

CENTRAL OFFICE TERMINATING UNIT FOR INTEGRATED PROTECTION SYSTEM DESCRIPTION, INSTALLATION, AND MAINTENANCE

1. GENERAL

1.01 This section provides a description of the Central Office Terminating Unit (COTU) which is an integral part of the Integrated Protection System designed for protection of power station wire communication services (Section 638-600-100). This section also provides installation, test, and maintenance procedures for the COTU.

1.02 This section is reissued to include options Q and R. Since this is a general revision, change arrows have not been used.

1.03 Wire communication services to power stations require special consideration and protection due to the severe electrical environment in which they must function. Protection at the central office is intended to prevent high voltage due to a power fault to ground (ground potential rise) or longitudinal induction from appearing at the terminal equipment or loop-through circuits. The special protection devices on the subscriber pairs serving a power station replace those normally provided in the vertical of the main distributing frame (MDF) or in a separate protector frame (PF).

1.04 The COTU provides a location for the orderly installation and connection of these special protection devices at the central office. Growth and flexibility are achieved by cross-connecting to the required protection as needed. When growth exceeds the COTU capacity, additional COTUs may be added.

1.05 The COTU may be connected to the subscriber pairs either through the vertical side of a conventional main distributing frame (MDF) or through a dedicated tip cable from the cable entrance facility (CEF). In central offices equipped with separate protector frames, the connection must be made through the dedicated tip cable from the

CEF. When the connection through the vertical MDF is used, the COTU must be located near the MDF so as not to exceed the wire-length restrictions described in paragraph 2.06. Figures 1A and 1B show a pictorial schematic of the relation of the COTU to the normal cable protection facilities.

2. DESCRIPTION

2.01 The COTU (Fig. 2) is 48 inches by 36 inches by 10 inches and weighs approximately 200 pounds. The COTU has two doors; the required clearance for opening the doors is 18-5/8 inches. The COTU can be either floor or wall mounted. If the unit is to be floor mounted, it must be ordered as a floor-mounted unit. When this is done, the legs for floor mounting (Fig. 2) come attached to the unit. If it is ordered as a wall-mounted unit, the legs will not come with it, but there will be wall-mounting brackets attached to the rear of the unit.

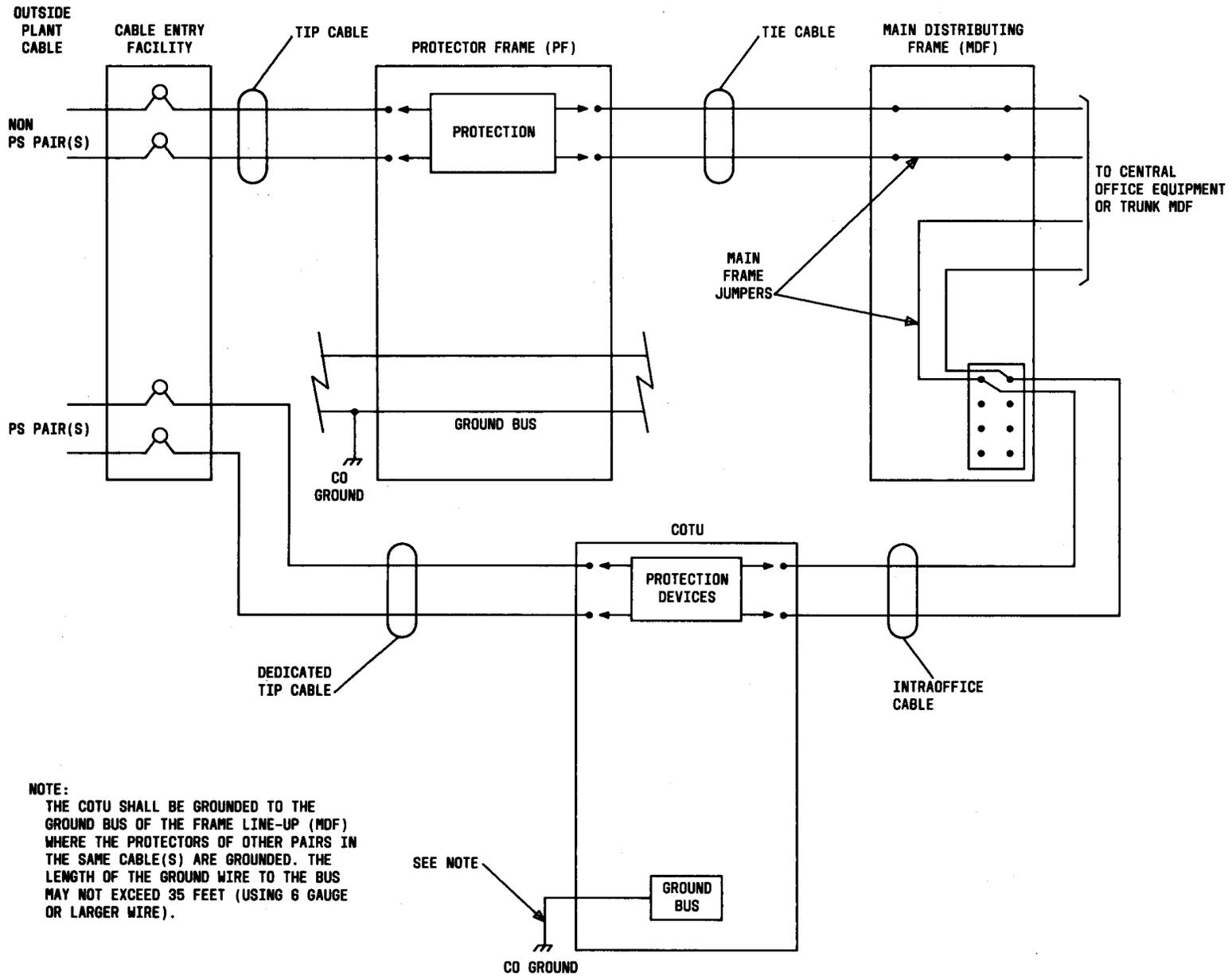
2.02 Two slightly different versions of the COTU are described in this section. Both versions provide:

- (a) Low-voltage terminal blocks for terminating the wire facilities assigned to the power industry service and for cross-connecting these facilities to the required protection device and to the terminal equipment
- (b) Shelves for mechanically mounting the drainage transformers when required.

The older version, option R (see Fig. 3A), provides mountings for 2B2A protectors for services requiring this type of protection. The newer version, option Q (see Fig. 3B), provides connectors for 4-type protectors, thereby providing the added feature of test access to the outside plant pairs terminated in the COTU.

NOTICE

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Bell System except under written agreement



NOTE:
 THE COTU SHALL BE GROUNDED TO THE GROUND BUS OF THE FRAME LINE-UP (MDF) WHERE THE PROTECTORS OF OTHER PAIRS IN THE SAME CABLE(S) ARE GROUNDED. THE LENGTH OF THE GROUND WIRE TO THE BUS MAY NOT EXCEED 35 FEET (USING 6 GAUGE OR LARGER WIRE).

