

**3-, 4-, AND 5-TYPE PROTECTOR UNITS
TEST PROCEDURES
USING KS-20100 AND 182A TEST SETS
DISTRIBUTING AND PROTECTOR FRAMES**

1. GENERAL

1.01 This section describes the method for testing 3-, 4-, and 5-type protector units, used on distributing and protector frames, using the KS-20100 test set and the 182A test set. For the KS-20100 test set piece part replacement, see Section 201-208-803.

1.02 This section is reissued for the reasons listed below. Revision arrows have been used to denote the significant changes. The Equipment Test List is affected.

- (a) Add distributing and protector frames to the title
- (b) Add information previously contained in Issue 1 of the addendum to this section
- (c) Change Fig. 3 to show stamping on front plate of KS-20100 test set
- (d) Change Fig. 6 to three figures (Fig. 6, 7, and 8) showing the internal connections of the 3-, 4-, and 5-type protector units, respectively, and add a reference to these figures in paragraph 1.07
- (e) Change paragraph 1.03 to describe each test and add the standard page heading
- (f) Add paragraph 2.02 and add minor headings to Part 2 to associate test sets with particular tests
- (g) Change Part 3 heading from PROTECTOR UNIT TESTS to PREPARATION and add Steps 1 through 4
- (h) Add Part 4, METHOD, and change the titles and procedures of the tests, formerly contained in Part 3, and add them to Part 4.

1.03 ♦The tests covered are:

	PAGE
A. Protector Units With Orange Housing (Minibridge Lifter): This test checks for the presence of tip and ring continuity and checks the function of the 410A switch.	3
B. All Protector Units Except Those With Green Housing: This test checks for the presence of tip and ring continuity as well as defective carbon blocks. Attempts are made to "burnout" defective carbon blocks.	3
C. Protector Units With Green Housing: This test checks for the absence of tip and ring continuity as well as defective carbon blocks. Attempts are made to "burnout" defective carbon blocks.♦	4

1.04 A provision is made for clearing out the air gap between carbon blocks (which may be shorted by carbon dust or particles) with the KS-20100 test set.

1.05 The circuitry of the KS-20100 L1, L2 (Mfr Disc) and L5 test sets is identical (Fig. 1). The L1 test set is an integral component of modular protector frames (Fig. 2). The L2 test set consists of an L5 (Fig. 3) test set assembled in a conduit box for wall mounting.

1.06 The 182A test set is housed in a conduit box for wall mounting (Fig. 4). A block diagram of the 182A test set is shown in Fig. 5.

1.07 ♦Internal connections of the 3-, 4-, and 5-type protector units are shown in Fig. 6, 7, and 8, respectively.♦

NOTICE

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1.08 The protector units are listed in Table A showing the new standard and equivalent superseded codes, housing color, protection devices (if any), and the circuit application of each protector unit.

TESTING 4A11C, 4B11C, OR 4C11C PROTECTOR UNITS (MINIBRIDGE LIFTERS)

1.09 The 182A test set is first used to test for tip and ring continuity and for shorted carbon protector blocks on these protector units. It also tests the function of the 410A switch. The 182A test set does not differentiate between failures of these components.

1.10 Protector units which pass the test on the 182A test set may be returned to service without further testing.

1.11 The protector units which fail the test on the 182A test set must also be tested with the KS-20100 test set.

1.12 Protector units with shorts which "burnout" successfully when tested on the KS-20100 test set must be retested, using the 182A test set.

TESTING OTHER 3-, 4-, AND 5-TYPE PROTECTOR UNITS

1.13 Protector units other than minibridge lifters (orange housing) are tested, using the KS-20100 test set only.

1.14 Lettered Steps: A letter a, b, c, etc, added to a step number in Part 4 of this section indicates 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.

1.15 Discard defective protector units except for the 4A11C, 4B11C or 4C11C protector unit (orange housing minibridge lifter). Return these defective protector units to the appropriate Western Electric Company repair facility for repair or replacement.

2. APPARATUS

Tests A and B

2.01 182A test set.

