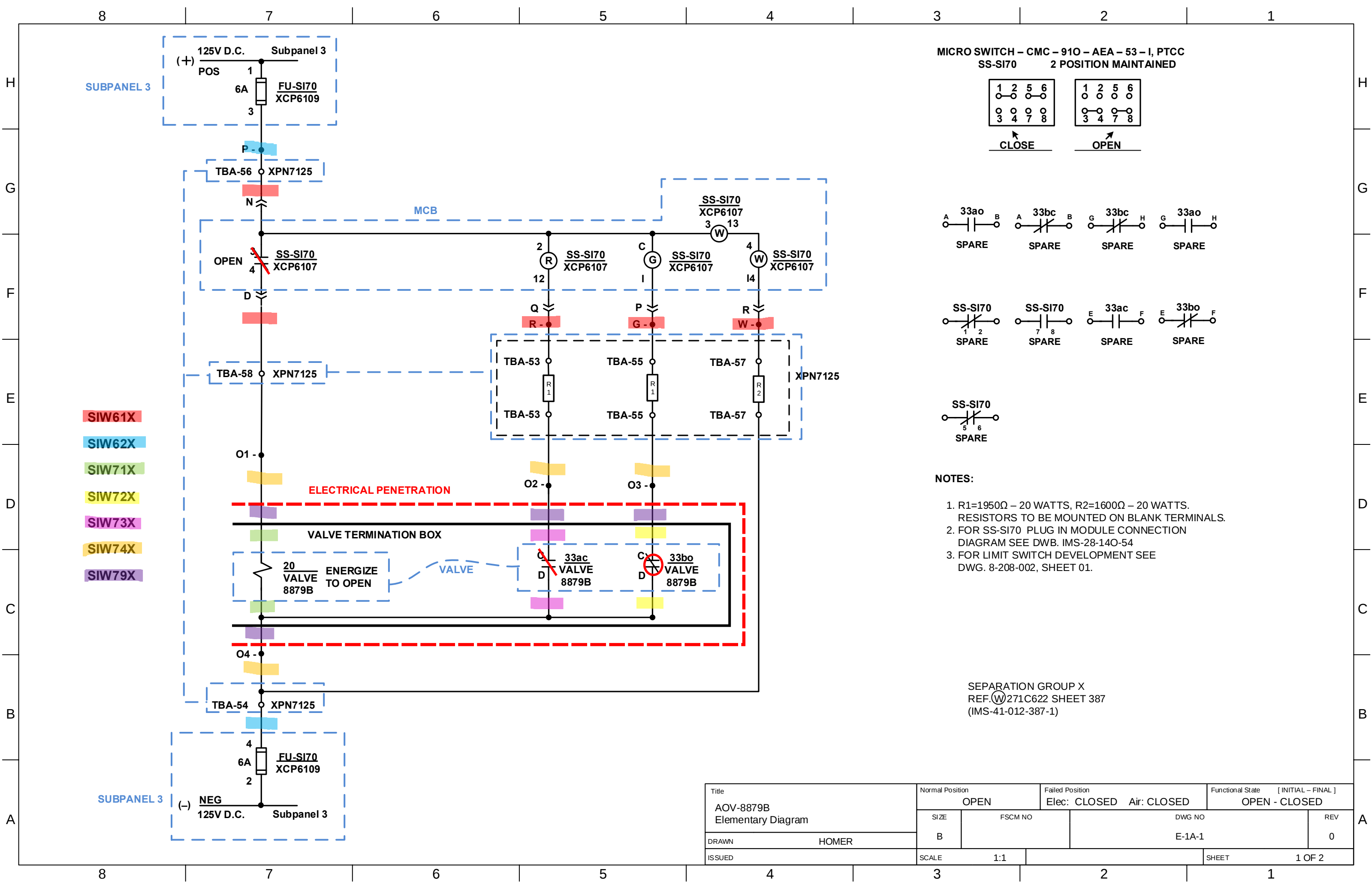
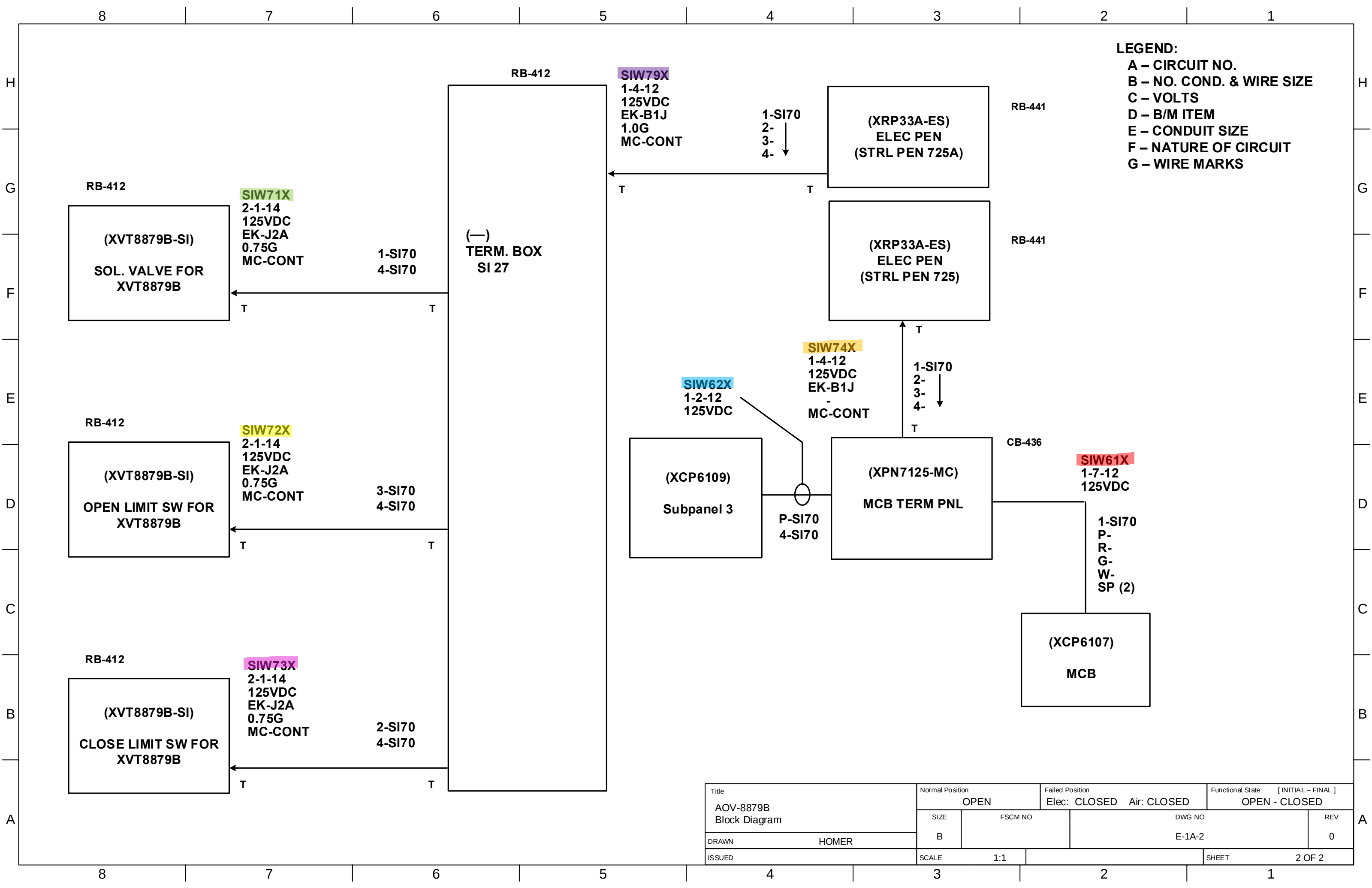




Title AOV-8879B Elementary Diagram	Normal Position OPEN		Failed Position Elec: CLOSED Air: CLOSED		Functional State [INITIAL - FINAL] OPEN - CLOSED
	SIZE B	FSCM NO		DWG NO E-1A-1	
	DRAWN HOMER			REV 0	
ISSUED		SCALE 1:1			SHEET 1 OF 2



Component ID	AOV-8879-B	Component Type	AOV
Component Description	Example 1B		

Component Type AOV

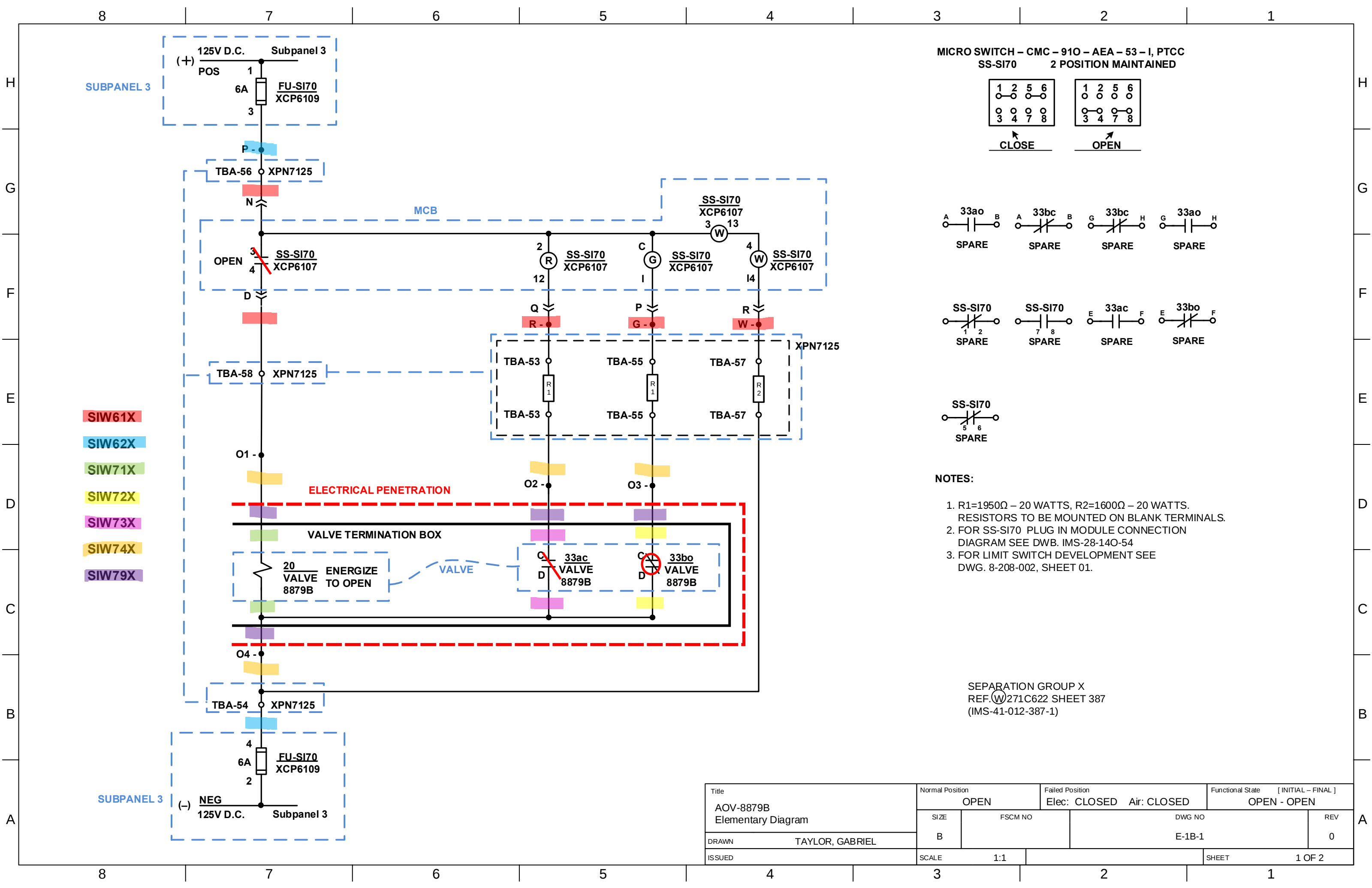
Component Description	Example 1B
-----------------------	------------

Normal Position	Open
Failed Electrical Position	Closed
Failed Air Position	Closed
Function State	8879B-O-O
Initial Position	Open
Desired Position	Open
BE Code	8879B_FTRO

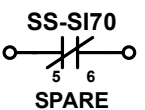
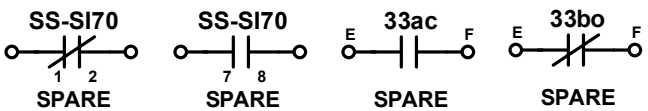
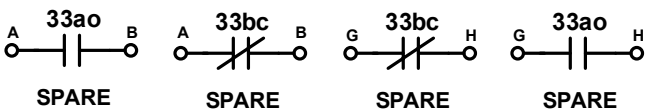
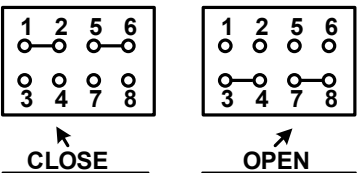
High Consequence Component Yes ☐ No ☒

Power Supplies	<u>XCP 6109 (Subpanel 3)</u>	Breaker	<u>FU-SI70</u>	Req'd	☒
		Breaker		Req'd	☐

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MICRO SWITCH - CMC - 910 - AEA - 53 - I, PTCC
SS-SI70 2 POSITION MAINTAINED

