Installation Engineering Handbook 269
Western Electric Company, Incorporated
Northern Illinois Works

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NO. 3 ESS
CONTROL FRAME
POWER VERIFICATION TESTS

CONTENTS

1. GENERAL INFORMATION

1.1 Description

1.11 This section provides a method of verifying that power with the proper voltages and polarities appears at the No. 3 ESS Control Frame. It also provides a method for verifying the operation of the power sequencing, power alarm and fuse alarm circuits on the Control (CONT) Frame.

1.12 The Control Frame is a double bay frame which requires four -48V power feeders (two from each bus) and two +24V power feeders (one from each bus). The +24V and two of the -48V feeders power all of the Control Frame units except the Network Pulser Unit which is powered from the remaining -48V A and B Bus feeders.

1.13 The Test Vertical and Power Control Unit on the Control Frame requires -130V A and B Bus power from the 130V Converter Unit on the Miscellaneous Power Frame. The -130V power is not fused at the Control Frame as it connects directly to the Test Vertical and Power Control (TV & PC) Unit. ±130V A and B Bus Power for the Coin Control Circuit(s) on Control Frame 0 is provided in a similar manner.

1.14 -48V power is supplied directly from the -48V Power Frame while +24V and -130V power is supplied from converters on the Miscellaneous Power Frame.

1.15 +3V power for the Peripheral Control Units is provided by DC to DC converter power modules within each unit.

1.16 Battery Boost voltage for the Customer Dial Pulse Receiver (CDPR) and Regular Ringing Circuits equipped on Control Frame (0) is provided from the Junctor and Junctor Control Unit on Network Frame 1. The battery boost voltage is fed to the CDPR & Reg Ring Circuits through fuses on the Control Frame fuse panel unit.

1.2 Sequence

1.21 Refer to Handbook 269, Section 1 for test sequence information.

1.22 The -48V Power Plant and the +24V and ± 130V Converters on the Miscellaneous Power Frame must be operational prior to the performance of this test. Handbook 21, Sections 211 and 399 provide test procedures for the 151A Power Plant and Miscellaneous Power Frame, respectively.

1.23 For Control Frame 0 only, the Battery Boost Converters on Network Frame (1) must be operational prior to the performance of this test. Handbook 269, Section 161 provides test procedures for applying power to the Network Frame.

1.24 This section must be applied before Test Program Tests (Handbook 269, Section 300) can be initiated.

1.3 References

1.31 The following documents will be useful as references during the performance of this test:

Document	Title
SD-3H110-01	Peripheral Control Circuit
SD-3H200-01	Junctor and Junctor Control Circuit
SD-3H411-01	Coin Control, Tone & Recorded Announcement, and Remote Recording Announcement Circuit
SD-3H901-01	Network Frame Circuit
SD-3H902-01	Control Frame Circuit
SD-3H905-01	Miscellaneous Power Circuit
SD-3H907-01	DC Power Distribution Circuit
SD-82250-01	Battery Boost Converter Circuit

1.4 Records

1.41 The results of these tests should be recorded on Forms SD-97-1313 and SD-97-1315. Information regarding the completion of these forms appears in Handbook 3, Section 6B.

2. TEST EQUIPMENT

2.1 Test Sets

2.11 The following test sets will be required for the performance of these tests:

Amt.	ITE	Description
1	4659	Volt-Ohm Milliammeter

2.2 Accessories

2.21 The following accessories are required for the performance of these tests:

Amt.	ITE	Description	With ITE
1	4715	Capacitor Forming Tool	*5543
1	5590	70 Type Fuse Alarm Verification Test Set	*5543
1	9169D	6-in. Test Cord with E-Z Mini-Hook on each end	*5543

* 3ACC/Auxiliary Processor Test Accessory Set

3. TEST PREPARATION

3.1 Remove the base covers from the Control Frame.

3.2 At the Power Frame, verify all -48V fuses supplying the Control Frame and the associated Pulser Units are removed.

3.3 At the Miscellaneous Power (MP) Frame +24V Converter Unit, verify +24V fuses CF0 or 1(0) and CF0 or 1(1) and associated LED assemblies supplying the Control Frame (0 or 1) under test are removed.

