

DATA SET 109E-TYPE
MULTIPLE DATA SET ARRANGEMENT
USING 28A1 DATA MOUNTING AND 27-TYPE DATA UNIT
MAINTENANCE

1. GENERAL

1.01 This section describes the maintenance requirements for the data set 109E-type multiple data set arrangement, which uses the 28A1 data mounting and 27-type data unit as the associated mounting apparatus.

1.02 This section is reissued to include information on the 27B1 data unit. Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

Maintenance Policy

1.03 The data set 109E-type, 28A1 data mounting, and 27-type data unit require no routine maintenance after the installation tests and adjustments have been made.

1.04 Care should be exercised when handling and transporting the data sets, data mountings, or data units. If possible, use the original cartons to store, transport, or ship these units.

1.05 If maintenance spares are stocked, verify that they are checked and ready for immediate installation. When replacing a data set or data unit, ensure that the proper options are installed in the replacement.

1.06 Since there is no routine maintenance required for the data set 109E-type, 28A1 data mounting, or 27-type data unit, maintenance of the data set 109E-type multiple data set arrangement is limited to detection and replacement of defective units.

1.07 Data set 109E-type multiple data set arrangements suspected of being in trouble should be tested as described in Section 591-036-501.

2. MAINTENANCE AIDS

2.01 Although the information given in Part 3 of this section will be sufficient to correct the majority of the problems experienced, the following documents may be helpful when dealing with difficult problems or unique installations.

| NUMBER | TITLE |
|-----------------|--|
| SD-&CD-1D198-01 | Data Set 109E-L1 |
| SD-&CD-73055-01 | No. 10A Data Line Concentrator |
| SD-&CD-1D212-01 | No. 10B Data Line Concentrator |
| SD-&CD-1D183-01 | 27-Type Data Unit |
| SD-&CD-1D176-01 | 28-Type Data Mounting |
| 590-100-114 | 27A1 and 27B1 Data Unit— Identification |
| 590-102-124 | 28A1 Data Mounting—Identifi- cation |
| 591-036-100 | Data Set 109E-L1—Description |
| 591-036-201 | Data Set 109E-Type—Multiple Data Set Arrangement Using 28A1 Data Mounting and 27-Type Data Unit—Installation and Connections |
| 591-036-501 | Data Set 109E-Type—Multiple Data Set Arrangement Using 28A1 Data Mounting and 27-Type Data Unit—Test Procedure. |

2.02 A KS-16979-L1 volt-ohm-milliammeter or equivalent is needed to perform some of the troubleshooting procedures which follow. A

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748A tool may be needed but is normally supplied with the 28A1 data mounting.

2.03 The troubleshooting chart shown as Fig. 1 is intended to be used to identify and correct problems that affect all of the data sets in slots 1 through 8, *or* 9 through 16, *or* the whole data mounting. These problems are usually associated with the common equipment, ie, power supply, 27-type data unit, or 28A1 data mounting.

2.04 The troubleshooting chart shown as Fig. 2 should be used to identify and correct problems that affect a single slot. It may also be used in the unlikely event that the problem affects more than one *but not all* of the slots in either or both of the groups mentioned in 2.03.

2.05 More detailed information on the procedures in Fig. 1 and 2 is given in Part 3 of this section.

3. TROUBLESHOOTING PROCEDURES

Multiple Data Set Trouble

3.01 When a trouble report includes all of the data sets either in slots 1 through 8, 9 through 16, or both, it indicates a dc power source failure. In this case, check that the power source is properly powered, the power source fuses are not blown, P1 of the 27-type data unit(s) is properly connected to J1 and/or J2 of the data mounting, and then perform Test A of Section 591-036-501. If the trouble report indicates a problem with a single data set, proceed to 3.05.

3.02 If the power source *does not* meet the requirements of Test A, perform Test B.

Note: Some installations will use limited output power supplies such as the KS-20575 rectifier for the dc power source. If this type power supply is overloaded (eg, shorted output), the output voltage will drop to zero and the current will be limited to a safe value.

3.03 If the power source does not meet the requirements of Test B, replace it with a power source that is known to be operating properly.