SEE NOTE

Fig. 1A—COTU Connected With a Dedicated Tip Cable

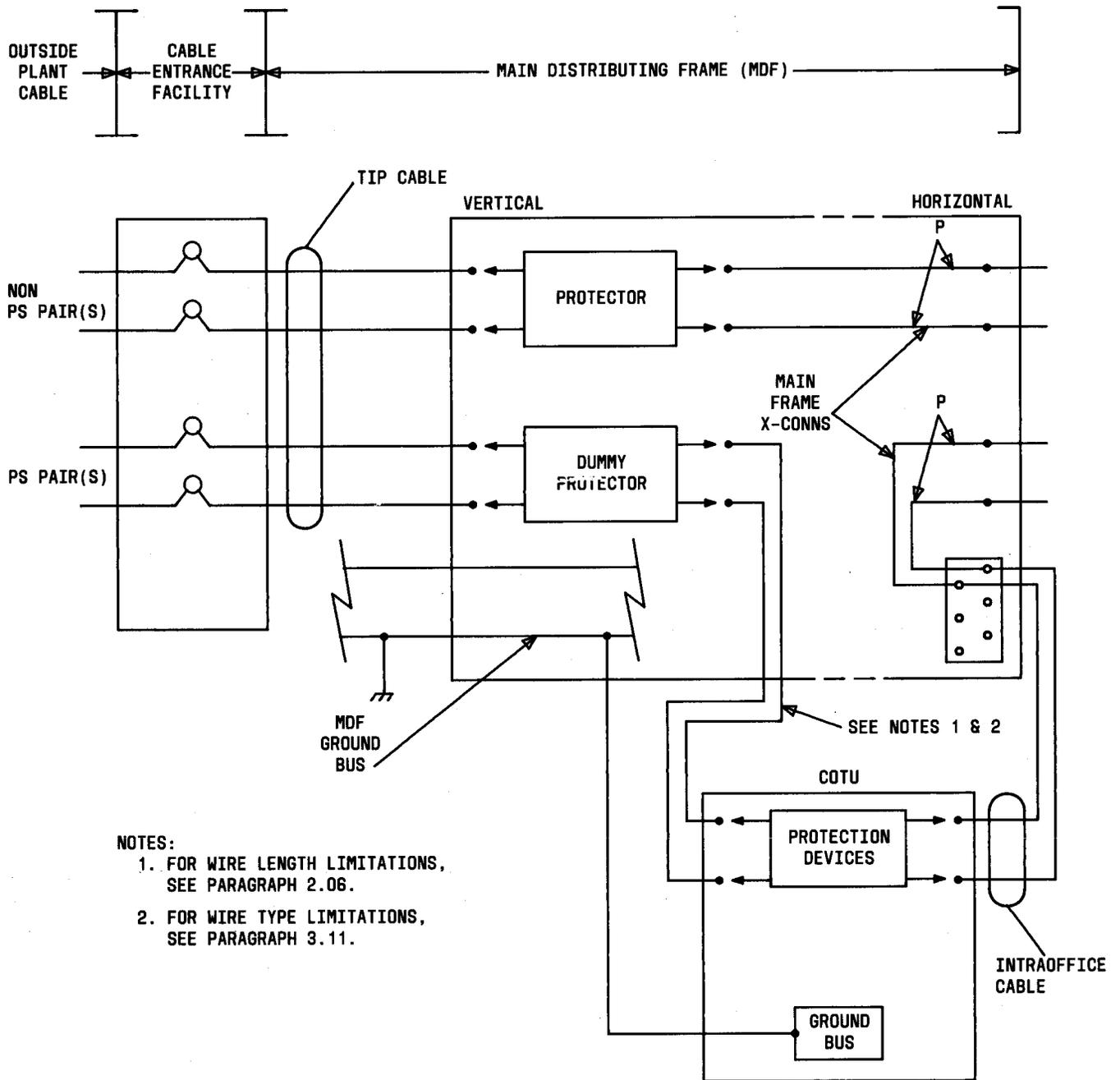


Fig. 1B—COTU Connected Through the Vertical Side of an MDF

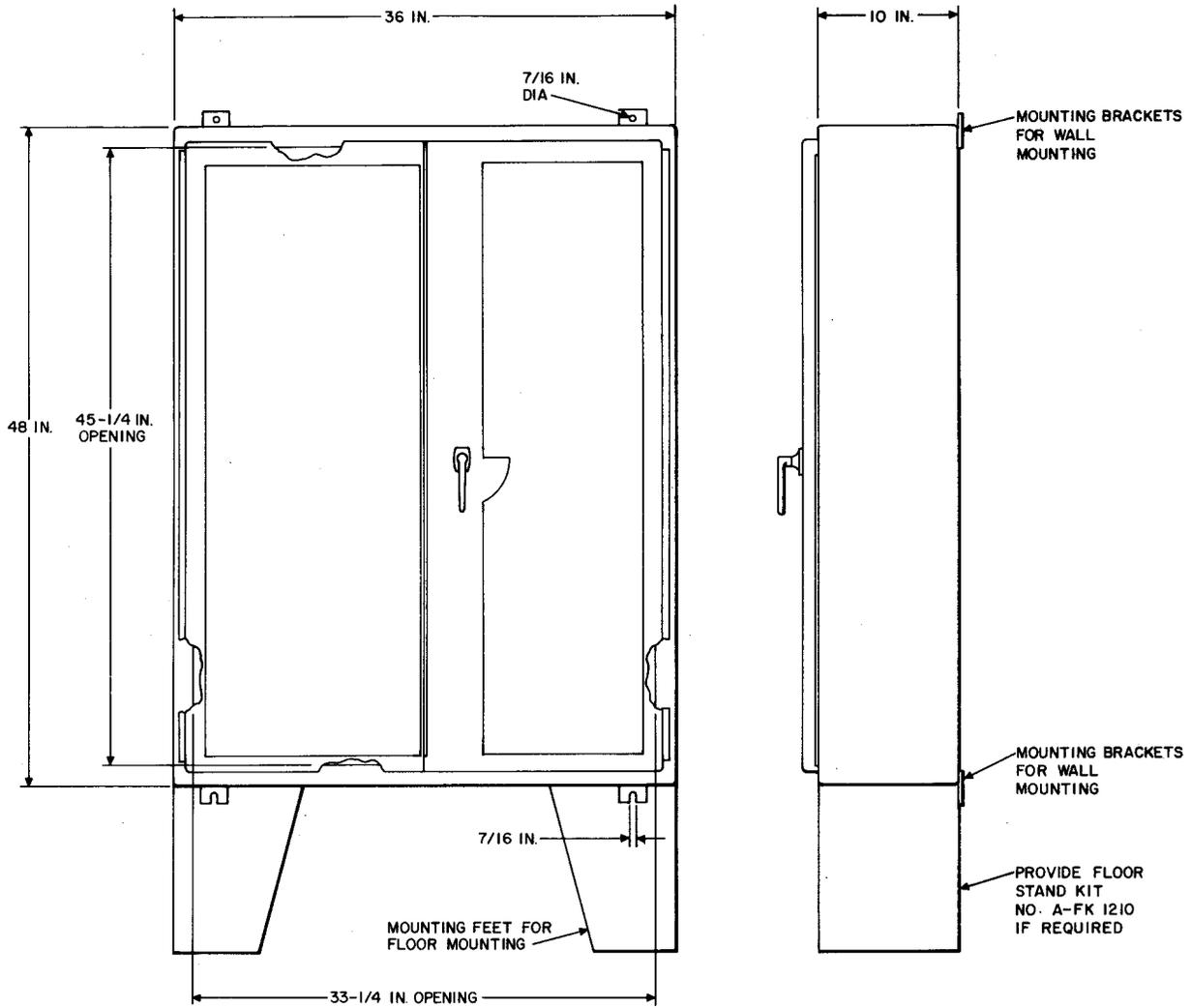


Fig. 2—Front and Side View of a COTU

2.03 Features are provided to give protection to five types of service with three service performance objective (SPO) classifications. The type and SPO class of each circuit is to be designated

by the power company and recorded by the service representative at the time the service order is placed. The service types and their protection are shown in Table A.