PRECAUTION: Since the Control and Miscellaneous Frame(s) are powered from the CF0 or 1(0) and CF0 or L(1) +24V fuses, it is required that the +24V distributing fuses at the bottom of the associated Miscellaneous Frame(s) be removed at this time.

3.4 At the MP Frame +48V and ±130V Converter Unit, verify -130V fuses -F1 or 2(0) and -F1 or 2(1) supplying the Control Frame (0 or 1) and for Control Frame 0 only, ±130V fuses C1 (0 & 1) and C2 (0 & 1) supplying the Coin Control Circuit(s) are removed.

3.5 Remove all distributing fuses from each Control Frame fuse panel unit (Bays 0 and 1).

3.6 Unseat all FC181 circuit packs on the Peripheral Decoder Unit (Bay 1) and the FC181 packs in locations 144-09 and 144-39 of the Control Frame. For Control Frame (0) only, unseat the FB425 pack in location 144-44.

4. TEST PROCEDURE

4.1 False Ground Check

4.11 Set up ITE-4659 Volt-Ohm-Milliammeter for resistance measurement on the X1K scale.

4.12 At the Miscellaneous Power (MP) Frame, measure the resistance between T.S.(G) terminals 5 and 6 or 7 and 8 (5 and 6 for Control Frame 0, 7 and 8 for Control Frame 1) on the +24V Converter Unit by connecting the negative meter lead to terminal 6 or 8 and the positive lead to terminal 5 or 7. Allow sufficient time for the filter capacitor to charge before taking the reading.

4.13 This resistance should read approximately 3300 ohms.

NOTE: At the instant the Volt-Ohm-Milliammeter is connected, the pointer reads a very low resistance because the plates of the electrolytic capacitor are not formed at that instant. As the filter capacitor begins to charge, the pointer gradually shifts toward a higher resistance value and finally reads approximately 3300 ohms after a lapse of a few minutes.

4.14 Repeat paragraphs 4.12 and 4.13 for T.S.(H).

4.15 At the Power Frame, measure the resistance between the ground bus at the rear of the Power Frame and the load terminal of the -48V Bus A fuse supplying the Control Frame circuits by connecting the positive meter lead to the ground bus and the negative lead to the load terminal.

4.16 This resistance should read infinite ohms after the plates of the electrolytic capacitor have formed.

4.17 Repeat paragraphs 4.15 and 4.16 for the -48V Bus B fuse supplying the Pulser Unit.

4.2 +24V, -48V and -130V Distribution

4.201 At the MP Frame, insert ITE-4715 Capacitor Forming Tool in the fuse socket of the +24V CF0 or 1(0) fuse supplying the Control Frame. Leave the tool in the socket until the lamp extinguishes indicating the filter capacitor is fully charged.

NOTE: The lamp normally glows very dimly and rapidly extinguishes.

4.202 At the Power Frame, insert ITE-4715 Capacitor Forming Tool in the alarm fuse socket of the -48V Bus A fuse supplying the Control Frame. Leave the tool in the socket until the lamp extinguishes indicating the filter capacitor is fully charged.

4.203 Replace the -48V Bus A fuse supplying the Control Frame and the +24V CF0 or 1(0) fuse at the MP Frame.

4.204 At the Control Frame, measure the voltage between the terminals of filter capacitor C2 (+24A) located at the bottom of the Control Frame (Bay 0). This voltage should read between +23.75 and +26.25 volts DC.

4.205 Measure the voltage between the terminals of filter capacitor C2 (-48A) located at the bottom of the Control Frame (Bay 1). This voltage should read between -42.75 and -52.5 volts DC.

4.206 At the Miscellaneous Frame(s) which shares the +24V A Bus fuse, measure the voltage between the +24V A Bus and ground bars at the bottom rear of the Miscellaneous Frame(s). This voltage should read between +23.75 and +26.25 volts DC.