Tests B and C

2.02 KS-20100 L1, L2 or L5 test set.

3. PREPARATION

STEP	ACTION	VERIFICATION
All Tests		
1	DANGER: Testing a protector unit while it is disassembled can expose the tester to hazardous voltages.	
Tests B and C		
2	At the KS-20100 test set— Momentarily depress the CONTINUITY R pushbutton.	The CONTINUITY R pushbutton momentarily lighted. Comment: If the pushbutton does not light, check the 1/4 AMP fuse.

STEP	ACTION	VERIFICATION
3	Momentarily depress the CONTINUITY T pushbutton.	The CONTINUITY T pushbutton momentarily lighted. <i>Comment:</i> If the pushbutton does not light, check the 1/4 AMP fuse.
4	Momentarily depress the GROUND pushbutton.	The GROUND pushbutton momentarily lighted. <i>Comment:</i> If the pushbutton does not light, check the 1/4 AMP fuse.

4. METHOD

STEP	ACTION	VERIFICATION
A. Protector Units With Orange Housing (Minibridge Lifter)		
2	At the 182A test set— Insert the protector unit into the test jack.	
3	Depress and hold the TEST pushbutton.	PASS (green) lamp or FAIL (red) lamp lighted. <i>Comment:</i> If neither lamp is lighted, check the 1/4 AMP fuse. The FAIL lamp may flash momentarily when the TEST pushbutton is first depressed and should be ignored.
4	Release the TEST pushbutton.	PASS or FAIL lamp extinguished.
5a	If the PASS lamp lighted in Step 3— Remove the protector unit from the test set and place it back in service.	
6b	If the FAIL lamp lighted in Step 3— Remove the protector unit from the test set.	
7b	Perform Test B.	
B. All Protector Units Except Those With Green Housing		
5	At the KS-20100 test set— Insert the protector unit into the test jack.	CONTINUITY R and CONTINUITY T pushbuttons lighted. GROUND pushbutton remained extinguished.

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STEP	ACTION	VERIFICATION
6a	If requirements of Step 5, VERIFICATION, are met— Remove the protector unit from the test jack and return it to service.	
7b	If both CONTINUITY pushbuttons did not light— Remove the protector unit from the test jack and dispose of it (paragraph 1.15).	
8c	If the GROUND pushbutton lighted— Momentarily depress the BURN OUT pushbutton for 2 or 3 seconds.	GROUND pushbutton extinguished. <i>Comment:</i> If the pushbutton does not remain extinguished, repeat this step several times.
9d	If the GROUND pushbutton remained lighted after repeating Step 8c several times— Remove the protector unit from the test jack and dispose of it (paragraph 1.15).	
10e	If the GROUND pushbutton remained extinguished after performing Step 8c once or several times— Remove the protector unit from the test jack.	
11f	If the protector unit housing is not orange— Return the protector unit to service.	
12g	If the protector unit housing is orange— At the 182A test set— Insert the protector unit into the test jack.	
13g	Depress and hold the TEST pushbutton.	PASS (green) lamp or FAIL (red) lamp lighted.
14h	If the PASS (green) lamp lighted in Step 13g— Remove the protector unit from the test jack and return it to service.	
15i	If the FAIL (red) lamp lighted in Step 13g— Remove the protector unit from the test jack and dispose of it (paragraph 1.15).	
C. Protector Units With Green Housing		
5	At the KS-20100 test set— Insert the protector unit into the test jack.	All pushbuttons remain extinguished.

STEP	ACTION	VERIFICATION
6a	If requirements of Step 5, VERIFICATION, are met— Remove the protector unit from the test set and return it to service.	
7b	If either or both CONTINUITY pushbuttons lighted— Remove the protector unit from the test jack and dispose of it (paragraph 1.15).	
8c	If the GROUND pushbutton lighted— Momentarily depress the BURN OUT pushbutton for 2 or 3 seconds.	GROUND pushbutton extinguished. <i>Comment:</i> If the pushbutton does not remain extinguished, repeat this step several times.
9d	If the GROUND pushbutton remained extinguished after performing Step 8c once or several times— Remove the protector unit from the test jack and return it to service.	
10e	If the GROUND pushbutton remained lighted after performing Step 8c several times— Remove the protector unit from the test jack and dispose of it (paragraph 1.15).♦	

