Type AT-12 Source-Transfer Control, open the door assembly of the Micro-AT control enclosure.

◆ See the "Layout of Circuit Cards" section on page 12. If replacement is indicated, refer to Instruction Sheet 515-525. Note the precautions to be taken to prevent static charges that are discussed in that document.

Chart 2. Diagnosing Voltage Input Problems



SEE FOOTNOTES ON PAGE 9 ►



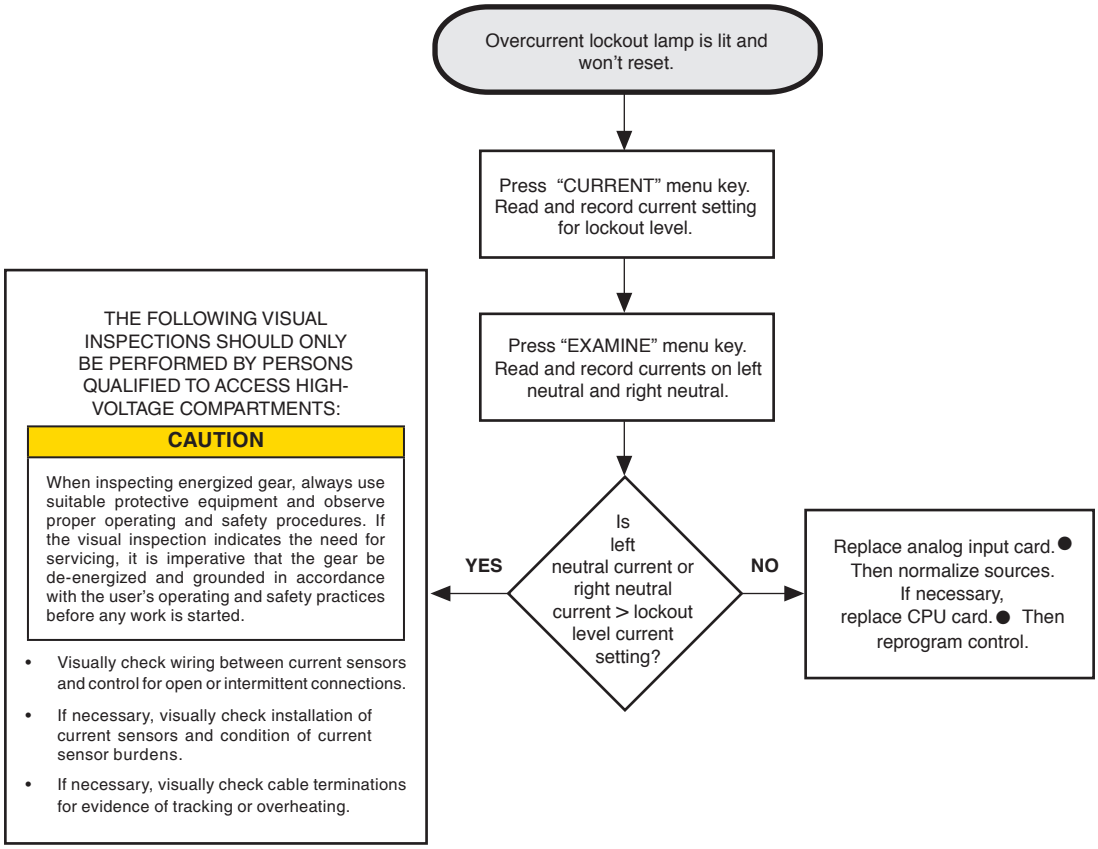
● I.e., switch operators aren't cycling. And each switch operator is in its proper position. (If the gear is in an illogical state, see Chart 4 on page 11.)

■ See the "Layout of Circuit Cards" section on page 12. If replacement is indicated, refer to Instruction Sheet 515-525. Note the precautions to be taken to prevent static charges discussed in that document.

