

**AUTOMATED REPAIR SERVICE BUREAU
EQUIPPED WITH MECHANIZED LOOP TESTING
CENTRAL OFFICE PREPARATION AND TESTING PROCEDURES
FOR NO-TEST TRUNK CIRCUITS
USING KS-22475 TRUNK TEST SET**

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NOTICE

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1. GENERAL

1.01 This section provides test procedures to be followed when using a KS-22475 Trunk Test Set (TTS) to test no-test trunk circuits and facilities when connected to a Loop Testing Frame (LTF) equipped with Mechanized Loop Testing (MLT).



If a KS-22475 Trunk Test Set (TTS) is not available, see Section 660-168-272 for testing procedures for no-test trunk circuits.

1.02 This section is reissued to incorporate Addendum 660-168-274, Issue 1, to modify the dynamic tests to include testing of No. 2 ESS and No. 3 ESS test trunks, and to bring the section up to date. Since this is a general revision, arrows ordinarily used to indicate changes have been omitted.

1.03 This issue of the section is based on the following drawings:

DRAWING	ISSUE	TITLE
SD-25251-01	13	No. 1 Crossbar No-Test Connector Circuit
SD-25432-01	17	No. 1 Crossbar Incoming Trunk Circuit
SD-25553-01	34	No. 1 Crossbar Subscriber Line, Line Link, and Controller Circuit
SD-25702-01	11	No. 5 Crossbar No-Test Connector Circuit
SD-25708-01	13	No. 5 Crossbar Incoming Trunk Circuit—DP

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SD-25708-02	10	No. 5 Crossbar Incoming Trunk Circuit—MF
SD-26030-01	41	No. 5 Crossbar Line, Line Link, and Marker Connector Control Circuit
SD-26136-01	8	No. 5 Crossbar Incoming Trunk Circuit
SD-31401-01	15	Step-by-Step Test Distributor Control Circuit
SD-32007-01	27	Step-by-Step Test Distributor Circuit
SD-95709-01	9	Test Trunk Selector Circuit
SD-2P017-01	19	Automated Repair Service Bureau Circuit
SD-2P033-01	7	Loop Testing Circuit
SD-1A186-01	9	No. 1 ESS Incoming Trunk Circuit
SD-2H109-01	6	No. 2 ESS Incoming Trunk Circuit
SD-3H520-01	4	Electronic Switching System No. 3

1.04 If this section is to be used with equipment reflecting later issue(s) of drawing(s), reference should be made to the SDs and CDs to determine the extent of the changes and the manner in which the section may be affected.

1.05 The term "test trunk" is used throughout this section to denote *no-test trunk*, *no-test trunk circuit*, *incoming test trunk*, or *test train* unless otherwise indicated.

1.06 Preliminary tests are required on all test trunks in service or additions to an existing group. Test trunks that fail to meet the stated requirements are to be repaired by telephone company or Western Electric Company personnel, in accordance with established procedures.

1.07 The testing procedures covered in this section are applicable when there is a need for making routine tests or repairing a trouble condition on test trunk circuits.

2. TEST EQUIPMENT

2.01 The following equipment will be needed to perform testing:

- One KS-14510 volt-ohm-milliammeter or equivalent (do not use a digital meter)
- One 143-ohm, 10 watt, 10% resistor
- Two jumpers with clip leads
- One 2.2 megohm, 1/4 watt, 10% resistor
- One 111C or 119E repeat coil
- One 900-ohm, 1/4 watt, 10% resistor
- One 0.5 UF capacitor

- One oscillator (200 Hz @ 10V rms)
- One noise meter (WEC0 3A or 3C or HP [Hewlett-Packard] 3555)
- One KS-22475 Trunk Test Set
- One 3W4B test cord, or equivalent
- One 2W12A test cord, or equivalent

KS-22475 TRUNK TEST SET

2.02 The KS-22475 Trunk Test Set (TTS) provides the means to:

- Access a test trunk circuit and a subscriber loop from either end of the trunk facility using either Multifrequency (MF) or Dial Pulse (DP) dialing.
- Monitor tip and ring battery polarity and ground on ring (i.e., office busy).
- Control sleeve current.
- Conveniently connect external measuring and test equipment.
- Monitor audio.

A. Physical Description

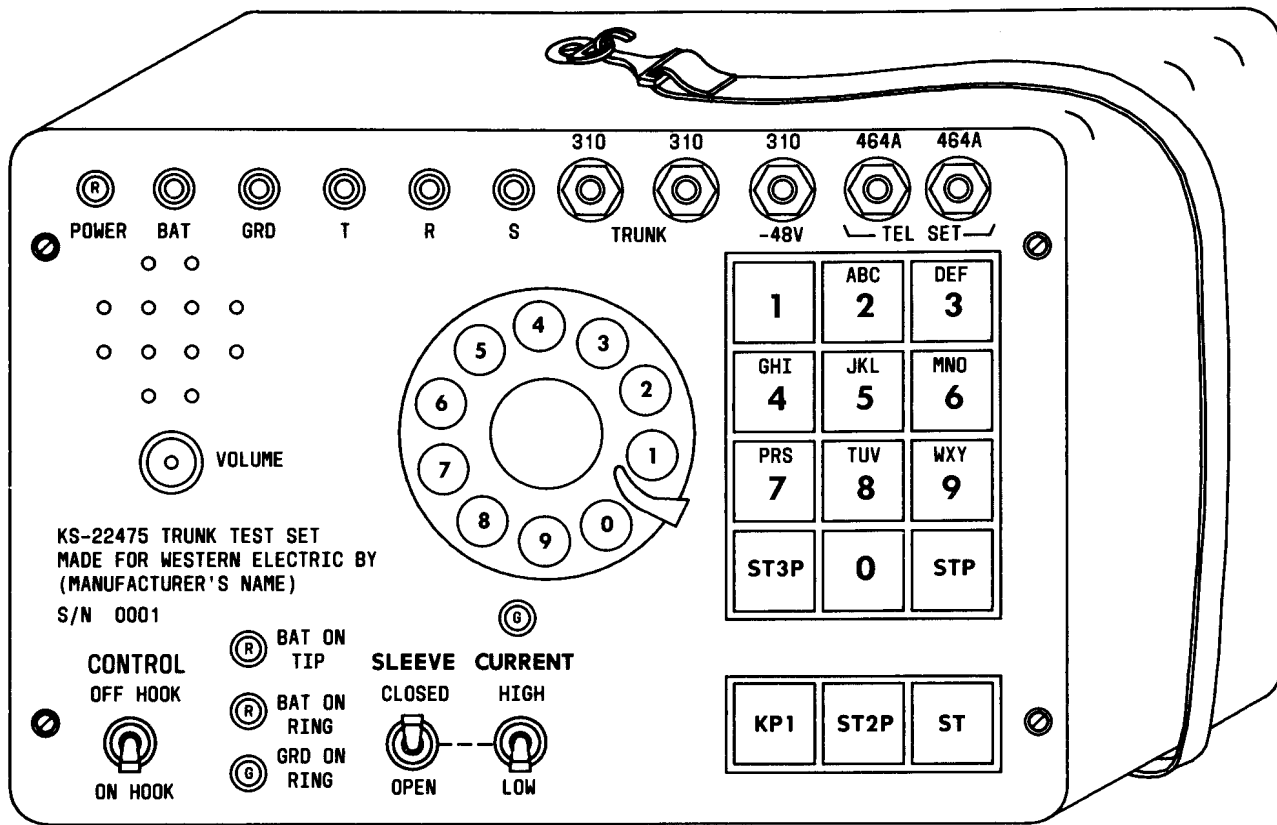
2.03 The KS-22475 TTS (Fig. 1) comes equipped with a carrying handle attached to a removable cover. The base of the TTS has a ladder strap attached to its sides, and the cover has a built-in storage area for test cords. The set weighs approximately four pounds. Test cords are not provided as part of the TTS and must be provided separately.

B. Functional Features

2.04 The KS-22475 TTS is equipped with the following features:

- Parallel jack access is provided for tip, ring, sleeve, battery, and ground in order to connect the test trunk under test to the set and to connect external measuring equipment.
- Telephone headset jacks are provided for two-way communication over the test trunk under test.
- An audio amplifier with speaker and volume control is provided to monitor signals on the test trunk.
- An on-hook/off-hook control switch is provided to access the trunk circuit.
- Two sleeve current switches are provided to control cut-through and to facilitate loop testing.

Note: Refer to Fig. 1 for the location and function of jacks, switches, and status lamps.



KS-22475 TRUNK TEST SET
MADE FOR WESTERN ELECTRIC BY
(MANUFACTURER'S NAME)

S/N 0001

STATUS INDICATING CIRCUITS

- POWER** - THE POWER INDICATOR LIGHTS WHEN THE CENTRAL BATTERY IS CONNECTED TO THE SET IN THE PROPER POLARITY.
- CURRENT** - THE CURRENT INDICATOR LIGHTS WHEN EITHER HIGH OR LOW SLEEVE CURRENT IS FLOWING.
- BAT ON TIP** - THE BAT ON TIP INDICATOR LIGHTS WHEN THE TIP IS MORE NEGATIVE THAN THE RING.
- BAT ON RING** - THE BAT ON RING INDICATOR LIGHTS WHEN THE RING IS MORE NEGATIVE THAN THE TIP.
- GRD ON RING** - THE GRD ON RING INDICATOR LIGHTS WHEN LOW RESISTANCE GROUND (UNDER 1500 OHMS) IS ON THE RING.

BINDING POSTS

T,R,S, BAT,GRD - THESE ARE BINDING POSTS WHICH ARE WIRED IN PARALLEL TO THE TRUNK AND -48V JACKS.

MF DIALER - THE MF DIALER IS A 3X5 PUSHBUTTON SWITCH MATRIX.

DP DIALER - THE DP DIALER IS A ROTARY SWITCH.

SWITCHES

- CONTROL** - ON-HOOK/OFF-HOOK - THIS SWITCH BRIDGES THE INTERNAL TIP AND RING TO THE TRUNK.
- CURRENT** - HIGH/LOW - THIS SWITCH SELECTS EITHER THE HIGH (28 MA) OR LOW (14 MA) CONSTANT SLEEVE CURRENT SOURCE.
- SLEEVE** - CLOSED/OPEN - THIS SWITCH CONNECTS THE CONSTANT CURRENT SOURCE TO THE SLEEVE OF THE TRUNK.
- VOLUME** - THIS IS A POTENTIOMETER WHICH CONTROLS THE OUTPUT OF THE AUDIO AMPLIFIER.

JACKS

- 48V** - THIS JACK ACCEPT A WECO TYPE 310 PLUG AND IS USED TO APPLY POWER TO THE SET. TIP IS -48 VOLTS, SLEEVE IS GROUND.
- TRUNK** - TWO JACKS ACCEPTING WECO TYPE 310 PLUGS ARE WIRED IN PARALLEL FOR TIP, RING, AND SLEEVE. ONE JACK BRINGS IN THE TRUNK AND THE OTHER IS FOR CONNECTING EXTERNAL MONITORING DEVICES.
- TEL SET** - THIS PAIR OF JACKS ACCEPT WECO TYPE 464A PLUGS. THE TIP IS THE TRANSMIT CIRCUIT AND THE RING IS THE RECEIVE CIRCUIT.