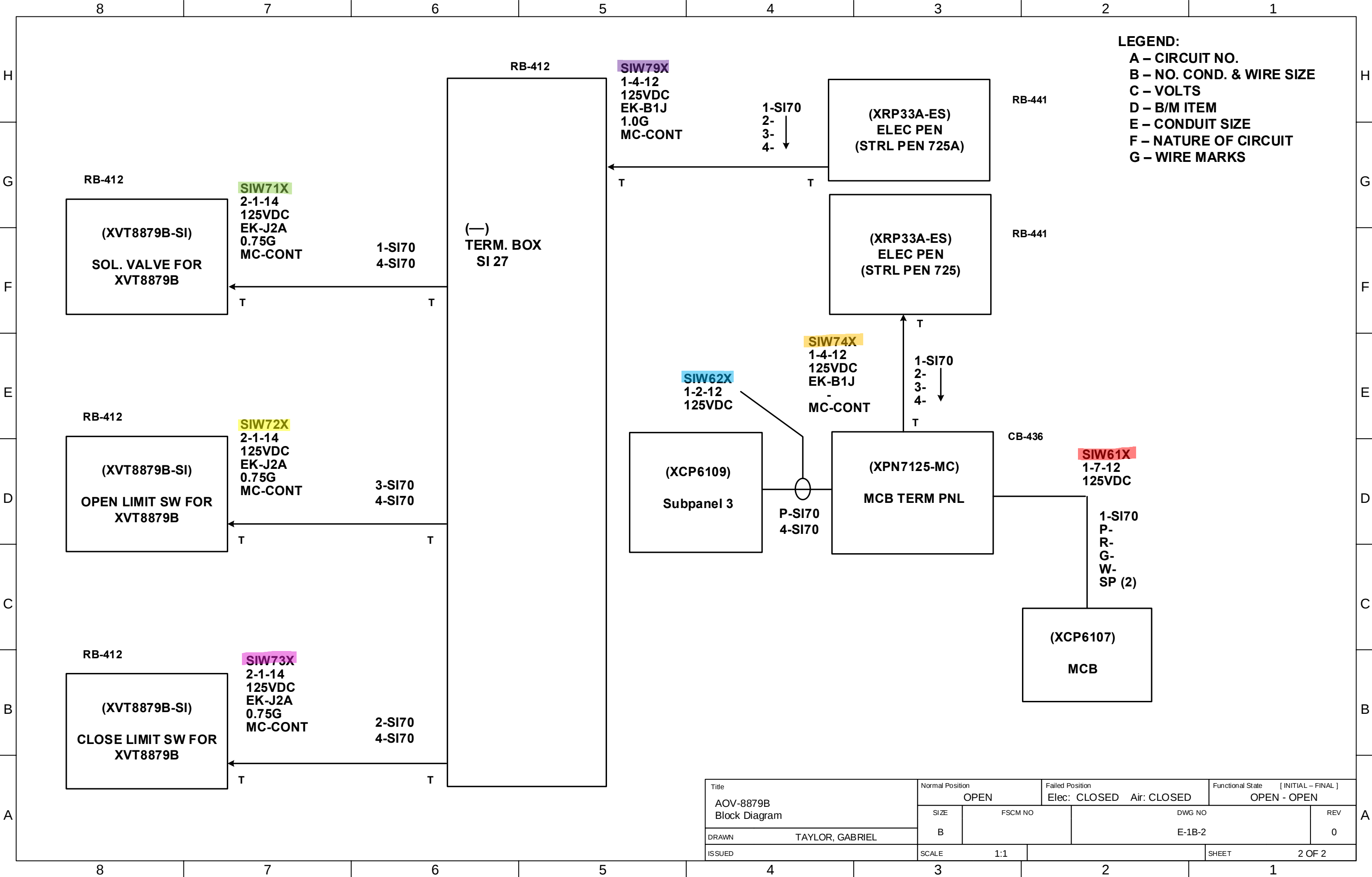


NOTES:

1. R1=1950Ω - 20 WATTS, R2=1600Ω - 20 WATTS.
RESISTORS TO BE MOUNTED ON BLANK TERMINALS.
2. FOR SS-SI70 PLUG IN MODULE CONNECTION
DIAGRAM SEE DWB. IMS-28-140-54
3. FOR LIMIT SWITCH DEVELOPMENT SEE
DWG. 8-208-002, SHEET 01.

SEPARATION GROUP X
REF. W271C622 SHEET 387
(IMS-41-012-387-1)

Title AOV-8879B Elementary Diagram	Normal Position OPEN		Failed Position Elec: CLOSED Air: CLOSED		Functional State [INITIAL - FINAL] OPEN - OPEN	
	SIZE B	FSCM NO		DWG NO E-1B-1		REV 0
DRAWN TAYLOR, GABRIEL		SCALE 1:1		SHEET 1 OF 2		
ISSUED						



CIRCUIT ANALYSIS WORKSHEET (EX-2A)

Component ID

MOV-8112-A

Component Type

MOV

Component Description

RCP Seal Water Return Isolation

Normal Position

Closed

Failed Electrical Position

As-Is

Failed Air Position

N/A

Function State

8112A-C-O

Initial Position

Closed

Desired Position

Open

BE Code

RC-8112_FTO

High Consequence Component

Yes

No

Power Supplies

MCC-1B

Breaker

11BD

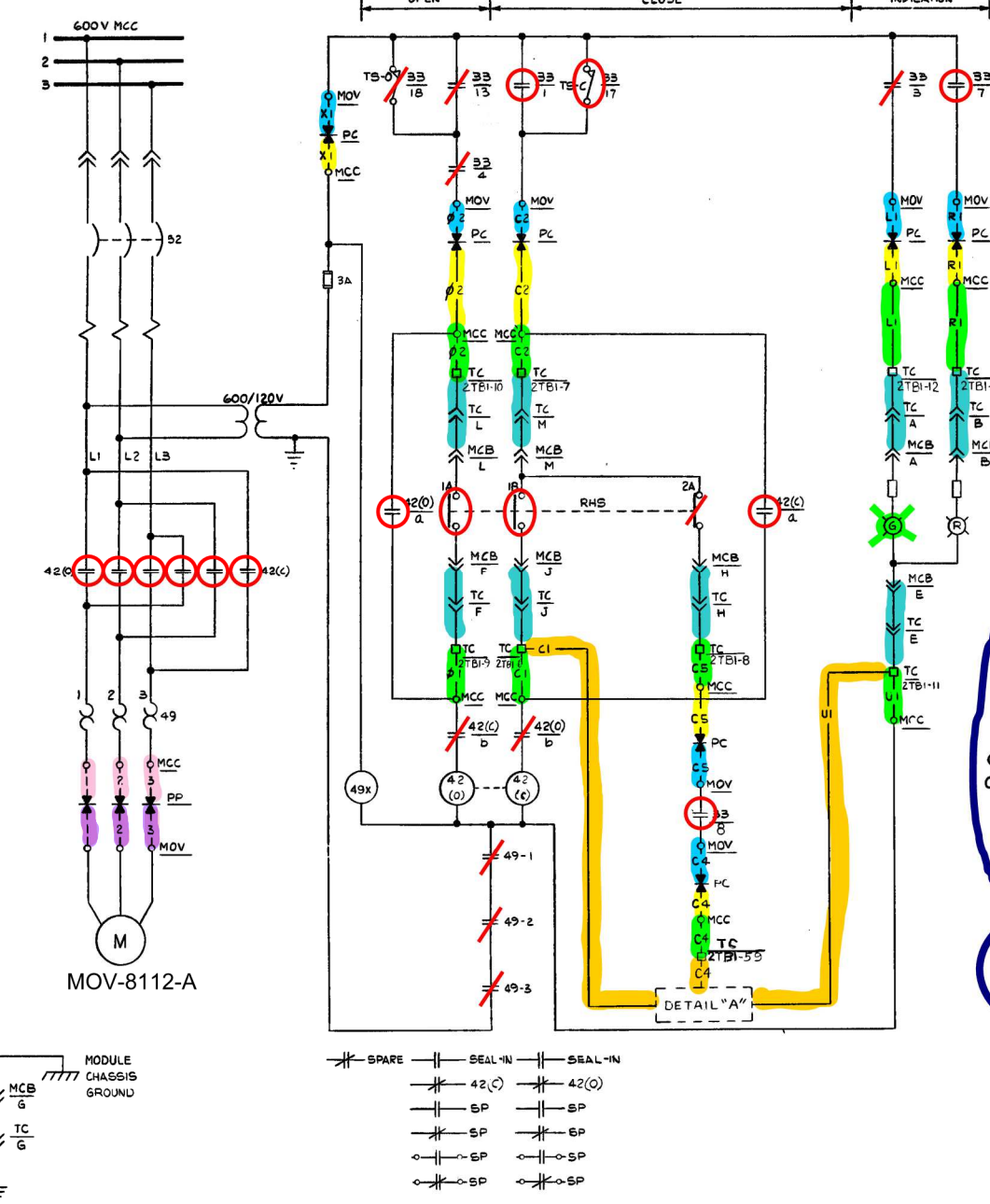
Req'd

Breaker

Cable Analysis

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
1VAFU-T4A	Y	N	LOC-BF, S/C-HS	
1VAFU-T4B	Y	N	LOC-BF, S/C-HS	
1VAFU-T4C	Y	N	LOC-BF	
1VAFU-T4D	Y	N	LOC-BF	
1VAFU-T4F	Y	N	LOC-BF, S/C-HS	
1VAFU-T4P	Y	N	LOP	3-Phase power cable
1VAFU-T4Q	Y	N	LOP	3-Phase power cable
1VAFU-T4Z	Y	N	LOC-BF, S/C-HS	

MCC-1B BKR 11BD



Limit & Torque Switches

LIMIT SWITCH CONTACT DEVELOPMENT		
CONT	VALVE POSITION	FUNCTION
1	FULL OPEN	BY PASS CKT
2	FULL OPEN	SPARE
3	FULL OPEN	SPARE
4	FULL OPEN	SPARE
5	FULL OPEN	SPARE
6	FULL OPEN	SPARE
7	FULL OPEN	SPARE
8	FULL OPEN	SPARE
9	FULL OPEN	SPARE
10	FULL OPEN	SPARE
11	FULL OPEN	SPARE
12	FULL OPEN	SPARE
13	FULL OPEN	SPARE
14	FULL OPEN	SPARE
15	FULL OPEN	SPARE
16	FULL OPEN	SPARE

CONTACT CLOSED
17 CLOSING TORQUE SWITCH INTERRUPTS CONTROL CIRCUIT IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE
18 OPENING TORQUE SWITCH INTERRUPTS CONTROL CIRCUIT IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE

RHS	BLK	CONT	CLOSE	AUTO	OPEN
1	A	X			X
2	A	X			X
3	A	X			X

REMOTE HANDSWITCH
GEMCO CAT NO 40453221-Y-AA3,A4
SPRING RETURN TC AUTO

Equipment Dependency - spurious CIS signal will cause MOV to spuriously CLOSE. See Notes 3 & 4. Hand Switch

NOTES

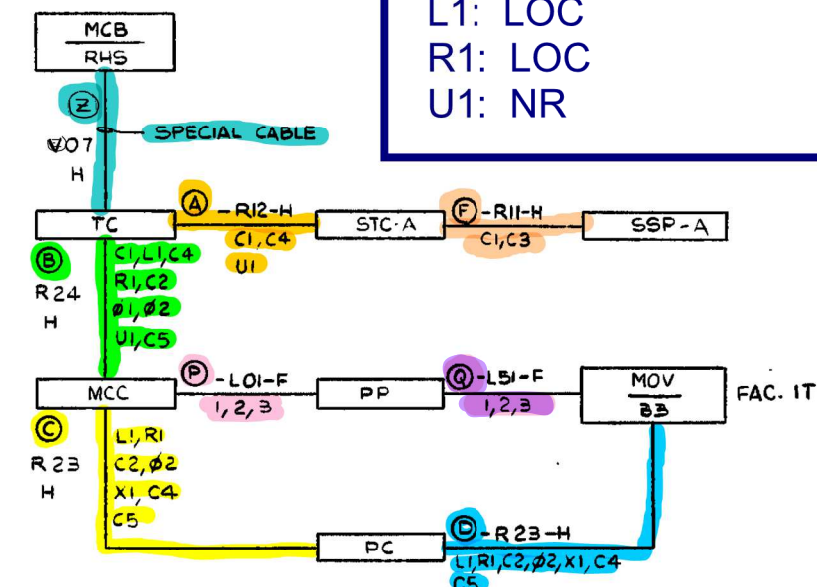
1. VALVE IS SHOWN IN FULLY CLOSED POSITION.
2. FOR MOTOR AND STARTER SIZE, SEE DWG B-177556 SHEET 19A.
3. CONTACT CLOSING ON CONTAINMENT ISOLATION. ACTUATION SIGNAL. PHASE A
4. CONTACT OPENS ON TEST OF K607 RELAY.

