Installation Engineering Handbook 269
Western Electric
Northern Illinois Works

SECTION

2-27-81
Replaces: Section 730.03
dated 11-23-79

NO. 3 ESS
CONTROL FRAME AND NETWORK FRAME 8
POWER VERIFICATION TEST FOR ADDITIONS

CONTENTS

1. GENERAL INFORMATION

1.1 Description

1.11 This section provides a method of verifying that power with proper voltages and polarities appears at the No. 3 ESS Control and Network Frame. It also provides a method for verifying the operation of the Power Sequencing, Power Alarm and Fuse Alarm Circuits on the No. 3 ESS Control and Network Frames.

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.

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 The Network Frame is a single bay frame which requires two -48V power feeders (one from each power bus). Each feeder has a dedicated filter at the Network Frame.

1.2 References

1.21 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.

NOTICE - NOT FOR USE OR DISCLOSURE OUTSIDE THE BELL SYSTEM EXCEPT UNDER WRITTEN AGREEMENT

Printed in U.S.A.

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
1	5632	Digital Multimeter

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	

3. TEST PREPARATION

3.1 Remove the Base Covers from the Control Frame and Network Frame.

3.2 At the Power Frame, verify all -48V fuses supplying Control Frame 1 its associated Pulser Units and Network Frame 8 are removed.

3.3 At the Miscellaneous Power (MP) Frame +24V Converter Unit, verify +24V fuses (CF1(0) and CF1(1) and associated LED assemblies supplying the Control Frame (1) under test are removed.

PRECAUTION

Since the Control and Miscellaneous Frame(s) are powered from the CF1(0) and CF1(1) +24 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 F2(0) and -F2(1) supplying the Control Frame (1) are removed!

3.5 Remove all distributing fuses from each Control Frame and Network Frame fuse panel units.

* 3A CC/Auxiliary Processor Test Accessory Set

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.

3.7 Operate the CONV A OFF and CONV B OFF keys to the "IN" operated position.

4. TEST PROCEDURE CONTROL FRAME 1

4.1 False Ground Check

4.11 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.

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

4.13 Repeat paragraphs 4.11 and 4.12 for the -48V Bus B fuse supply.

4.14 At the Power Frame, measure the resistance between the ground bus bar and the load terminal of the -48V Bus A fuse supplying the Pulser 0.

4.15 The resistance should measure infinite ohms.

4.16 Repeat paragraphs 4.14 and 4.15 for -48V Bus B fuse supply Pulser 1.

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 CF1(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 CF1(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 CF1(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 +24 CF1(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 -F2(0) fuse.

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

4.219 At the MP Frame, replace the -130V -F2(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.

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 TVPDO (-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 (-48 TALKA)

TMF0 (-48 TALKA)

LT (-48 TALKB)

PD7 (-48 TALKB)

SSA0 (-48 SIGA)

SSA4 (-48 SIGA)

SSB0 (-48 SIGB)

SSB4 (-48 SIGB)

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 TALKS)

MS2A (-48 TALKA)

MS7A (-48 TALKA)

MS0B (-48 TALKB)

MS8B (-48 TALKB)

SCD0 (-48 SIGA)

SRR0 (-48 SIGA)

SRR1 (-48 SIGB)

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

BAY 0	BAY 1
CVLA (-48 TALKA)	CVLB (-48 TALKB)
NCLA (+24A)	NCLB (+24B)
SCA (+24A)	SCB (+24B)
PPDA (+24A)	PPDB (+24B)
→ RCA (+24A)	RCB (+24B)

4.38 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.

NOTE: If the power is not restored, check the bus type fuses CVHA (CONT 0) and CVHB (CONT 1).

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 ON key and verify PWR OFF lamp is extinguished.

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

4.65 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.

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

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

TEST PROCEDURE NETWORK FRAME 8

5.1 False Ground Check

5.11 Set up ITE-4659 Volt-Ohm-Milliammeter for resistance measurement on the X1 scale.

5.12 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 Network Frame by connecting the positive meter lead to the ground bus and the negative lead to the load terminal.

