

INSTALLATION • OPERATION • MAINTENANCE I N S T R U C T I O N S

TYPE SDG-1T & SDG-2T STATIC GROUND DISTANCE RELAYS – CONTACT OUTPUT (WITH IMPROVED 0-0 DESENSITIZER)

These instructions are a supplement to instruction leaflet I.L. 41-496.5. The combination of the two leaflets contain instructions for the type SDG-1T and SDG-2T Relays.

The construction and operation of these relays are the same as the corresponding SDG-1 and SDG-2 relays covered by I.L. 41-496.5 except:

1. The internal schematics are replaced by those shown in this supplement.
2. These relays are provided with an Indicating Contactor Switch (ICS). The ICS provides a seal-in contact for the output telephone relay.
3. (For SDG-1T)

The 15 to 20 volt dc transistor output in the standard SDG-1 relay has been replaced by normally open contacts of a telephone relay.

The coil of the telephone relay is in series with the collector of transistor Q16 so that, when Q16 is turned on, the telephone relay is energized causing the contacts to close. A zener diode is connected across the collector of Q16 to limit the inductive kick voltage appearing at the collector during the pickup and dropout of the telephone relay.

4. (For SDG-2T)

The 15 to 20 volt dc transistor output in the standard SDG-2 relay has been replaced by normally open contacts of a telephone relay.

The coil of the telephone relay is in series with the collector of transistor Q14 so that, when Q14 is turned on, the telephone relay is energized causing the contacts to close. A

silicon diode is connected across the coil of the telephone relay to limit the inductive kick voltage appearing at the collector during the pickup and dropout of the telephone relay.

5. (For SDG-1T)

This relay does not have a pushbutton check circuit. The operation of the telephone relay contacts is now used for output circuit checkout.

6. (for SDG-1T)

A two phase to ground switch is connected between pin 8 of the 2Ø-Gnd. circuit board S-203C369G01 and the positive supply bus. This permits de-activation of the 2Ø-Gnd. circuit when desired by opening the switch.

APPLICATION

The SDG-1T and SDG-2T relays are single zone ground distance relays used for transmission line protection. They each contain a telephone relay output and are used where the low energy level 20 volt output of the SDG-1 and SDG-2 are unsuitable.

The SDG-1T may be used in zone 1, zone 2 or pilot applications. It contains a 2Ø-Gnd. switch which can be closed for zone 1 applications where overreach for ØØG faults cannot be tolerated. It contains an overcurrent fault detector that prevents tripping on loss-of-potential.

The SDG-2T is intended for use in zone 1 applications where an external fault detector is applied.

SETTINGS

See I.L. 41-496.5 "Settings" for information regarding the selection of taps.