4.207 At the Power Frame, replace the -48V Bus A fuse supplying Pulser Unit 0 on the Control Frame under test.

4.208 Measure the voltage between terminal 1 (-48A, 003-12R) and terminal 1 (GRD A, 003-05R) on the CONN BLOCK at the bottom rear of the Control Frame (Bay 0). This voltage should read between -42.75 and -52.5 volts DC.

4.209 At the MP Frame, insert ITE-4715 Capacitor Forming Tool in the fuse socket of the +24V CF0 or 1(1) fuse supplying the Control Frame. Leave the tool in the socket until the lamp extinguishes indicating the filter capacitor is fully charged.

NOTE: The lamp normally glows very dimly and rapidly extinguishes.

4.210 At the Power Frame, insert ITE-4715 Capacitor Forming Tool in the alarm fuse socket of the -48V Bus B fuse supplying the Control Frame. Leave the tool in the socket until the lamp extinguishes indicating the filter capacitor is fully charged.

4.211 Replace the -48V Bus B fuse supplying the Control Frame and the +24V CF0 or 1(1) fuse at the MP Frame.

4.212 At the Control Frame, measure the voltage between terminals of filter capacitor C1 (+24B) located at the bottom of the Control Frame (Bay 0). This voltage should read between +20.75 and +26.25 volts DC.

4.213 Measure the voltage between the terminals of filter capacitor C1 (-48B) located at the bottom of the Control Frame (Bay 1). This voltage should read between -42.75 and -52.5 volts DC.

4.214 Repeat 4.206 for the Miscellaneous Frame(s) associated with the +24V B Bus fuse.

4.215 At the Power Frame, replace the -48V Bus B fuse supplying Pulser Unit 1 on the Control Frame under test.

4.216 Measure the voltage between terminal 1 (-48B, 003-39R) and terminal 1 (GRD B, 003-32R) on the CONN BLOCK at the bottom rear of the Control Frame (Bay 0). This voltage should read between -42.75 and -52.5 volts DC.

4.217 At the MP Frame, replace the -130V -F1 or 2(0) fuse (-F1 for Control Frame 0 and -F2 for Control Frame 1).

4.218 At the Control Frame measure the voltage at 140-14-214. This voltage should read between -125 and -135 volts DC.

4.219 At the MP Frame, replace the -130V -F1 or 2(1) fuse.

4.219 At the MP Frame, replace the -130V -F1 or 2(1) fuse.

4.220 At the Control Frame, measure the voltage at 140-33-214. This voltage should read between -125 and -135 volts DC.

NOTE: Paragraphs 4.221 through 4.223 apply to Control Frame 0 only.

4.221 At MP-0, replace the 130V +C1(0) and -C1(0) fuses.

4.222 At Control Frame 0, measure the voltage between frame ground and 114-03-010. This voltage should read between +125 and +135 volts DC. Measure the voltage between frame ground and 114-03-004. This voltage should read between -125 and -135 volts DC.

4.223 Repeat 4.221 and 4.222 for each Coin Control Circuit (FB 423 circuit pack) provided on Control Frame 0 according to the appropriate 130V fuses and test points given in Table A.

TABLE A

FB 423 CP LOCATION	130V FUSES	MEASURE VOLTAGE AT
114-07	+C1(1) -C1(1)	114-07-010 -004
114-10	+C2(0) -C2(0)	114-10-010 -004
114-14	+C2(1) +C2(1)	114-14-010 -004

4.3 Fuse Alarm Circuit Check

4.31 Replace fuse MISB (-48 TALKB) in the Control Frame fuse block (Bay 1) and verify the PERIPH CONT 1 PWR OFF lamp is lit.

4.32 Insert ITE-5590, 70 Type Fuse Alarm Verification Test Set, into Bay 1 fuse position TVPD0 (-48 TALKA) and verify that the FA lamp on the fuse block in Bay 1 is lit.