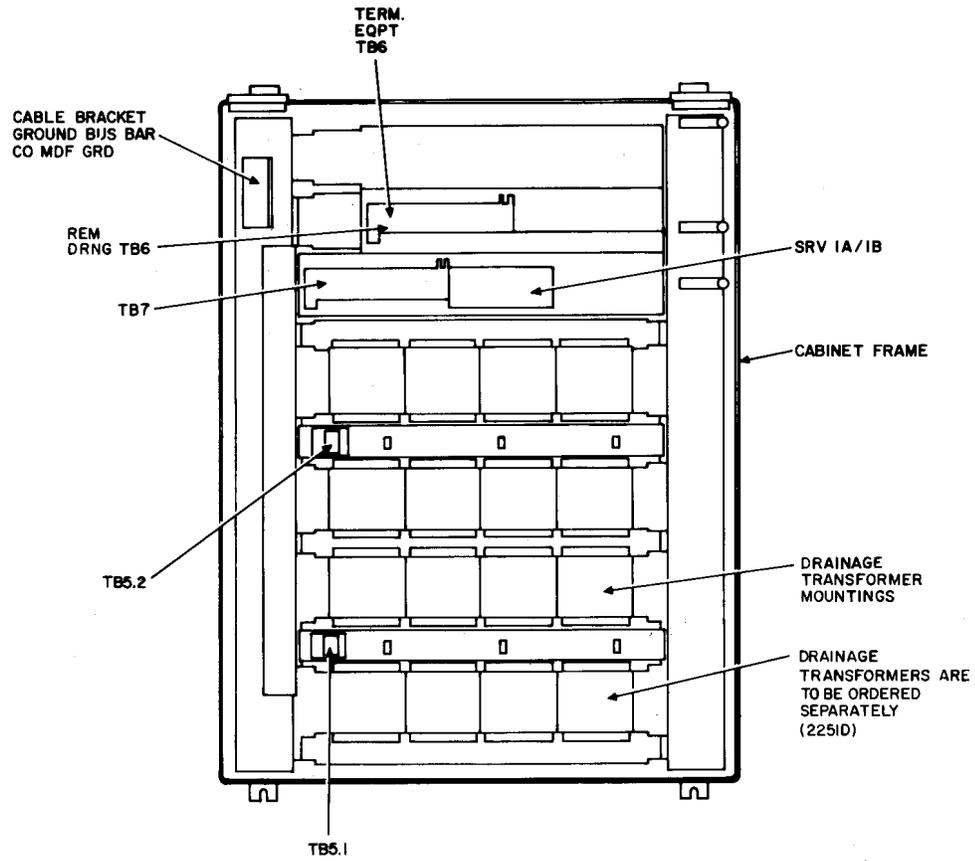


Fig. 3A—Inside View of a COTU Equipped With Option R

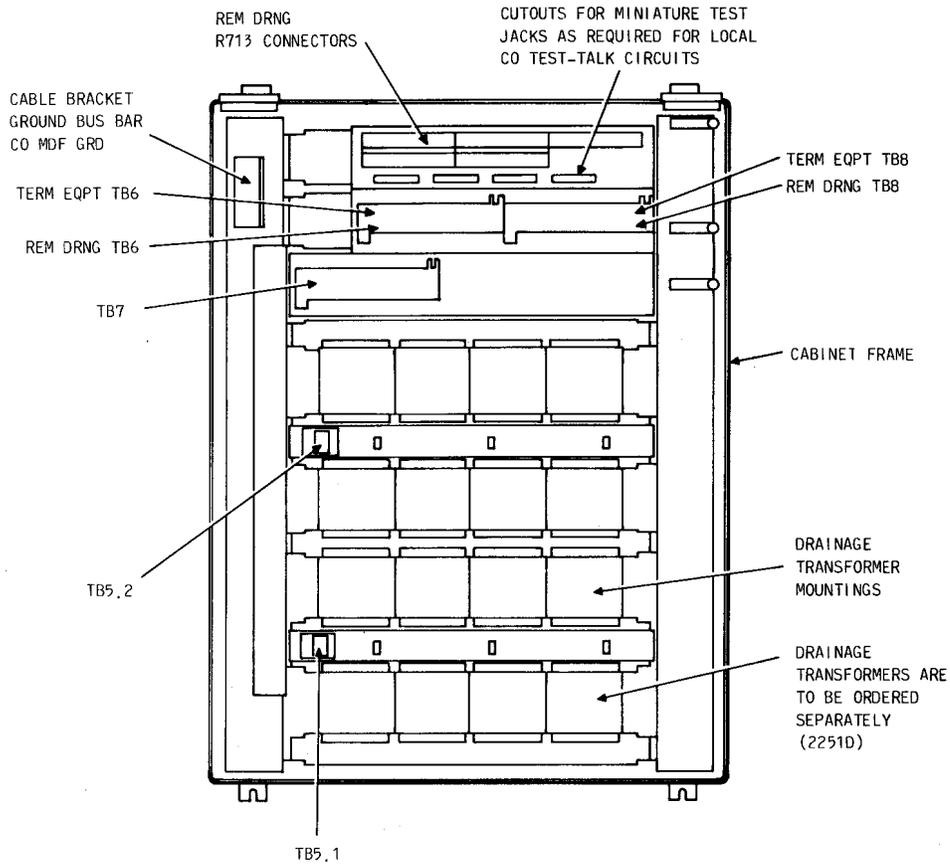


Fig. 3B—Inside View of a COTU Equipped With Option Q

TABLE A
SERVICE TYPE AND PROTECTION MATRIX

SERVICE TYPE	TRANSMISSION REQUIREMENTS	SERVICE EXAMPLE	TYPICAL SERVICE PERFORMANCE OBJECTIVE CLASSIFICATION	PROTECTION AT CENTRAL OFFICE
1A	DC OR AC AND DC	EXCHANGE TELEPHONE SERVICE, PRIVATE LINE TELEPHONE SERVICE	B OR C	3-MIL CARBON BLOCKS OR GAS TUBE (NOTE 1)
1B	DC OR AC AND DC	DC TELEMETRING, TELETYPE	B OR C	3-MIL CARBON BLOCKS OR GAS TUBE (NOTE 2)
2	DC AND/OR AC	DC TRIPPING, PILOT WIRE PROTECTIVE RELAYING	A	2251D DRAINAGE TRANSFORMER WITH 11B1A GAS TUBE PROTECTORS
3	AC ONLY	SUPERVISORY CONTROL, DATA	A OR B	2251D DRAINAGE TRANSFORMER WITH SHORTING BLOCKS OR GAS TUBES (NOTE 2)
4	AC ONLY	AUDIO TONE PROTECTIVE RELAYING	A	2251D DRAINAGE TRANSFORMER WITH SHORTING BLOCKS

NOTE 1:

OPTION	SERVICE PERFORMANCE OBJECTIVE CLASSIFICATION	TYPE OF PROTECTION
R	C	2B2 CARBON PROTECTORS
	B	11B1A GAS TUBE PROTECTORS
Q	C	4B3C CARBON PROTECTOR
	B	4B3E GAS TUBE PROTECTOR

NOTE 2:

OPTION	SERVICE PERFORMANCE OBJECTIVE CLASSIFICATION	TYPE OF PROTECTION
R OR Q	A	SHORTING BLOCKS †
	B	11B1A GAS TUBE PROTECTORS

† RELIABLE ELECTRIC COMPANY — P-18374

SECTION 201-211-101

2.04 The pair capacity of the two versions of the COTU is:

	R OPTION	Q OPTION
Subscriber pairs terminated	25*	50
Service types 1A and 1B (carbon block or gas tube protectors)	14	50
Service types 2, 3, and 4 (drainage transformers)	16	16

(*Loop-through circuits, when both pairs are terminated in the same COTU, have the second pair terminated on the TERM EQPT terminals, thus increasing the number of pairs terminated.) Any combination of service types may be protected up to the maximum shown. If COTU capacity for a specific service type becomes exhausted, another (supplementary) COTU must be installed even though the existing COTU has not been filled to its maximum terminating capacity.

2.05 When two or more power stations are served from the same central office, they may be protected in a single COTU (or adjacent COTUs connected to the same ground) if the wiring restrictions of paragraph 2.06 are met. Loop-through circuits, which connect pairs from two power stations without being connected to central office equipment, should have both legs of the circuit served at the same COTU location if possible. When the wiring restrictions of paragraph 2.06 cannot be met for both stations at a single COTU location, separate COTU locations must be established and all circuits are treated as terminating circuits.

2.06 The mounting location of a COTU depends on whether the outside plant pairs are connected through a dedicated tip cable from the CEF or through the main distributing frame. When connected through the MDF, the location must be

chosen to satisfy wire-length limitations arising from the need to minimize hazard from extending unprotected outside plant wires into an area in the central office which normally contains only protected wiring. The wiring limitations are as follows:

(a) The COTU shall be grounded to the ground bus of the frame line-up (MDF) where the protectors of other pairs in the same cable(s) are grounded. The length of the ground wire to the bus may not exceed 35 feet (using 6 gauge or larger wire).

(b) The length of the paired conductors between the connection to the subscriber pair at the VMDF and the COTU cannot exceed 235 feet minus the length of the ground wire. For example, if the ground connection is 35 feet long, the paired conductor cross-connections are restricted to 200 feet in length. When the connection from the VMDF is carried through a terminal block on the horizontal of the MDF, the length restriction applies to the total pair length from the VMDF to the COTU. Gauge and insulation requirements for the wire pairs are given in paragraph 3.12.