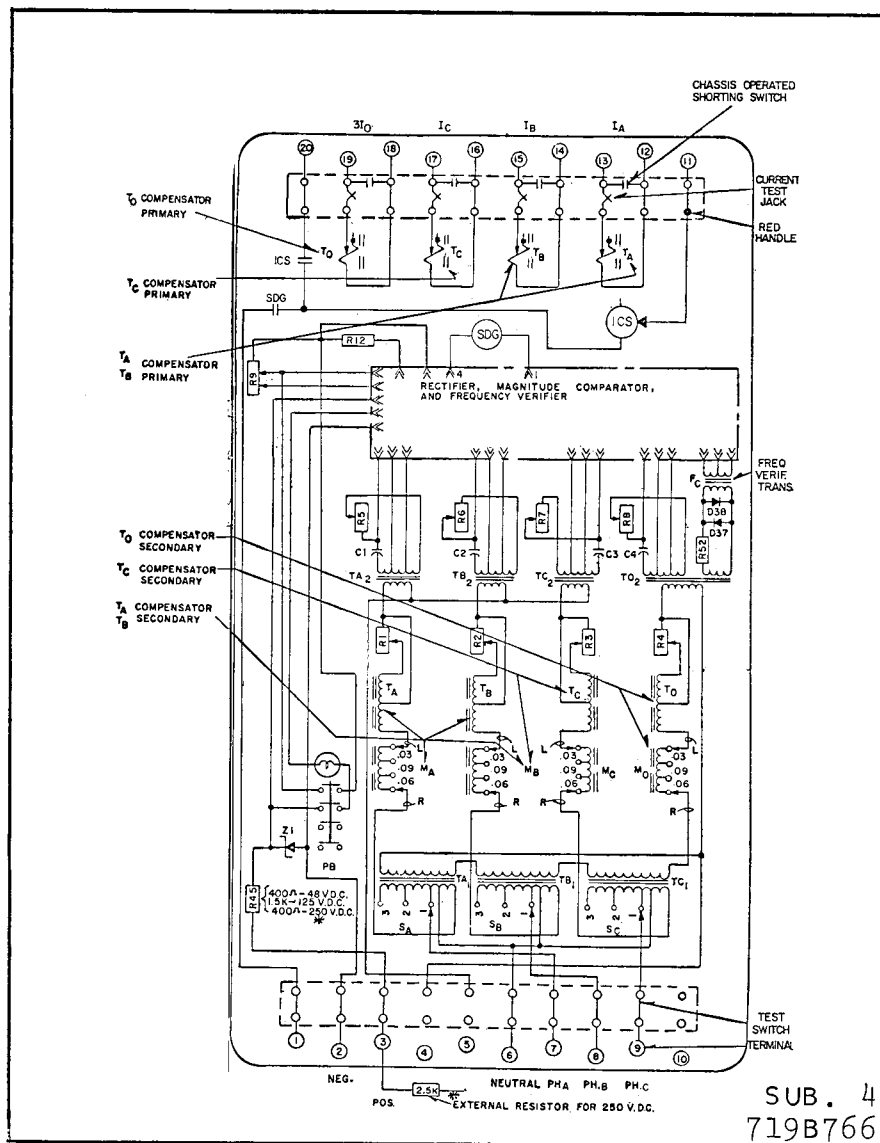


Fig. 1. Internal Diagram of Type SDG-2T Relay.

STYLE INFORMATION

Style	Description	Logic Diag.	Internal Schematic	Relay Type
6698D11A01	48Vdc 1.0-30 ohms	Fig. 1	Fig. 2	SDG-2T
6698D11A02	125Vdc 0.2-4.35 ohms			
6698D11A03	125Vdc 1.0-30 ohms			
6698D11A04	48Vdc 1.0-30 ohms	Fig. 3	Fig. 3	SDG-1T
6698D11A05	125Vdc 1.0-30 ohms			
6698D11A06	48Vdc 0.1-4.35 ohms			
6698D11A07	125Vdc 0.2-4.35 ohms			

