

FALSELY GROUNDED TERMINATING MARKER

RL OR TRL LEAD

NO. 1 CROSSBAR OFFICES

1. GENERAL

1.01 This section covers methods to be followed when the terminating marker RL or TRL lead becomes grounded, causing XRL trouble indications.

2. INDICATIONS OF TROUBLE CONDITION

2.01 A false ground on the RL or TRL lead will cause the operation of the terminating marker XRL relay and result in terminating trouble indications. In addition, under certain conditions the marker frame TA lamp, and the MB and DT lamps on the trouble indicator frame will light, and the major alarm will sound after 28 to 58 seconds. / When the RL lead is falsely closed in the terminating marker connector, the CT and GR lamps and the C-lamp of the connector in trouble will light at the terminating trouble indicator and the major alarm will sound. When the TRL lead is falsely closed in the connector, trouble indications resulting from other troubles and involving other markers will appear with a lighted DL lamp representing the marker with its TRL lead in trouble.

3. REACTIONS DUE TO TROUBLE

3.01 During busy hour periods, RL or TRL lead trouble conditions may cause a backup of the terminating traffic due to a marker being withheld from service. Under certain conditions, a false closure of the RL lead in the connector may result in the false release of service calls. A false closure of the TRL lead in the terminating marker connector may cause second trials. Other RL or TRL lead troubles may affect only a single service call.

4. IMMEDIATE PROCEDURE TO FOLLOW

4.01 If repeated XRL trouble indications are received remove the marker from service. If operated, or if operated but releasing momentarily every 2.45 to 3.75 seconds, block the XRL relay normal. If the XRL relay is normal, determine if further XRL indications are received with the marker removed from service and analyze the trouble condition.

5. ANALYSIS OF TROUBLE CONDITIONS

5.01 Grounds on the RL and TRL lead have various effects on the equipment and are revealed by varying indications. A dirty contact at the 6 and 7 upper springs of the GT2 relay prevents this relay from locking. When

the ringing control check relays are released by the release of the incoming trunk F relay, the GT2 relay releases and recloses the XRL relay to the RL lead. The normal release ground through the cross-points and over the NS lead releases the sender and at the same time operates the XRL relay. The call completes as usual but 2.45 to 3.75 seconds later an XRL trouble indication is received. A trouble indicator test call does not reveal this trouble condition.

5.02 Permanent Ground on the RL and TRL Leads

(a) Ground on the section of RL lead between the 2 lower contact of the TRB relay and the connector TM-relay will cause the RL and XRL lamps to be displayed on the terminating trouble indicator. The marker XRL relay is released when the indicator dismisses the marker and reoperates on the release of the TR relay. This causes continual timing recycles with repeated attempts to seize the indicator.

(b) Ground on the section of the RL lead between the 1 lower contact of the TRB relay and the primary winding of the XRL relay will cause the XRL lamp to be displayed on the indicator. The RL lamp will not light because the RL lead to the indicator is opened by the TRB relay. The XRL relay is held operated by the ground and therefore the timing recycles mentioned in (a) do not take place. However, the marker TA lamp and the indicator DT and MB lamps are lighted and the major alarm is sounded.

(c) Ground on the section of the TRL lead between 2 upper of the TR relay and the connector TM-relay will cause the XRL lamp to be displayed on the indicator. The TRL lamp will not light because the TRL lead is wired through the TIF relay which is not operated when the indicator is summoned by the operation of the XRL relay. Continual timing recycles and repeated attempts to seize the indicator take place.

(d) Ground on the section of the TRL lead between the 3 upper of the TR relay and the secondary winding of the XRL relay will cause the XRL lamp to be displayed on the indicator. In addition the marker TA lamp and the indicator DT and MB lamps will light and the major alarm will sound. Although the XRL relay is held operated, the timing relays are released and the recycling action mentioned in (c) takes place.

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5.03 A false closure of the marker RL lead in the terminating marker connector will produce XRL indications on the marker in trouble when any other marker passes a call through the connector in trouble. If the marker in trouble is in the act of setting up a call, this call will be falsely released. Likewise if the marker in trouble sends a release signal through another connector this signal will give a false release to any other marker setting up a call in the connector in trouble. This will result in an XRL indication and light the DR lamp of a marker not in trouble. However, if no calls are proceeding in the connector in trouble, the CT, GR and C- lamps at the terminating trouble indicator will light to indicate the connector in trouble. By observing the marker busy lamps at the terminating trouble indicator, it will be noted that the CT, GR and C- lamps appear nearly every time a particular marker handles a call. After removing this marker from service, it will then be noted that if the terminating senders in the indicated connector are routined with the automatic test frame set for a regular call test (class key 0) XRL trouble indications will appear, indicating the marker removed from service. This reveals a false closure of the RL lead in the connector.