4.33 Remove ITE-5590 and verify that the FA lamp is extinguished.

4.34 Repeat paragraphs 4.32 and 4.33 for the following Bay 1 fuse positions:

PD4 (-48 TALKA)
PD12 (" ")
TMF0 (" ")
LT (-48 TALKB)
PD7 (" ")
SSA0 (-48 SIGA)
SSA4 (" ")
SSB0 (-48 SIGB)
SSB4 (" ")
BCD4 (BAT BOOSTA)
BCD5 (BAT BOOSTB)

4.35 Replace fuse MISA (-48 TALKA) in the Control Frame fuse block (Bay 1) and verify the PERIPH CONT 0 PWR OFF lamp is lit.

4.36 Repeat paragraphs 4.32 and 4.33 for each of the following Bay 0 fuse positions observing the Bay 0 Fa lamp:

MS0A (-48 TALKA)
MS2A (" ")
MS7A (" ")
MS0B (-48 TALKB)
MS8B (" ")
SCD0 (-48 SIGA)
SRR0 (" ")
SRR1 (-48 SIGB)
BCD0 (BAT BOOSTA)
BCD1 (BAT BOOSTB)

4.37 Replace all fuses in the Control Frame fuse blocks (Bays 0 and 1) except the following:

BAY 0	BAY 1
CVLA (-48 TALKA)	CVLB (-48 TALKB)
NCLA (+24A)	NCLB (+24B)
SCA (")	SCB (")
PPDA (")	PPDB (")
PWCA (")	PWCB (")

Verify no fuse alarms occur.

4.4 Lamp Test

4.41 Depress and hold the LP & PWR TEST key on the Control Frame and verify that both OOS and both PWR OFF lamps on the control panel and the FA lamps on the fuse blocks (Bays 0 and 1) are lit.

4.42 Release the LP & PWR TEST key and verify only the PWR OFF lamps remain lit.

4.5 Power Sequencing Circuit Check

4.501 Momentarily operate the PERIPH CONT 0 ON key and verify PWR0 relay on Bay 0 fuse panel unit is operated and the associated PWR OFF lamp is extinguished. No fuse alarms should occur.

4.502 Insert ITE-5590, 70 Type Fuse Alarm Verification Test Set, into SCA (Bay 0) fuse position. Verify that the FA lamp on the fuse panel (Bay 0) is lit and the PERIPH CONT 0 PWR lamp on the control panel is lit.

4.503 Remove ITE-5590 and replace the SCA fuse. Momentarily operate the PERIPH CONT 0 ON key and verify that the FA and PWR OFF lamps are extinguished.

4.504 Repeat paragraphs 4.502 and 4.503 for NCLA (+24A), PPDA (+24A) and CVLA (-48 TALKA) fuses.

4.505 Insert ITE-5590 into PWCA (Bay 0) fuse position and verify FA lamp on the Bay 0 fuse block is lit and PERIPH CONT 0 PWR OFF lamp is not lit.

4.506 Remove ITE-5590, verify FA lamp is extinguished and replace PWCA fuse.

4.507 Depress and hold the PERIPH CONT 0 REQ and OFF keys simultaneously and verify the associated PWR OFF lamp is lit.

4.508 Release the REQ and OFF keys and verify the PWR OFF lamp remains lit. Momentarily operate the PERIPH CONT 0 ON key and verify the PWR OFF lamp is extinguished.

4.509 Momentarily operate the PERIPH CONT 0 OFF key and verify the PWR OFF lamp is not lit.

4.510 Using an ITE-9169D Test Cord, clipcord 144-09-012 to ground and verify OOS-0 lamp is lit. Momentarily operate the PERIPH CONT 0 OFF and verify the PWR OFF lamp is lit.

4.511 Remove the clipcord and verify OOS-0 lamp is extinguished. Momentarily operate the PERIPH CONT 0 ON key and verify the PWR OFF lamp is extinguished.