Fig. 1—KS-22475 Trunk Test Set (TTS)

SETUP PROCEDURES

2.05 The following describes how battery and ground and test trunk circuit leads (T, R, and S) are connected to the KS-22475 Trunk Test Set (TTS) (see Fig. 2).

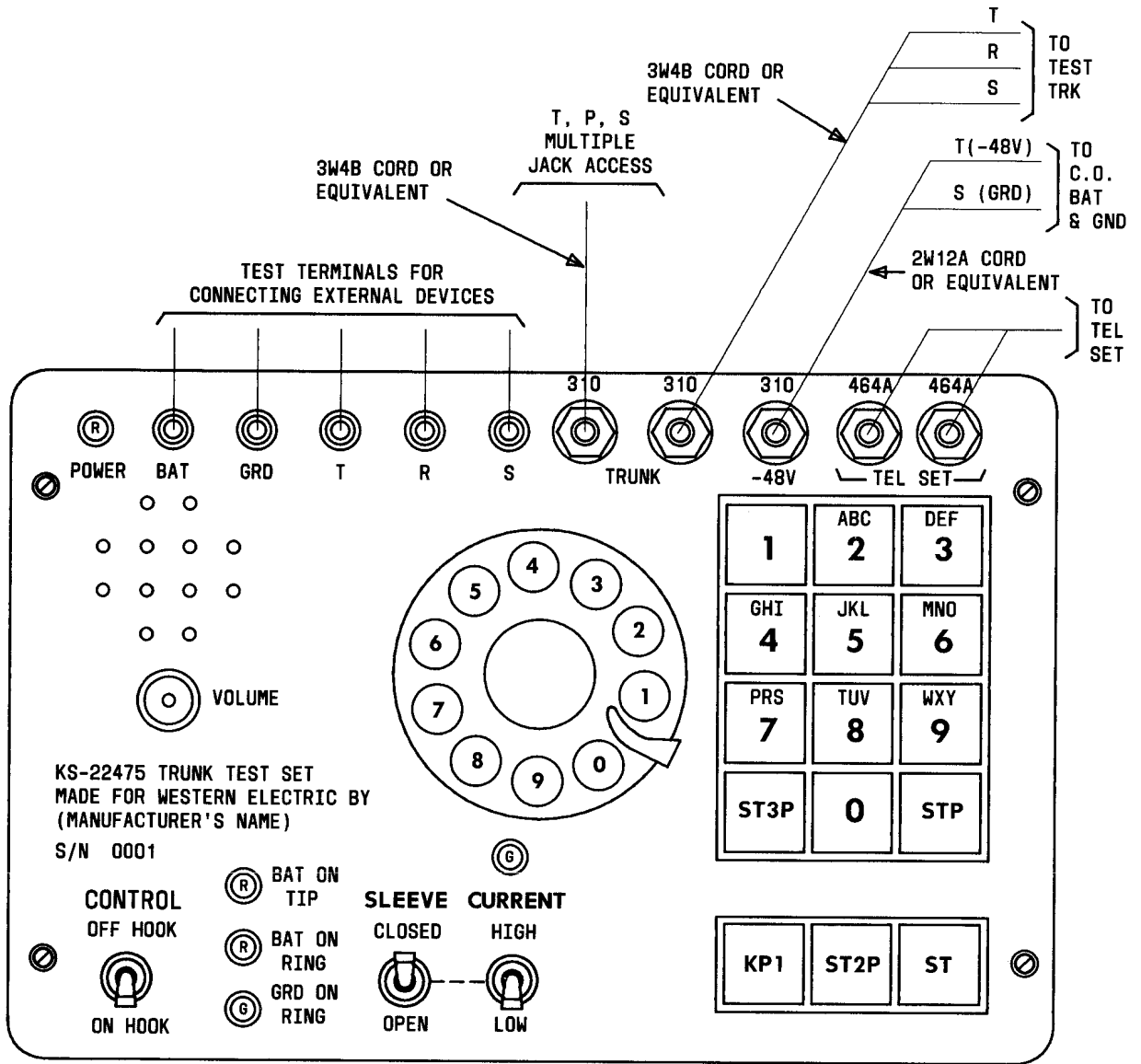


Fig. 2—Typical Setup for KS-22475 Trunk Test Set (TTS)

STEP	ACTION	VERIFICATION
1	At KS-22475 TTS— Connect central office -48 volts and ground using a 2W12A cord or equivalent.	POWER lamp lighted. If lamp does not light, check for correct polarity of battery and ground.

STEP	ACTION	VERIFICATION
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Caution: To avoid possible grounding of the battery supply lead, connect the battery lead to the TTS first; and when disconnecting, remove the battery lead from the TTS last.

2	Verify that the following switches are in the positions indicated:	
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2	SWITCH POSITION	
---	------------------------	--

	CONTROL ON HOOK	
--	-----------------	--

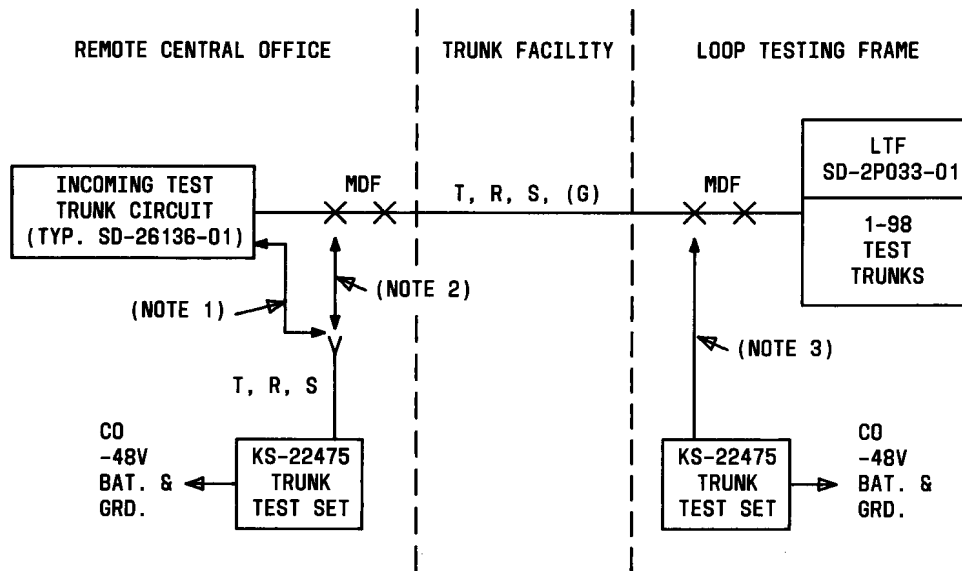
	SLEEVE CLOSED	
--	---------------	--

	CURRENT HIGH	
--	--------------	--

3	Connect T, R, and S of test trunk using a 3W4B cord or equivalent. (See Fig. 3 and Table A.)	
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When performing tests using the TTS, the test trunk circuit must be isolated from the LTF; i.e., T, R, S, and G lead ground (if required) must be opened between the TTS and the LTF. This may be done by removing the heat coils or lifting the cross-connections at the MDF. This action is necessary to prevent a possible trouble condition from interfering with the testing (refer to Fig. 3). If the G-lead is returned to the LTF for grounding, the ground will be removed when the sleeve lead is opened. Therefore, for proper test trunk circuit operation, it is necessary to ground the G lead back to the test trunk circuit when performing tests. Additionally, the sleeve lead of the Trunk Access Switch (TAS) located on the LTF has resistance (143 ohm) battery (-48 Vdc) present, which if not removed will prevent use of the TTS. If testing at the LTF location, the S-screw on the TAS should be opened to remove the resistance battery from the sleeve lead. (This is not necessary if the MDF cross-connections are opened.)



NOTES:

1. THIS CONFIGURATION MAY BE USED FOR NEWLY INSTALLED OR MODIFIED TEST TRUNK CIRCUITS TO TEST FOR PROPER CIRCUIT OPERATION. IN THIS CASE THE TEST SET IS CONNECTED TO THE TIP, RING AND SLEEVE TERMINALS AT THE EQUIPMENT. THIS ARRANGEMENT MAY ALSO BE USED FOR MAINTENANCE PURPOSES.
2. THIS CONFIGURATION SHOWS THE TEST SET CONNECTED TO THE MDF AT THE REMOTE CENTRAL OFFICE. THIS ARRANGEMENT IS USED TO CHECK THE OPERABILITY OF ALL TRUNK CIRCUITS IN THE WIRE CENTER FROM ONE LOCATION WITHOUT GOING TO EACH ONE INDIVIDUALLY.
3. THIS CONFIGURATION SHOWS THE TEST SET CONNECTED TO THE MDF AT THE LTF LOCATION. WITH THIS ARRANGEMENT ALL TEST TRUNKS CONNECTED TO THE LTF CAN BE TESTED FOR TRUNK CIRCUIT OPERABILITY AND THE FACILITIES CHECKED TO ASCERTAIN THAT THE MLT SPECIFICATIONS ARE MET.

Fig. 3—Typical Connecting Arrangements for KS-22475 Trunk Test Set (TTS)

TABLE A

CONNECTIONS FOR TRUNK TEST SET AT TEST TRUNK CIRCUIT

CENTRAL OFFICE	SCHEMATIC DRAWING (SD)	LEAD DESIGNATION	TERMINAL STRIP	TERMINAL PUNCHING
NO. 1 ESS	SD-1A186-01	T	ON UNIT	51
		R		41
		S		21
		G		STRAP 11 TO 18
NO. 2 ESS	SD-2H109-01	T	A	51
		R		41
		S		21
		G		STRAP 11 TO 18
NO. 3 ESS	SD-3H520-01	T	AT MDF	T
		R		R
		S		S
		G		GROUND G
NO. 1 CROSSBAR	SD-25432-01	T	ON UNIT	0
		R		1
		S		2
		G		GROUND 3 TO FRAME
NO. 5 CROSSBAR	SD-26136-01	T	B	68
		R		58
		S		48
		G		STRAP 47 TO 31
STEP-BY-STEP	SD-31401-01	T	ON UNIT	1
		R		2
		S		3
		G		STRAP 15 TO 16

STEP

ACTION

VERIFICATION

- 4 Use T, R, S, BAT, and GRD test terminals on TTS when external devices are required (refer to Fig. 2).

A. Accessing Procedures

2.06 For the majority of tests in this section, it will be necessary to access the MLT dedicated trunk calibration telephone number. This circuit appears as an open at the MDF and is representative of the longest path through the central office. Each MLT test trunk group has a dedicated trunk calibration telephone number. The dedicated trunk calibration telephone number associated with a test trunk group may be obtained from the MLT Administrator. When testing a specific trunk, ensure that the correct dedicated trunk calibration telephone number is used. If it is found that the dedicated trunk calibration telephone number has a trouble condition, either correct the trouble or notify the MLT Administrator.