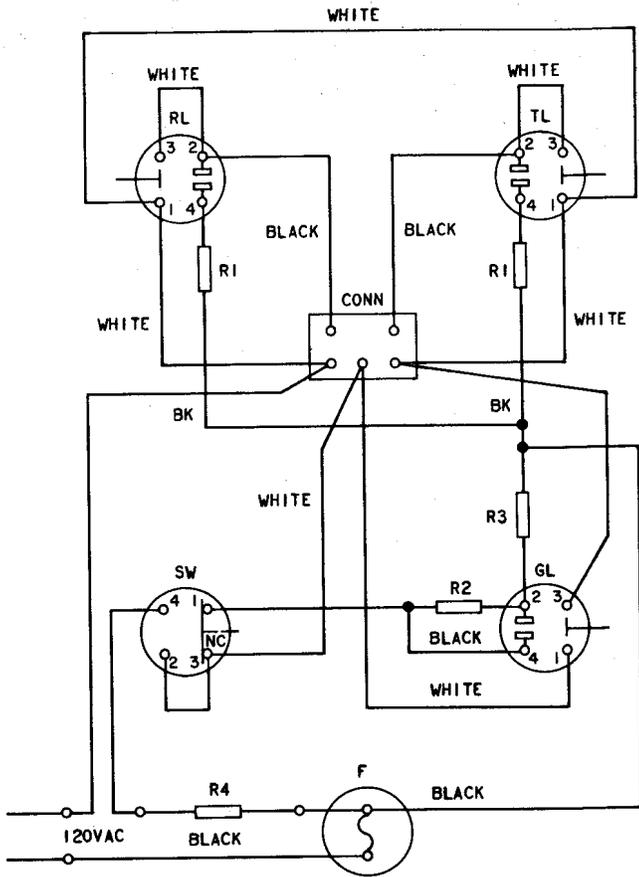


Fig. 1—KS-20100 Test Set Schematic Diagram

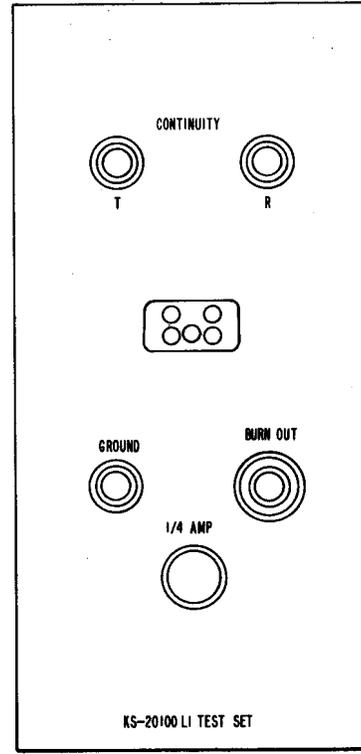