When connected through a dedicated tip cable, the COTU may be either grounded to the MDF ground bus or grounded to any central office ground suitable for grounding an MDF or protector frame. The length of the ground wire may not exceed 35 feet (using 6 gauge or larger wire).

2.07 The permitted combination of types of CO protection, type of COTU, and method of connecting to the COTU are shown in Table B.

Supplemental COTUs

2.08 Supplemental COTUs are needed in the following cases:

- If the number of pairs to be terminated exceeds the maximum shown in paragraph 2.04
- If the requirement for protection exceeds the capacity of the initial COTU for a specific service type.

2.09 If a supplemental COTU is to be used, the length restrictions on the ground wire and wire pairs are still applicable. The ground connection

TABLE B
CO PROTECTION AND CONNECTION

CO PROTECTION	TYPE OF COTU	CONNECTION TO SUBSCRIBER PAIRS		
		THROUGH MDF		DEDICATED TIP CABLE
		BH20P JUMPERS	450-TYPE CABLE	
CONVENTIONAL MDF	OPTION Q	NO	PERMITTED	PREFERRED
	OPTION R	PERMITTED	PREFERRED	NO
SEPARATE PF	OPTION Q	NO	NO	YES
	OPTION R	OPTION R NOT USABLE WITH SEPARATE PROTECTOR FRAME.		

of the supplemental COTU should be connected to the ground bus bar of the preceding COTU unless the total length of ground wire from the supplemental COTU to the MDF or CO ground exceeds the length limit of paragraph 2.06. If connecting to the preceding COTU exceeds the length limit, a separate ground wire must be installed in the same manner as for an initial COTU. This should be connected to the same ground as adjacent COTUs.

2.10 The installation, maintenance, and test requirements are the same for the supplemental COTUs as for the initial COTU.

2.11 There is no limit to the number of COTUs that may be added. The only restrictions are described in paragraph 2.06.

3. INSTALLATION PROCEDURES

3.01 *List of Tools and Gauges:*

CODE OR
SPEC NO.

DESCRIPTION

TOOLS

- Drill and bits for setting 5/8-inch bolts in wall and 3/8-inch bolts in floor
- B or C short-nose pliers

714B

Wire inserter

R-1770

1/2-inch and 9/16-inch open double-end flat wrench (or equivalent)

KS-16363, L2

Wrapper, wire-equipped with KS-20963, L1 sleeve and R 4495 bit (equipped for 20 gauge wire).

GAUGES

KS-20538

Volt-ohmmeter (or equivalent).

3.02 After determining a proper location and satisfying the length restriction on the ground wire and wire pairs (paragraph 2.06), the COTU can be mounted.

3.03 For mounting information, refer to ED-97747-50; refer also to Floor Plan Data, section 7.3, sheet 16 and Fig. 4. For wiring information, refer to Fig. 5 for terminal strip locations and designations.

3.04 *Pair Assignments:* When a single power station is served from the central office, all of the services will be connected to some type of central office equipment or to a trunk distributing frame and are designated "terminating circuits". The terminating circuit subscriber pair connections from the MDF or from the CEF will terminate on the REM DRNG terminals of TB6 (option R) or

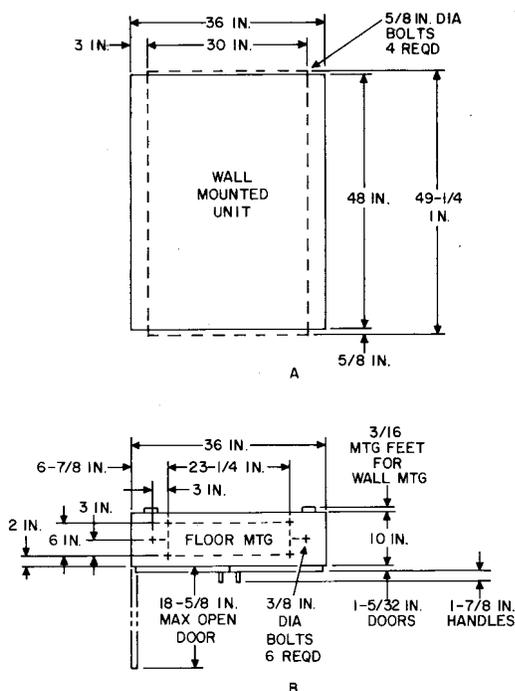


Fig. 4—Floor Plan Data

on the R713 connectors (option Q). The terminals on the TERM EQPT side of TB6 or TB8 are used for the connections to the central office equipment. Cross-connections between the REM DRNG terminals and the TERM EQPT terminals connect the protection devices and complete the circuit through the COTU. If more than one COTU is used at the same location, connected to the same ground, REM DRNG assignments in one COTU may be cross-connected to TERM EQPT assignments in another COTU. Examples of pair assignments and wiring for terminating circuits are shown in Fig. 6 A and 6 B.

3.05 When more than one power station is served from the same central office, circuits other than loop-through circuits are treated as terminating circuits and are assigned as in paragraph 3.04. The assignments for loop-through circuits depend on:

- (1) Whether the power stations are served through the same COTU location
- (2) Whether the COTUs are equipped with option R or option Q.

3.06 Loop-through circuits where the two legs of the circuit are served by COTUs at different locations in the central office are treated as if they are two separate terminating circuits. Each leg of the circuit is assigned to REM DRNG and TERM EQPT terminals in its COTU as in paragraph 3.04. Protection is applied to the circuit in both of the COTUs. The circuit is completed through the central office by interconnecting the assigned TERM EQPT terminals in the two COTUs.

3.07 Loop-through circuits where the two legs of the circuit are served from the same COTU location require only a single protection device for the circuit. If the COTUs are equipped with R713 connectors (option Q), the two circuit legs are assigned to REM DRNG terminals (Fig. 7A). The circuit is completed by cross-connecting the two pairs of REM DRNG terminals of TB6 or TB8 and no connection is made to TERM EQPT terminals. If the COTU is equipped with wells for 2B2A protectors (option R), one circuit leg is assigned to REM DRNG terminals on TB6 and the other is assigned to TERM EQPT terminals on TB6 (Fig. 7B). The circuit is completed by cross-connecting between the assigned REM DRNG and TERM EQPT terminals as in paragraph 3.04. This is the only circumstance under which a pair from the vertical of the MDF is terminated on TERM EQPT terminals.

3.08 Test Access: In COTUs that are used with a dedicated tip cable from the CEF, test access to the pair is gained through the R713 connector of the COTU. A standard single pair test cord may be plugged into the R713 connector in place of the 4- or 5-type protector. The R713 connector is wired with the same tip-ring relationship as the WE 302 connector (Fig. 8); test cords such as W4BR or W4BS which are compatible with the 302 connector should be used. Holes are provided in the panel just below the R713 connector for mounting miniature test-talk jacks as required by the particular central office test-talk circuit arrangements.

3.09 Grounding: Connect a 6-gauge (or larger) ground wire between the cable bracket/ground bus bar in the upper left corner (Fig. 3A or 3B) of the COTU and the most convenient point on the MDF ground bar.

Note: Keep length of 6-gauge ground wire to 35 feet or less.

TO
TERM.
EQPT.