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

5.14 Repeat paragraphs 4.12 and 4.13 for the -48V Bus B fuse supplying the Network Frame.

5.2 -48V Distribution

5.21 At the Power Frame, insert ITE-4715 Capacitor Forming Tool in the alarm fuse socket of the -48V Bus A (15 Amp) fuse supplying the Network Frame. Leave the tool in the socket until the lamp extinguishes indicating the filter capacitor is fully charged.

5.22 Replace the -48V Bus A (15 Amp) fuse supplying the Network Frame.

5.23 At the Network Frame, measure the voltage between the terminals of filter capacitor C2 (-48A) located at the bottom of the Network Frame. This voltage should read between -42.75 and -52.5 volts DC.

5.24 At the Power Frame, insert ITE-4715 Capacitor Forming Tool in the alarm fuse socket of the -48V Bus B (15 Amp) fuse supplying the Network Frame. Leave the tool in the socket until the lamp extinguishes indicating the filter is fully charged.

5.25 Replace the -48V Bus A (15 Amp) fuse supplying the Network Frame.

5.26 At the Network Frame, measure the voltage between the terminals of filter capacitor C1 (-48B) located at the bottom of the Network Frame. This voltage should read between -42.75 and -52.5 volts DC.

5.3 Fuse Alarm Circuit Check

5.31 Replace the MC (P48VA) fuse in the Network Frame fuse panel and verify the CONV A and CONV B lamps are lit.

5.32 Insert ITE-5590, 70 Type Fuse Alarm Verification Test Set into fuse position 0A2 (P48VB) and verify relay FAA on the Control Panel is operated and the FA lamp on the fuse panel is lit.

5.33 Remove ITE-5590 and verify the FAA relay is released and the FA lamp is extinguished.

5.34 Repeat paragraphs 5.32 and 5.33 for the following fuse positions:

1A2 (P48VB)

0B3 (P48VB)

0A0 (P48VA)

1A0 (P48VA)

5.35 Repeat paragraphs 5.32 and 5.33 for the following fuse positions observing the FAB relay:

SPD5 (P48VB)

SPD7 (P48VB)

SPD4 (P48VA)

SPD6 (P48VA)

TT1 (P48FB)

TT3 (P48FB)

TT0 (P48FA)

TT2 (P48FA)

5.36 Replace all FC181 circuit packs in the network frame.

5.37 Replace all P48VA, P48VB, P48FA, and P48FB fuses in the Network Frame fuse panel. Do not replace any PBB0 or PBB1 fuses at this time.

5.38 Insert ITE-5590 into fuse position BCD0 (PBB0) and verify FA lamp is lit.

5.39 Repeat 5.37 for fuse positions BCD2 (PBB0), BCD1 (PBB1), and BCD3 (PBB1). Remove ITE-5590.

5.40 Replace all PBB0 and PBB1 fuses in the Network Frame fuse panel.

5.4 Battery Boost Converters Check

6.41 Release the CONV A OFF key and verify the lamp within the key is extinguished.

6.42 Using ITE-5632 Digital Multimeter, measure the voltage at fuse post of fuse BCD0 (PBB0). This voltage should read between -53.85 and -53.35 volts DC.

6.43 Leave the voltmeter connected at the fuse post and operate the CONV A OFF key. Verify the reading drops to the normal -48V office potential.

6.44 Release the CONV B OFF key and verify the lamp within the key is extinguished.

6.45 Measure the voltage at fuse post of fuse BCD1 (PBB1). This voltage should read between -53.85 and -53.35 volts DC.

6.46 Leave the voltmeter connected at the fuse post and operate the CONV B OFF key. Verify the reading drops to the normal -48V office potential.

6.47 Release the CONV A OFF and CONV B OFF keys and verify the lamp within each key is extinguished.

Manager, Development Engineering - 2/2B, 3, 4 and 5 ESS

Reason for Reissue:
To include information for 3E3 Generic.