4.512 Momentarily operate the PERIPH CONT 1 ON key and verify PWR1 relay on Bay 1 fuse panel unit is operated and the associated PWR OFF lamp is extinguished. No fuse alarms should occur.

4.513 Insert ITE-5590 into SCB (Bay 1) fuse position. Verify that the FA lamp on the fuse panel (Bay 1) is lit and the PERIPH CONT 1 PWR OFF lamp on the control panel is lit.

4.514 Remove ITE-5590 and replace the SCB fuse. Momentarily operate the PERIPH CONT 1 ON key and verify the FA and PWR OFF lamps are extinguished.

4.515 Repeat paragraphs 4.513 and 4.514 for NCLB (+24A), PPDB (+24A) and CVLB (-48 TALKB) fuses.

4.516 Insert ITE-5590 into PWCB (Bay 1) fuse position and verify FA lamp on the Bay 1 fuse block is lit and PERIPH CONT 1 PWR OFF lamp is not lit.

4.517 Remove ITE-5590, verify FA lamp is extinguished, and replace PWCB fuse.

4.518 Depress and hold the PERIPH CONT 1 REQ and OFF keys simultaneously and verify the associated PWR OFF lamp is lit.

4.519 Release the REQ and OFF keys and verify the PWR OFF lamp remains lit. Momentarily operate the PERIPH CONT 1 ON key and verify PWR OFF lamp is extinguished.

4.520 Momentarily operate the PERIPH CONT 1 OFF key and verify the PWR OFF lamp is not lit.

4.521 Using an ITE-9169D Test Cord, clipcord 144-09-112 to ground and verify OOS-1 lamp is lit. Momentarily operate the PERIPH CONT 1 OFF key and verify the PWR OFF lamp is lit.

4.522 Remove the clipcord and verify OOS-1 lamp is extinguished. Momentarily operate the PERIPH CONT 1 ON key and verify the PWR OFF lamp is extinguished.

4.6 Power Alarm Test

4.61 Depress and hold the LP & PWR TEST key on the control panel and verify the following:

a) The OOS and PWR OFF lamps on the control panel are lit.

b) The FA lamps on the fuse panel units (Bays 0 & 1) are lit.

c) The LED indicators on the A8 Converters in locations 62-38 and 62-43 and on the FB152 circuit pack in location 62-34 of each Peripheral Controller Unit (Bays 0 & 1) are lit.

4.62 Release the LP & PWR TEST key and verify all lamps and LEDs are extinguished.

4.63 Using an ITE-9169D Test Cord, clipcord 144-39-012 to ground. Verify the LED indicators on the A8 converters in locations 62-38 and 62-43 and on the FB152 circuit pack in location 62-34 of the Peripheral Controller Unit in Bay 0 only are lit.

4.64 For Control Frame (0) only, this test will cause the PAT relays in the PROC (Bay 0) and MTCE Frames to operate. Verify the LED indicators on the MTCE Frame and Bay 0 of the PROC Frame are lit.

4.65 Remove the clipcord, momentarily operate LP & PWR TEST key, and verify all LED indicators are extinguished.

4.66 Clipcord 144-39-112 to ground and verify the LED indicators on the A8 converters in locations 62-38 and on the FB152 circuit pack in location 62-34 of the Peripheral Controller Unit in Bay 1 only are lit.

4.67 For Control Frame (0) only, this test will cause the PAT relays in the PROC (Bay 1) and MTCE Frames to operate. Verify the LED indicators on the MTCE Frame and Bay 1 of the PROC Frame are lit.

4.68 Remove the clipcord, momentarily operate LP & PWR TEST key, and verify all LED indicators are extinguished.

4.69 Remove -48V fuse supplying all FC181 circuit packs. Reseat the FC181 packs and replace the fuses.

NOTE: Do not reseat the FB425 pack on Control Frame (0) until instructed to do so in Handbook 269, Section 551.

→ Arrows indicate new or changed information.

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Reason for Reissue:
Circuit design change.