5.04 A false closure of the marker TRL lead in the connector will not result in XRL indications except under the following condition: If a trouble free marker, having a plug in its TLB jack at the terminating trouble indicator, sets up a call in the connector in trouble and a trouble, such as an open line, is encountered then an XRL indication will appear to reveal the marker in trouble. However, the normal indication that will result from a false closure of the TRL lead is an excessive number of DL lamps or MTR registrations on the marker in trouble. This is a result of the difference in time between the grounding of the TRL lead and the summoning of the trouble indicator. If a trouble free marker meets some other trouble condition while attempting to set up a call in the connector in trouble, the trouble indicator is summoned. In releasing the indicator, it grounds its TRL lead causing the operation of the XRL relay in the marker in trouble and a second trial to calls proceeding in both markers. The marker in trouble summons the trouble indicator 2.45 to 3.75 seconds later only to find it busy and so lights its DL lamp and scores its MTR register. Automatic routine of the terminating senders

with the trouble release by marker test (class key 4) will cause XRL indications on the marker in trouble if its TRL lead is falsely closed in the connector.

5.05 A false closure of the 7 and 8 upper contacts of the marker NTT relay results in XRL, CT, GR, and connector C- lamp indications. This false RL lead ground causes the operation of the connector GR relay before the slow operating GRA relay removes the GR relay from the RL lead. The resulting connector C- lamp will indicate the connector in which the call is placed and has no relation to the trouble. As the marker in trouble repeats its XRL indication on every call, it should be routined with the trouble indicator. It will be noticed that a release signal will be received before the LE lamp is extinguished if this trouble condition exists.

6. SUGGESTED METHOD OF LOCATING AND CLEARING TROUBLE

6.01 With the marker removed from service, block the XRL relay normal if it is operated. This will prevent the marker from placing ground on the RL and TRL leads. Open the 2 and 3 lower contacts of the XR relay. Test on the 1, 2 and 3 lower contacts of the XR relay for the presence of ground. If ground appears on the 1 lower contact of the XR relay, open the 1 and 2 upper contacts of the XR relay and test for the presence of ground on both contacts. From the circuit drawing it can be seen how these tests will determine which section of the RL or TRL lead is grounded. If the XRL relay is normal, routine the terminating senders with class keys 0 and 4 of the terminating sender test frame. XRL indications will appear if the marker RL or TRL lead is falsely closed in the connector.

6.02 Routine tests of the marker with the trouble indicator will reveal a false closure of the 7 and 8 upper contacts of the NTT relay or a false closure of the RL lead at the TM- relay of the marker connector. In the first case, a premature release will be received. In the latter case, CT, GR and connector C- lamps will reveal the connector in which the closure has occurred.

6.03 To determine that the GT2 relay locks properly, remove the marker from service and block the CON2 relay operated. Electrically operate the GT2 relay which should lock through its 6 and 7 upper contacts.

7. TROUBLE CONDITIONS CAUSING REACTION

										<u>TROUBLE APPEARANCES</u>				
										<u>LAMPS</u>		<u>MARKER XRL RELAY</u>	<u>TROUBLE INDICATOR</u>	
										<u>TROUBLE INDICATOR</u>			<u>MARKER</u>	
No.	DR	XRL	RL	DT	MB	GR	CT	CONN C	TA					
1	0	x									Restored to normal	Seized 2.45-3.75 seconds after marker passes call		
2	0	x		x	0				x		Steadily operated	Seized once		
3	0	x	x								Releases every 2.45-3.75 seconds	Seized every 2.45-3.75 seconds		
4	0	x		x	0				x		Releases every 2.45-3.75 seconds	Seized every 2.45-3.75 seconds		
5	0	x									Releases every 2.45-3.75 seconds	Seized every 2.45-3.75 seconds		
6	{	x				x	x	1-0			Restored to normal	Seized 2.45-3.75 seconds after marker 1 or 2 passes a call in connector 1-0. CT, GR and C-lamps appear after marker 0 passes a call in any other connector		
	{	x												
	{	x												
7	0	x				x	x	Vari-ous						
8	Excessive DL 0 lamp indications and MTR 0 registrations.													

- No. CORRESPONDING TROUBLE CONDITIONS
- 1 - Dirty contacts 6 and 7 upper GT2 relay. Marker 0
 - 2 - Permanent ground on RL lead (XRL winding to 1 lower TRB relay). Marker 0
 - 3 - Permanent ground on RL lead (2 lower TRB relay to TMO No. 14 contacts). Marker 0
 - 4 - Permanent ground on TRL lead (XRL winding to 3 upper TR relay). Marker 0
 - 5 - Permanent ground on TRL lead (2 upper TR relay TMO No. 4 contacts). Marker 0
 - 6 - False closure or cross on No. 14 contacts TMO relay. Marker connector 1-0
 - 7 - False closure or cross on 7 and 8 upper NTT relay. Marker 0
 - 8 - False closure or cross on No. 4 contacts TMO relay in unknown connector. Connector is determined by testing terminating senders. When sender in connector in trouble is tested, DRO, XRL indications will appear. (Use class key 4 of the terminating sender test frame.)

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ADDITIONAL TROUBLE CONDITIONS MAY BE LISTED BELOW

{ DBR lamp + T1 lamp also Conn lamp are markers involved
① Contact CBR relay not making