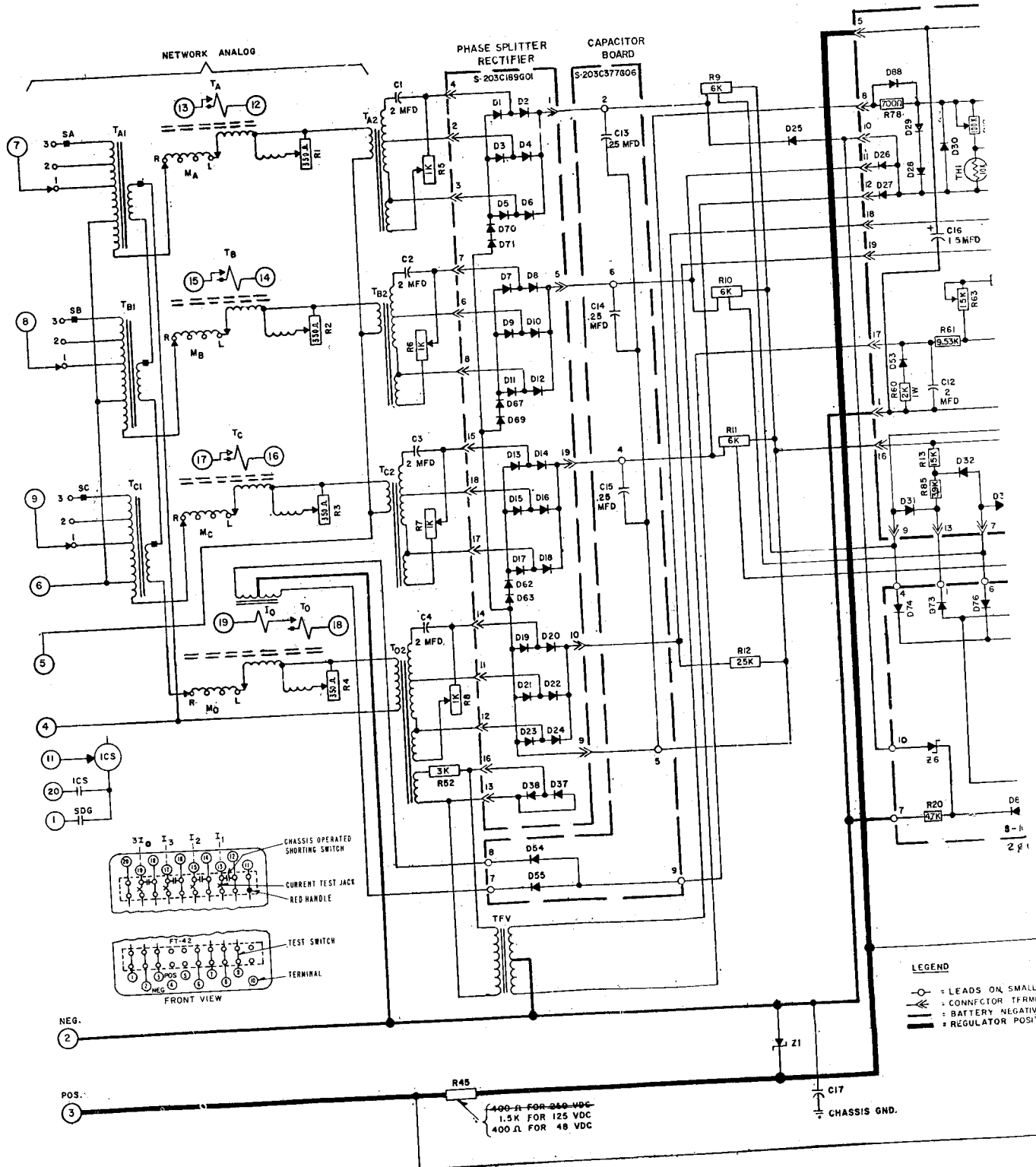
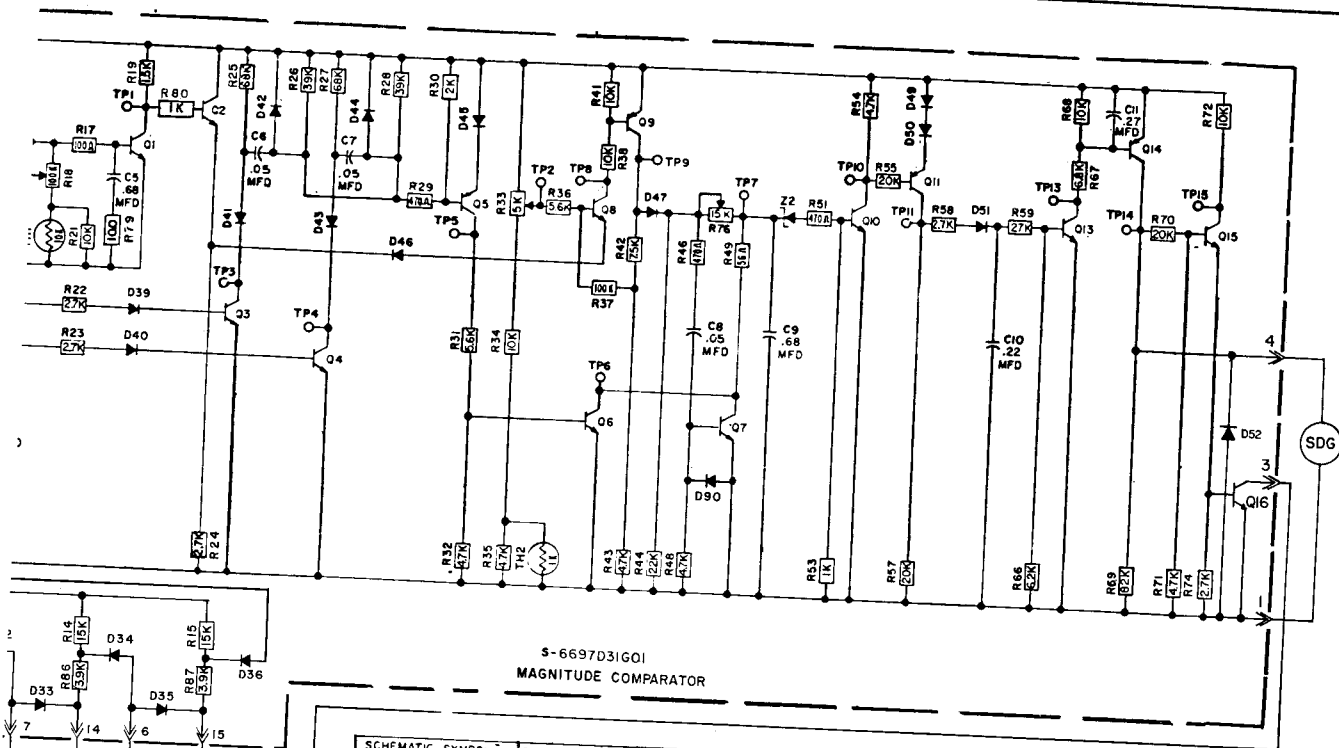