Fig. 2—KS-20100 L1 Test Set

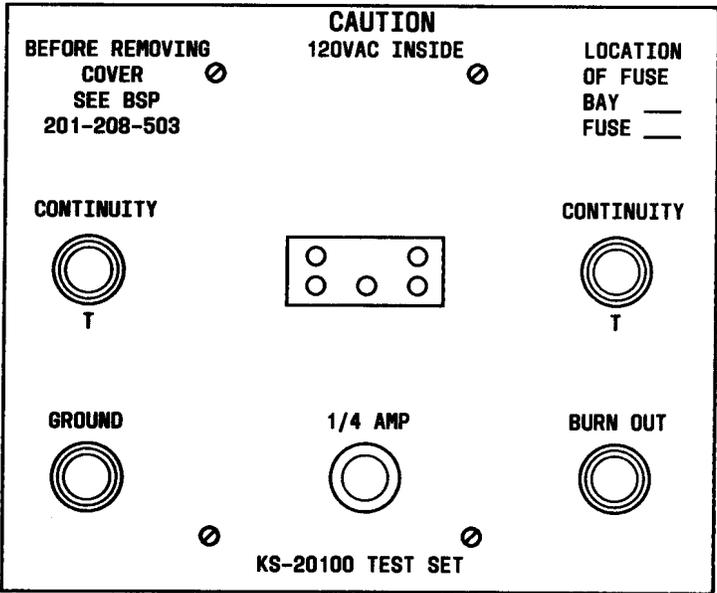


Fig. 3—KS-20100, L2 and L5 Test Set

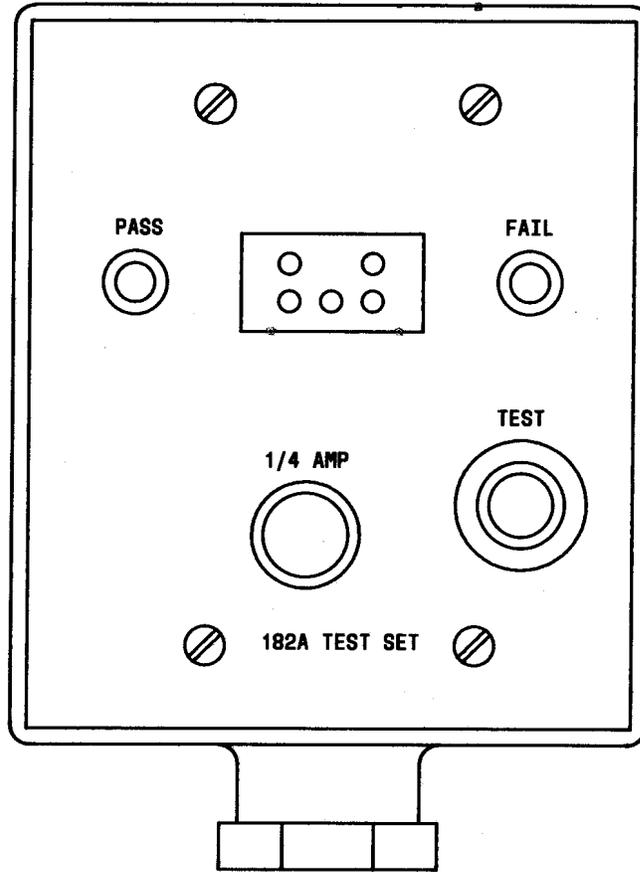