REFERENCE DRAWINGS

- A-177538-ELECTRICAL GENERAL DETAILS AND NOTES
B-177556-MCC SCHEDULES

1,2,3: LOP
X1: LOC
01: LOC
02: LOC
C1: LOC, S/C-HS
C2: LOC
C3: LOC
C4: LOC
C5: LOC
L1: LOC
R1: LOC
U1: NR

DETAIL "A"



BLOCK DIAGRAM

Example: 2 MOV-8112-A
Normal Position: CLOSED Case: 2A
Failed Elec Position: AS-IS Function State: CLOSED - OPEN

CIRCUIT ANALYSIS WORKSHEET (EX-2B)

Component ID

MOV-8112-A

Component Type

MOV

Component Description

RCP Seal Water Return Isolation

Normal Position

Closed

Failed Electrical Position

As-Is

Failed Air Position

N/A

Function State

8112A-C-C

Initial Position

Closed

Desired Position

Closed

BE Code

RC-8112_FTRC

High Consequence Component

Yes

☐

No

☒

Power Supplies

MCC-1B

Breaker

11BD

Req'd

☐

Breaker

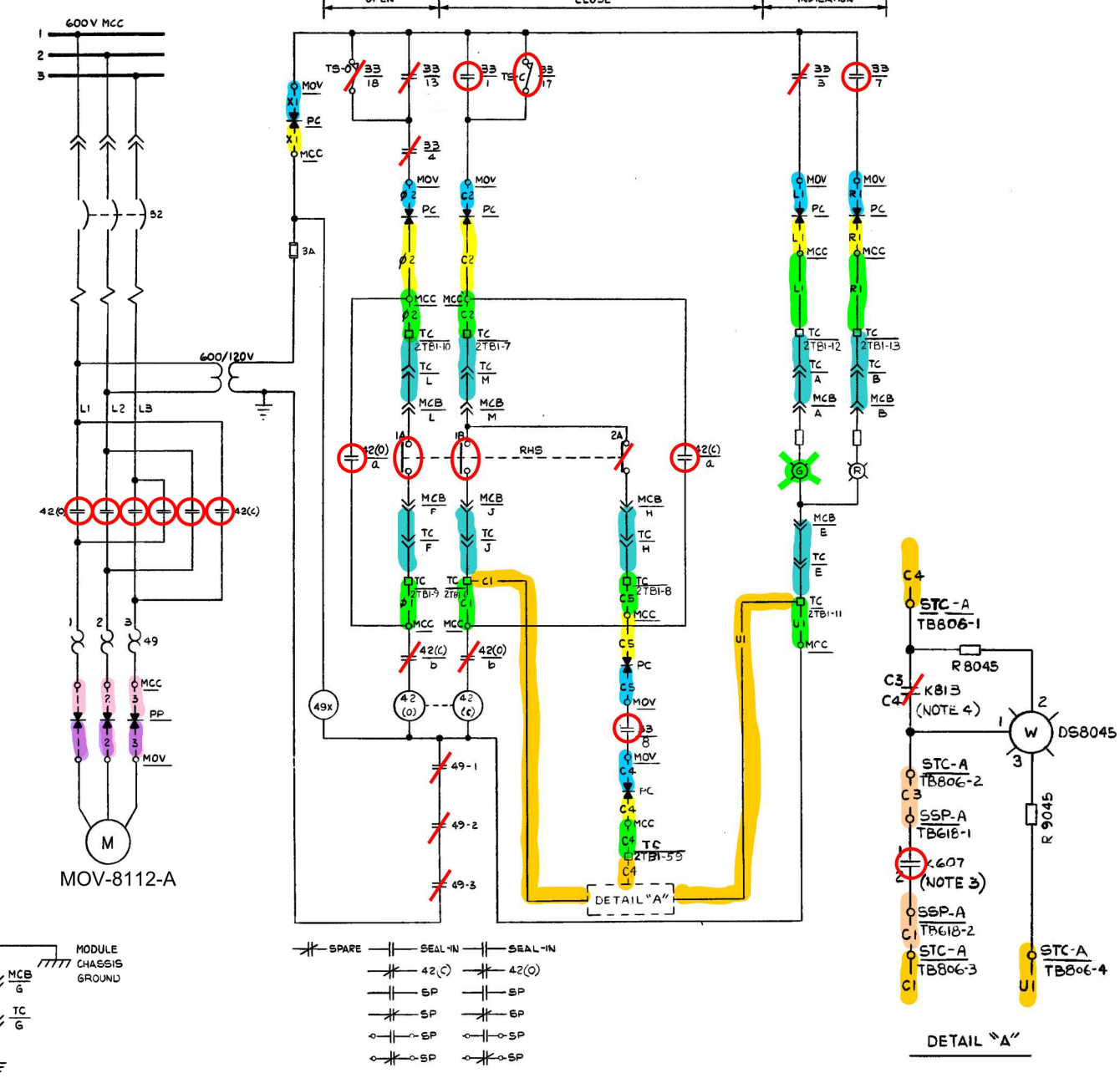
Req'd

☐

Cable Analysis

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
1VAFU-T4A	N	N	NR	
1VAFU-T4B	Y	N	S/O-HS	Conductor 01
1VAFU-T4C	N	N	NR	
1VAFU-T4D	N	N	NR	
1VAFU-T4F	N	N	NR	
1VAFU-T4P	N	N	NR	3-Phase power cable
1VAFU-T4Q	N	N	NR	3-Phase power cable
1VAFU-T4Z	Y	N	S/O-HS	Conductor 01

MCC-1B BKR 11BD



Limit & Torque Switch

LIMIT SWITCH CONTACT DEVELOPMENT		
CONT	VALVE POSITION	FUNCTION
1	FULL OPEN	BY PASS CKT
2	FULL OPEN	SPARE
3	FULL OPEN	SPARE
4	FULL OPEN	SPARE
5	FULL OPEN	SPARE
6	FULL OPEN	SPARE
7	FULL OPEN	SPARE
8	FULL OPEN	SPARE
9	FULL OPEN	SPARE
10	FULL OPEN	SPARE
11	FULL OPEN	SPARE
12	FULL OPEN	SPARE
13	FULL OPEN	SPARE
14	FULL OPEN	SPARE
15	FULL OPEN	SPARE
16	FULL OPEN	SPARE

CONTACT CLOSED
17 CLOSING TORQUE SWITCH INTERRUPTS CONTROL CIRCUIT IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE
18 OPENING TORQUE SWITCH INTERRUPTS CONTROL CIRCUIT IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE

Hand Switch

RHS	BLK	CONT	CLOSE	AUTO	OPEN
1	A	X			X
2	A	X			X
3	A	X			X

REMOTE HANDSWITCH
GEMCO CAT NO 404532221-Y-AA3,A4
SPRING RETURN TC AUTO

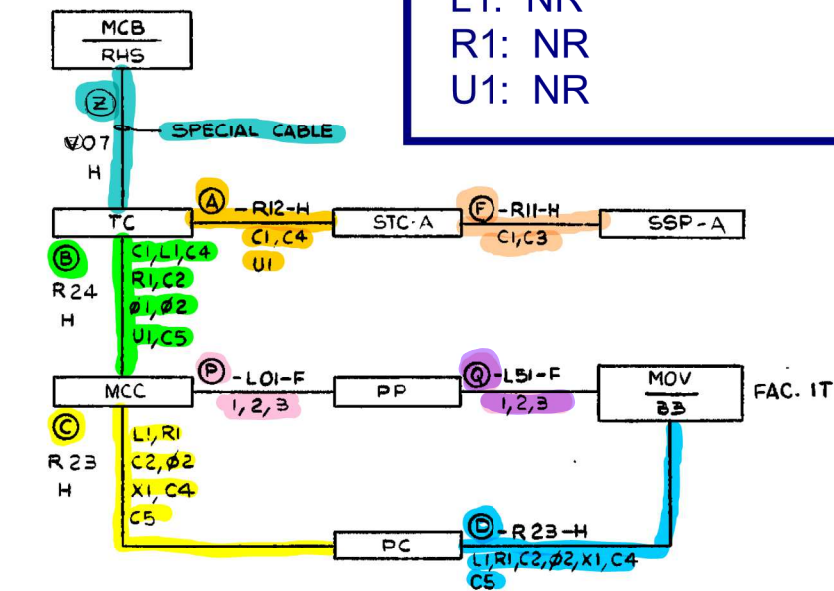
NOTES

1. VALVE IS SHOWN IN FULLY CLOSED POSITION.
2. FOR MOTOR AND STARTER SIZE, SEE DWG B-177556 SHEET 19A.
3. CONTACT CLOSING ON CONTAINMENT ISOLATION. ACTUATION SIGNAL. PHASE A
4. CONTACT OPENS ON TEST OF K607 RELAY.

REFERENCE DRAWINGS

- A-177538-ELECTRICAL GENERAL DETAILS AND NOTES
B-177556-MCC SCHEDULES

1,2,3: NR
X1: NR
01: S/O-HS
02: NR
C1: NR
C2: NR
C3: NR
C4: NR
C5: NR
L1: NR
R1: NR
U1: NR



BLOCK DIAGRAM

Example: 2

Normal Position:

Failed Elec Position:

MOV-8112-A

CLOSED

AS-IS

Case: 2B

Function State: CLOSED - CLOSED

Component ID	MOV-8112-A	Component Type	MOV
Component Description	RCP Seal Water Return Isolation		

Component Type MOV

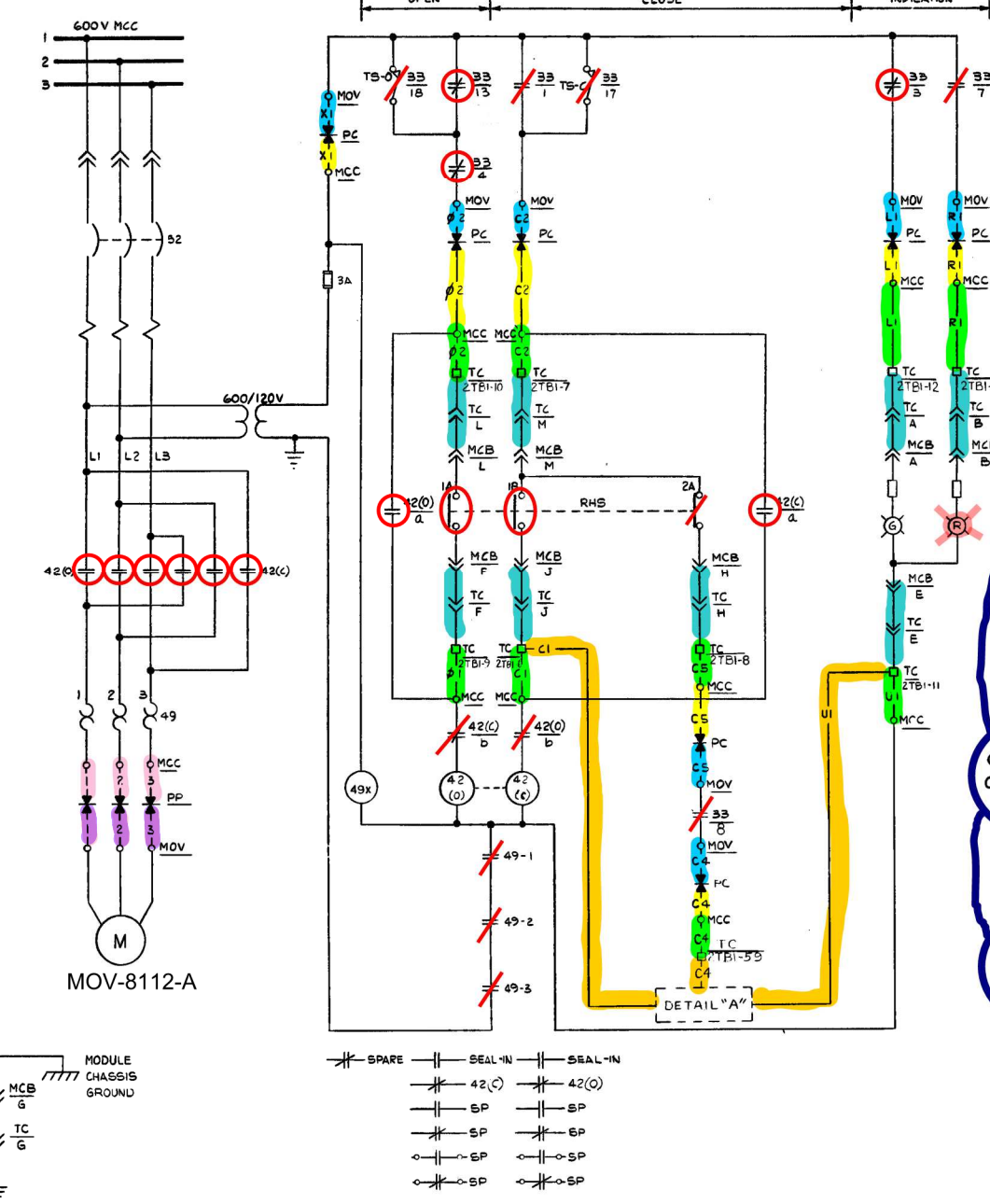
Component Description	RCP Seal Water Return Isolation
1. Isolation Valve	1. Isolation Valve
2. Check Valve	2. Check Valve
3. Flange	3. Flange
4. Gasket	4. Gasket
5. Bolt	5. Bolt
6. Nut	6. Nut
7. Washer	7. Washer
8. Seal	8. Seal
9. O-ring	9. O-ring
10. Plug	10. Plug
11. Cap	11. Cap
12. Cover	12. Cover
13. Bracket	13. Bracket
14. Mounting Plate	14. Mounting Plate
15. Support Structure	15. Support Structure
16. Foundation	16. Foundation
17. Anchoring System	17. Anchoring System
18. Reinforcement	18. Reinforcement
19. Protection Layer	19. Protection Layer
20. Drainage System	20. Drainage System
21. Ventilation System	21. Ventilation System
22. Heating System	22. Heating System
23. Cooling System	23. Cooling System
24. Filtration System	24. Filtration System
25. Monitoring System	25. Monitoring System
26. Control System	26. Control System
27. Safety System	27. Safety System
28. Emergency System	28. Emergency System
29. Backup System	29. Backup System
30. Redundancy System	30. Redundancy System
31. Fail-Safe System	31. Fail-Safe System
32. Interlocking System	32. Interlocking System
33. Locking System	33. Locking System
34. Unlocking System	34. Unlocking System
35. Reset System	35. Reset System
36. Test System	36. Test System
37. Calibration System	37. Calibration System
38. Maintenance System	38. Maintenance System
39. Repair System	39. Repair System
40. Replacement System	40. Replacement System
41. Upgrade System	41. Upgrade System
42. Expansion System	42. Expansion System
43. Modification System	43. Modification System
44. Customization System	44. Customization System
45. Personalization System	45. Personalization System
46. Configuration System	46. Configuration System
47. Optimization System	47. Optimization System
48. Enhancement System	48. Enhancement System
49. Improvement System	49. Improvement System
50. Upgrade System	50. Upgrade System