2.07 The procedure for accessing the dedicated trunk calibration telephone number or any other test line telephone number follows:

STEP	ACTION	VERIFICATION
1	At TTS— Perform Steps 1 through 4 in paragraph 2.05.	POWER lamp lighted.
2	Operate CONTROL switch to OFF HOOK .	If crossbar or No. 3 ESS test trunk— CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted momentarily, then BAT ON TIP lamp lighted. If step-by-step test trunk— BAT ON TIP lamp lighted. If dial pulse crossbar test trunk— Tone heard during dialing sequence. Note: Failure may indicate tip and ring leads are reversed or open.
3a	If Multifrequency (MF) dialing— At TTS— Dial KP1, the steering digit (if required), and the four digits of the test line telephone number and ST.	BAT ON RING lamp lighted (except No. 2 ESS test trunk) and BAT ON TIP lamp extinguished. If No. 1 ESS or No. 2 ESS test trunk— CURRENT lamp lighted after last digit. If No. 3 ESS test trunk— BAT ON RING lamp flashes once.
	Note: No. 1 crossbar and No. 3 ESS do not require ST pulse.	
4b	If Dial Pulse (DP) dialing— At TTS— Dial the steering digit (if required) and the four digits of the test line telephone number.	BAT ON RING lamp lighted and BAT ON TIP lamp extinguished. If step-by-step test trunk— BAT ON TIP remains lighted.
	Note: If TTS is located at step-by-step location and LTF is located at a distant location, dial pulsing may not be accurate due to low resistance of test trunk loop. Temporarily remove "Z" option (strap), SD-31401-01.	

STEP	ACTION	VERIFICATION
5	Operate CURRENT switch to LOW . <i>Note:</i> TTS should be cut through to test line telephone number.	BAT ON RING lamp extinguished. CURRENT lamp remains lighted. If ESS trunk calibration telephone number dialed— A 1-second burst of tone may be heard (denied line indication). If step-by-step test trunk— BAT ON TIP lamp extinguished.
6	Operate CONTROL switch to ON HOOK .	

B. Disconnect Procedures

2.08 The disconnect procedure will vary slightly depending upon the position of the TTS switches when ready to disconnect. In general, disconnect will occur if the CONTROL switch is ON HOOK, the SLEEVE switch is CLOSED, and the CURRENT switch is HIGH. As an example, if disconnecting from the access routine in paragraph 2.07 (after Step 6), only the CURRENT switch need be operated to HIGH since the other switches are already in the "disconnect" position. The following disconnect procedures release the test trunk from the TTS:

STEP	ACTION	VERIFICATION
1	At KS-22475 TTS— Operate CONTROL switch to OFF HOOK .	BAT ON RING lamp lighted.
2	Operate SLEEVE switch to CLOSED .	CURRENT lamp lighted.
3	Operate CONTROL switch to ON HOOK .	BAT ON RING lamp extinguished.
4	Operate CURRENT switch to HIGH .	CURRENT lamp extinguished and test trunk released.
5	Disconnect T, R, and S leads from test trunk.	
6	Disconnect BAT and GRD.	
7	At MDF— Restore test trunk circuit (i.e., reconnect cross-connections).	

3. TEST TRUNK SERVICE OPTIONS

3.01 Table B provides a list of options that apply to central office test trunk circuits.

TABLE B

TEST TRUNK CIRCUIT SERVICE OPTIONS

CENTRAL OFFICE	CIRCUIT DRAWING	FEATURE/OPTION
No. 5 Crossbar	SD-26136-01	Option W for MF. Option V for DP. Option Y or Z for S-lead ground.*
No. 1 Crossbar	SD-25432-01	Options M and N for MF. Options K and Q for DP. Option Z and Figure 2. Figure F must <u>not</u> be provided. Option X or Y for S-lead ground.*
Step-by-Step With Test Trunk Selector Circuit	SD-31401-01 SD-32007-01 SD-95709-01	For loops less than 1000 ohms: Option Z (SD-95709-01). Options N and Y (SD-32007-01). For loops more than 1000 ohms: Option Y (SD-95709-01). Options Q and Y (SD-32007-01). For loops more than 300 ohms: Option Z (SD-31401-01). For all loops: Option X or Y (SD-31401-01) for S-lead ground.* Remove Option Z (SD-32007-01).
Step-by-Step Without Test Trunk Selector Circuit	SD-31401-01 SD-32007-01	For loops less than 1000 ohms: Options Q and X (SD-32007-01). For loops more than 1000 ohms: Options Q and Y (SD-32007-01). For loops more than 300 ohms: Option Z (SD-31401-01). For all loops: Option X or Y (SD-31401-01) for S-lead ground.* Remove option Z (SD-32007-01).
No. 1 ESS	SD-1A186-01	Option Z when trunks are shared with Local Test Desk and Test Trunk Ringing Circuit is used.
No. 2 ESS	SD-2H109-01	Option Z when trunks are shared with Local Test Desk and Test Trunk Ringing Circuit is used. Option Y for unigauge loops.
No. 3 ESS	SD-3H520-01	None.

* If S-lead does not leave central office or the earth potential between the offices is less than ± 15 volts dc, furnish Option X (for No. 5 crossbar, furnish Option Z). If the earth potential between the two offices is more than ± 15 volts dc, furnish Option Y.

4. TEST TRUNK TESTS

GENERAL

4.01 This part describes how the Dynamic and Loop tests should be used in testing the test trunks associated with a Loop Testing Frame (LTF).

4.02 The Dynamic tests are used to check the operability of the test trunk circuits. All circuits should be tested. These tests are best performed at the trunk circuit where the circuit operation can be monitored should a test fail. These tests may be performed prior to the installation of the LTF; however, the dedicated open trunk calibration TN should be installed before testing commences.

4.03 When the test trunk circuits have been tested successfully, the Loop tests should be performed. These tests are made at the LTF location (MDF). They check the test path straight through to the open termination at the distant locations and verify that the test trunks meet the MLT specifications.



Insure that the test trunk circuit is not in use before attempting any test.

- If the test trunk to be tested is shared with a No. 14 Local Test Desk (LTD), the BY relay on the LTF associated with the test trunk must either be blocked operated to prevent the LTD from seizing the test trunk or the LTD personnel must be notified that the test trunk should not be used while testing is in progress.
- If the trunk is shared with a No. 16 LTD, it will be necessary to notify the LTD personnel that the trunk should not be used while testing is in progress.

4.04 Test trunk circuits that fail to meet the stated requirements are to be repaired.



Under NO circumstances can loops serving as test trunks be paralleled to meet testing requirements.

4.05 The letters a, b, c, etc., added to a step number in the procedures in this section indicate an action which may or may not be required depending on local conditions. The condition under which a lettered step or a series of lettered steps should be made is given in the ACTION column, and all steps governed by the same condition are designated by the same letter within a test. Where a condition does not apply, all steps designated by that letter should be omitted.

DYNAMIC TESTS

4.06 The KS-22475 Trunk Test Set is connected directly to the tip, ring, and sleeve of the test trunk circuit at the equipment location. This will enable the person who is performing the dynamic tests to monitor the test trunk circuit operation.

A. Tone Access Test—120 IPM (not applicable for step-by-step, No. 2 ESS or No. 3 ESS)


Note: For this test, the 120 IPM overflow feature of the test trunk is tested.

STEP	ACTION	VERIFICATION
1	At incoming test trunk circuit— Open T, R, S, and (G) leads. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	POWER lamp lighted.
3	At TTS— Operate CONTROL switch to OFF HOOK .	If crossbar test trunk— CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted momentarily, then BAT ON TIP lamp lighted.
4a	If Multifrequency (MF) dialing— Dial KP1, steering digit (if required), and ST.	CURRENT lamp lighted. BAT ON RING lamp lighted. If crossbar test trunk— 120 IPM tone heard.
5b	If Dial Pulse (DP) dialing— Dial steering digit (if required) and four digits of 120 IPM test line or await timeout after dialing only two digits.	CURRENT lamp lighted. BAT ON RING lamp lighted. If crossbar test trunk— 120 IPM tone heard.
6	Operate CURRENT switch to LOW .	120 IPM tone heard. GRD ON RING lamp flashes. BAT ON RING lamp extinguished.
7c	If No. 1 crossbar test trunk— At incoming test trunk— Manually release RC relay.	60 IPM tone heard. GRD ON RING lamp flashes.
8c	Restore RC relay.	120 IPM tone heard. GRD ON RING lamp flashes.
9	Operate CONTROL switch to ON HOOK .	120 IPM tone silenced. GRD ON RING lamp extinguished.
10	Operate CURRENT switch to HIGH .	CURRENT lamp extinguished. Test trunk released.

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B. Tone Access Test—60 IPM (not applicable for No. 3 ESS)

Note: For this test, the 60 IPM test line shall be accessed.

STEP	ACTION	VERIFICATION
1	At incoming test trunk circuit— Open T, R, S, and (G) leads. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	POWER lamp lighted.
3a	If No. 2 ESS test trunk— At local telephone set— Receiver OFF-HOOK .	Dial tone heard.
4a	Wait for removal of dial tone.	Dial tone removed. Recorded message and/or howler heard (approximately 16 seconds).
	 <p>Testing must be performed between the time when dial tone is removed and before the line goes high and dry (approximately 3 minutes).</p>	
5	At TTS— Operate CONTROL switch to OFF HOOK .	If crossbar test trunk— CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted momentarily, then BAT ON TIP lamp lighted. If step-by-step test trunk— BAT ON TIP lamp lighted.
6a	Access local telephone line in Step 3a.	
7b	If Multifrequency (MF) dialing— Dial KP1, steering digit (if required), four digits of 60 IPM test line, and ST.	CURRENT lamp lighted. BAT ON RING lamp lighted (except No. 2 ESS). If crossbar test trunk— 60 IPM tone heard.
8c	If Dial Pulse (DP) dialing— Dial steering digit (if required) and four digits of 60 IPM test line.	CURRENT lamp lighted. BAT ON RING lamp lighted (except No. 2 ESS). If crossbar test trunk— 60 IPM tone heard.
9d	If step-by-step test trunk— At test connector— Place test connector associated with the open calibration telephone number OFF NORMAL.	
10d	At TTS— Dial steering digit (if required) and four digits	CURRENT lamp lighted. 60 IPM tone heard.

STEP	ACTION	VERIFICATION
	of open calibration telephone number.	BAT ON TIP lamp extinguished after second digit. BAT ON RING lamp lighted after second digit.
11d	Operate CONTROL switch to ON-HOOK .	CURRENT lamp extinguished. 60 IPM tone silenced. Test trunk released.
12	Operate CURRENT switch to LOW .	60 IPM tone heard. GRD ON RING lamp flashes. BAT ON RING lamp extinguished.
13	Operate CONTROL switch to ON-HOOK .	60 IPM tone silenced. GRD ON RING lamp extinguished.
14	Operate CURRENT switch to HIGH .	CURRENT lamp extinguished. Test trunk released.
15a	At local telephone set— Receiver ON HOOK .	
16	Repeat Steps 1 through 15 for each steering digit.	

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C. Intercept Line Access Test (not applicable for step-by-step)

Note: For this test, an intercepted line shall be accessed.