Fig. 4—182A Test Set

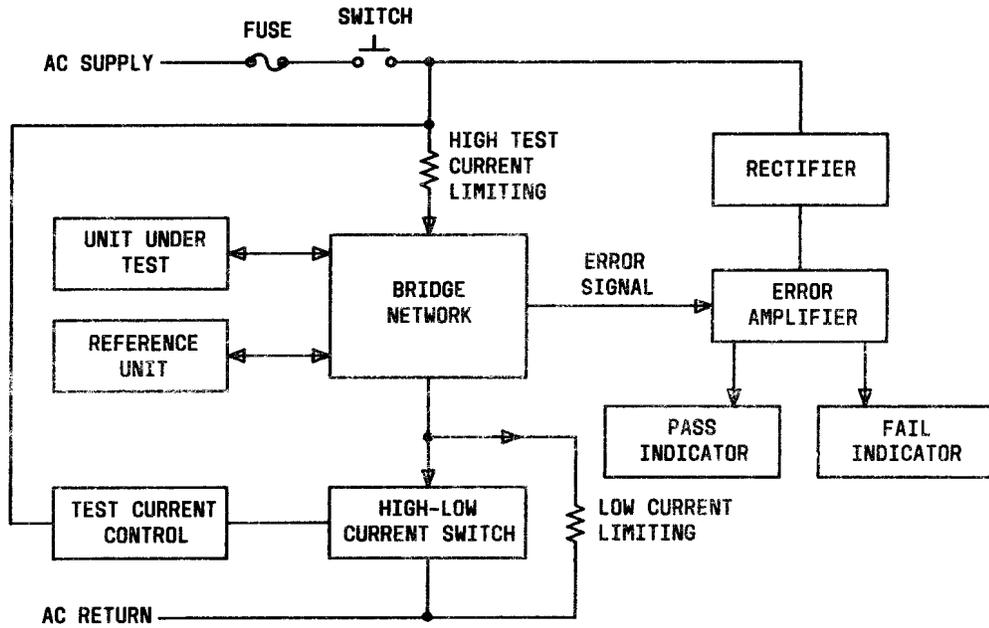


Fig. 5—182A Test Set Block Diagram

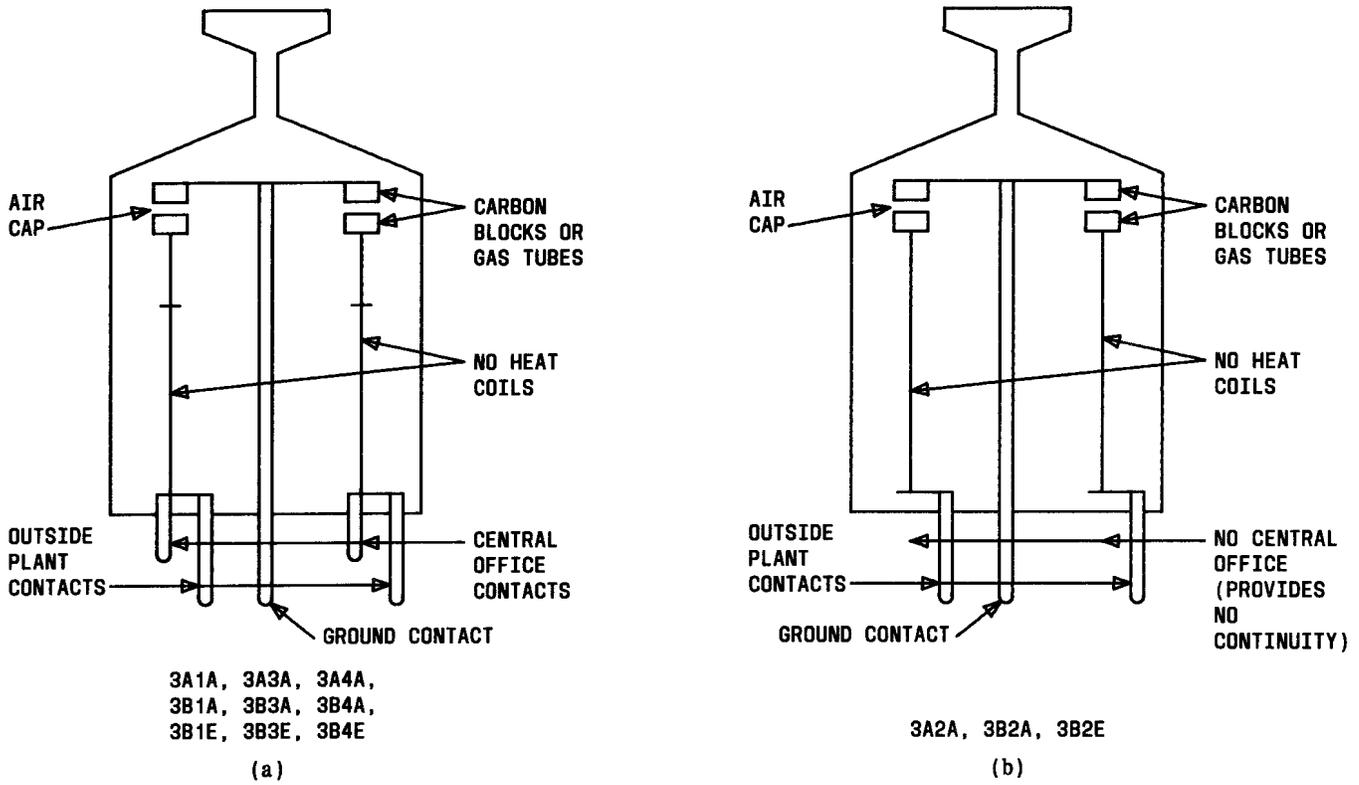