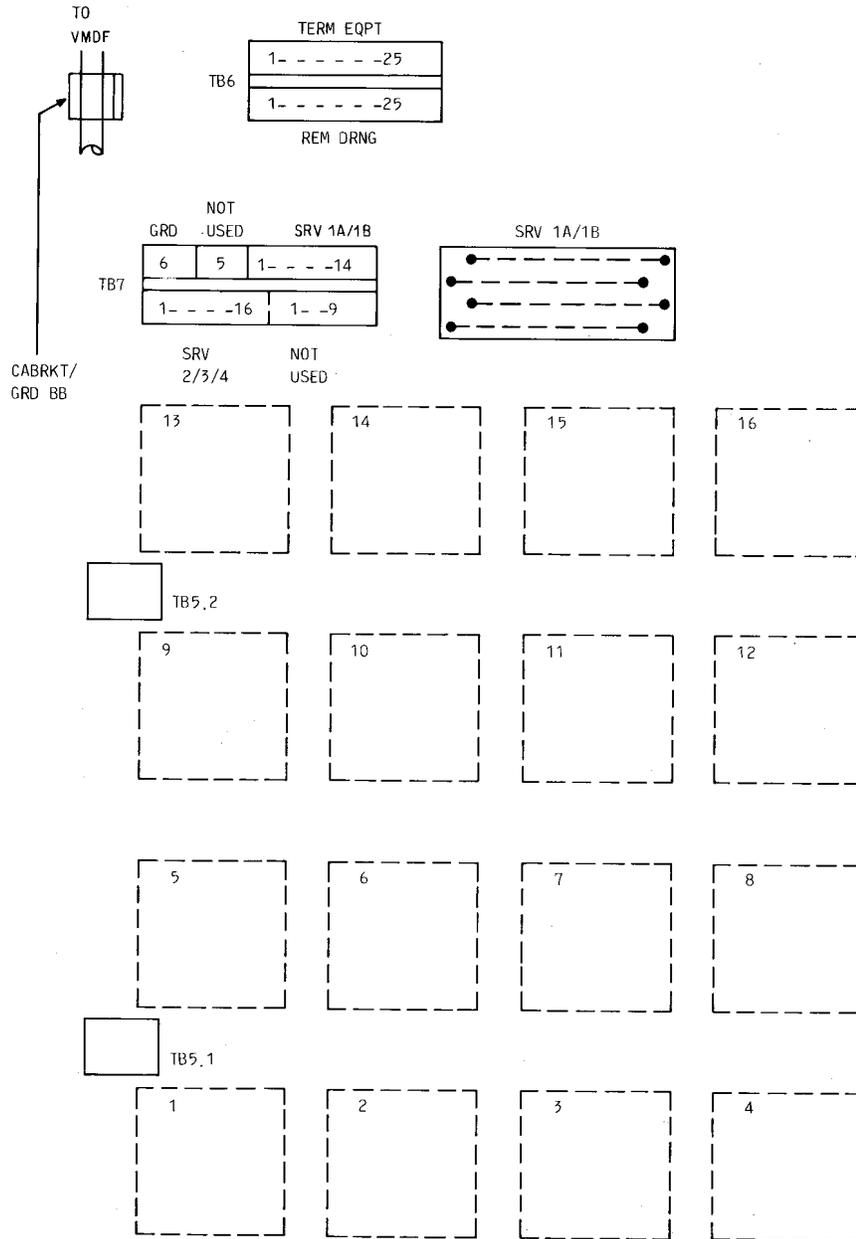


Fig. 5—Central Office Terminating Unit

3.10 Protectors on MDF: In those installations where the COTU is connected to the subscriber pairs through the MDF, the protection devices normally supplied at the MDF must be removed from these pairs. These must be replaced with dummy protectors to connect the paired cable

extensions through the protector mounting. Detailed instructions for the various types of frames and protector mountings are as follows:

- (a) For a type B MDF equipped with C-, E-, or similar type protector mountings, remove