STEP	ACTION	VERIFICATION
1	At incoming test trunk circuit— Open T, R, S, and (G) leads. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	POWER lamp lighted.
3	At TTS— Operate CONTROL switch to OFF HOOK .	If crossbar test trunk— CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted momentarily, then BAT ON TIP lamp lighted.
4	Access intercepted line.	
5a	If Multifrequency (MF) dialing— Dial KP1, steering digit (if required), four digits of intercepted line, and ST.	CURRENT lamp lighted. BAT ON RING lamp lighted (except No. 2 ESS). If No. 2 ESS test trunk— Steady tone heard. If No. 3 ESS test trunk— BAT ON RING lamp flashes once.
6b	If Dial Pulse (DP) dialing— Dial steering digit (if required) and four digits of intercepted line.	CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted.
7	Operate CURRENT switch to LOW .	If No. 1 ESS or No. 2 ESS test trunk— GRD ON RING lamp lighted. High tone heard. If crossbar test trunk— Intercept announcement heard.
8c	If No. 3 ESS— Operate SLEEVE switch to OPEN then CLOSED .	High tone heard.
9	Operate CONTROL switch to ON-HOOK .	GRD ON RING lamp extinguished. No tone or announcement heard.
10	Operate CURRENT switch to HIGH .	CURRENT lamp extinguished. Test trunk released.
11	Repeat Steps 1 through 10 for all steering digits.	

D. Idle Line Access Test

Note: For this test, an idle telephone line shall be accessed.

STEP	ACTION	VERIFICATION
1	At incoming test trunk circuit— Open T, R, S, and (G) leads. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	POWER lamp lighted.
3	At TTS— Operate CONTROL switch to OFF HOOK .	If crossbar test trunk— CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted momentarily, then BAT ON TIP lamp lighted. If step-by-step test trunk— BAT ON TIP lamp lighted.
4	Access idle telephone set line.	
5a	If Multifrequency (MF) dialing— Dial KP1, steering digit (if required), four digits of idle line, and ST.	CURRENT lamp lighted. BAT ON RING lamp lighted (except No. 2 ESS). If No. 3 ESS test trunk— BAT ON RING lamp flashes once.
6b	If Dial Pulse (DP) dialing— Dial steering digit (if required) and four digits of idle line.	CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted. If step-by-step test trunk— BAT ON TIP lamp lighted.
7	Operate CURRENT switch to LOW .	Only CURRENT lamp lighted.
8c	If No. 3 ESS test trunk— Operate SLEEVE switch to OPEN then CLOSED .	Only CURRENT lamp lighted.
9	At idle telephone set— Receiver OFF HOOK .	No dial tone heard.
10	Receiver ON HOOK .	
11	At TTS— Operate SLEEVE switch to OPEN .	BAT ON RING lamp lighted. CURRENT lamp extinguished. If step-by-step or ESS test trunk— Dial tone heard.
12	Operate SLEEVE switch to CLOSED .	Only CURRENT lamp lighted.
13	Operate CONTROL switch to ON HOOK .	

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STEP	ACTION	VERIFICATION
14	Operate CURRENT switch to HIGH .	CURRENT lamp extinguished. Test trunk released.

E. Busy Line Access Test

Note: For this test, access an announcement (i.e., weather).

STEP	ACTION	VERIFICATION
1	At incoming test trunk circuit— Open T, R, S, and (G) leads. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	POWER lamp lighted.
3	At TTS— Operate CONTROL switch to OFF HOOK .	If crossbar test trunk— CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted momentarily, then BAT ON TIP lamp lighted. If step-by-step test trunk— BAT ON TIP lamp lighted.
4	At local telephone set— Access an announcement circuit.	Announcement heard.
5	At TTS— Access local telephone line in Step 4.	
6a	If Multifrequency (MF) dialing— Dial KP1, steering digit (if required), four digits of local line in Step 4, and ST.	CURRENT lamp lighted. BAT ON RING lamp lighted (except No. 2 ESS). If No. 3 ESS test trunk— BAT ON RING lamp flashes once. Short burst of dial tone heard.
7b	If Dial Pulse (DP) dialing— Dial steering digit (if required) and four digits of local line in Step 4.	CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted. If step-by-step test trunk— BAT ON TIP lamp lighted. Announcement should NOT be heard.
		Note: If announcement is heard, remove option Z per SD-32007-01.
8	Operate CURRENT switch to LOW .	Announcement heard (except No. 3 ESS). BAT ON RING lamp lighted.
9c	If No. 3 ESS test trunk— Operate SLEEVE switch to OPEN then CLOSED .	Announcement heard. BAT ON RING lamp lighted.

STEP	ACTION	VERIFICATION
10d	If ESS test trunk— Operate SLEEVE switch to OPEN .	Announcement heard. CURRENT lamp extinguished.
11d	Operate SLEEVE switch to CLOSED .	Announcement heard. CURRENT lamp lighted.
12d	At local telephone set— Receiver ON HOOK .	At TTS— Announcement heard (TTS should hold connection).
13d	At TTS— Operate SLEEVE switch to OPEN , then CLOSED .	Announcement heard.
14e	If crossbar test trunk— Operate SLEEVE switch to OPEN .	High tone heard.
15e	Operate SLEEVE switch to CLOSED .	BAT ON RING lamp lighted. Announcement heard.
16e	At local telephone set— Receiver ON HOOK .	At TTS— Announcement heard (TTS should hold connection). BAT ON RING lamp remains lighted.
17e	At TTS— Operate SLEEVE switch to OPEN .	High tone heard.
18e	Operate SLEEVE switch to CLOSED .	High and low tone heard alternately. GRD ON RING lamp flashes.
19	Operate CONTROL switch to ON HOOK .	BAT ON RING lamp extinguished. No announcement heard.
20	Operate CURRENT switch to HIGH .	CURRENT lamp extinguished. Test trunk released.

F. Dedicated Trunk Calibration Telephone Number (TN) Verification Test

Note: For this test, the dedicated trunk calibration telephone number shall be accessed.

STEP	ACTION	VERIFICATION
1	At incoming test trunk circuit— Open T, R, S, and (G) leads. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	POWER lamp lighted.
3	At TTS— Operate CONTROL switch to OFF HOOK .	If crossbar test trunk— CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted momentarily, then BAT ON TIP lamp lighted. If step-by-step test trunk— BAT ON TIP lamp lighted.
4	Access dedicated trunk calibration telephone number.	
5a	If Multifrequency (MF) dialing— Dial KP1, steering digit (if required), four digits of test line, and ST.	CURRENT lamp lighted. BAT ON RING lamp lighted (except No. 2 ESS). If No. 3 ESS test trunk— BAT ON RING lamp flashes once.
6b	If Dial Pulse (DP) dialing— Dial steering digit (if required) and four digits of test line.	CURRENT lamp lighted. If crossbar or ESS test trunk— BAT ON RING lamp lighted. If step-by-step test trunk— BAT ON TIP lamp lighted.
7	Operate CURRENT switch to LOW .	Only CURRENT lamp lighted. If No. 1 ESS test trunk— One-second dial tone may be heard.
8c	If No. 3 ESS test trunk— Operate SLEEVE switch to OPEN then CLOSED .	Only current lamp lighted.
9	Operate SLEEVE switch to OPEN .	BAT ON RING lamp lighted. CURRENT lamp extinguished. If step-by-step or ESS test trunk— Dial tone heard.
10	Operate SLEEVE switch to CLOSED .	Only CURRENT lamp lighted. If step-by-step test trunk— BAT ON RING lamp lighted.
11	Operate CONTROL switch ON-HOOK .	

STEP	ACTION	VERIFICATION
12	Connect dc voltmeter between T and GRD.	At dc voltmeter— 0 volts.
13	Connect dc voltmeter between R and GRD.	0 volts.
14	Disconnect dc voltmeter.	
15	Connect ohmmeter between T and GRD.	At ohmmeter— Open circuit.
16	Connect ohmmeter between R and GRD.	Open circuit.
17	Connect ohmmeter between T and R.	Open circuit.
18	Disconnect ohmmeter.	
19	At TTS— Operate CURRENT switch to HIGH .	Current lamp extinguished. Test trunk released.

LOOP TESTS

- 4.07** Use the Test Trunk Measurements Chart (Fig. 4) for recording data obtained in the following tests.
- 4.08** The KS-22475 Trunk Test Set is connected directly to the tip, ring, and sleeve of the test trunk at the Loop Testing Frame location. This will enable the person who is performing the loop tests to check the trunk facilities for each test trunk and ensure that Mechanized Loop Testing specifications are met.
- 4.09** Tests C through H in this part require accessing the dedicated trunk calibration telephone number. Refer to paragraphs 2.07 and 2.08 for the access and disconnect procedures.

TRUNK NUMBER	OFFICE POTENTIAL DIFFERENCE	DC ISOLATION		LOOP CURRENT	DC FEMF			AC FEMF			SHORT CIRCUIT CURRENT		LONGITUDINAL BALANCE	SLEEVE RESISTANCE
		T-G	R-G		T-R	T-G	R-G	R-G	T-G	S-G	R-G	T-G		

Fig. 4—Test Trunk Measurements Chart

A. Office Potential Difference (not required for test trunks with G lead returned and ground at LTF location) (Fig. 5).

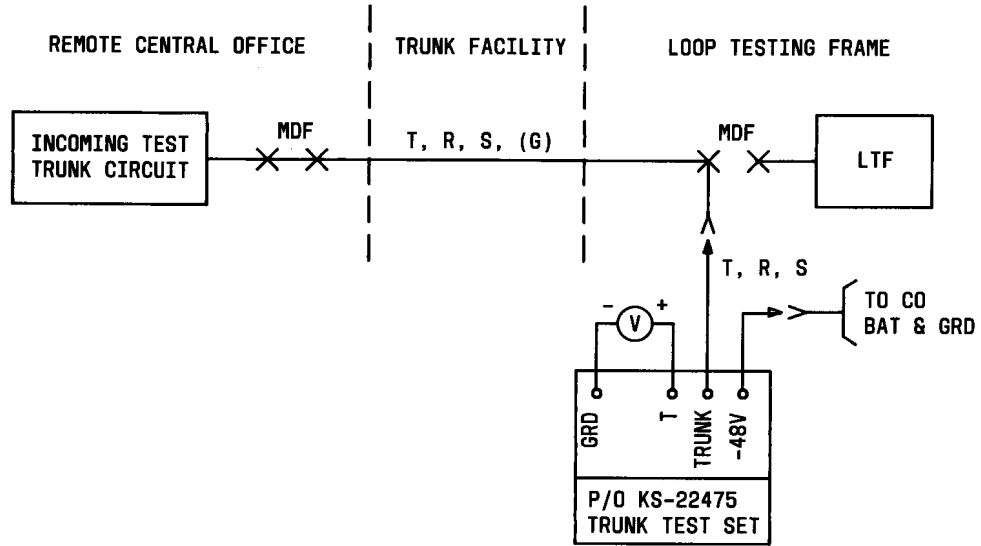


Fig. 5—Office Potential Difference—Connections

STEP	ACTION	VERIFICATION
1	At LTF location— Open T, R, S, and (G) leads of test trunk circuit. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	At TTS— POWER lamp lighted.
3	At TTS— Connect a dc voltmeter between the T and GRD terminals (see Fig. 5). Note: For test trunks terminating in a step-by-step office, connect voltmeter between ring lead and ground.	At dc voltmeter— Less than 15 Vdc during a 5-second interval. If voltage is greater than 15 Vdc at any time during the 5-second interval, the test trunk (G) lead must be returned to the LTF location and grounded. See Table B (options X and Y).
4	Record the value on the chart provided (refer to Fig. 4).	
5	At TTS— Disconnect the dc voltmeter.	
6a	If additional tests are to be performed, omit Step 7 and proceed to Step 3 of next test.	
7	Restore test trunk circuit as described in paragraph 2.08, Steps 5 through 7.	