Fig. 6—3-Type Protector Units, Internal Connections

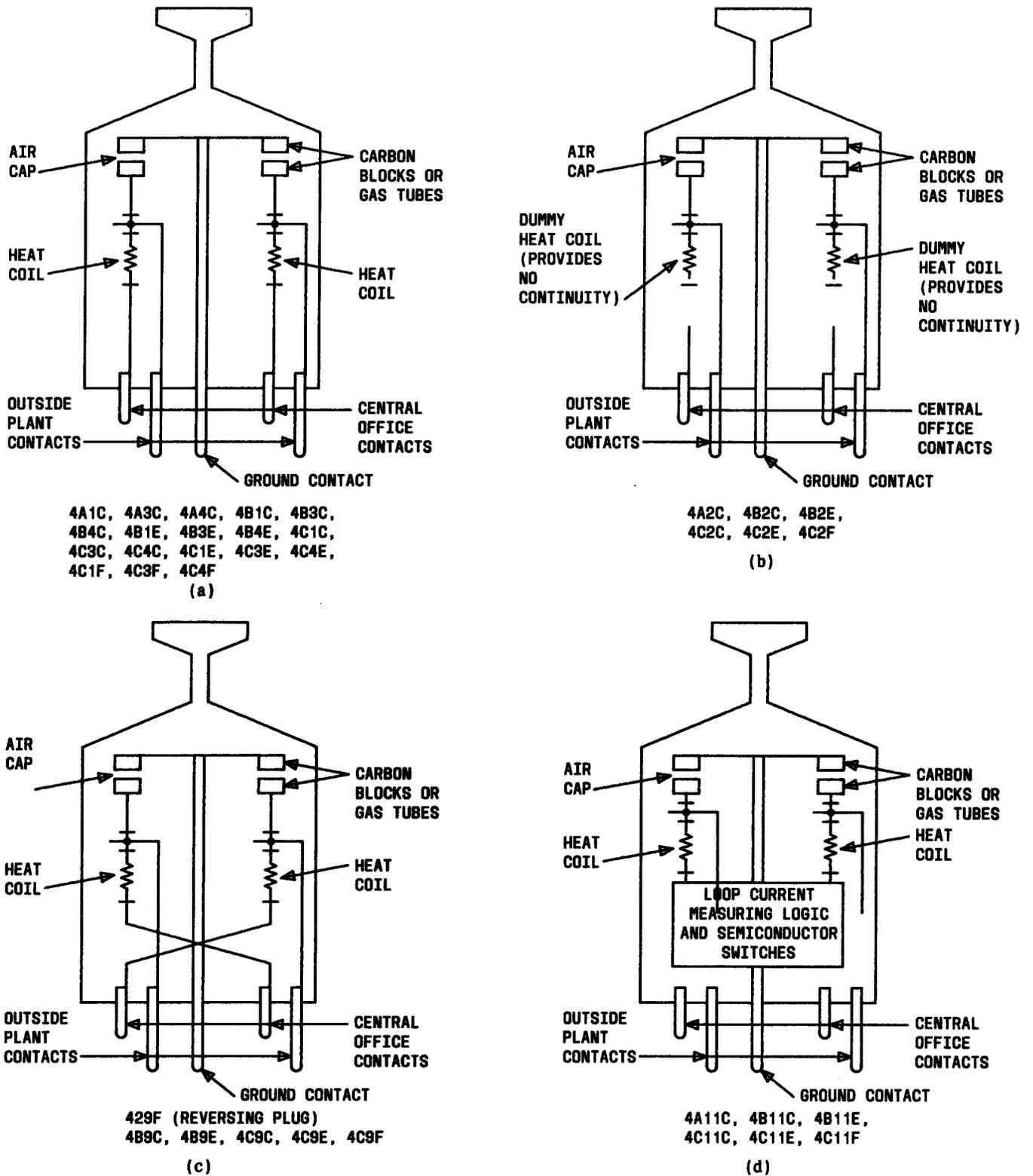


Fig. 7—4-Type Protector Units, Internal Connections