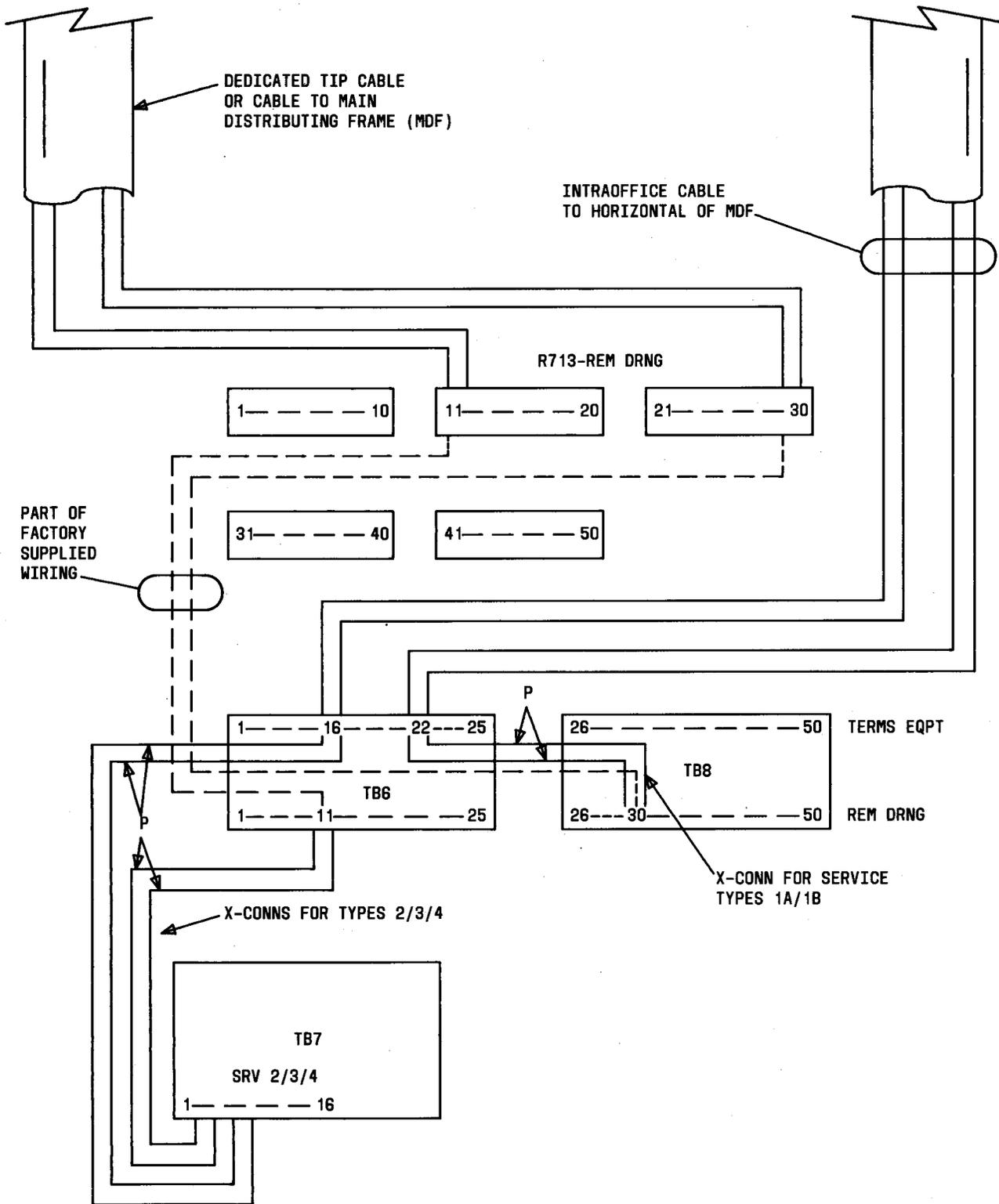


Fig. 6A—Examples of Terminating Circuit Pair—Assignments

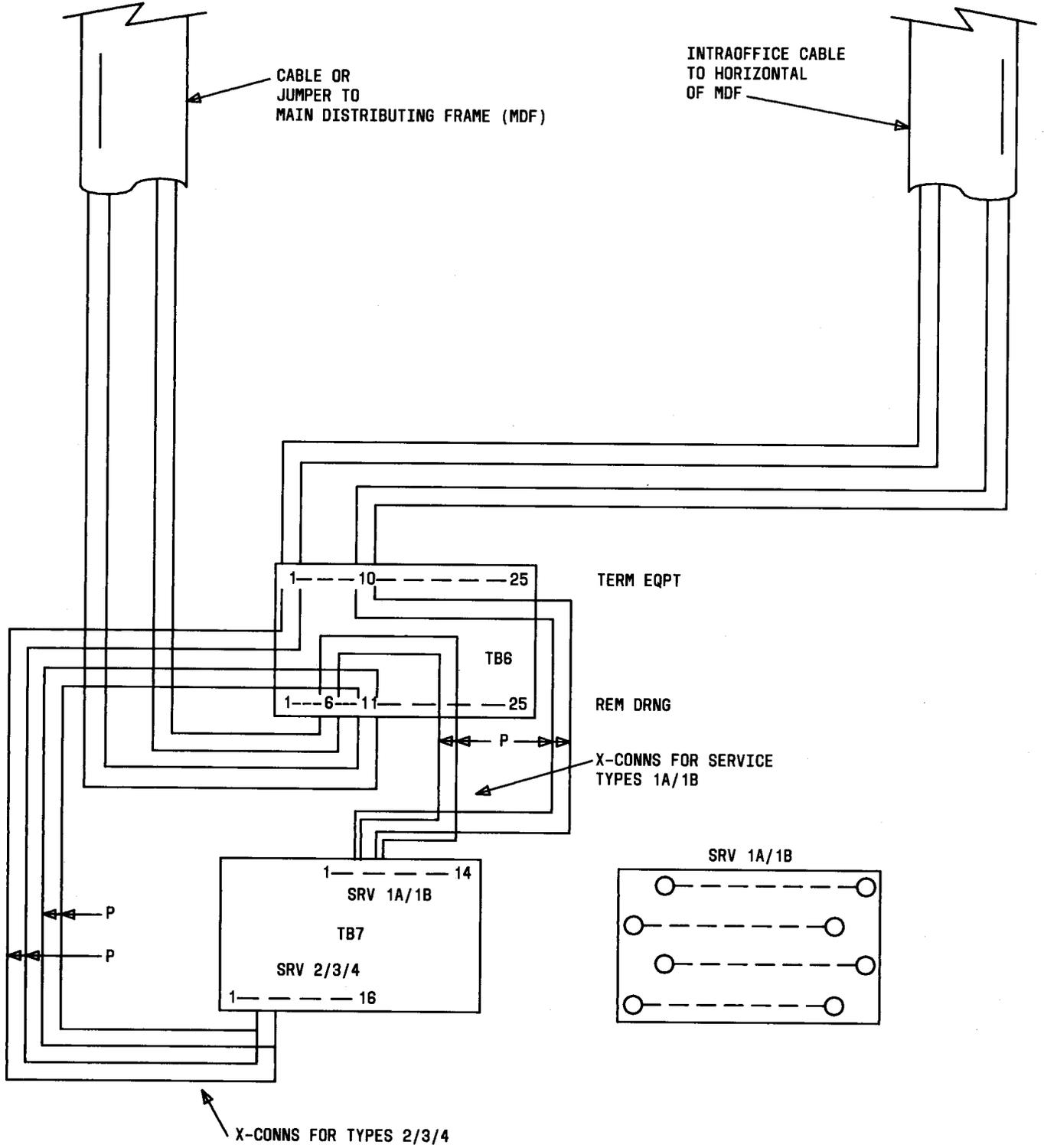


Fig. 6B—Examples of Terminating Circuit Pair—Assignments

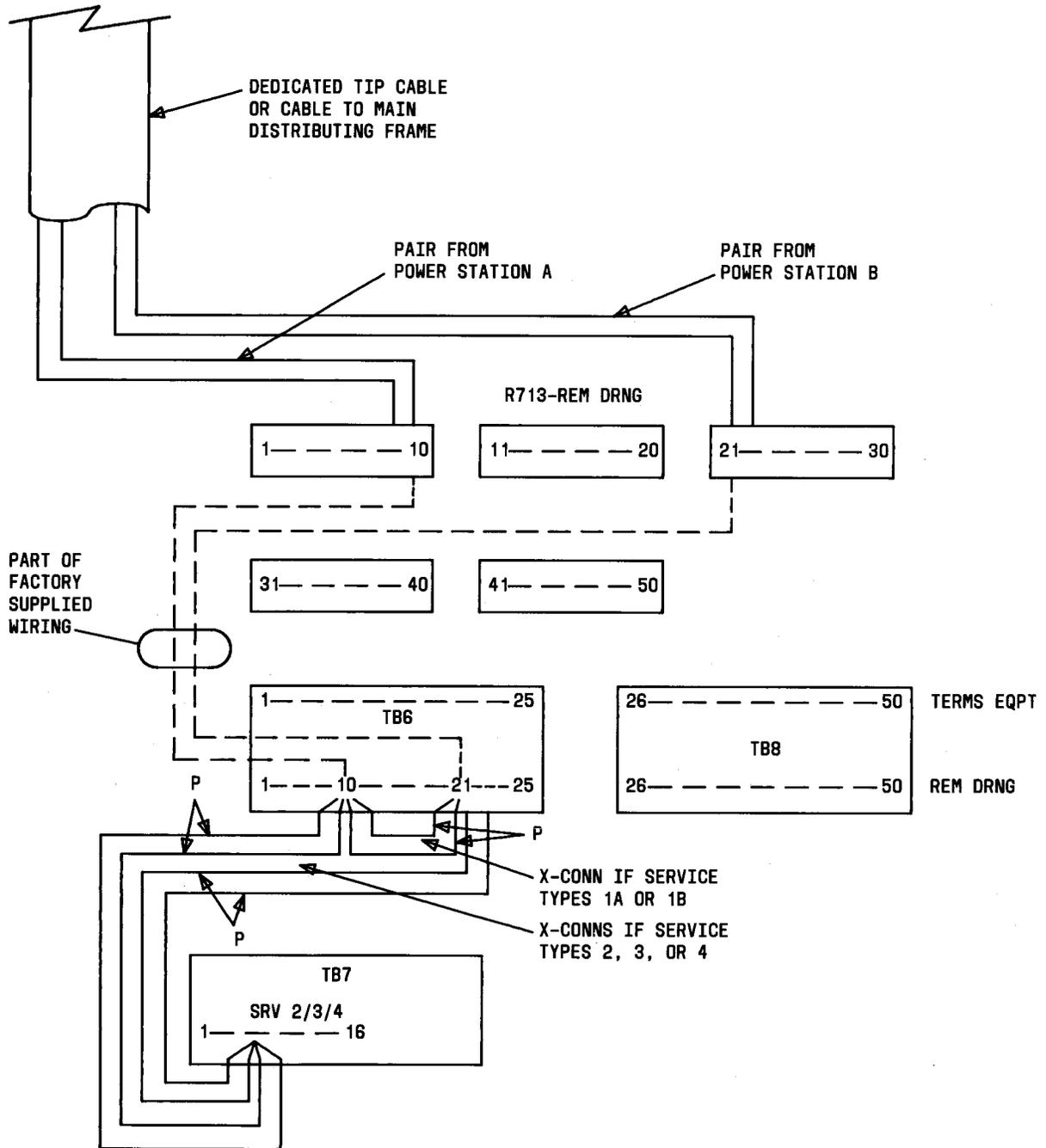


Fig. 7A—Examples of Loop-Through Circuit Pair—Assignments and Wiring

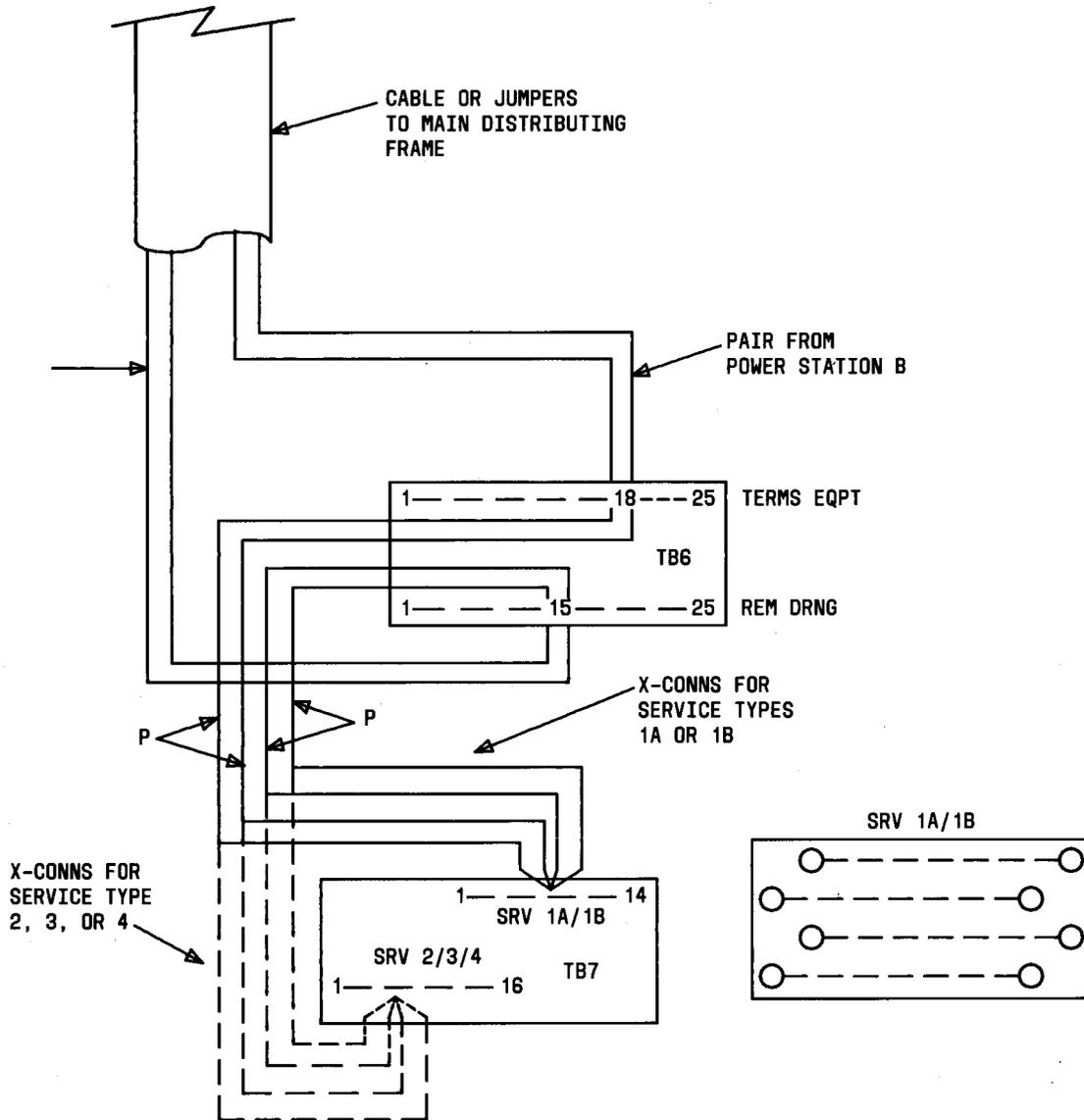


Fig. 7B—Examples of Loop-Through Circuit Pair—Assignments and Wiring

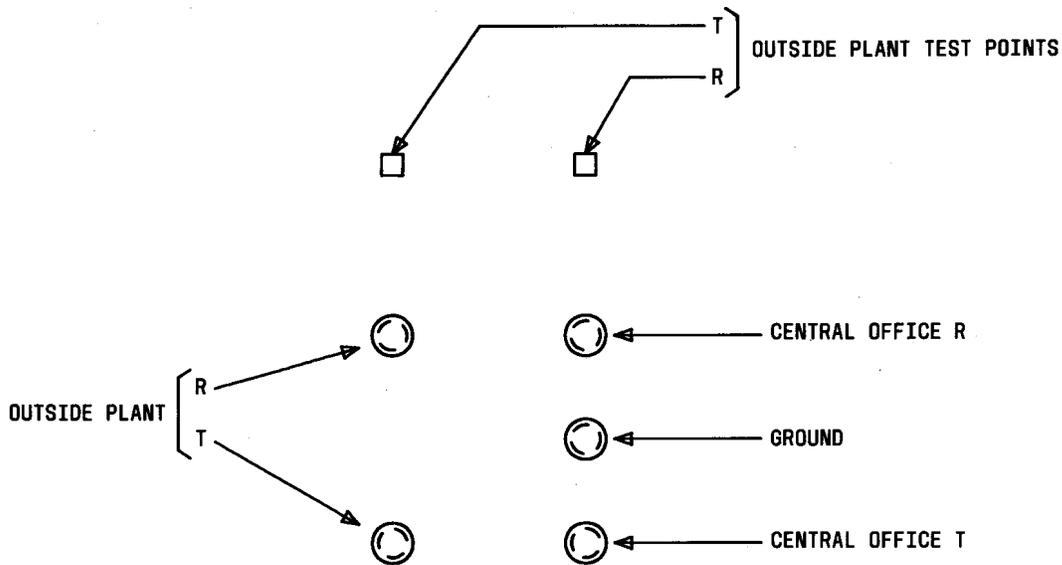


Fig. 8—R13 Connector

the carbon blocks and replace them with insulating dummy protector blocks and remove the heat coils and replace them with metal dummy heat coils.

- (b) For an MDF equipped with 300-type connectors, remove the 1A1A or 1A1C protectors and replace them with 1A1D (gray case) protectors.
- (c) For an MDF equipped with 302-, 303-, 305-, or 308-type connectors, remove the 3A or 4A protector (or 3B or 4B protector) and replace it with a 5A3D (red case, gold terminals).
- (d) For an MDF equipped with 307-type connectors, remove the 4C-protector unit and replace it with a 4C12C protector unit (gray housing).

3.11 Wiring—Subscriber Pair to COTU:

- (a) Where the COTU is connected to the subscriber pairs through the MDF, the interconnection from the MDF to the COTU must be made with 20-gauge BH-type wire. This may be done by connecting BH20P jumpers from the central office side of the main frame vertical directly to the COTU or by connecting the BH20P jumper to a terminal block on the horizontal side of the main frame and, thence, to the COTU using multi-pair 450-type cable. If the COTU is equipped with R713 connectors (option Q), the connection must be made with 450-type cable.

(b) Where the COTU is connected to the subscriber pairs by a dedicated tip cable from the CEF, any cable type approved for tip cable use may be used.

(c) All subscriber pair-to-COTU connections will be fed through the opening at the upper left in the specified COTU.

(d) In accordance with the assignment chart (see Fig. 9 through 11), connect the pairs to the assigned REM DRNG terminals on TB6 in a COTU equipped with 2B2A protectors (option R), or to the T and R pins on the back of the R713 connector in a COTU equipped with option Q. The mounting plate of the R713 connector will have to be loosened and rocked forward to make these installation connections.