B. Loop Current (all test trunks) (Fig. 6).

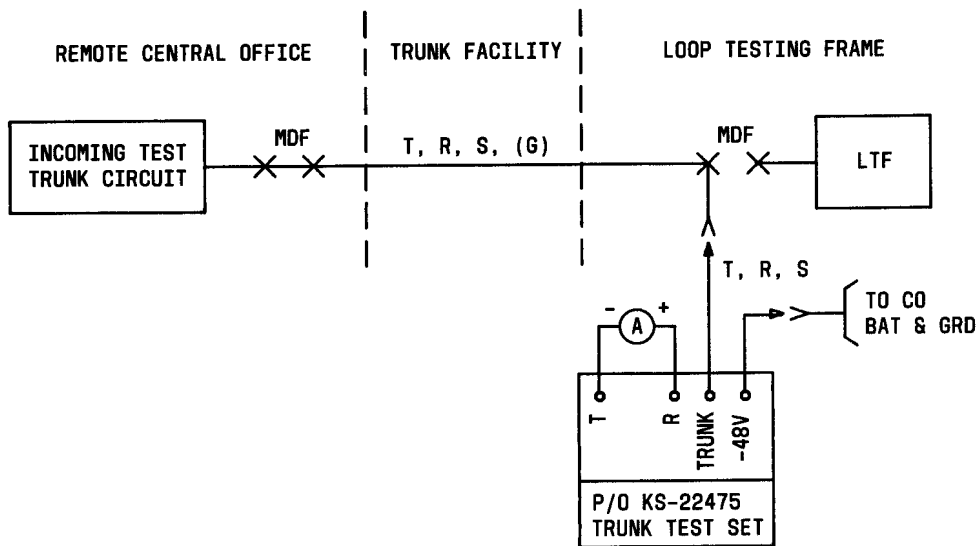


Fig. 6—Loop Current—Connections

STEP	ACTION	VERIFICATION
1	At LTF location— Open T, R, S, and (G) leads of test trunk circuit. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	At TTS— POWER lamp lighted.
3	At TTS— Connect an ammeter between the T and R terminals (see Fig. 6).	At ammeter— After current reversal, current reading should be greater than 15 ma. If step-by-step test trunk— Current reading should be greater than 15 ma.
4	Record the value on the chart provided (refer to Fig. 4).	
5	At TTS— Disconnect the ammeter.	
6a	If additional tests are to be performed, omit Step 7 and proceed to next test.	
7	Restore test trunk circuit as described in paragraph 2.08, Steps 5 through 7.	

C. DC Isolation (all test trunks) (Fig. 7 and 8).

Note: For this test the dedicated trunk calibration telephone number shall be accessed.

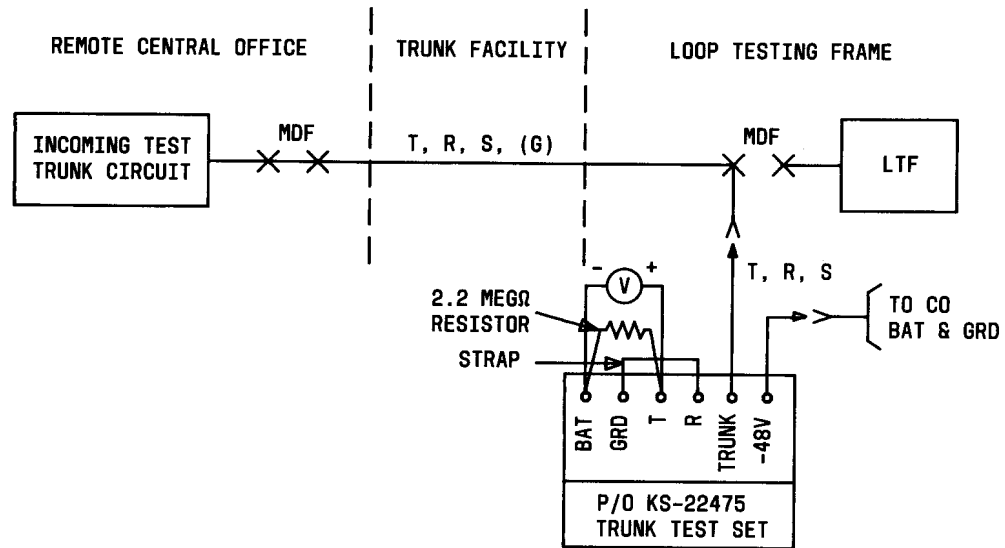


Fig. 7—DC Tip Isolation—Connections

STEP	ACTION	VERIFICATION
1	At LTF location— Open T, R, S, and (G) leads of test trunk circuit. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	At TTS— POWER lamp lighted.
3	At TTS— Access dedicated trunk calibration telephone number (refer to paragraphs 2.06 and 2.07).	CURRENT lamp lighted.
4	Connect a 2.2 megohm resistor between the T and BAT terminals (see Fig. 7).	
5	Strap the R terminal to the GRD terminal (see Fig. 7).	
6	Connect a dc voltmeter across the 2.2 megohm resistor (see Fig. 7).	At dc voltmeter— Voltage readings should be less than 3 Vdc.
7	Record the value on the chart provided (refer to Fig. 4).	

STEP	ACTION	VERIFICATION
8	At TTS— Disconnect the dc voltmeter, the 2.2 megohm resistor, and the strap (between R and GRD terminals).	

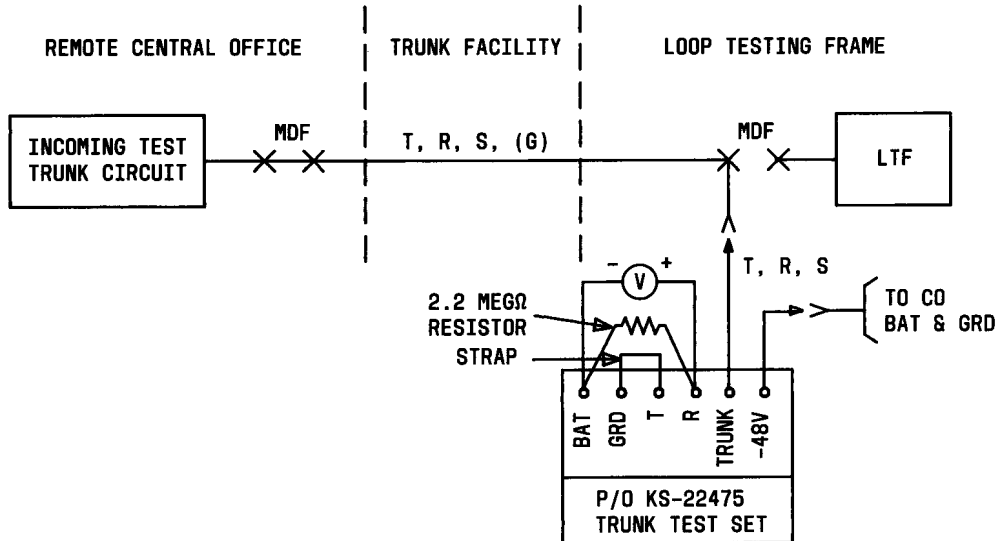


Fig. 8—DC Ring Isolation—Connections

9	Reconnect the 2.2 megohm resistor between the R and BAT terminals (see Fig. 8).	
10	Strap the T terminal to the GRD terminal (see Fig. 8).	
11	Reconnect the dc voltmeter across the 2.2 megohm resistor.	At dc voltmeter— Voltage reading should be less than 3 Vdc.
12	Record the value on the chart provided (refer to Fig. 4).	
13	At TTS— Disconnect the dc voltmeter, the 2.2 megohm resistor, and the strap (between T and GRD terminals).	
14a	If additional tests are to be performed, omit Step 15 and proceed to Step 4 of next test.	
15	Restore test trunk circuit as described in paragraph 2.08.	

D. Short-Circuit Current (all test trunks) (Fig. 9 and 10).

Note: For this test the dedicated trunk calibration telephone number shall be accessed.

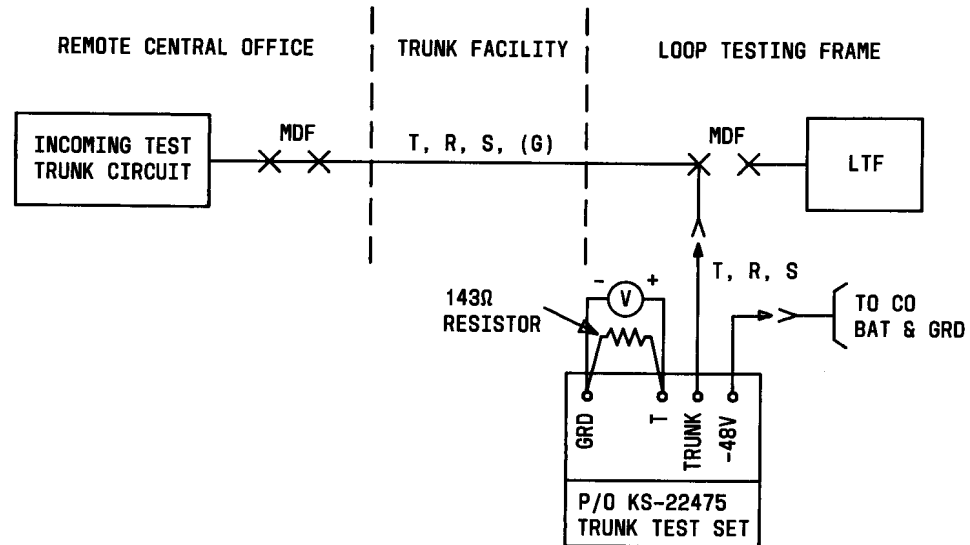


Fig. 9—Short-Circuit Current (T-G)—Connections

STEP	ACTION	VERIFICATION
1	At LTF location— Open T, R, S, and (G) leads of test trunk circuit. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	At TTS— POWER lamp lighted.
3	At TTS— Access dedicated trunk calibration telephone number (refer to paragraphs 2.06 and 2.07).	CURRENT lamp lighted.
4	Connect a 143-ohm resistor between the T and GRD terminals (see Fig. 9).	
5	Connect an ac voltmeter across the 143-ohm resistor (see Fig. 9).	At ac voltmeter— Voltage reading should be less than 0.7 Vac (rms).
6	Record the value on the chart provided (refer to Fig. 4).	
7	At TTS— Disconnect the ac voltmeter and the 143-ohm resistor.	