High Consequence Component Yes ☐ No ☒

Req'd ☐

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
1VAFU-T4A	Y	N	LOC-BF	
1VAFU-T4B	Y	N	LOC-BF, S/O-HS	
1VAFU-T4C	Y	N	LOC-BF	
1VAFU-T4D	Y	N	LOC-BF	
1VAFU-T4F	Y	N	LOC-BF	
1VAFU-T4P	Y	N	LOP	3-Phase power cable
1VAFU-T4Q	Y	N	LOP	3-Phase power cable
1VAFU-T4Z	Y	N	LOC-BF, S/O-HS	

MCC-1B BKR 11BD



Limit & Torque Switch

LIMIT SWITCH CONTACT DEVELOPMENT		
CONT	VALVE POSITION	FUNCTION
1	FULL OPEN	BY PASS CKT
2	FULL OPEN	SPARE
3	FULL OPEN	SPARE
4	FULL OPEN	SPARE
5	FULL OPEN	SPARE
6	FULL OPEN	SPARE
7	FULL OPEN	SPARE
8	FULL OPEN	SPARE
9	FULL OPEN	SPARE
10	FULL OPEN	SPARE
11	FULL OPEN	SPARE
12	FULL OPEN	SPARE
13	FULL OPEN	SPARE
14	FULL OPEN	SPARE
15	FULL OPEN	SPARE
16	FULL OPEN	SPARE

CONTACT CLOSED
17 CLOSING TORQUE SWITCH INTERRUPTS CONTROL CIRCUIT IF MECHANICAL OVERLOAD OCCURS DURING CLOSING CYCLE
18 OPENING TORQUE SWITCH INTERRUPTS CONTROL CIRCUIT IF MECHANICAL OVERLOAD OCCURS DURING OPENING CYCLE

RHS	BLK	CONT	CLOSE	AUTO	OPEN
1	A	X			X
2	A	X			X
3	A	X			X
4	A	X			X
5	A	X			X
6	A	X			X
7	A	X			X
8	A	X			X
9	A	X			X
10	A	X			X
11	A	X			X
12	A	X			X
13	A	X			X
14	A	X			X
15	A	X			X
16	A	X			X

REMOTE HANDSWITCH
GEMCO CAT NO 40453221-Y-AA3,A4
SPRING RETURN TC AUTO

Equipment Dependency - both off-scheme circuits must function correctly for auto-function (CIS) to work properly - See Notes 3 & 4.

Hand Switch

NOTES

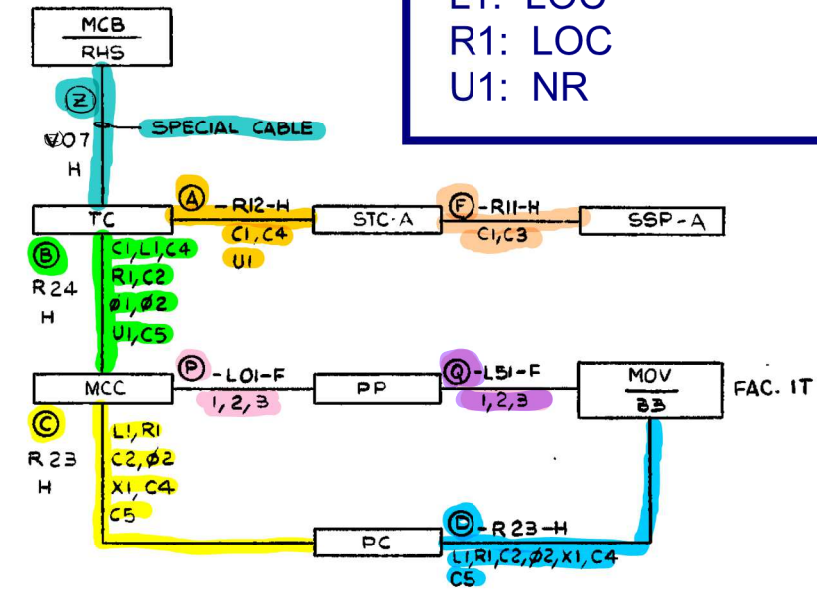
1. VALVE IS SHOWN IN FULLY CLOSED POSITION.
2. FOR MOTOR AND STARTER SIZE, SEE DWG B-177556 SHEET 19A.
3. CONTACT CLOSING ON CONTAINMENT ISOLATION. ACTUATION SIGNAL. PHASE A
4. CONTACT OPENS ON TEST OF K607 RELAY.

REFERENCE DRAWINGS

- A-177538-ELECTRICAL GENERAL DETAILS AND NOTES
B-177556-MCC SCHEDULES

- 1,2,3: LOP
X1: LOC
01: LOC, S/O-HS
02: LOC
C1: LOC
C2: LOC
C3: LOC
C4: LOC
C5: LOC
L1: LOC
R1: LOC
U1: NR

DETAIL "A"



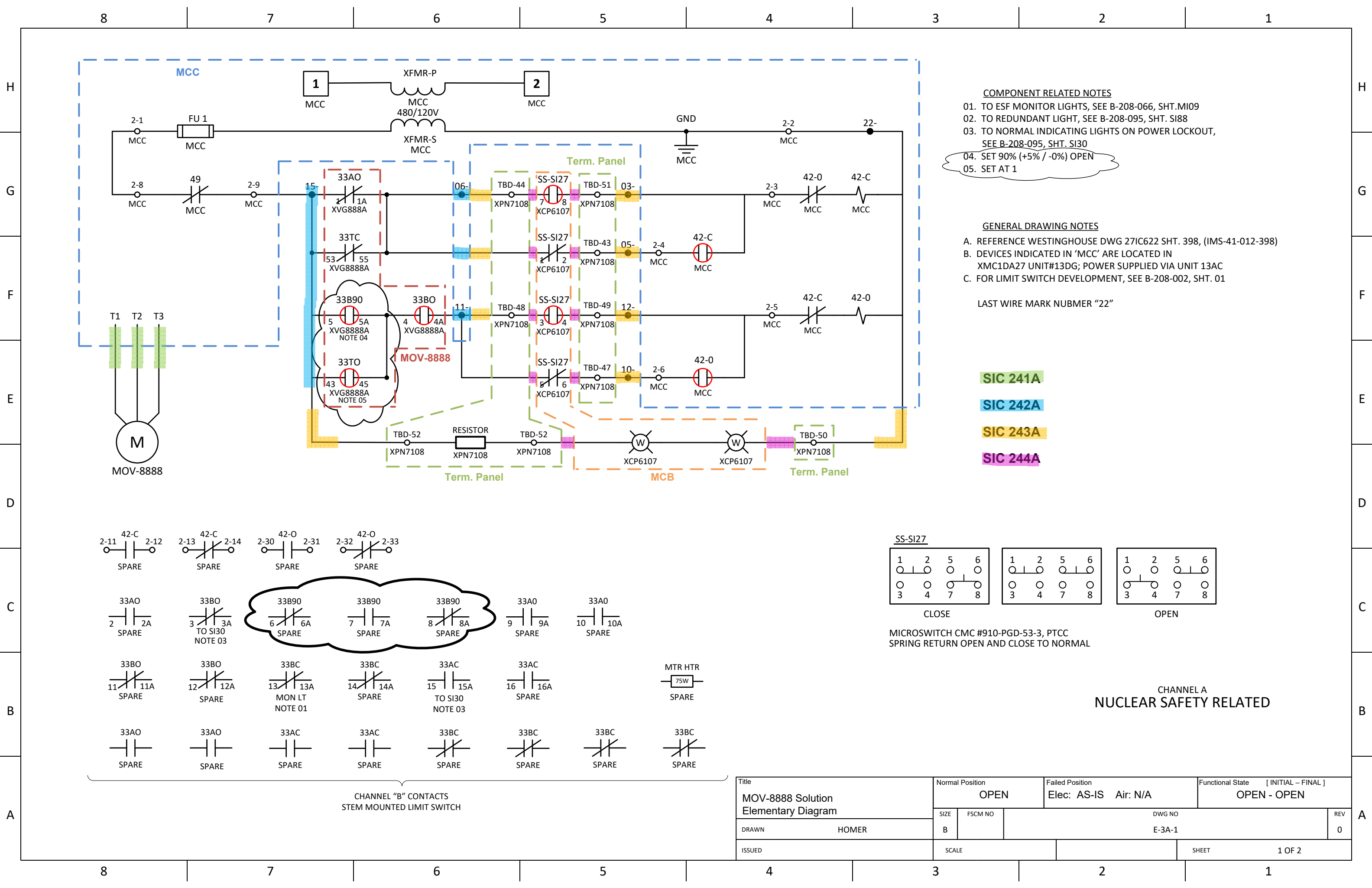
BLOCK DIAGRAM

SERVICE	FAC	SCHEM	MOV	MCC	MCB	TC	SSP-A	PC	HS	START-UP	DRAWING	POWER	SOLID STATE	STC-A	33
REACTOR COOLANT PUMPS SEAL WATER RETURN ISOLATION	IV	AFU-T4	Q1E21 MOV8112-A	MCC-1B 11BD	MAIN CONTROL BOARD	TERMINATION CABINET	SOLID STATE PROT. SYSTEM	CONTROL PENETRATION	REMOTE HANDSWITCH	NIE21 HSB112-A	40	U170028	Q1752B014-A	Q1752B014-A	ZS8112-A

Example: 2
Normal Position: CLOSED
Failed Elec Position: AS-IS

Case: 2C
Function State: OPEN - CLOSED

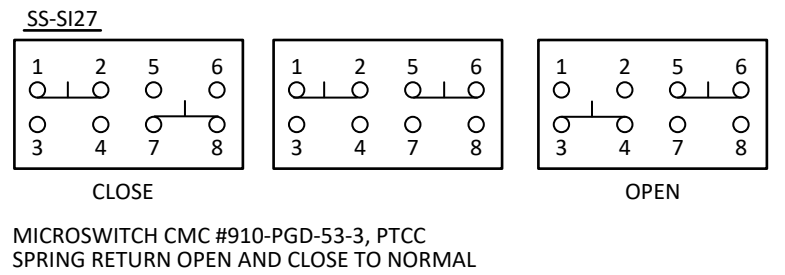
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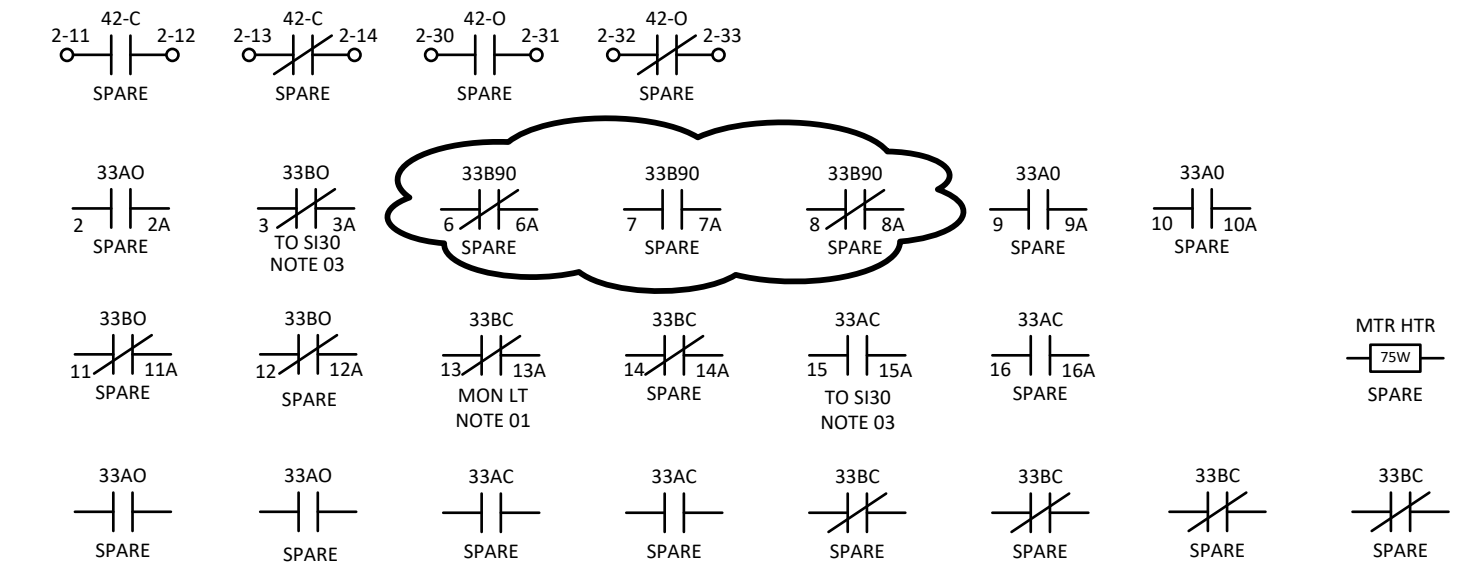
- COMPONENT RELATED NOTES**
- 01. TO ESF MONITOR LIGHTS, SEE B-208-066, SHT.MI09
 - 02. TO REDUNDANT LIGHT, SEE B-208-095, SHT. SI88
 - 03. TO NORMAL INDICATING LIGHTS ON POWER LOCKOUT, SEE B-208-095, SHT. SI30
 - 04. SET 90% (+5% / -0%) OPEN
 - 05. SET AT 1