Note: Loop-through connections served through a COTU equipped with option R will each have one pair assigned to TERM EQPT terminals on TB6 (see paragraph 3.07).

(e) All 20-gauge BH-type wire must be stripped before connecting it to the 66-type terminals.

(f) The stripping of BH-type wire will be made according to the guidelines given in Section 069-120-811.

(g) All record assignments must be kept accurate for identification of cable pairs.

3.12 *Wiring—COTU to Central Office:*

(a) The connections to the central office equipment will be made with standard cross-connect paired wires or cables.

(b) Feed all incoming pairs from central office equipment into the unit through the opening at the upper right.

(c) Extend wire pairs from the required central office equipment into the COTU and connect these wires to the assigned TERM EQPT terminals on TB6 or TB8.

3.13 *Wiring—COTU Internal:*

(a) For each type 2, 3, or 4 service required:

(1) Mount one drainage transformer (type 2251D) in the designated mounting position as indicated by the assignment chart. (Do not install carbon protection or shorting blocks at this time.)

(2) Install a pair of cross-connect wires between the assigned REM DRNG terminals on TB6 or TB8 to the SRV 2/3/4 terminals on TB7 of the same number as the mounting position of the drainage transformer.

(3) From the same numbered tip and ring terminals [Step (2)] at TB5.1 or TB5.2, install a pair of cross-connect wires to go to the same numbered drainage transformer.

(4) Connect tip and ring on the terminal block (TB5.1 or TB5.2) to transformer terminals 1 and 4, respectively.

(5) Install a cross-connect wire from G on the terminal block (TB5.1 or TB5.2) to terminal 5 on the transformer.

(6) Connect a third pair of cross-connect wires at SRV 2/3/4 on TB7 to the assigned pair of terminals at TERM EQPT on TB6 or TB8.

(b) For each type 1A or 1B service required:

(1) In a COTU equipped with 2B2A protectors (option R), install a pair of cross-connect wires from the assigned REM DRNG terminals of TB6 to the desired pair of terminals at SRV 1A/1B on TB7 and install a second pair of cross connect wires from the SRV 1A/1B terminals on TB7 to the assigned terminals at TERM EQPT on TB6.

(2) In a COTU equipped with R713 connectors (option Q), install a pair of cross-connect wires directly between each of the assigned REM DRNG terminals and the TERM EQPT terminals on TB6 or TB8.