3.04 If the power source *does* meet the requirements of Test B but not those of Test A, proceed as follows.

(1) Use a KS-16979-L1 volt-ohm-milliammeter, or equivalent, to monitor the power source output voltage.

Note 1: Obtain a release of working circuits (in slots 1 through 8 or slots 9 through 16) from the customer before disconnecting the 27-type data unit.

Note 2: If replacement equipment cannot be obtained or if Steps 2 and/or 6 are considered impractical, an attempt should be made to diagnose the problem without replacing the suspected equipment. Refer to the appropriate documents listed in Part 2 of this section.

(2) Disconnect the connecting cable of the 27-type data unit associated with the slot in trouble from the 28A1 data mounting connector J1 (slots 1 through 8) or J2 (slots 9 through 16).

Note: If all slots are in trouble, disconnect the data unit associated with slots 1 through 8 from data mounting connector J1 first. If trouble persists, disconnect the data unit associated with slots 9 through 16 from data mounting connector J2.

(3) If disconnection of a 27-type data unit restores the power source to normal, verify that the leads connected to terminals 48 and 49 of the data unit plug are properly insulated and stored at the mounting plate end of the cable. Reconnect the 27-type data unit to the 28A1 data mounting. If the trouble returns, replace the data unit with one that is known to be operating properly.

(4) If disconnection of the 27-type data unit(s) does not clear the trouble, continue to monitor the power source output voltage, and using the 748A tool supplied with the 28A1 data mounting or the locking bar, remove all of the data sets reported to be in trouble from the data mounting.

(5) If the power source output returns to normal, replace the data sets one at a time until the trouble returns, and then replace the data set causing the trouble with one that is known to be operating properly.

(6) If the power source output is still incorrect after the data sets have been removed,

replace the 28A1 data mounting with one that is known to be operating properly.

Single Data Set Troubles

3.05 If the trouble report indicates that there is a problem with one of the individual circuits, proceed as follows:

(1) Ask the customer to verify that the customer-provided equipment is operating properly. Ensure that the equipment is being operated correctly. Attempt to operate the system.

(2) If the trouble is *not* in the Telco equipment, the employee should advise the customer and notify the Plant Service Center to fill out Form E-5855 in conformance with the section entitled Maintenance of Service Charge on Service with Customer Provided Equipment (CPE) (660-101-312).

(3) If there appears to be a problem in the Telco equipment, continue the test by checking for signs of damaged equipment, loose connections, or any external cause for a malfunction. If found, repair or replace any suspected equipment.

Note: When the problem has been located and corrected during this and the following procedures, conduct an operational check of the installation and ask the customer to verify that service has been restored.

(4) If no probable causes are found and the terminal equipment is Bell System, verify that the teletypewriter (TTY) is functioning properly by placing it in the local mode and sending RY and U*. If the TTY is able to send and copy these characters, it is assumed that it is operating properly. Refer to the appropriate field maintenance practice if the TTY will *not* operate properly.

(5) If the TTY is operating properly and the trouble persists, perform a line voltage test in accordance with Section 591-036-501.

(6) If the installation fails the voltage test, replace the data set with one known to be operating properly and retest. If it fails again, replace the 27-type data unit and retest. If it fails again, replace the 28A1 data mounting and retest. If the installation continues to fail the voltage test, request help from immediate supervision.

Note: If replacement equipment cannot be obtained or if this step is considered impractical, refer to the documents referenced in Part 2 of this section and troubleshoot the equipment in place.

(7) If the installation meets the requirements of the line voltage test and the trouble persists, perform loop current test.

Note: A Telco employee must be present at the far-end data station to assist with the line current and the end-to-end tests.