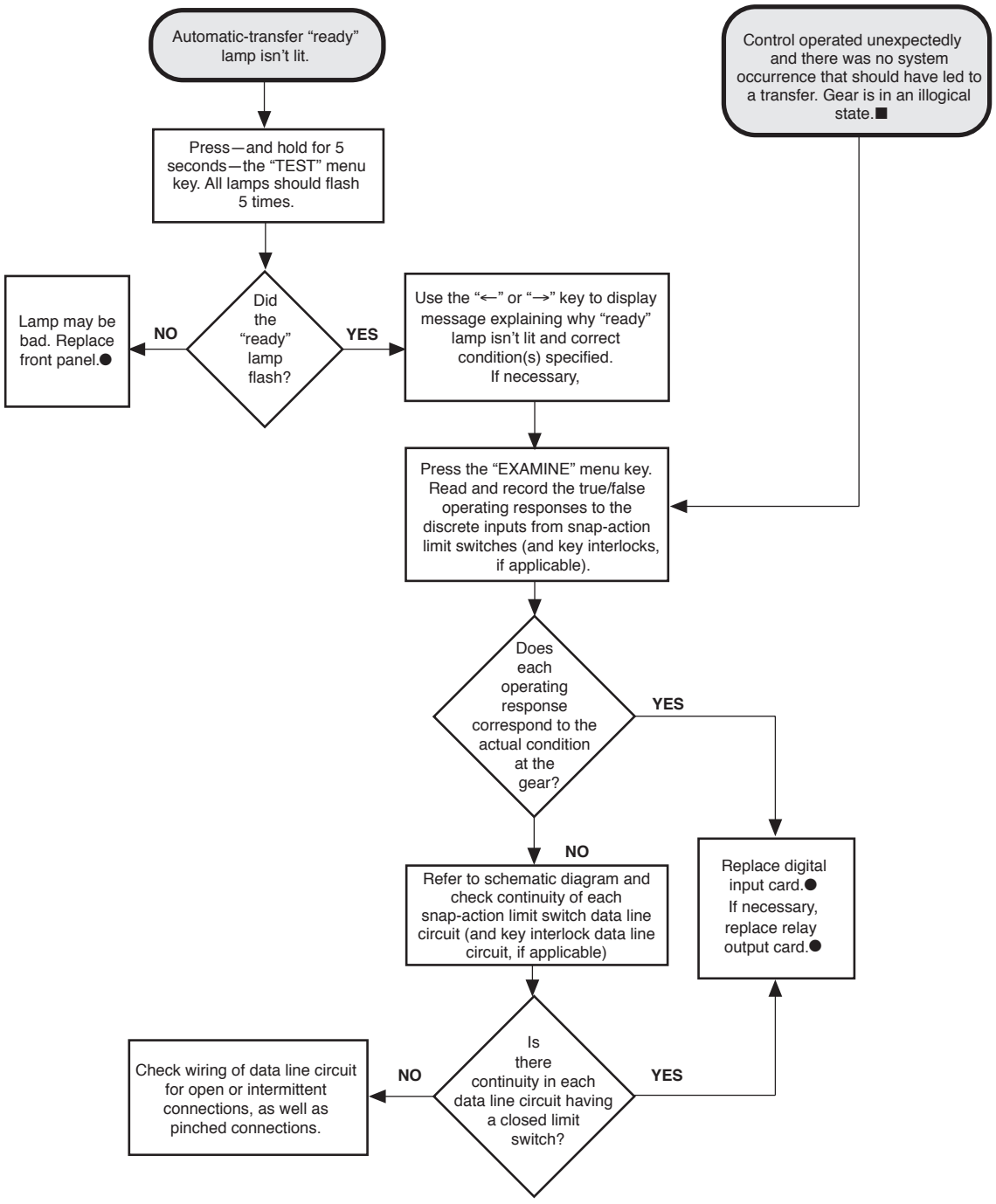
▲ Different values may apply in metal-enclosed switchgear and source-transfer pad-mounted gear originally furnished with Type AT Source-Transfer Controls. Contact your nearest S&C Sales Office.

◆ As of firmware version v2.5.3, zero sequence voltage of each source is also used in the determination of Unbalance Voltage for the respective source. The zero sequence voltages can be viewed in menu items within the **Examine** menu.

Chart 3. Diagnosing Current Input Problems



● See the "Layout of Circuit Cards" section on page 12. If replacement is indicated, refer to Instruction Sheet 515-525. Note the precautions to be taken to prevent static charges discussed in that document.



● See the "Layout of Circuit Cards" section on page 12. If replacement is indicated, refer to Instruction Sheet 515-525. Note the precautions to be taken to prevent static charges discussed in that document.