(c) The termination of all cross-connect wires on 66-type terminals will be made in accordance with Section 201-221-301.

3.14 Installation Test and Inspection:

(a) **Continuity:** In all continuity checks, use the KS-20538 volt-ohmmeter (or equivalent).

(b) **Type 1A and 1B Services in COTU Equipped With Option R:**

(1) Check continuity for both tip and ring of each pair used for 1A and 1B services from the pair appearance at REM DRNG on TB6 to their respective protector block wells at the SRV 1A/1B protectors. If an open is found, the trouble is in either the cross-connect wiring from REM DRNG TB6 to SRV 1A/1B on TB7 or in the internal wiring from TB7 to the protector wells.

(2) Check continuity for both T and R of each pair used for 1A and 1B services from the pair appearance at REM DRNG on TB6 to their respective pair appearance on TERM EQPT TB6. If an open is found, the trouble is in either the cross-connect wiring from the protector wells to TERM EQPT or in the wiring mentioned in (1).

(c) **Type 1A and 1B Services in COTU Equipped With Option Q:**

Check continuity for both T and R of each pair used for 1A and 1B services from the CO side of the R713 connector (Fig. 8) to the pair appearance on TERM EQPT on TB6 or TB8. If an open is found, the trouble is in either the cross-connect wiring on TB6 or TB8 or in the internal wiring from the R713 connector to TB6 or TB8.

(d) **Type 2, 3, and 4 Services:** Check continuity from pair appearances on REM DRNG TB6 or TB8 to the proper pins on the corresponding drainage transformer using the following procedures.

(1) Check continuity from the tip side of each wire pair at REM DRNG on TB6 or TB8 to pin 1 of the corresponding drainage transformer.

(2) Check continuity from the ring side of each wire pair at REM DRNG on TB6 or TB8 to pin 4 of the corresponding drainage transformer.

(3) Check continuity from pin 5 of each drainage transformer to local ground.

Note: If an open is found during continuity check in (1), (2), or (3), the trouble is in the cross-connect wiring from REM DRNG to the SRV 2/3/4 terminals on TB7, the cross-connect wiring from TB5.1 or TB5.2 to the transformer terminal or the internal wiring from TB7 to TB5.1 and TB5.2.

(4) Check continuity for both T and R of each pair used for 2, 3, and 4 services from the pair appearance at REM DRNG on TB6 or TB8 to their respective pair appearance at TERM EQPT on TB6 or TB8.

3.15 Installation of Protection:

(a) In a COTU equipped with option R:

(1) For a type 1A or 1B service having a service performance objective (SPO) class C, insert 2B2A protectors in the designated SRV 1A/1B protector wells.

(2) For a type 1A or 1B service having SPO class B, insert 11B1A protectors in the designated SRV 1A/1B protector wells.

(3) For a type 2 or 3 service having SPO class B, insert 11B1A protectors in the protector wells of the designated 2251D drainage transformer.

(4) For a type 2 or 3 service having SPO class A or for a type 4 service, insert P-18374 (Reliable Electric Co) shorting blocks in the protector wells of the designated 2251D drainage transformer.

(b) In a COTU equipped with option Q:

(1) For each loop-through circuit, insert a 5A3D protector in the designated position in the R713 connector for the second leg of the service.

(2) For a type 1A or 1B service having SPO class C, insert a 4B3C protector in the designated position in the R713 connector.

- (3) For a type 1A or 1B service having SPO class B, insert a 4B3E protector in the designated position in the R713 connector.
- (4) For a type 2 or 3 service having SPO class B, insert a 5A3D protector in the designated position in the R713 connector and insert 4B3E protectors in the protector wells of the 2251D drainage transformer.
- (5) For a type 2 or 3 service having SPO class A or for a type 4 service, insert a 5A3D protector in the designated position in the R713 connector and insert P-18374 (Reliable Electric Co) shorting blocks in the protector wells of the 2251D drainage transformer.

3.16 Assignment Charts:

- (a) The complexity of the installation and maintenance will increase at the COTU unless accurate and efficient records are kept to show the assignment of each incoming pair, the location and type of protection applied, and assignment of the outgoing wire facility.
- (b) A record-keeping chart has been designed to alleviate installation and maintenance problems. It is recommended that the chart be filled in by the local engineer. Copies should be given to the craft person who makes the initial connections. The original copy should be retained by the local engineer for reference.
- (c) An example of use of the chart for a COTU equipped with option R is given in Fig. 9. Seventeen entries are identified by circuit numbers. Additional information such as vertical main frame cable and pair count may be included in the circuit identification column, depending on local options. The remaining columns on the chart are titled the same as the stampings found on the COTU.
- (d) The numbers under the REM DRNG column refer to the numbered pairs of terminals appearing on TB6 under this heading.
- (e) The last column, TERM EQPT, permits number entries to be made opposite the assigned circuit to which the terminal equipment connection is made.

- (f) In the example, it may be seen that the 4DC 0269 circuit appears on the REM DRNG terminal number 1. The protection for this circuit is made at the first set of terminals at SRV 2/3/4. Since this is known to be a type 3 circuit, the number/entry is made under the SRV 3 column. From the first pair of terminals at SRV 2/3/4, a cross-connection is installed to the 15th pair of terminals at TERM EQPT.
- (g) When used with a COTU equipped with option Q, the numbers in the SRV 1A/1B columns would be replaced by check marks; otherwise, the use of the chart is the same. Since option Q permits termination of fifty pairs, two pages of assignment charts are necessary for each cabinet.

- (h) Reproducible copies of the assignment charts are provided in Figures 10 and 11.

4. MAINTENANCE

4.01 The following inspections and test should be performed periodically at the discretion of the local company. These operations are extremely useful in maintaining a high degree of integrity of the whole Integrated Protection System. ***Permission must be obtained from the power company before beginning the tests.***

- (a) Inspect and replace, as necessary, all carbon block protectors. If some blocks indicate many operations, these blocks should be inspected more often.
- (b) Inspect thoroughly for any evidence of:
- Tampering
 - Heat or burning
 - Loose or disturbed cross-connect wiring
 - Loose connections at the cable bracket ground bus bar
 - Loose connections at the MDF.

DATE: 8-15-79

UNIT NO. 1

PLACE: Belleville CO

CIRCUIT IDENTIFICATION	SPD CLASS	REM DRNG	ASSIGNMENT					TERM. EQPT
			SRV		SRV			
			1A	1B	2	3	4	
4DC0269	B	1				1		15
4DC0289	A	2					2	6
4DC0290	A	3					3	7
4DC0291	A	4					4	8
4DC0268	B	5				5		16
4DC1178	A	6			6			10
4DC2453	B	7			7			11
4DC2454	A	8			8			12
4DC2455	A	9			9			13
4DC2456	A	10			10			14
40P0402	B	11	1					1
40P1802	A	12	2					2
40P1170	A	13	3					3
4DR3106	A	14					11	9
40P3460	B	15	4					4
4DM0958	B	16				12		17
TVX328-3130	A	17		5				5
		18						
		19						
		20						
		21						
		22						
		23						
		24						
		25						

PREPARED BY: Guido Panzini

Fig. 9—Example of Use of the COTU Assignment Chart

DATE: _____

UNIT NO. _____

PLACE: _____

CIRCUIT IDENTIFICATION	SPD CLASS	REM DRNG	ASSIGNMENT					TERM. EQPT
			SRV		SRV			
			1A	1B	2	3	4	
		1						
		2						
		3						
		4						
		5						
		6						
		7						
		8						
		9						
		10						
		11						
		12						
		13						
		14						
		15						
		16						
		17						
		18						
		19						
		20						
		21						
		22						
		23						
		24						
		25						

PREPARED BY: _____

Fig. 10—COTU Assignment Chart (Page 1 of 2)

DATE: _____

UNIT NO. _____

PLACE: _____

CIRCUIT IDENTIFICATION	SPD CLASS	REM DRNG	ASSIGNMENT					TERM. EQPT
			SRV		SRV			
			1A	1B	2	3	4	
		26						
		27						
		28						
		29						
		30						
		31						
		32						
		33						
		34						
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PREPARED BY: _____

Fig. 11—COTU Assignment Chart (Page 2 of 2)