Fig. 3. Detailed Internal Schematic



S-6697D3IGOI
MAGNITUDE COMPARATOR

SCHEMATIC SYMBOL	ENGINEERING REFERENCE	STYLE	REQ.
R1 TO R4	POTENTIOMETER - 350Ω 1/2 W	836A635H01	4
R5 TO R8	POTENTIOMETER - 1K - 1/2 W	836A635H02	4
R18	POTENTIOMETER - 100K - 1/4 W	629A430H04	1
R33	POTENTIOMETER - 5K - 1/4 W	629A430H07	1
R76	POTENTIOMETER - 15K - 1/4 W	629A430H08	1
R9 TO R11	RESISTORS		
R12	6K - 1/2 W	849A379H02	3
R13 TO R15	25K - 1/2 W	184A856H15	1
R45 (148 Ω 250 V.D.C.)	15K - 3 W	763A126H08	3
R45 (125 V.D.C.)	400Ω - 25 W	184A856H14	1
R45A (250 V.D.C.)	1.5K - 25 W	184A856H11	1
R52	2.5K - 40 W	1336127	1
	3K - 0 W	184A856H19	1
R78	700Ω - 3 W	763A127H28	1
R17 R79	100Ω - 1/2 W	629A531H08	2
R19	15K - 1/2 W	629A531H36	1
R69	82K - 1/2 W	629A531H79	1
R21-R34 R38 R41 R68 R72	10K - 1/2 W	629A531H56	6
R22-R23 R24-R74-R58	2.7K - 1/2 W	629A531H42	5
R53-R80	1K - 1/2 W	629A531H32	2
R25-R27	68K - 1/2 W	629A531H76	2
R26 R28	39K - 1/2 W	629A531H70	2
R29 R46-R51	470Ω - 1/2 W	629A531H24	3
R30	2K - 1/2 W	629A531H39	1
R31 R36	56K - 1/2 W	629A531H50	2
R55-R57-R70	20K - 1/2 W	629A531H63	3
R37	100K - 1/2 W	629A531H80	1
R42	75K - 1/2 W	629A531H53	1
R44	22K - 1/2 W	629A531H64	1
R49	56Ω - 1/2 W	629A531H02	1
R59	27K - 1/2 W	629A531H66	1
R81	330 - 1/2 W	629A531H20	1
R66 R84	62K - 1/2 W	629A531H51	2
R67	6.9K - 1/2 W	629A531H52	1
R20-R32-R35-R43-R54	4.7K - 1/2 W	629A531H48	7
R71-R48	4.3K 1/2 W	629A531H47	1
R83	3.9K 3W	763A127H13	3
R85-R86-R87			