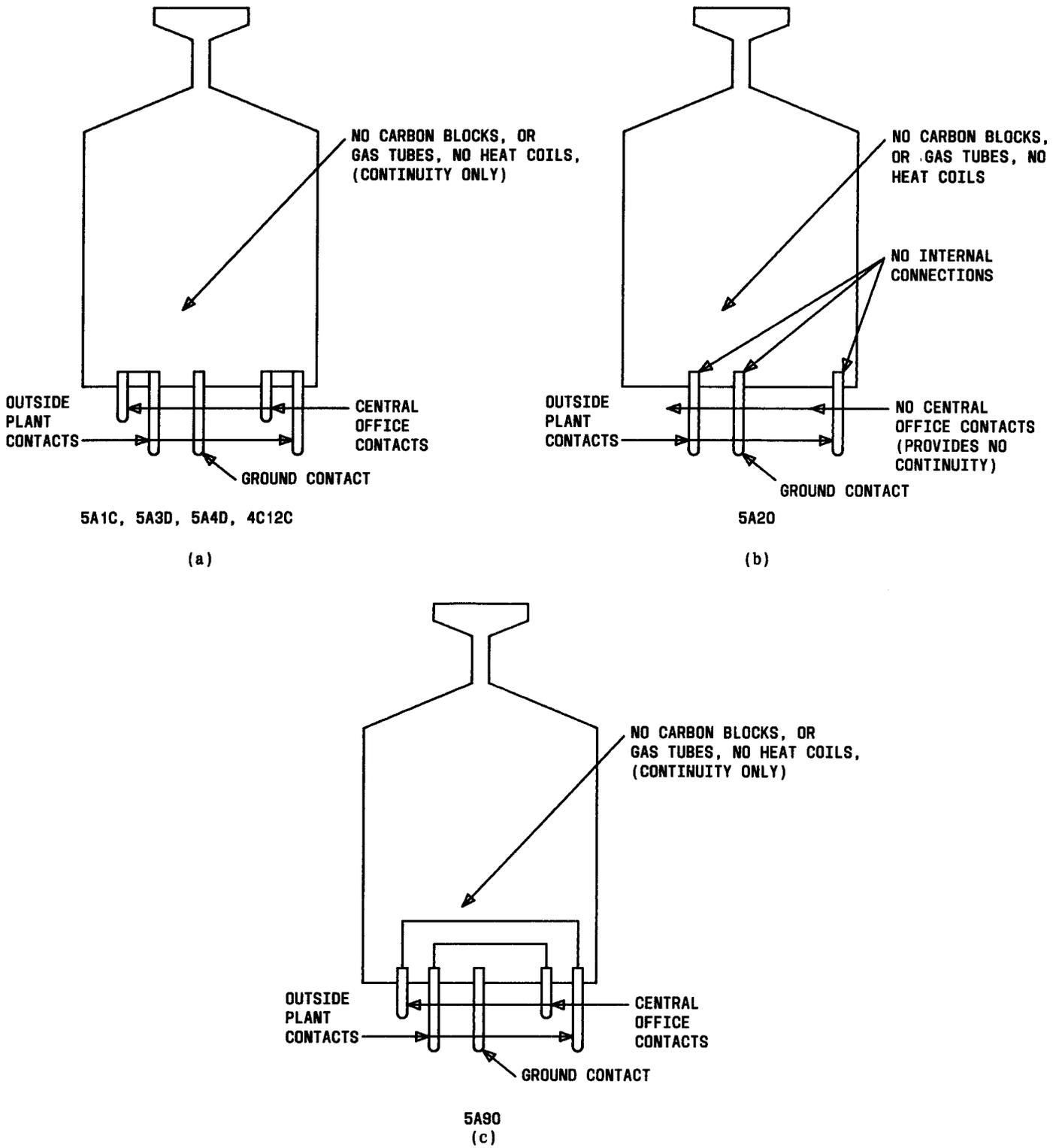


Fig. 8—5-Type Protector Units, Internal Connections

♦TABLE A♦

PROTECTOR UNITS (NOTE)