- GENERAL DRAWING NOTES**
- A. REFERENCE WESTINGHOUSE DWG 27IC622 SHT. 398, (IMS-41-012-398)
 - B. DEVICES INDICATED IN 'MCC' ARE LOCATED IN XMC1DA27 UNIT#13DG; POWER SUPPLIED VIA UNIT 13AC
 - C. FOR LIMIT SWITCH DEVELOPMENT, SEE B-208-002, SHT. 01
- LAST WIRE MARK NUBMER "22"

- SIC 241A
- SIC 242A
- SIC 243A
- SIC 244A

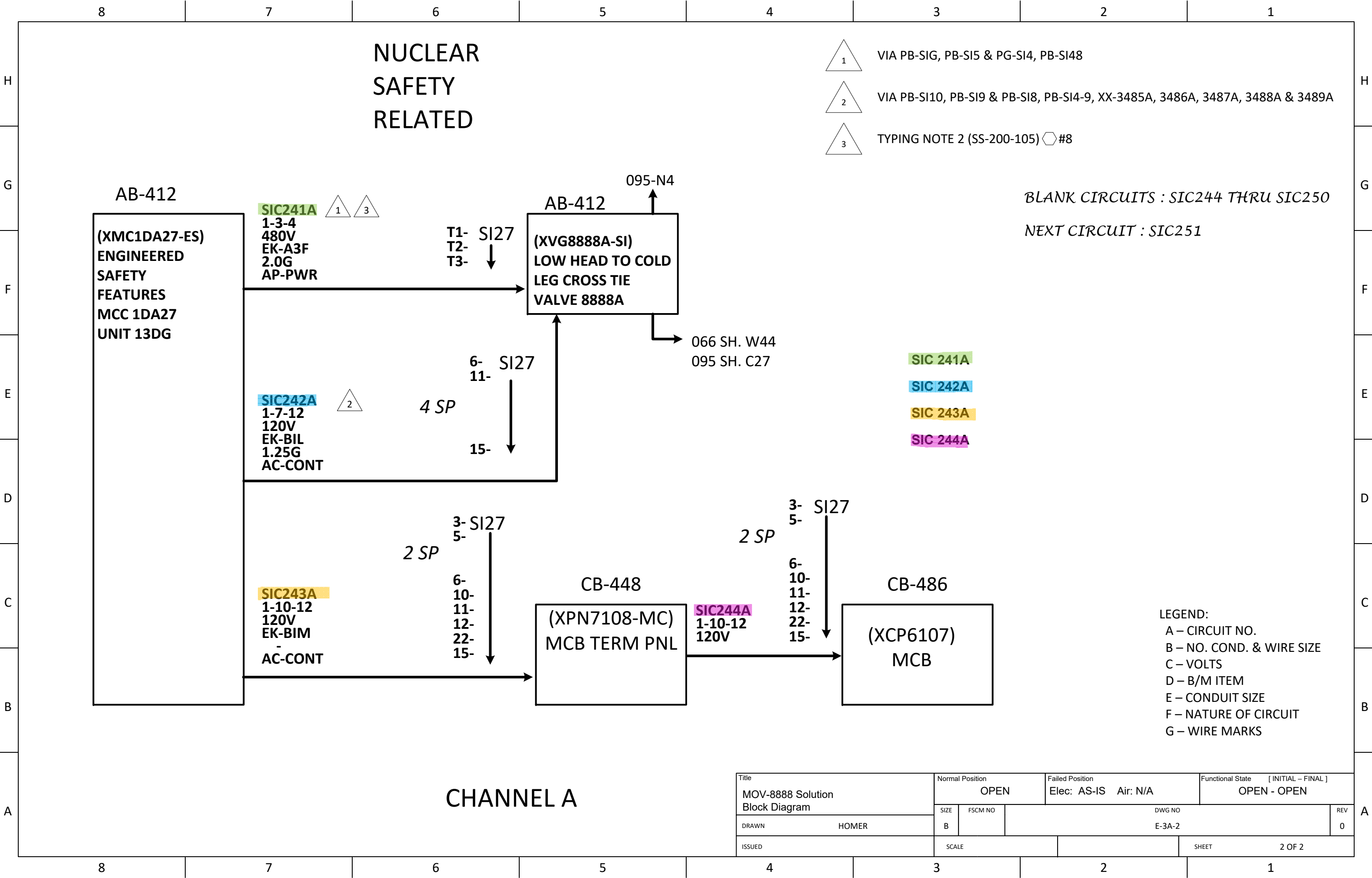


CHANNEL A
NUCLEAR SAFETY RELATED



CHANNEL "B" CONTACTS
STEM MOUNTED LIMIT SWITCH

Title MOV-8888 Solution Elementary Diagram		Normal Position OPEN		Failed Position Elec: AS-IS Air: N/A		Functional State [INITIAL - FINAL] OPEN - OPEN	
		SIZE B	FSCM NO	DWG NO E-3A-1			REV 0
DRAWN HOMER		ISSUED		SCALE		SHEET 1 OF 2	



Component ID	<u>MOV-8888</u>	Component Type	<u>MOV</u>
Component Description	<u>Example 3B</u>		

Component Type MOV

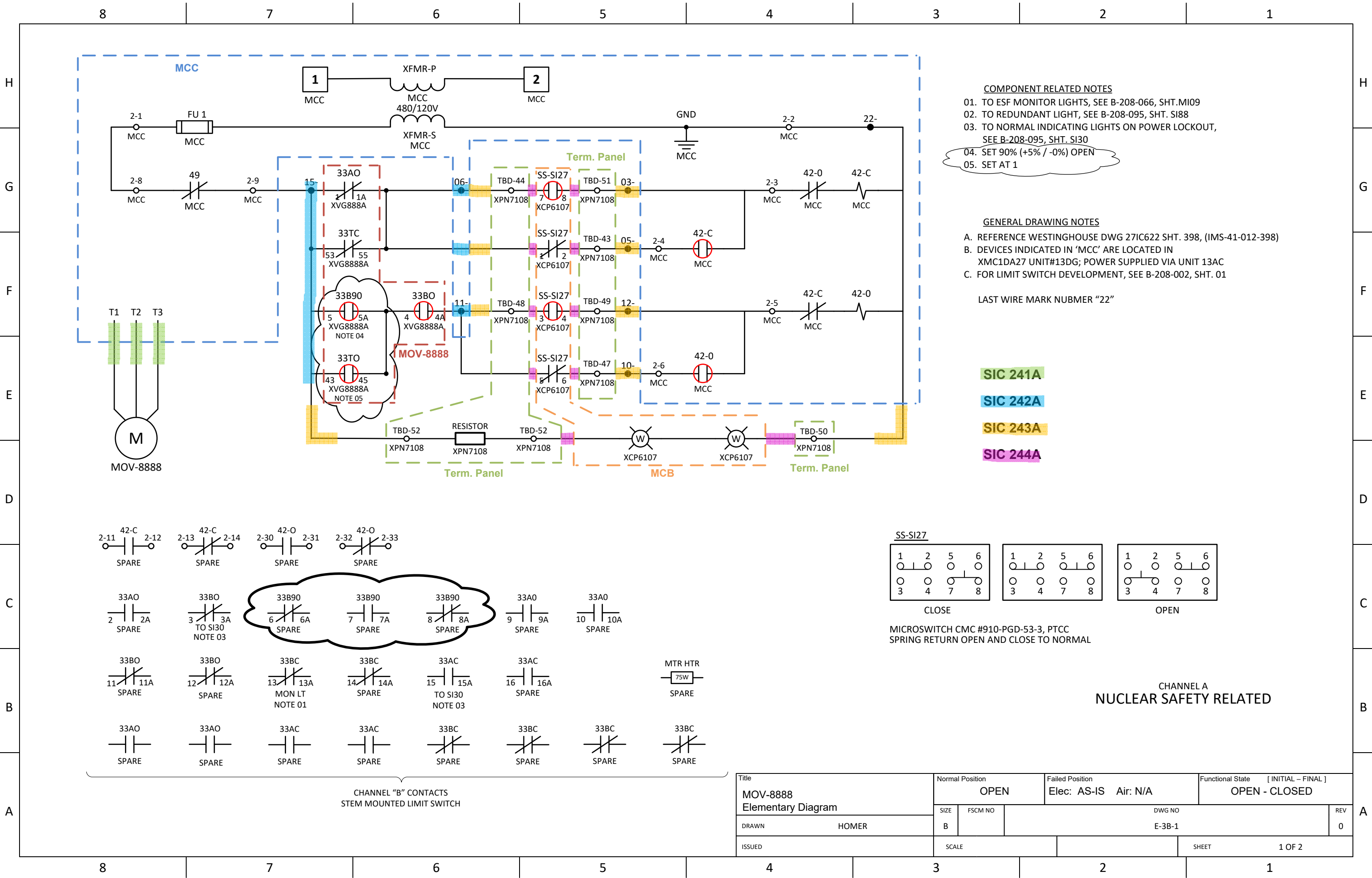
Component Description	Example 3B
-----------------------	------------

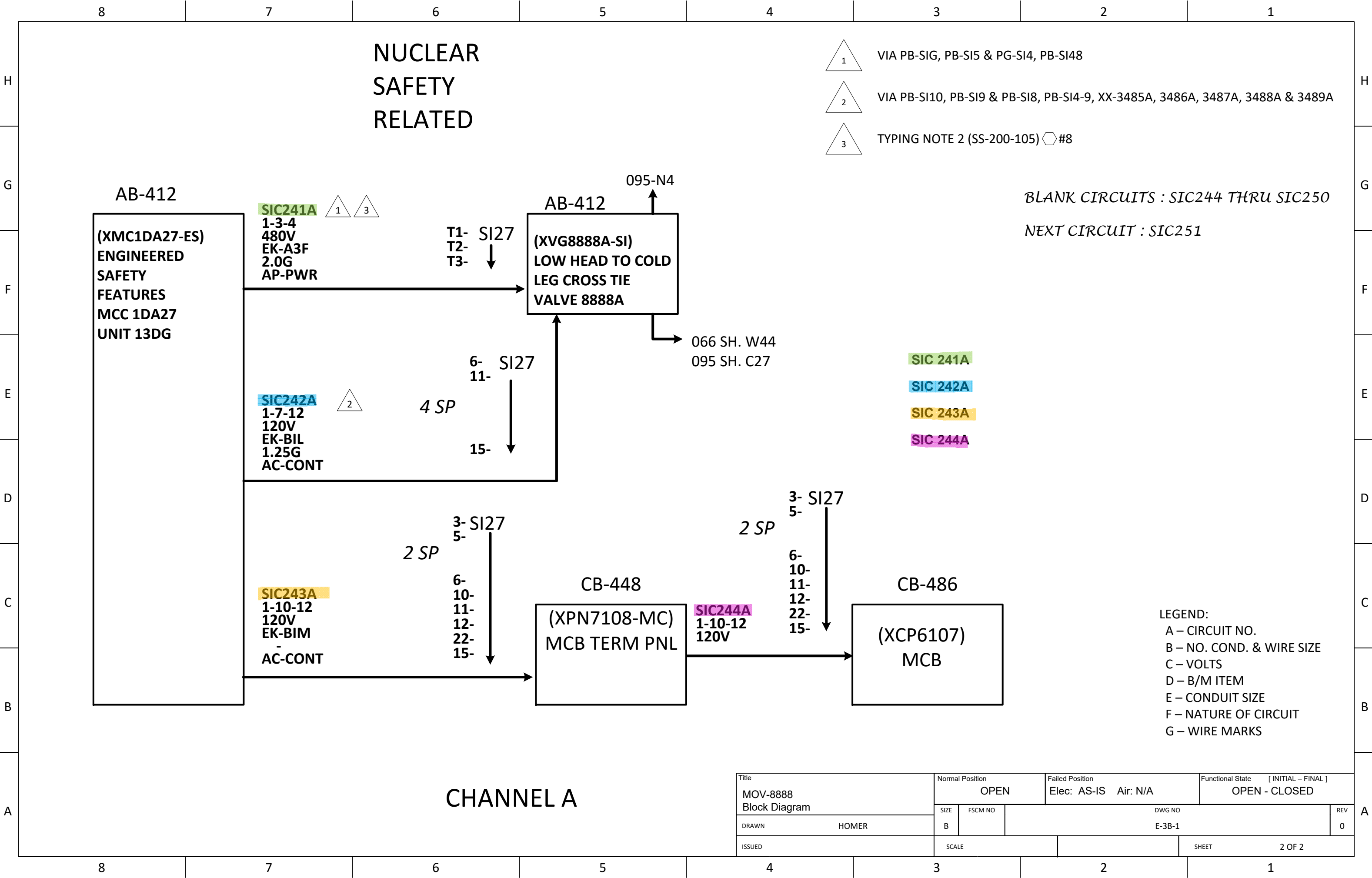
Normal Position	Open
Failed Electrical Position	As-Is
Failed Air Position	N/A
Function State	8888-O-C
Initial Position	Open
Desired Position	Closed
BE Code	8888_FTC