STEP

ACTION

VERIFICATION

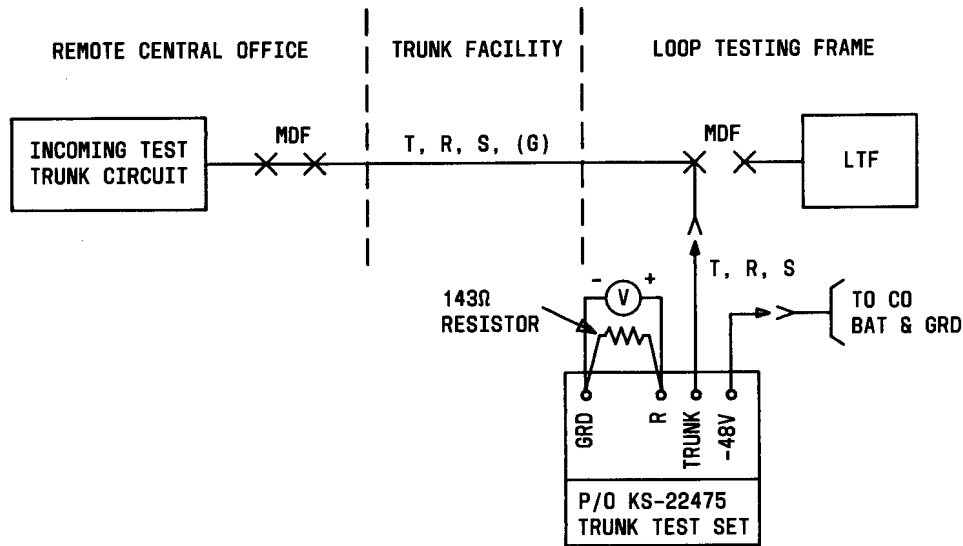


Fig. 10—Short-Circuit Current (R-G)—Connections

- | | | |
|-----|---|--|
| 8 | Reconnect the 143-ohm resistor between the R and GRD terminals (see Fig. 10). | |
| 9 | Reconnect the ac voltmeter across the 143-ohm resistor (see Fig. 10). | At ac voltmeter—
Voltage reading should be less than 0.7 Vac (rms). |
| 10 | Record the value on the chart provided (refer to Fig. 4). | |
| 11 | At TTS—
Disconnect the ac voltmeter and the 143-ohm resistor. | |
| 12a | If additional tests are to be performed, omit Step 13 and proceed to Step 4 of next test. | |
| 13 | Restore test trunk circuit as described in paragraph 2.08. | |

E. Open Circuit DC FEMF (all test trunks) (Fig. 11, 12, and 13).

Note: For this test the dedicated trunk calibration telephone number shall be accessed.

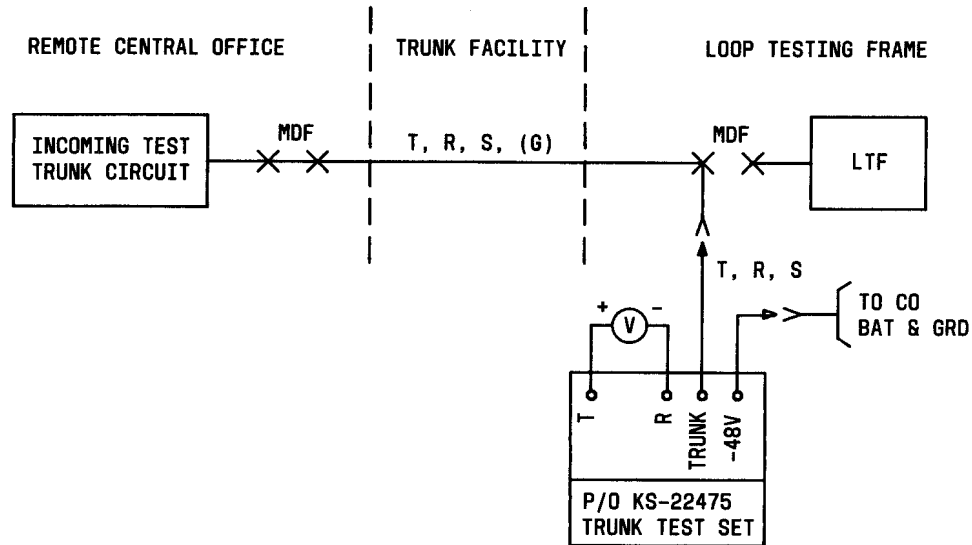


Fig. 11—Open Circuit DC FEMF (T-R)—Connections

STEP	ACTION	VERIFICATION
1	At LTF location— Open T, R, S, and (G) leads of test trunk circuit. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	At TTS— POWER lamp lighted.
3	At TTS— Access dedicated trunk calibration telephone number (refer to paragraphs 2.06 and 2.07).	CURRENT lamp lighted.
4	Connect a dc voltmeter between the T and R terminals (see Fig. 11).	At dc voltmeter— Voltage reading should be less than 5 Vdc.
5	Record the value on the chart provided (refer to Fig. 4).	
6	At TTS— Disconnect the dc voltmeter.	

STEP ACTION VERIFICATION

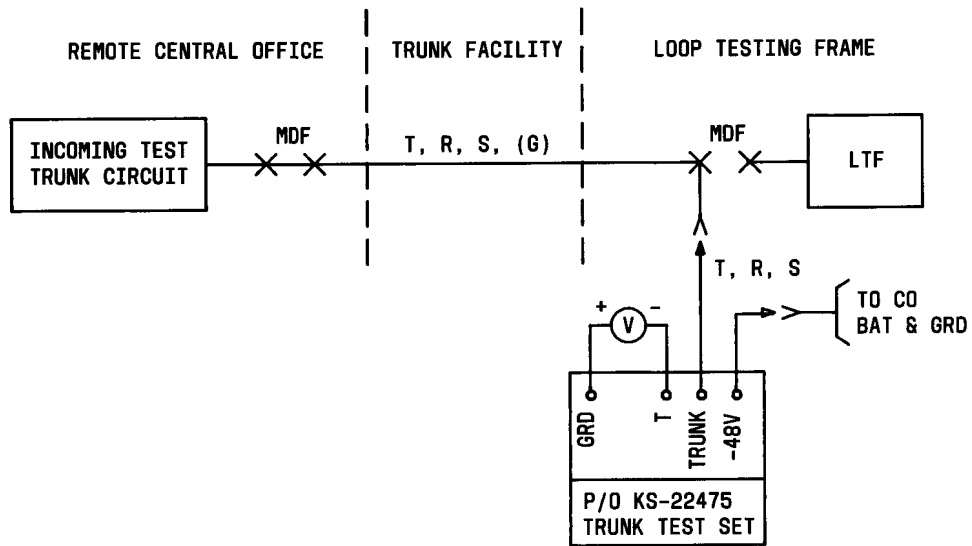


Fig. 12—Open Circuit DC FEMF (T-G)—Connections

- | | | |
|---|---|--|
| 7 | Reconnect the dc voltmeter between the T and GRD terminals (see Fig. 12). | At dc voltmeter—
Voltage reading should be less than 3 Vdc. |
| 8 | Record the value on the chart provided (refer to Fig. 4). | |
| 9 | At TTS—
Disconnect the dc voltmeter. | |

STEP	ACTION	VERIFICATION
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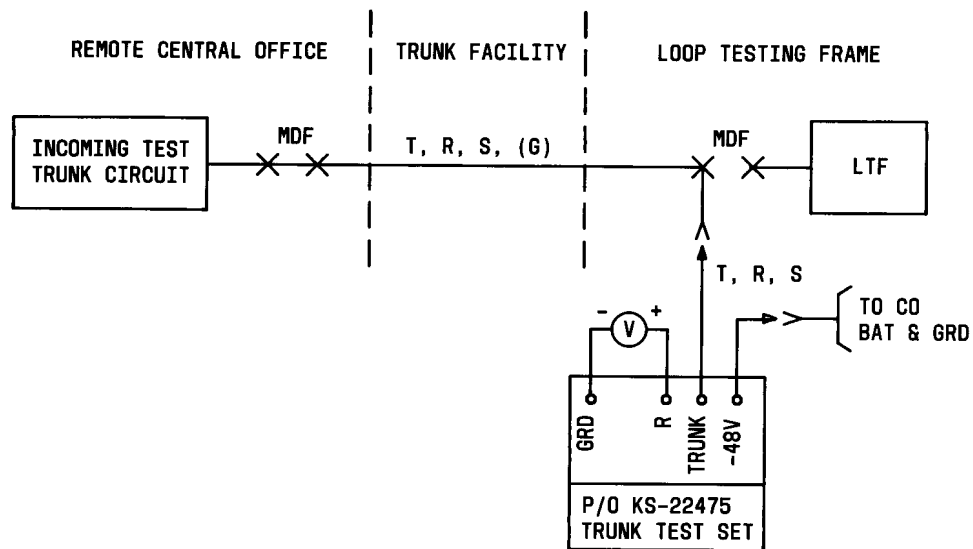


Fig. 13—Open Circuit DC FEMF (R-G)—Connections

STEP	ACTION	VERIFICATION
10	Reconnect the dc voltmeter between the R and GRD terminals (see Fig. 13).	At dc voltmeter— Voltage reading should be less than 3 Vdc.
11	Record the value on the chart provided (refer to Fig. 4).	
12	At TTS— Disconnect the dc voltmeter.	
13a	If additional tests are to be performed, omit Step 14 and proceed to Step 4 of next test.	
14	Restore test trunk circuit as described in paragraph 2.08.	

F. Open Circuit AC FEMF (all test trunks) (Fig. 14, 15, and 16).

Note: For this test the dedicated trunk calibration telephone number shall be accessed.

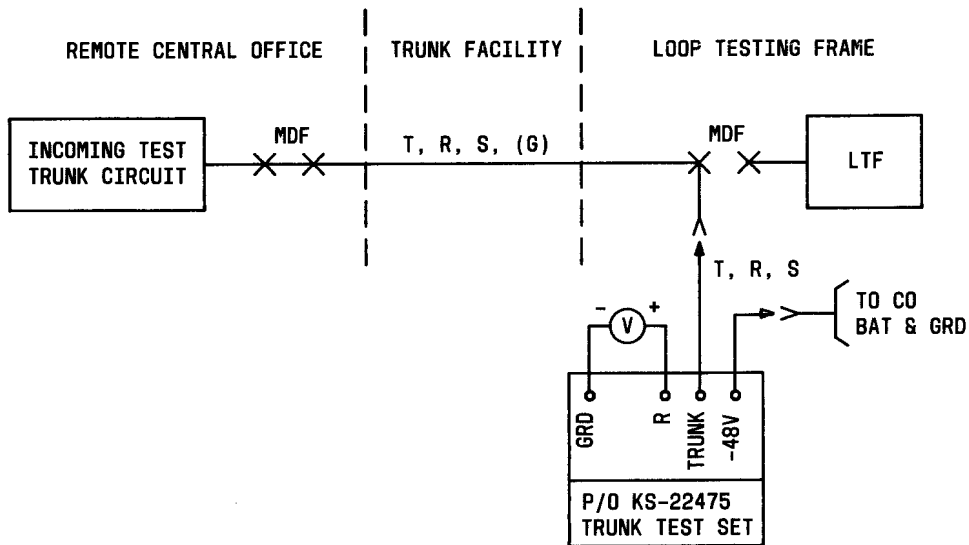


Fig. 14—Open Circuit AC FEMF (R-G)—Connections

STEP	ACTION	VERIFICATION
1	At LTF location— Open T, R, S, and (G) leads of test trunk circuit. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	At TTS— POWER lamp lighted.
3	At TTS— Access dedicated trunk calibration telephone number (refer to paragraphs 2.06 and 2.07).	CURRENT lamp lighted.
4	Connect the ac voltmeter between the R and GRD terminals (see Fig. 14).	At ac voltmeter— Voltage reading should be less than 15 Vac (rms).
5	Record the value on the chart provided (refer to Fig. 4).	
6	At TTS— Disconnect the ac voltmeter.	