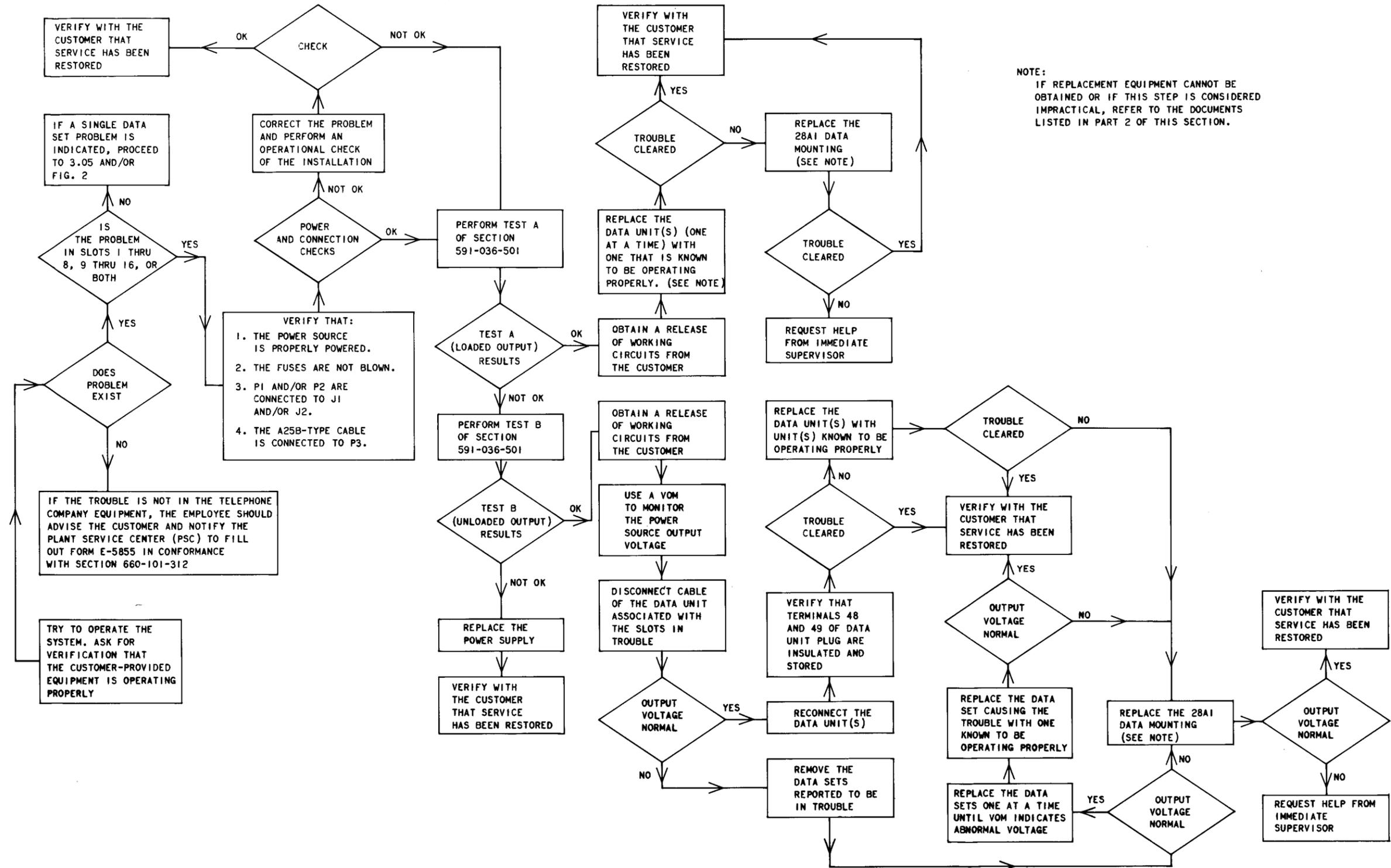
Failure of the line current test indicates a problem in the transmission facilities.

(8) If the installation meets the requirements of the loop current test and the trouble is not cleared, perform an end-to-end test in accordance with Section 591-036-501. If the requirements of this test are met and the trouble is not cleared, request help from immediate supervision.

(9) If the requirements of the end-to-end test are *not* met and the problem is in the transmit *and* receive paths, test the transmission facilities.

(10) If the requirements of the end-to-end test are not met and the problem is *one-way*, replace the data set with one known to be operating properly and retest.

(11) If the requirements are not met, request help from immediate supervision.



NOTE:
IF REPLACEMENT EQUIPMENT CANNOT BE OBTAINED OR IF THIS STEP IS CONSIDERED IMPRACTICAL, REFER TO THE DOCUMENTS LISTED IN PART 2 OF THIS SECTION.

Fig. 1—Troubleshooting Procedure for Problems With Multiple Data Sets