High Consequence Component Yes ☐ No ☒

Power Supplies	<u>MCC-1DA2Y</u>	Breaker	<u>13DG</u>	Req'd	☒
		Breaker		Req'd	☐

[illegible]





CIRCUIT ANALYSIS WORKSHEET (EX-4A)

Component ID AOV-2869-A

Component Type AOV

Component Description Example 4A

Normal Position	<u>Closed</u>
Failed Electrical Position	<u>Closed</u>
Failed Air Position	<u>Closed</u>
Function State	<u>2869A-C-C</u>
Initial Position	<u>Closed</u>
Desired Position	<u>Closed</u>
BE Code	<u>2869A_FTRC</u>

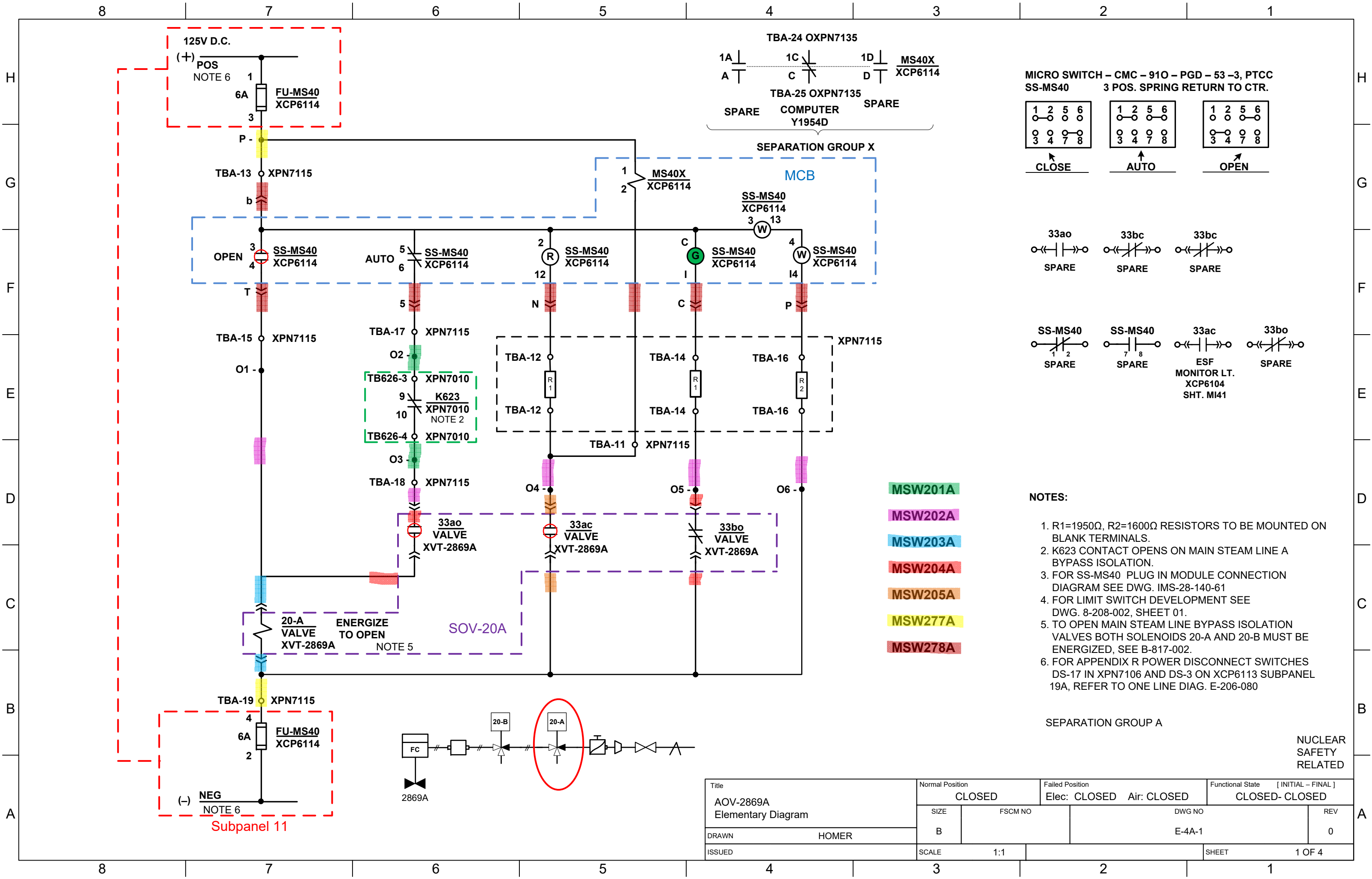
High Consequence Component Yes ☐ No ☒

Power Supplies Subpanel 11
 Subpanel 12

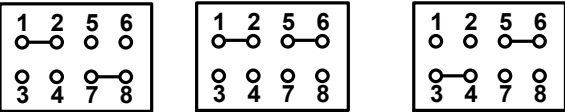
Breaker FU-MS40 Req'd ☐
Breaker FU-MS43 Req'd ☐

Cable Analysis

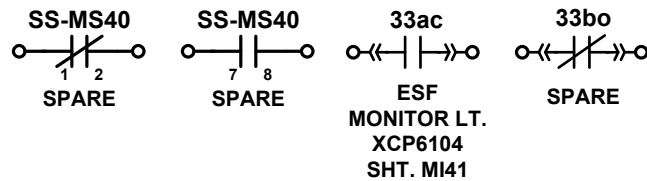
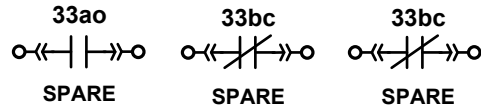
Cable ID	Req'd?	MHS?	Fault Consequence	Comments
MSW201A	-	-	NR	
MSW202A	Y	Y	S/O-HS	
MSW203A	Y	Y	S/O-HS	
MSW204A	Y	Y	S/O-HS	
MSW205A	-	-	NR	
MSW277A	-	-	NR	
MSW278A	Y	Y	S/O-HS	
MSW231B	Y	Y	S/O-HS	
MSW232B	Y	Y	S/O-HS	
MSW233B	Y	Y	S/O-HS	
MSW234B	Y	Y	S/O-HS	
MSW235B	Y	Y	S/O-HS	
MSW236B	Y	Y	S/O-HS	



MICRO SWITCH – CMC – 910 – PGD – 53 –3, PTCC
SS-MS40 3 POS. SPRING RETURN TO CTR.



CLOSE AUTO OPEN

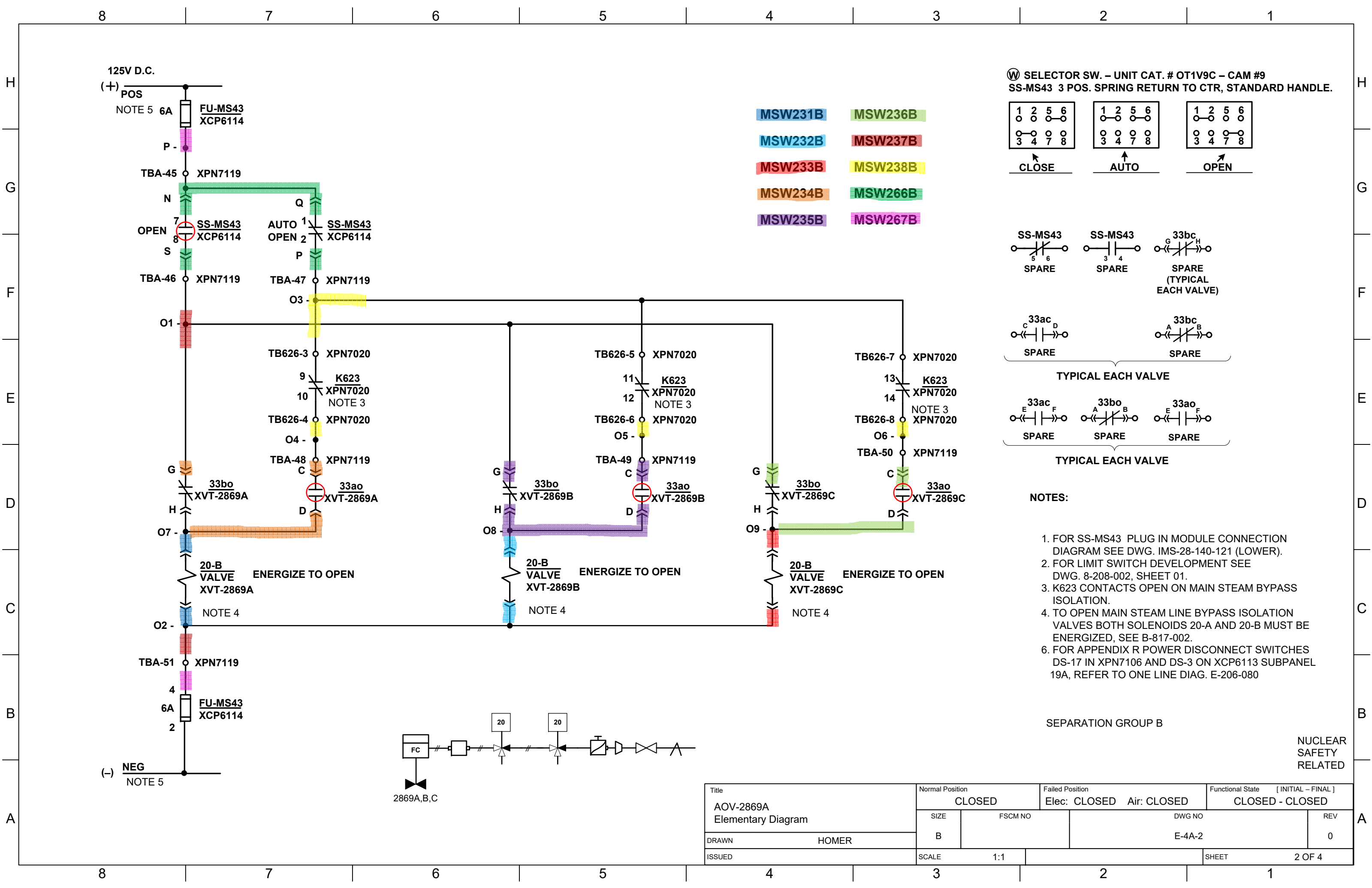


- NOTES:
1. R1=1950Ω, R2=1600Ω RESISTORS TO BE MOUNTED ON BLANK TERMINALS.
 2. K623 CONTACT OPENS ON MAIN STEAM LINE A BYPASS ISOLATION.
 3. FOR SS-MS40 PLUG IN MODULE CONNECTION DIAGRAM SEE DWG. IMS-28-140-61
 4. FOR LIMIT SWITCH DEVELOPMENT SEE DWG. 8-208-002, SHEET 01.
 5. TO OPEN MAIN STEAM LINE BYPASS ISOLATION VALVES BOTH SOLENOIDS 20-A AND 20-B MUST BE ENERGIZED, SEE B-817-002.
 6. FOR APPENDIX R POWER DISCONNECT SWITCHES DS-17 IN XPN7106 AND DS-3 ON XCP6113 SUBPANEL 19A, REFER TO ONE LINE DIAG. E-206-080

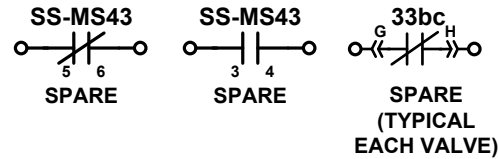
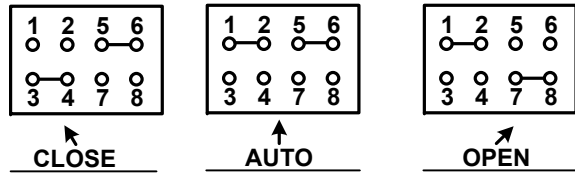
SEPARATION GROUP A

NUCLEAR
SAFETY
RELATED

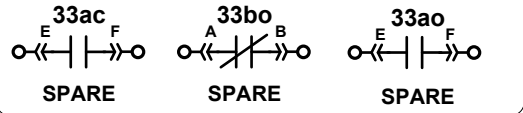
Title AOV-2869A Elementary Diagram	Normal Position CLOSED		Failed Position Elec: CLOSED Air: CLOSED		Functional State [INITIAL – FINAL] CLOSED- CLOSED	
	SIZE B	FSCM NO		DWG NO E-4A-1		REV 0
DRAWN HOMER	SCALE 1:1		SHEET 1 OF 4			
ISSUED						



Ⓢ SELECTOR SW. - UNIT CAT. # OT1V9C - CAM #9
SS-MS43 3 POS. SPRING RETURN TO CTR, STANDARD HANDLE.