STEP	ACTION	VERIFICATION
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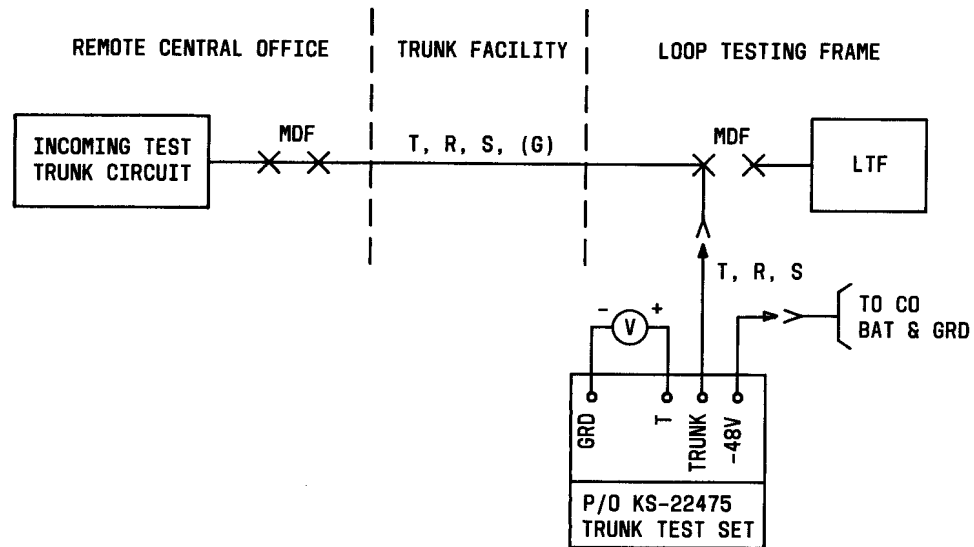


Fig. 15—Open Circuit AC FEMF (T-G)—Connections

- | | | |
|----|---|---|
| 7 | Reconnect the ac voltmeter between the T and GRD terminals (see Fig. 15). | At ac voltmeter—
Voltage reading should be less than 15 Vac (rms). |
| 10 | Record the value on the chart provided (refer to Fig. 4). | |
| 11 | At TTS—
Disconnect the ac voltmeter. | |
| 12 | Operate CONTROL switch to OFF HOOK . | |
| 13 | Operate SLEEVE switch to OPEN . | At TTS—
CURRENT lamp extinguished. |

STEP ACTION VERIFICATION

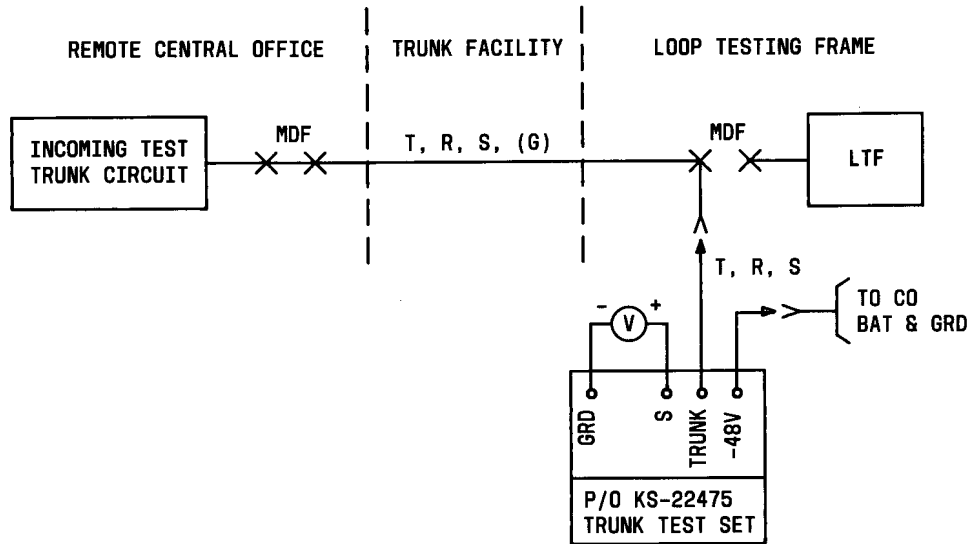


Fig. 16—Open Circuit AC FEMF (S-G)—Connections

- | | | |
|-----|---|---|
| 14 | Reconnect the ac voltmeter between the S and GRD terminals (see Fig. 16). | At ac voltmeter—
Voltage reading should be less than 15 Vac (rms). |
| 15 | Record the value on the chart provided (refer to Fig. 4). | |
| 16 | At TTS—
Disconnect the ac voltmeter. | |
| 17a | If additional tests are to be performed, omit Step 18 and proceed to Step 4 of next test. | |
| 18 | Restore test trunk circuit as described in paragraph 2.08. | |

G. Sleeve Resistance (all test trunks) (Fig. 17).

Note: For this test the dedicated trunk calibration telephone number shall be accessed.

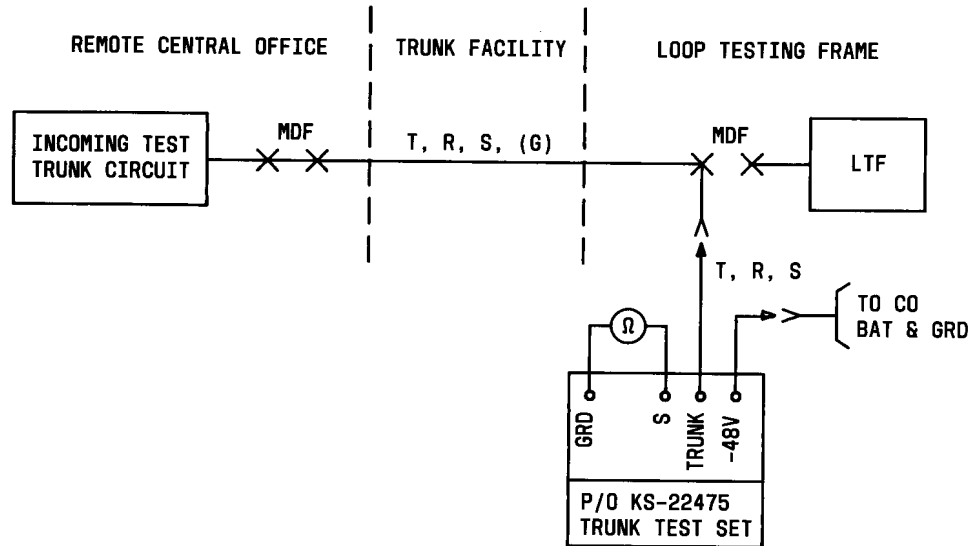


Fig. 17—Sleeve Resistance—Connections

STEP	ACTION	VERIFICATION
1	At LTF location— Open T, R, S, and (G) leads of test trunk circuit. Refer to paragraph 2.05, Step 3.	
2	Connect TTS as described in paragraph 2.05.	At TTS— POWER lamp lighted.
3	At TTS— Access dedicated trunk calibration telephone number (refer to paragraphs 2.06 and 2.07).	CURRENT lamp lighted.
4	Operate SLEEVE switch to OPEN .	CURRENT lamp extinguished.
5	Connect an ohmmeter between the S and GRD terminals (see Fig. 17).	At ohmmeter— Resistance read should be less than 850 ohms or less than 1600 ohms when G lead is grounded at LTF location.
6	Record the value on the chart provided (refer to Fig. 4).	
7	At TTS— Disconnect the ohmmeter.	

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STEP	ACTION	VERIFICATION
8a	If additional tests are to be performed, omit Step 9 and proceed to Step 4 of next test.	
9	Restore test trunk circuit as described in paragraph 2.08.	

H. Longitudinal Balance (all test trunks) (Fig. 18).

Notes:

1. For this test the dedicated trunk calibration telephone number shall be accessed.
2. This test uses a WECO 3A or 3C or Hewlett-Packard 3555 noise measurement set to measure the longitudinal balance of the test trunk.

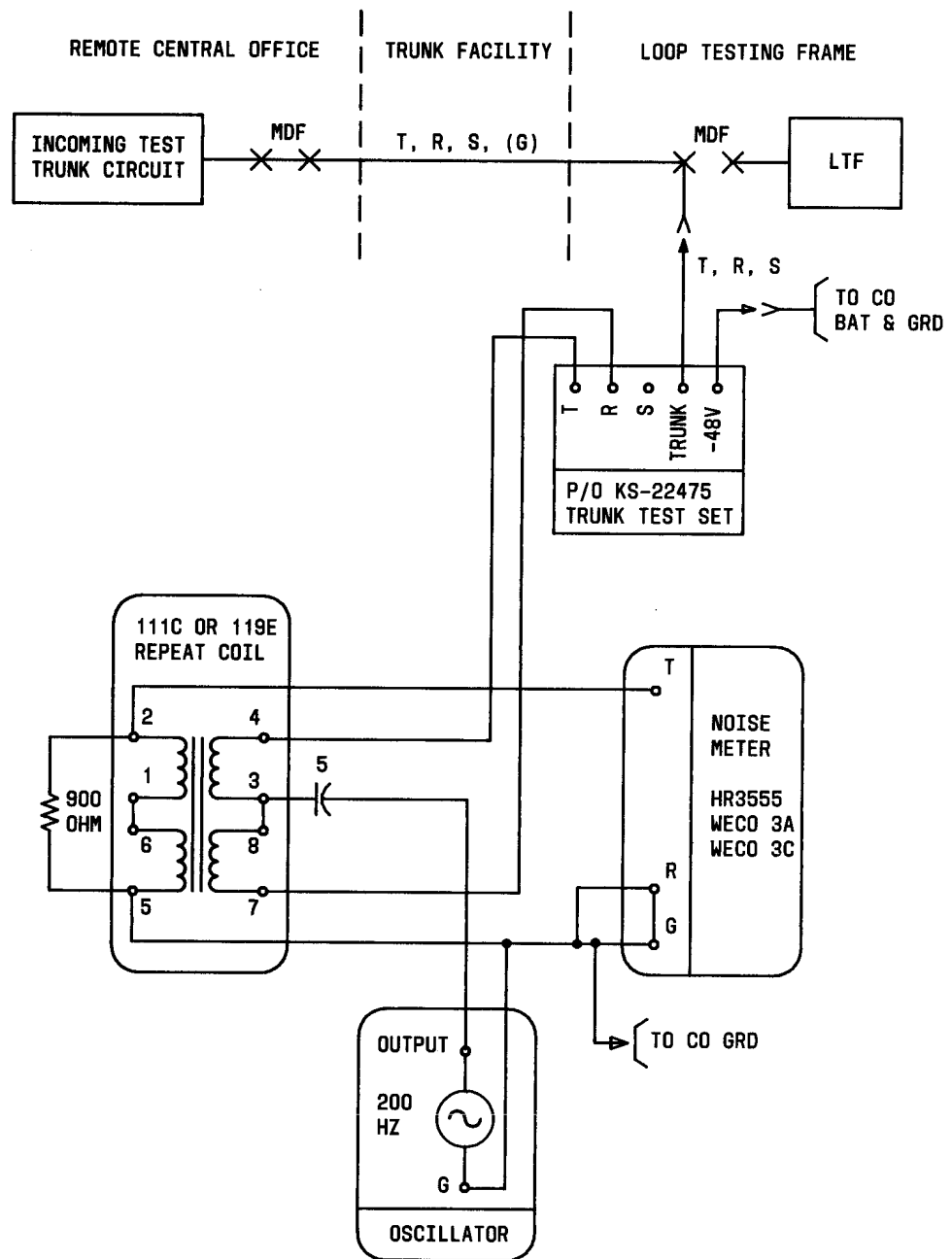


Fig. 18—Longitudinal Balance—Connections

STEP	ACTION	VERIFICATION
1	Adjust oscillator for 200-Hz signal.	
2	Select Ng position of function switch.	
3	Connect the R (ring) input of the of the noise meter to its ground terminal.	