SCHEMATIC SYMBOL	ENGINEERING REFERENCE	STYLE	REQ.
D1 TO D27	DIODE - 82N9	837A692H04	27
D28 TO D30-D39 TO D47			
D49 TO D51-D52	DIODE - 1N4385	184A855H14	38
D62 D63 D67-D69-D70-D71			
D73 TO D80-D82-	DIODE - 1N3283	837A692H02	6
D84 TO D88 D90 D91	DIODE - 1N3283	837A692H02	3
D31 TO D36			
D37-D38-D81			
C1 TO C3	CAPACITOR		
C4	CAPACITOR 2 MFD	606B340H06	3
C5-C9	CAPACITOR 2 MFD	606B340H01	1
C6 TO C8	CAPACITOR .68 MFD	764A278H16	2
C10	CAPACITOR .05 MFD	187A624H08	3
C11	CAPACITOR .22 MFD	188A669H12	1
C16	CAPACITOR .27 MFD	188A669H05	1
C13 TO C15	CAPACITOR 1.5 MFD	187A508H18	3
C17	CAPACITOR .25 MFD	197A624H02	1
	CAPACITOR .04 MFD	186A105H03	1
TH1	THERMISTOR		
TH2	THERMISTOR 10K	185A211H04	1
	THERMISTOR 1K	185A211H02	1
Q2 Q8 Q10-Q13			
Q15-Q17	TRANSISTOR 2N697	184A638H18	6
Q11-Q18	TRANSISTOR 2N1132	184A638H20	2
Q3-Q4	TRANSISTOR 2N336	184A638H06	2
Q5-Q9-Q14	TRANSISTOR 2N3645	849A441H01	3
Q6-Q7-Q1-Q16	TRANSISTOR 2N3417	848A851H02	4
Z1	ZENER DIODE		
Z2	ZENER DIODE IN2984B	762A631H01	1
	ZENER DIODE IN759A	837A693H07	1
Z5-Z8	ZENER DIODE IN5035B	188A502H08	8