TYPICAL EACH VALVE



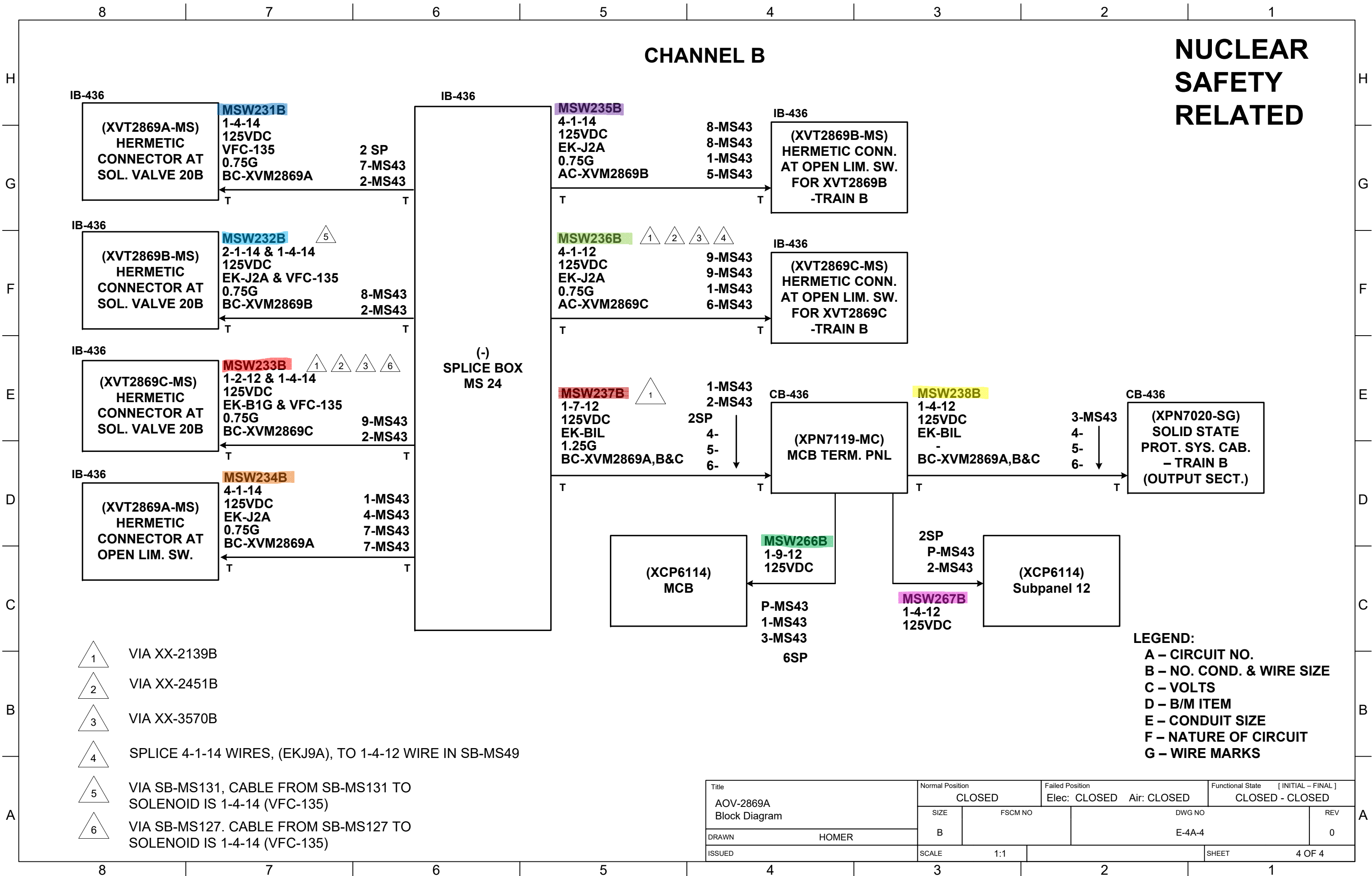
TYPICAL EACH VALVE

- NOTES:
- 1. FOR SS-MS43 PLUG IN MODULE CONNECTION DIAGRAM SEE DWG. IMS-28-140-121 (LOWER).
 - 2. FOR LIMIT SWITCH DEVELOPMENT SEE DWG. 8-208-002, SHEET 01.
 - 3. K623 CONTACTS OPEN ON MAIN STEAM BYPASS ISOLATION.
 - 4. TO OPEN MAIN STEAM LINE BYPASS ISOLATION VALVES BOTH SOLENOIDS 20-A AND 20-B MUST BE ENERGIZED, SEE B-817-002.
 - 6. FOR APPENDIX R POWER DISCONNECT SWITCHES DS-17 IN XPN7106 AND DS-3 ON XCP6113 SUBPANEL 19A, REFER TO ONE LINE DIAG. E-206-080

SEPARATION GROUP B

NUCLEAR
SAFETY
RELATED

Title AOV-2869A Elementary Diagram	Normal Position CLOSED		Failed Position Elec: CLOSED Air: CLOSED		Functional State [INITIAL - FINAL] CLOSED - CLOSED	
	SIZE B	FSCM NO		DWG NO E-4A-2		REV 0
DRAWN HOMER		SCALE 1:1		SHEET 2 OF 4		
ISSUED						



CIRCUIT ANALYSIS WORKSHEET (EX-4B)

Component ID AOV-2869-A

Component Type AOV

Component Description Example 4B

Normal Position	<u>Closed</u>
Failed Electrical Position	<u>Closed</u>
Failed Air Position	<u>Closed</u>
Function State	<u>2869A-C-O</u>
Initial Position	<u>Closed</u>
Desired Position	<u>Open</u>
BE Code	<u>2869A_FTO</u>

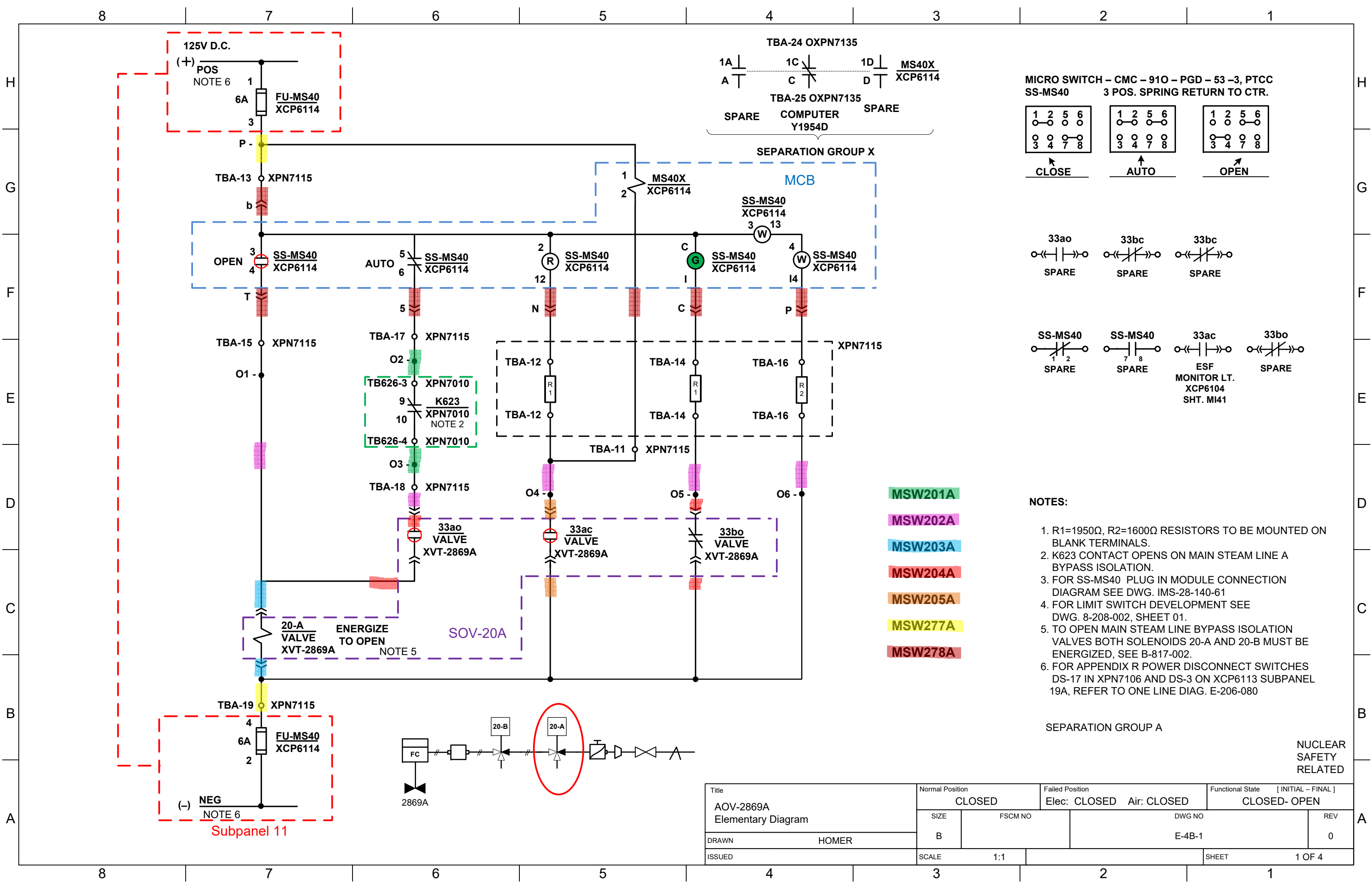
High Consequence Component Yes ☐ No ☒

Power Supplies Subpanel 11
 Subpanel 12

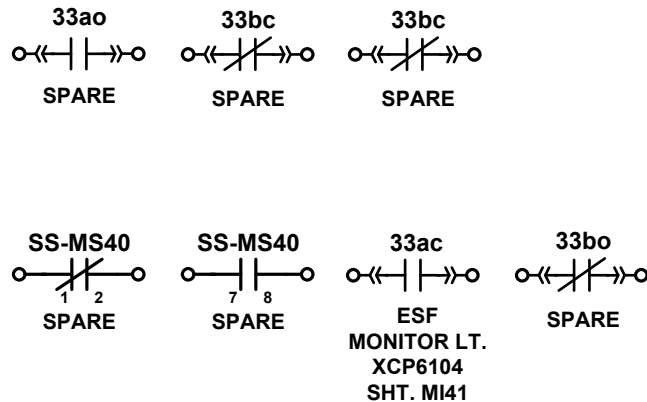
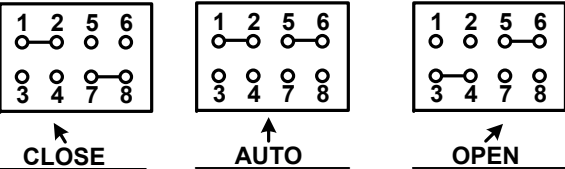
Breaker FU-MS40 Req'd ☒
Breaker FU-MS43 Req'd ☒

Cable Analysis

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
MSW201A	Y	N	LOC-FTO	
MSW202A	Y	N	LOC-FTO	
MSW203A	Y	N	LOC-FTO	
MSW204A	Y	N	LOC-FTO	
MSW205A	Y	N	LOC-FTO	
MSW277A	Y	N	LOC-FTO	
MSW278A	Y	N	LOC-FTO	
MSW231B	Y	N	LOC-FTO	
MSW232B	Y	N	LOC-FTO	
MSW233B	Y	N	LOC-FTO	
MSW234B	Y	N	LOC-FTO	
MSW235B	Y	N	LOC-FTO	
MSW236B	Y	N	LOC-FTO	



MICRO SWITCH – CMC – 910 – PGD – 53 –3, PTCC
SS-MS40 3 POS. SPRING RETURN TO CTR.