■ For example, switch operators are cycling, or a switch operator is in an improper position.

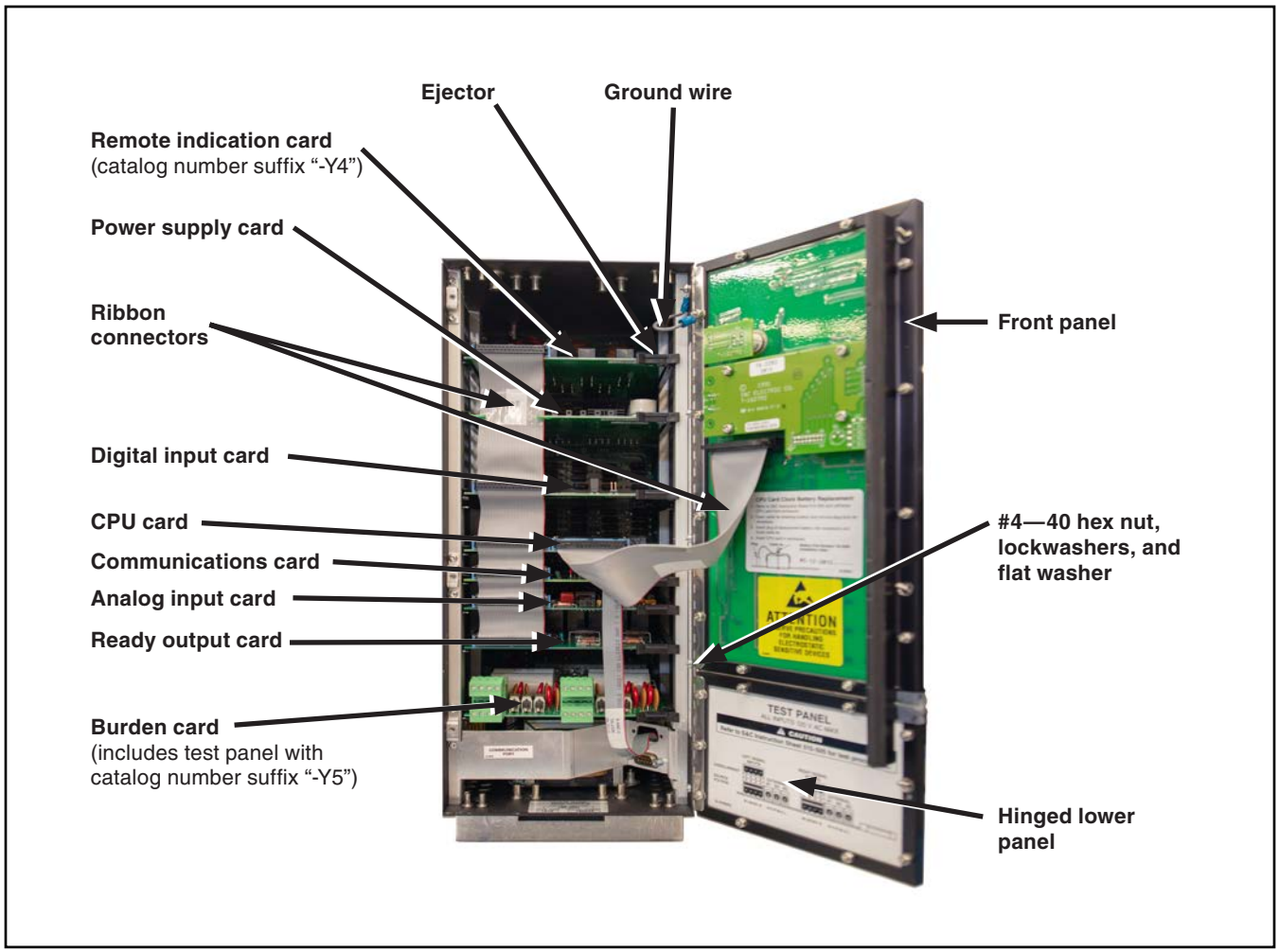


Figure 1. Positions of various circuit cards in the Micro-AT Source-Transfer Control. In pad-mounted gear originally furnished with the Type AT-12 Source Transfer Control, circuit cards are accessed by opening the door assembly of the Micro-AT control enclosure.