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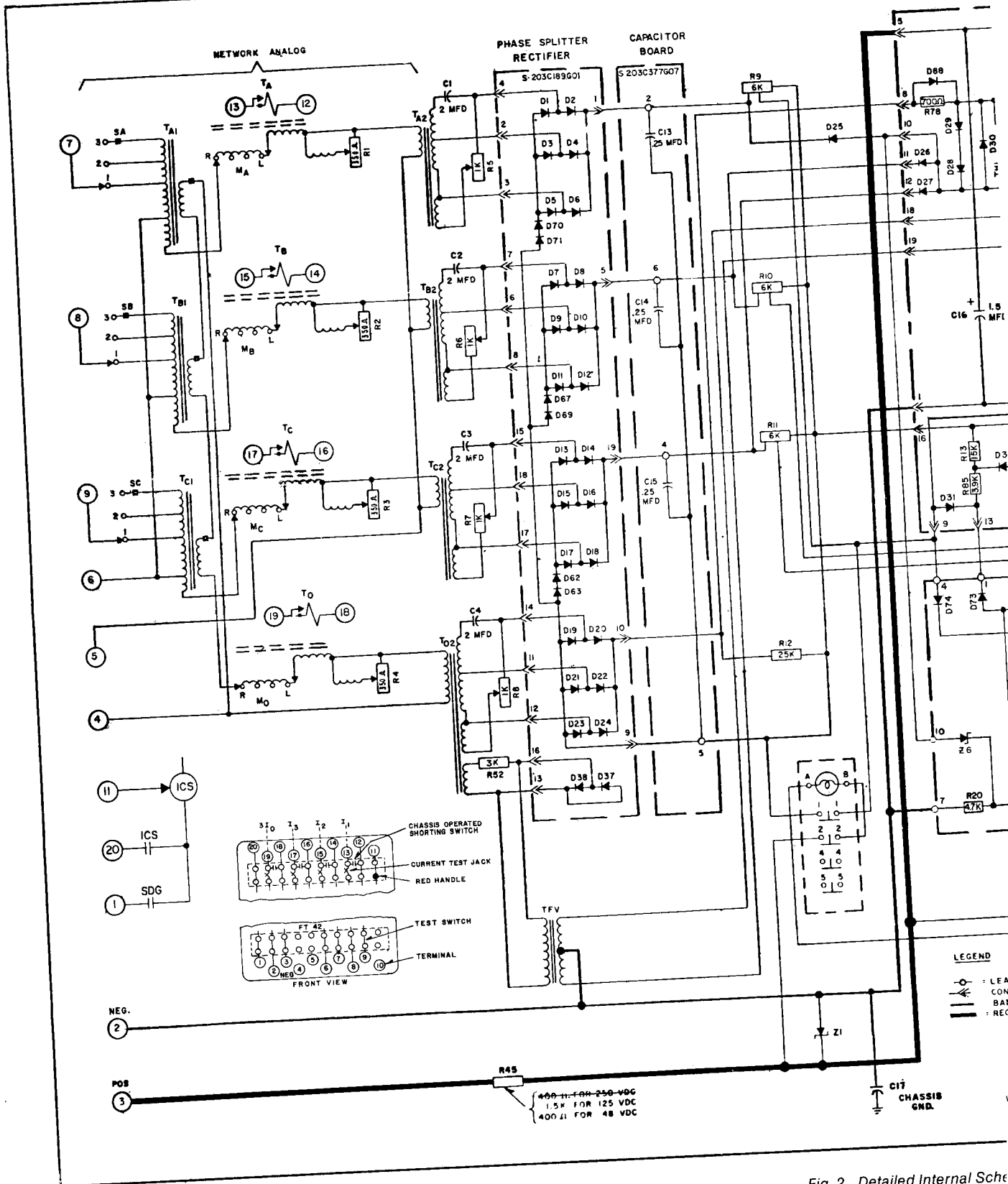
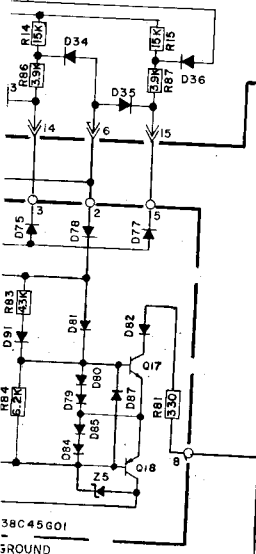
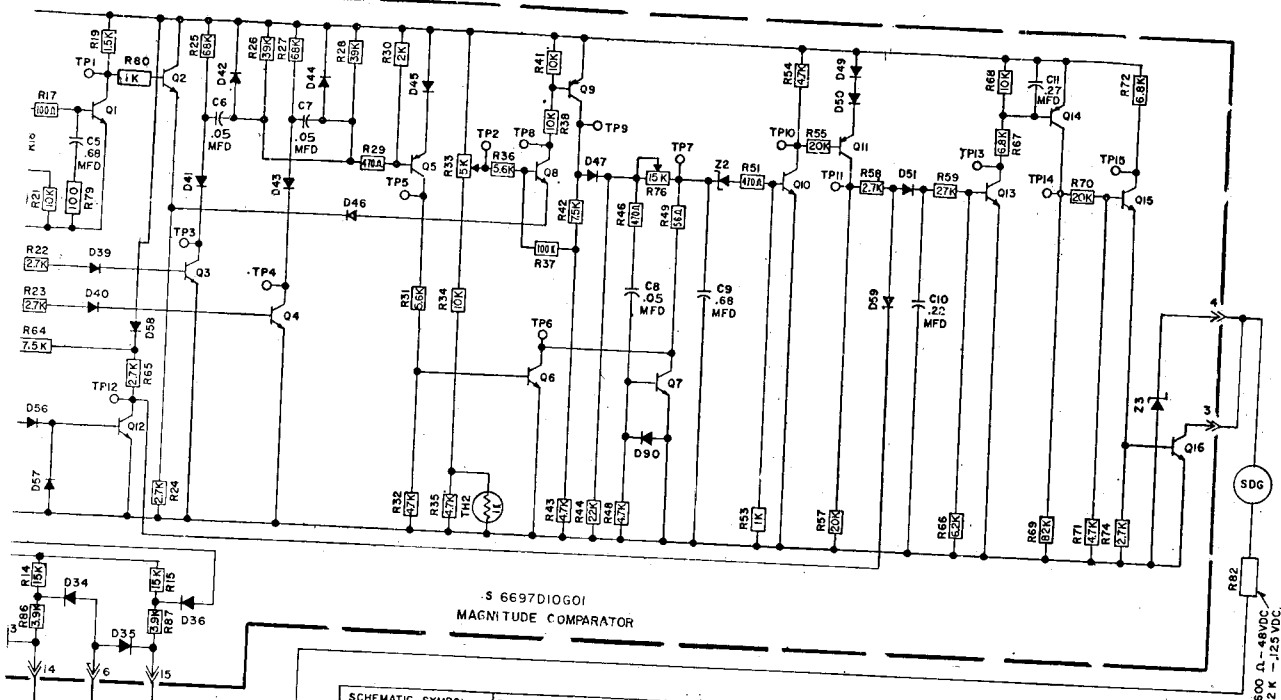