STEP	ACTION	VERIFICATION
4	Connect the T (tip) input of the noise meter to the open-circuited oscillator output.	
5	Connect the noise meter ground terminal to a CO earth ground and to the oscillator ground terminal.	
6	Connect ground terminal of oscillator to one side of oscillator output terminal, if provided.	
7a	If WECO 3A or 3C noise measurement set is used:	
8a	Set WTG filter for 3 kHz flat.	
9b	If HP 3555 noise measurement set is used:	
10b	Set noise weighting switch to 3 kHz flat.	
11b	Select Term Noise Input switch.	
12	Adjust the oscillator output to obtain a reading of 66 dBrn on the noise meter (V_{in}).	Obtain value for V_{in} to be used in computation in Step 22, eg., $V_{in} = 66$.
	Note: The oscillator used for this test must be capable of 10V rms output in order to obtain a 66 dBrn reading. If an oscillator capable of 10V rms cannot be obtained, set the oscillator output as high as possible (e.g., 60 dBrn) and adjust the requirements in Step 21 accordingly (i.e., 54 dBrn).	
13	Connect repeat coil— Strap the windings of a WECO 111C or 119E repeat coil as shown in Fig. 18 (Pins 1 and 6, 3 and 8).	
14	Remove oscillator output from noise meter and reconnect to the repeat coil as shown in Fig. 18 (through a 0.5 μ F coupling capacitor).	
15	Connect the oscillator ground terminal to the repeat coil as shown in Fig. 18.	
16	Connect a 900-ohm resistor across repeat coil terminals as shown in Fig. 18.	
17	At LTF location— Open T, R, S, and (G) leads of test trunk circuit. Refer to Paragraph 2.05, Step 3.	

STEP	ACTION	VERIFICATION
18	Connect TTS as described in paragraph 2.05.	At TTS— POWER lamp lighted.
19	At TTS— Access dedicated trunk calibration telephone number (refer to paragraphs 2.06 and 2.07).	CURRENT lamp lighted.
20	Connect the repeat coil to the cable pair at the LTF end as shown in Fig. 18.	
21	At noise measuring set— Measure V_o using a WEC0 3A or 3C or Hewlett-Packard 3555 noise measuring set. Use the setup as detailed below:	
22	Remove the T (tip) input of the noise meter from the oscillator output terminal and reconnect to pin 2 of the repeat coil to read V_o (across the 900-ohm resistor) as shown in Fig. 18.	At noise measuring set— Obtain value for V_o .
	Note: If no deflection of the meter is obtained, unbalance the cable pair momentarily with a capacitor T-G or R-G and observe that a deflection of the meter is obtained in order to verify correct setup.	
23	Calculate trunk balance as follows: Balance (dB) = $V_{in} - V_o$ Example: If $V_{in} = +66$ and $V_o = -6$, The balance = $66 - (-6) = 72$.	Trunk balance greater than or equal to 60 dB.
24	Record the value on the chart provided (refer to Fig. 4).	
25	At TTS— Disconnect oscillator. Disconnect repeat coil. Disconnect noise measuring set.	
26	Restore test trunk circuit as described in paragraph 2.08.	

5. TEST CONNECTOR OPERATION

A. No. 1 Crossbar—No-Test Connector Tests

INSTRUCTIONS FOR PERFORMING TESTS A, B, AND C

Test A should be performed in all offices connected to the MLT LTF; preferably, before MLT becomes online.

Tests B and C need only be performed if complaints are received which indicate that open-in results are occurring on lines that have tip-ring shorts (ROH, busy, etc.) (i.e., any condition that simulates a "busy" condition which would force the test to be made via the no-test path through the central office). If Tests B and C are necessary, perform Test A first.

PREPARATION

1. Determine the quantity and location of the Line Link Frames (LLFs), the No-Test Connector (NTC) switches, and the incoming trunk circuits assigned to the Loop Testing Frame (LTF).
2. Determine the horizontal level on the NTC switches associated with each incoming trunk circuit.

OPERATIONAL TESTS

Test A: **Verifying JC-Leads**

1. Insulate contact 9 top of relay F1 and block relays F1 and F2 operated on one incoming trunk circuit.
2. Observe that the *correct* horizontal level select magnet operates on all NTC switches.
3. Remove blocking tool from the F1 and F2 relays and restore contact 9 top of relay F1.
4. Repeat Steps 1 through 3 for each incoming trunk circuit assigned to the LTF.

Test B: **Verifying the T, R, S, and H Leads from the Incoming Trunk Circuit to Each NTC Switch**

1. Buzz test the T, R, S, and H leads from the incoming trunk circuit punchings 28, 29, 30, and 31, respectively, on vertical T.S. on unit to the first NTC switch, horizontal level terminals 2, 1, 0, and 3, respectively.
2. Buzz test the T, R, S, and H leads from the first NTC switch to each of the other NTC switches (20 maximum). The T, R, S, and H leads appear at the horizontal level terminals 2, 1, 0, and 3, respectively, on the switches.
3. Repeat Steps 1 and 2 for each incoming trunk circuit assigned to the LTF.

Test C: **Verifying T, R, S, H, and NT Leads from the NTC Switches to the LLFs**

1. Buzz test the T, R, S, H, and NT leads from each LLF to the associated NTC switch.
Note: Each NTC switch contains up to four LLFs with two switch verticals required for each LLF. One vertical (even number) is for the LLF HG 0-4 and the other vertical (odd number) is for the LLF HG 5-9. Lead designations and test point locations are given in Table C. All leads must be tested for continuity.

TABLE C
NO. 1 CROSSBAR—NO-TEST CONNECTOR TESTS

LEAD DESIGNATION	LOCATION AT NTC	LOCATION AT LLF T.S. BETWEEN SEC. SW. 7 AND 8
NT	3 Term. of even	30
T	2 no. vert.	32
R	1 HG 0-4	33
S	0	34
H	Hold O.N. Contact	35
NT	3 Term. of odd	31
T	2 no. vert.	36
R	1	37
S	0	38
H	Hold O.N. Contact	39

B. No. 5 Crossbar—No-Test Connector Tests

INSTRUCTIONS FOR PERFORMING TESTS A, B, AND C

Test A should be performed in all offices connected to the MLT LTF; preferably, before MLT becomes online.

Tests B and C need only be performed if complaints are received which indicate that open-in results are occurring on lines that have tip-ring shorts (ROH, busy, etc.) (i.e., any condition that simulates a "busy" condition which would force the test to be made via the no-test path through the central office). If Tests B and C are necessary, perform Test A first.

PREPARATION

1. Determine the quantity and location of the Line Link Frames (LLFs), the No-Test Connector (NTC) switches, and the incoming trunk circuits assigned to the Loop Testing Frame (LTF).
2. Determine the horizontal level on the NTC switches associated with each incoming trunk circuit.
Note: There may be extension NTC (ENTC) switches in parallel with the NTC switches to extend the number of horizontals from 10 to 20. The paired NTC and ENTC switches serve the same five LLFs with the incoming trunk circuit assigned to either of the two switches.

OPERATIONAL TESTS

Test A: *Verifying JC-Leads*

1. Insulate contact 1 make of relay F1 and block relay F1 operated on one incoming trunk circuit.
2. Observe that the **correct** horizontal level select magnet operates on all NTC (or ENTC) switches.
3. Remove blocking tool from the F1 relay and restore contact 1 make.

- Repeat Steps 1 through 3 for each incoming trunk circuit assigned to the LTF.

Test B: Verifying T, R, S, and H Leads from the Incoming Trunk Circuit to Each NTC (or ENTIC) Switch

- Buzz test the T, R, S, and H leads from the incoming trunk circuit punchings 84, 83, 82, and 81, respectively, on TS(B), on the unit to the first NTC switch, horizontal level terminals 2, 1, 0, and 3, respectively, at vertical 8 on the switch.
- Buzz test the T, R, S, and H lead multiple from the first NTC switch to each of the other NTC switches (12 maximum). The T, R, S, and H leads appear at the horizontal level terminals 2, 1, 0, and 3, respectively, at verticals 6 and 8 on the switches.
- Repeat Steps 1 and 2 for each incoming trunk circuit assigned to the LTF.

Test C: Verifying T, R, S, H, and NT Leads from the NTC Switches to the LLFs

- Buzz test the T, R, S, H, and NT leads from each LLF to the associated NTC (or ENTIC) switch. **Note:** Each NTC switch has a capacity for five LLFs with two switch verticals required for each LLF. One vertical (even number) is for the LLF JG 0-4 and the other vertical (odd number) is for the LLF HG 5-9. Lead designations and test point locations are given in Table D. All leads must be tested for continuity.

**TABLE D
NO. 5 CROSSBAR—NO-TEST CONNECTOR TESTS**

LEAD DESIGNATION	LOCATION AT NTC	LOCATION AT LLF TS(A)		
		290 LINE LLF	SPLIT 90 LINE LLF	
			TOP	BOTTOM
NT0-4	3 Term. of even	44	94	104
T	2 no. vert.	40	90	100
R	1 HG 0-4	41	91	101
S	0	42	92	102
H	Hold O.N. Contact	43	93	103
NT5-9	3 Term. of odd	49	99	109
T1	2 no. vert.	45	95	105
R1	1 HG 5-9	46	96	106
S1	0	47	97	107
H1	Hold O.N. Contact	48	98	108

C. No. 1/1A ESS—No-Test Vertical Tests**PROCEDURES FOR TESTING NTV ASSIGNMENT AND JUMPERS IN NO. 1/1A ESS****OPERATIONAL TESTS**

5.01 The following test should be performed in all No. 1/1A ESS offices to ensure the integrity of the NTV jumpers. An excess of "VER Code 34—Possible Invalid Access" reports is indicative of faulty or missing jumpers:

1. Assign spare office directory number to the LEN wired to the NTV under test. ((Ref. TG1A Division 3, Section 5K.)
2. At MDF—place a short across the tip and ring of the NTV under test.
3. At Trunk and Line Test Panel—set up test on the directory number to verify the short. (If the short is observed, the correct NTV was chosen and the NTV jumper was proper.)
4. Remove the short.
5. Unassign the directory number.
6. Repeat Steps 1 through 5 for all NTVs in the office.

Note: To ensure the security of the NTV jumpers, place a red service protector on the NTV appearances.