1A PROTECTIVE RELAYING TERMINAL MAINTENANCE

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1. GENERAL

1.01 This practice describes the maintenance philosophy and procedures for the 1A protective relaying (PR) terminal. Although the PR terminal is designed with unusually reliable components, due to the critical nature of the service provided, every effort must be made to restore service as quickly as possible when trouble does occur in the system.

1.02 Maintenance shall be limited to the replacement of wiring external to the transceiver and interface unit and replacement of fuses, incandescent lamps, circuit packs, and interface modules. ***No component replacement or soldering within the circuit packs or interface modules shall be attempted in the field.***

1.03 Circuit packs and interface modules believed to be defective shall be removed and replaced with spares known to be serviceable. Isolation of the defective unit(s) should be made in accordance with the test procedures given in the section entitled 1A Protective Relaying Terminal—Test Procedures (024-195-500). Defective units should be returned to the service center in accordance with local instructions.

1.04 For convenience in maintenance, spare fuses and incandescent lamps may be kept at each PR terminal site. The fuses and lamps required for the terminal are listed in Tables A and B, respectively.

1.05 It is recommended that a set of spares, corresponding to at least one of each unit used in the area served by the operating company, be maintained at the operating company maintenance location. These units should be kept in suitable containers so that they are ready to transport to a site reporting trouble with minimum delay. Dispatching to any PR terminal site reporting trouble should be on an emergency basis, so that down time of the terminal is minimized.

2. MAINTENANCE AIDS

Special Tools and Apparatus

2.01 A KS-20538 volt-ohm-milliammeter (VOM) or equivalent is required for performing certain tests during installation, and also for troubleshooting tests.

2.02 A 1500-ohm 30-watt WE 44U resistor (or equivalent) is required as a dummy load in performing certain tests specified in Section 024-195-500.

2.03 A screw-starting screwdriver, such as Kedman No. 1736, No. 2356, or equivalent, will be helpful in mounting apparatus in the event a transceiver or interface unit is replaced.

Maintenance Tests

2.04 Two types of tests are used on the 1A PR terminal:

- In-Service Tests
- Out-of-Service Tests.

The in-service tests may be performed without removing the terminal from service. If a trip should occur while the in-service test is being performed, the test is automatically aborted and the trip signal is sent to its destination. However, certain parts of the system, such as the transmitter and receiver logic, are not tested by the in-service tests. The out-of-service tests provide a more comprehensive test of the entire system, including input and output circuitry not tested by the in-service tests. Before out-of-service tests and the following

maintenance procedures can be performed, the coordination of all sites is required in taking the system out of service. Both in-service and out-of-service tests, and taking the system out of service, are described in Section 024-195-500.

3. MAINTENANCE PROCEDURES

3.01 After tests have indicated a particular module or circuit pack is defective, deenergize the terminal by removing the CONVERTER INPUT MAIN POWER POS fuse, unless the CONVERTER INPUT module is the suspected defective unit. In that case, request the customer to disconnect the power company station battery input.

3.02 If the suspect unit is a circuit pack, open the door on the transceiver, remove the circuit pack, and replace it with a spare known to be serviceable. Proceed to 3.04.

3.03 If the suspect unit is an interface module, disconnect all wires from the module, marking each wire as removed to facilitate rewiring. (Small tags with strings or masking tape may be used to write TS designations on for proper identification.) Replace module with a spare known to be serviceable. Verify that options on replacement module agree with those on the module to be replaced. Replace each wire on the module, being careful to place wires on correct terminals.

3.04 After suspected circuit pack or module has been replaced, restore power to the terminal. Repeat the test that isolated the trouble.

3.05 After trouble has been cleared, return system to service in coordination with all sites in the system as described in Section 024-195-500.

TABLE A

FIELD REPLACEABLE FUSES

FUSE LABEL	LOCATION (MODULE)	SUPPLY VOLTAGE	FUSE TYPE AND RATING
	OPTION P		
MAIN POWER			
F1 POS	Converter Input	48V	Bussman GBA, 5A
F2 NEG	Converter Input	48V	Bussman GBA, 5A
POS	Fuse & Converter	48V	Bussman GBA, 3A
NEG	Fuse & Converter	48V	Bussman GBA, 3A
	OPTION S		
MAIN POWER			
F1 POS	Converter Input	125V	Bussman GBA, 3A
F2 NEG	Converter Input	125V	Bussman GBA, 3A
POS	Fuse & Converter	125V	Bussman GBA, 1.5A
NEG	Fuse & Converter	125V	Bussman GBA, 1.5A
	OPTION P OR S		
AUX POWER			
F3 POS	Converter Input	—	Bussman GBA, 1.5A
F4 NEG	Converter Input	—	Bussman GBA, 1.5A
ALM	Fuse & Converter	—	Bussman GBA, 3A
−15L	Fuse & Converter	—	Bussman GBA, 3A
−15R	Fuse & Converter	—	Bussman GBA, 3A
+15L	Fuse & Converter	—	Bussman GBA, 3A
+15R	Fuse & Converter	—	Bussman GBA, 3A
FA	Keying Input	—	WECo 70E, 180 mA

TABLE B

FIELD REPLACEABLE INCANDESCENT LAMPS

LAMP	LOCATION	TYPE
TRIP OUTPUT OFF TRIP ALM SYSTEM ALARM ALARM DISABLE KEYING INPUT OFF	Rcvr Control Panel Alarm Module Alarm Module Interface Control Panel Interface Control Panel Trmtr Control Panel	General Electric or Dialco 382
FA	Keying Input Module	GE or Dialco 394
TRIP TEST	Rcvr Trip Output Module	Dialco 507-6022-1437-600