Fig. 2. Detailed Internal Schematic Diagram



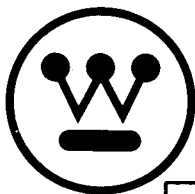
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SCHEMATIC SYMBOL	ENGINEERING REFERENCE	STYLE	REQ.
R1 TO R4	POTENTIOMETER - 350Ω - 12 1/2 W	836A635H01	4
R5 TO R8	POTENTIOMETER - 1K - 12 1/2 W	836A635H03	4
R9	POTENTIOMETER - 100K - 1/4 W	629A430H04	1
R10	POTENTIOMETER - 5K - 1/4 W	629A430H07	1
R11	POTENTIOMETER - 2.5K - 1/4 W	629A430H03	1
R12 - R13	POTENTIOMETER - 15K - 1/4 W	629A430H08	2
RESISTORS			
R14	6K - 1/2 W	849A379H02	3
R15	25K - 10 W	184A856H15	1
R16	15K - 3 W	763A126H08	3
R17 (48 & 250 V.D.C.)	400Ω - 25 W	184A856H14	1
R18 (125 V.D.C.)	1.5K - 25 W	184A856H11	1
R19	3K - 10 W	184A856H19	1
R20	2K - 1 W	187A643H34	1
R21	700Ω - 3 W	763A127H28	1
R22	100Ω - 1/2 W	629A531H08	1
R23	1.5K - 1/2 W	629A531H36	1
R24	82K - 1/2 W	629A531H78	1
R25 - R27	10K - 1/2 W	629A531H56	5
R28	2.7K - 1/2 W	629A531H42	6
R29 - R30	1K - 1/2 W	629A531H32	2
R31 - R32	68K - 1/2 W	629A531H76	2
R33 - R34	39K - 1/2 W	629A531H70	2
R35 - R36	470Ω - 1/2 W	629A531H24	3
R37	2K - 1/2 W	629A531H39	1
R38 - R39	5.6K - 1/2 W	629A531H50	1
R40	20K - 1/2 W	629A531H63	3
R41	100K - 1/2 W	629A531H80	1
R42	75K - 1/2 W	629A531H53	1
R43	22K - 1/2 W	629A531H64	1
R44	36Ω - 1/2 W	629A531H02	1
R45	27K - 1/2 W	629A531H66	1
R46	3.3K - 1/2 W	629A531H44	1
R47 - R48	75K - 1/2 W	629A531H53	1
R49 - R50	6.2K - 1/2 W	629A531H51	2
R51 - R52	6.8K - 1/2 W	629A531H52	2
R53 - R54	4.7K - 1/2 W	629A531H48	7
R55	330Ω - 1/2 W	629A531H20	1
R56 (48 VDC)	600Ω - 10 W	3502A39H01	1
R57 (125 VDC)	2K - 10 W	184A856H08	1
R58	4.3K - 1/2 W	629A531H47	1
R59 - R60	3.9K - 3 W	763A127H13	3
R61	9.53K - 1/2 W	848A820H43	1