STANDARD CODE	SUPERSEDED CODE	HOUSING		GAS TUBES OR PROTECTOR BLOCKS (1 PAIR EACH)	HEAT COILS (2 EACH)	FUSIBLE DISCS	CIRCUIT APPLICATION	LIST NO. OF KS-14174 DESIGNATION PIN		
		COLOR	STAMPING							
3B1A	3A1A	Black	↑	32A & 33B Protector Blocks	↑	↑	Standard Circuit	None		
3B2A	3A2A	Green	↑		↑	↑	Open Circuit	4		
3B3A	3A3A	Red	None		↓	None	Yes	Special Circuit	7	
3B4A	3A4A	Yellow						PBX Battery	5	
3B1A	3B5A*	Black	None		↓	↓	↓	Standard Circuit	None	
3B2A	3B6A*	Green	↓					Open Circuit	4	
3B3A	3B7A*	Red	↓					Special Circuit	7	
3B4A	3B8A*	Yellow	↓					PBX Battery	5	
3B1E	↑	Black	O	↑	↑	↑	Standard Circuit	None		
3B2E	None	Green	O	201A	None	No	Open Circuit	4		
3B3E	↓	Red	O	Gas Tubes			Special Circuit	7		
3B4E	↓	Yellow	O	↓			PBX Battery	5		
4B1C	4A1C	Black	↑	32A & 33B Protector Blocks			82B	↑	Standard Circuit	None
4B2C	4A2C	Green	↑		82A	Open Circuit	4			
4B3C	4A3C	Red	None		↓	82B	Special Circuit		7	
4B4C	4A4C	Yellow				PBX Battery	5			
4B1C	4A5C*	Black	None		↓	82B	No		Standard Circuit	None
4B2C	4A6C*	Green	↓			82A			Open Circuit	4
4B3C	4A7C*	Red	↓			82B			Special Circuit	7
4B4C	4A8C*	Yellow	↓			82C			PBX Battery	5
4B9C	429F Plug	White	X	32A & 33B	82B	No	Reverse Tip & Ring	None		
4B11C	4A11C	Orange	None	32A & 33B	82B	No	Minibridge Lifter	2		
4B1E	↑	Black	O	201A Gas Tubes	82D	↑	Standard	None		
4B2E	None	Green	O		82A		Open Circuit	4		
4B3E	↓	Red	O		82D		Special Circuit	7		
4B4E	↓	Yellow	O		82E		PBX Battery	5		
4B9E	↓	White	⊗		82D		Reverse Tip & Ring	None		
4B11E	↓	Orange	O		82D		Minibridge Lifter	2		

Note: All protector units have gold-plated contact pins unless otherwise noted.

* These protector units have solder-plated contact pins.

♦TABLE A (Contd)♦

PROTECTOR UNITS (NOTE)

STANDARD CODE	SUPERSEDED CODE	HOUSING		GAS TUBES OR PROTECTOR BLOCKS (1 PAIR EACH)	HEAT COILS (2 EACH)	FUSIBLE DISCS	CIRCUIT APPLICATION	LIST NO. OF KS-14174 DESIGNATION PIN
		COLOR	STAMPING					
4C1C 4C2C 4C3C 4C4C 4C9C 4C11C 4C12C	↑ None ↓	Black Green Red Yellow White Orange Gray	↑ None ↓ X None None	↑ 32A & 33B Protector Blocks ↓ None	82B 82A 82B 82B 82B None	↑ No ↓	Standard Circuit Open Circuit Special Circuit PBX Battery Reverse Tip & Ring Minibridge Lifter Continuity Only	↑ None ↓
4C1E 4C2E 4C3E 4C4E 4C9E 4C11E	↑ None ↓	Black Green Red Yellow White Orange	O O O O ⊗ O	↑ 201A Gas Tubes ↓	82D 82A 82D 82E 82D 82D	↑ No ↓	Standard Circuit Open Circuit Special Circuit PBX Battery Reverse Tip & Ring Minibridge Lifter	↑ None ↓
4C1F 4C2F 4C3F 4C4F 4C9F 4C11F	↑ None ↓	Black Green Red Yellow White Orange	⊕ ⊕ ⊕ ⊕ ⊕ ⊕	↑ 205A Gas Tubes ↓	82D 82A 82D 82E 82D 82D	↑ No ↓	Standard Circuit Open Circuit Special Circuit PBX Battery Reverse Tip & Ring Minibridge Lifter	↑ None ↓
5A1D 5A2D 5A3D 5A4D 5A9D*	5A5D* 5A6D* 5A7D* 5A8D* None	Gray Green Red Yellow White	↑ None ↓ X	↑ None ↓	↑ None ↓	↑ No ↓	Standard Circuit Open Circit Special Circuit PBX Battery Reverse Tip & Ring	None 4 7 5 None

Note: All protector units have gold-plated contact pins unless otherwise noted.

* These protector units have solder-plated contact pins.