SCHEMATIC SYMBOL	ENGINEERING REFERENCE	STYLE	REQ.
D1 TO D27	DIODE - B2N9	837A692H04	27
D28 TO D30 - D39 TO D47 - D49 TO D51 - D54 TO D59 - D62 - D63 - D67 - D69 - D70 - D71 - D73 TO D80 - D82 - D84 TO D88 - D90 - D91	DIODE - IN4385	184A855H14	43
D31 TO D36 - D89	DIODE - IN3283	837A692H02	7
D37 - D38 - D91	DIODE - IN3283	837A692H02	3
D53	DIODE - IN4818	188A342H06	1
C1 TO C3	CAPACITOR	606B340H06	3
C4	CAPACITOR	2 MFD	1
C5 - C9	CAPACITOR	2 MFD	1
C6 TO C8	CAPACITOR	.68 MFD	2
C10	CAPACITOR	.05 MFD	3
C11	CAPACITOR	.22 MFD	1
C12	CAPACITOR	.27 MFD	1
C13 TO C15	CAPACITOR	2 MFD	3
C16	CAPACITOR	.25 MFD	1
C17	CAPACITOR	1.5 MFD	1
C18	CAPACITOR	.04 MFD	1
TH1	THERMISTOR	10 K	1
TH2	THERMISTOR	1 K	1
SDG	TELEPHONE RELAY	541D514H17	1
Q2 - Q8 - Q10 - Q12 - Q13 - Q15 - Q17	TRANSISTOR	2N697	7
Q9 - Q14 - Q18	TRANSISTOR	2N1132	3
Q3 - Q4	TRANSISTOR	2N336	2
Q5 - Q9	TRANSISTOR	2N3645	2
Q6 - Q7 - Q1	TRANSISTOR	2N3417	3
Q16	TRANSISTOR	2N3590	1
F01 - F02	TUNNEL DIODE	IN3743	2
Z1	ZENER DIODE	IN2984B	1
Z2	ZENER DIODE	IN759A	1
Z3	ZENER DIODE	15KE200	1
Z5 - Z6	ZENER DIODE	IN3035B	2

SUB. 2
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tic of SDG-1T Relay with Parts List.



Westinghouse I.L. 41-496.52

INSTALLATION • OPERATION • MAINTENANCE I N S T R U C T I O N S

TYPE SDG-4T STATIC GROUND DISTANCE RELAYS WITH CONTACT OUTPUT

These instructions are a supplement to instruction leaflet I.L. 41-496.5 which is included in this leaflet. The combination of the two leaflets contain instructions for the type SDG-4T Relay.

The construction and operation of this relay is the same as the corresponding SDG-4 relay covered by I.L. 41-496.5 except:

1. The internal schematic has been replaced by that shown in this supplement.
2. The relay is provided with an Indicating Contactor Switch (ICS). The ICS provides a seal-in contact for the output telephone relay.
3. The 15 to 20 volt dc transistor output in the standard SDG-4 relay has been replaced by normally open contacts of a telephone relay.

The coil of the telephone relay is in series with the collector of transistor Q16 so that, when Q16 is turned on, the telephone relay is energized causing the contacts to close. A zener diode is connected across the collector of Q16 to limit the inductive kick voltage appearing at the collector during the pickup and drop-out of the telephone relay.

4. This relay does not have a pushbutton check circuit. The operation of the telephone relay contacts is now used for output circuit checkout.

TYPE SDG-4T STYLE INFORMATION

Style	Description	Internal Schematic
6667D56A08	48 Vdc 1.0 - 30 ohms	Fig. 1
6667D56A09	125 Vdc 1.0 - 30 ohms	
6667D56A10	48 Vdc 0.2 - 4.35 ohms	
6667D56A11	125 Vdc 0.2 - 4.35 ohms	