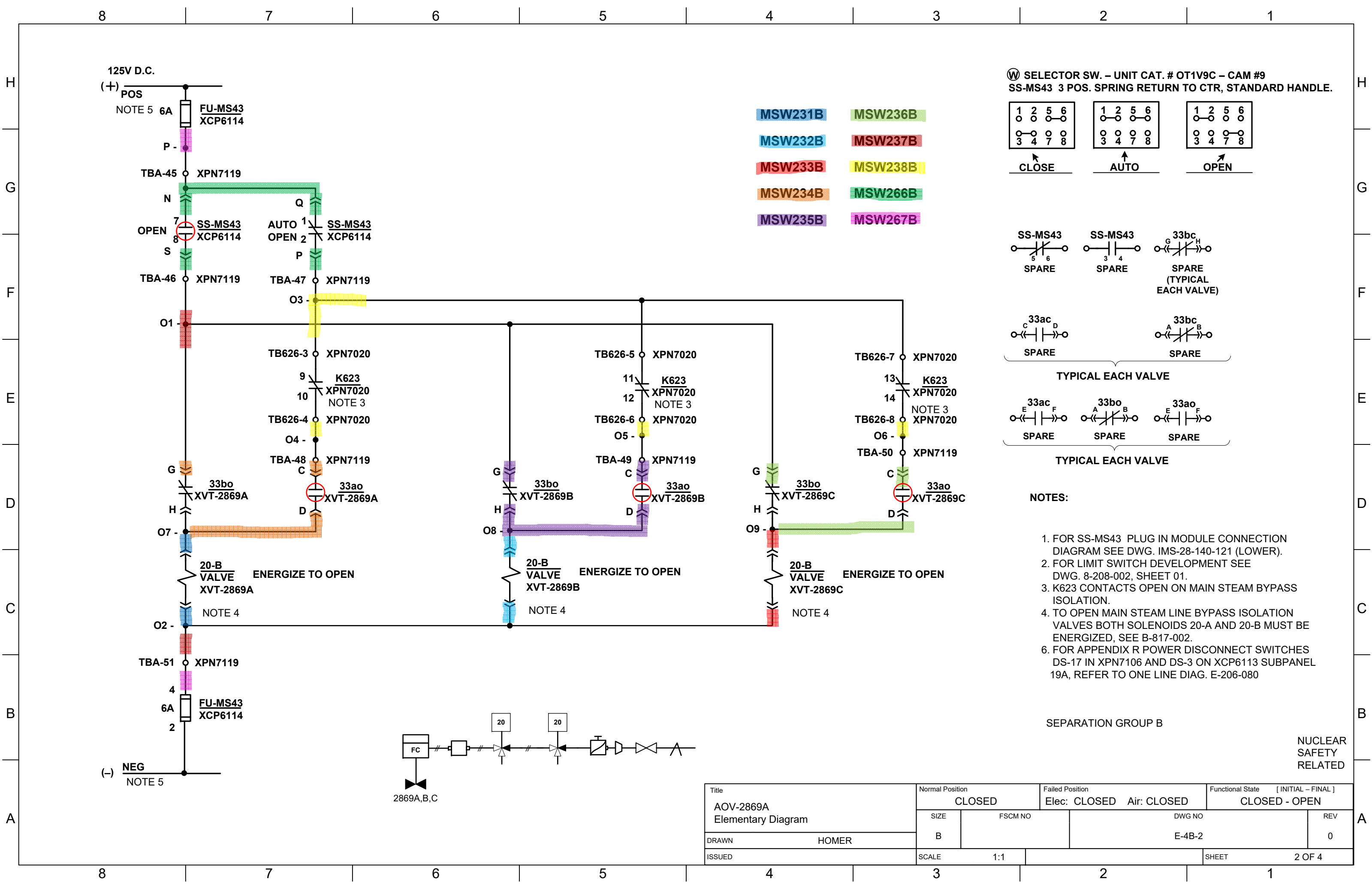


- NOTES:
- 1. R1=1950Ω, R2=1600Ω RESISTORS TO BE MOUNTED ON BLANK TERMINALS.
 - 2. K623 CONTACT OPENS ON MAIN STEAM LINE A BYPASS ISOLATION.
 - 3. FOR SS-MS40 PLUG IN MODULE CONNECTION DIAGRAM SEE DWG. IMS-28-140-61
 - 4. FOR LIMIT SWITCH DEVELOPMENT SEE DWG. 8-208-002, SHEET 01.
 - 5. TO OPEN MAIN STEAM LINE BYPASS ISOLATION VALVES BOTH SOLENOIDS 20-A AND 20-B MUST BE ENERGIZED, SEE B-817-002.
 - 6. FOR APPENDIX R POWER DISCONNECT SWITCHES DS-17 IN XPN7106 AND DS-3 ON XCP6113 SUBPANEL 19A, REFER TO ONE LINE DIAG. E-206-080

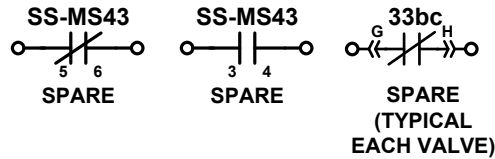
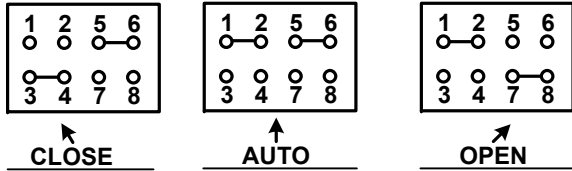
SEPARATION GROUP A

NUCLEAR
SAFETY
RELATED

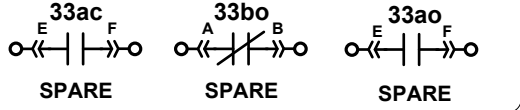
Title AOV-2869A Elementary Diagram	Normal Position CLOSED		Failed Position Elec: CLOSED Air: CLOSED		Functional State [INITIAL – FINAL] CLOSED- OPEN	
	SIZE B	FSCM NO		DWG NO E-4B-1		REV 0
DRAWN HOMER	SCALE 1:1		SHEET 1 OF 4			
ISSUED						



Ⓢ SELECTOR SW. - UNIT CAT. # OT1V9C - CAM #9
SS-MS43 3 POS. SPRING RETURN TO CTR, STANDARD HANDLE.



TYPICAL EACH VALVE



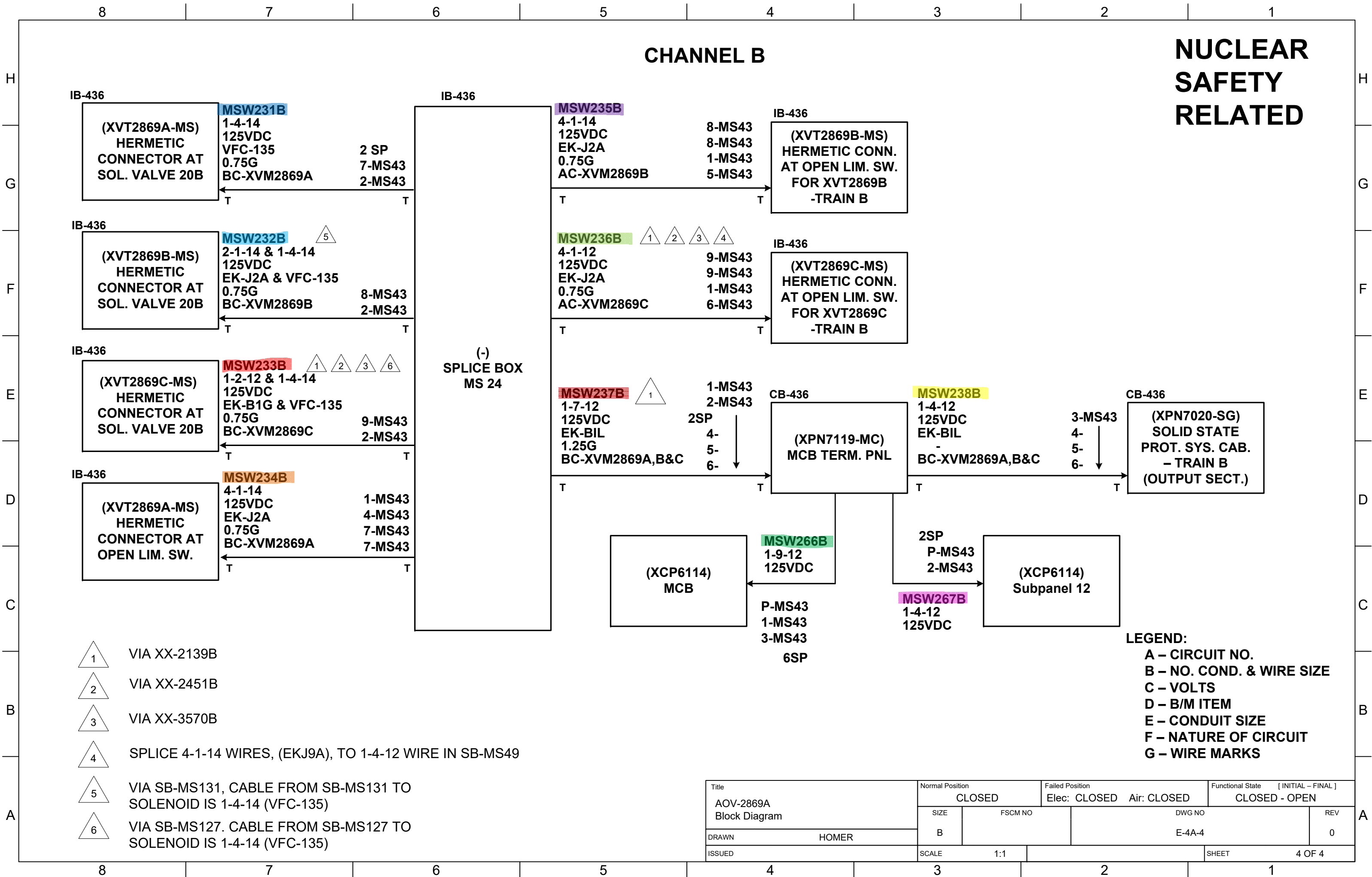
TYPICAL EACH VALVE

- NOTES:
- 1. FOR SS-MS43 PLUG IN MODULE CONNECTION DIAGRAM SEE DWG. IMS-28-140-121 (LOWER).
 - 2. FOR LIMIT SWITCH DEVELOPMENT SEE DWG. 8-208-002, SHEET 01.
 - 3. K623 CONTACTS OPEN ON MAIN STEAM BYPASS ISOLATION.
 - 4. TO OPEN MAIN STEAM LINE BYPASS ISOLATION VALVES BOTH SOLENOIDS 20-A AND 20-B MUST BE ENERGIZED, SEE B-817-002.
 - 6. FOR APPENDIX R POWER DISCONNECT SWITCHES DS-17 IN XPN7106 AND DS-3 ON XCP6113 SUBPANEL 19A, REFER TO ONE LINE DIAG. E-206-080

SEPARATION GROUP B

NUCLEAR
SAFETY
RELATED

Title AOV-2869A Elementary Diagram	Normal Position CLOSED		Failed Position Elec: CLOSED Air: CLOSED		Functional State [INITIAL - FINAL] CLOSED - OPEN	
	SIZE B	FSCM NO		DWG NO E-4B-2		REV 0
DRAWN HOMER		SCALE 1:1		SHEET 2 OF 4		
ISSUED						



Component Description	Example 5
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High Consequence Component Yes ☐ No ☒

Power Supplies	<u>DC Bus 1B</u>	Breaker	<u>LB02</u>	Req'd	☒
		Breaker		Req'd	☐

[illegible]

Cable ID	Req'd?	MHS?	Fault Consequence	Comments

Equipment Dependencies

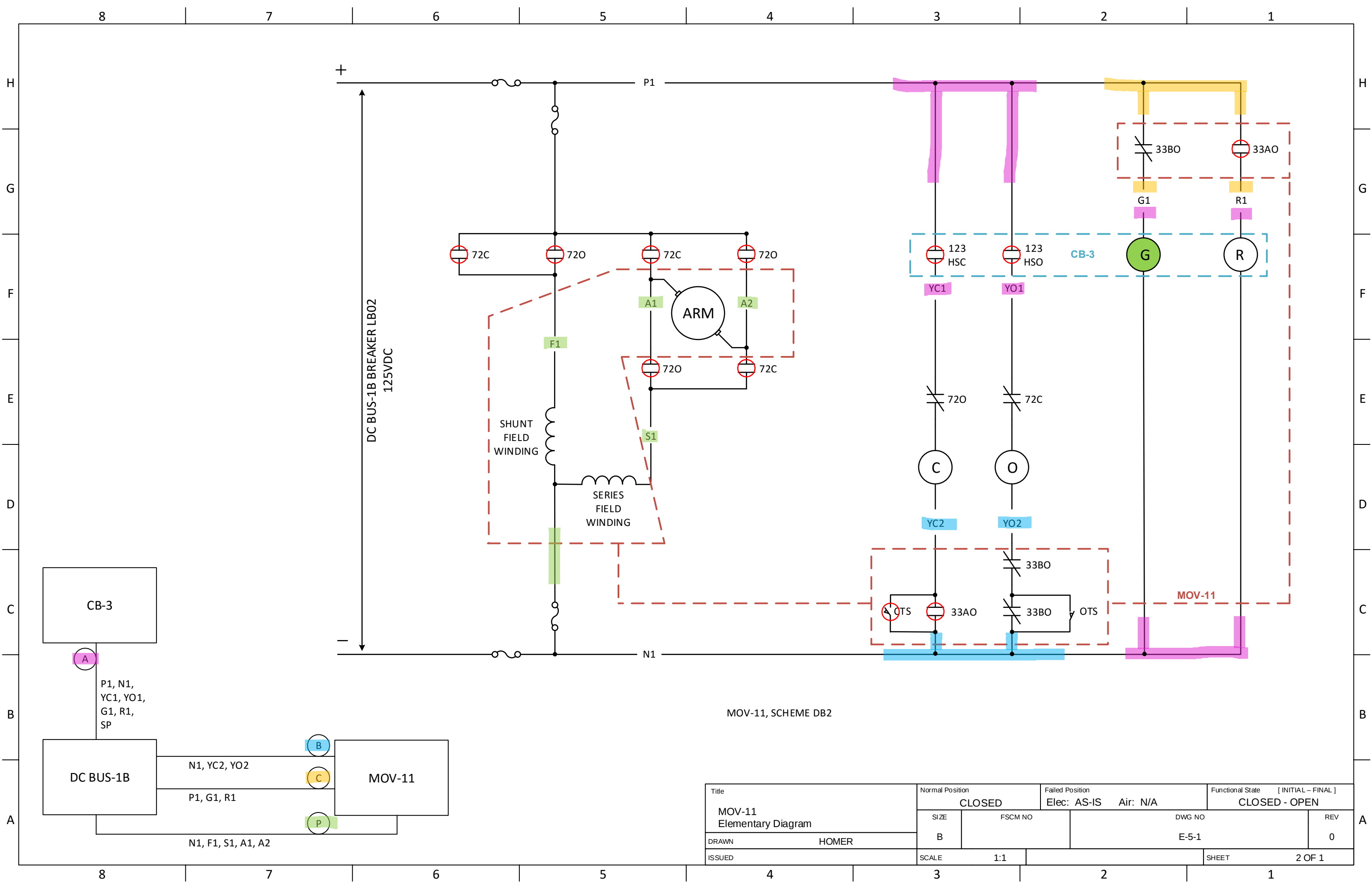
None

Comments

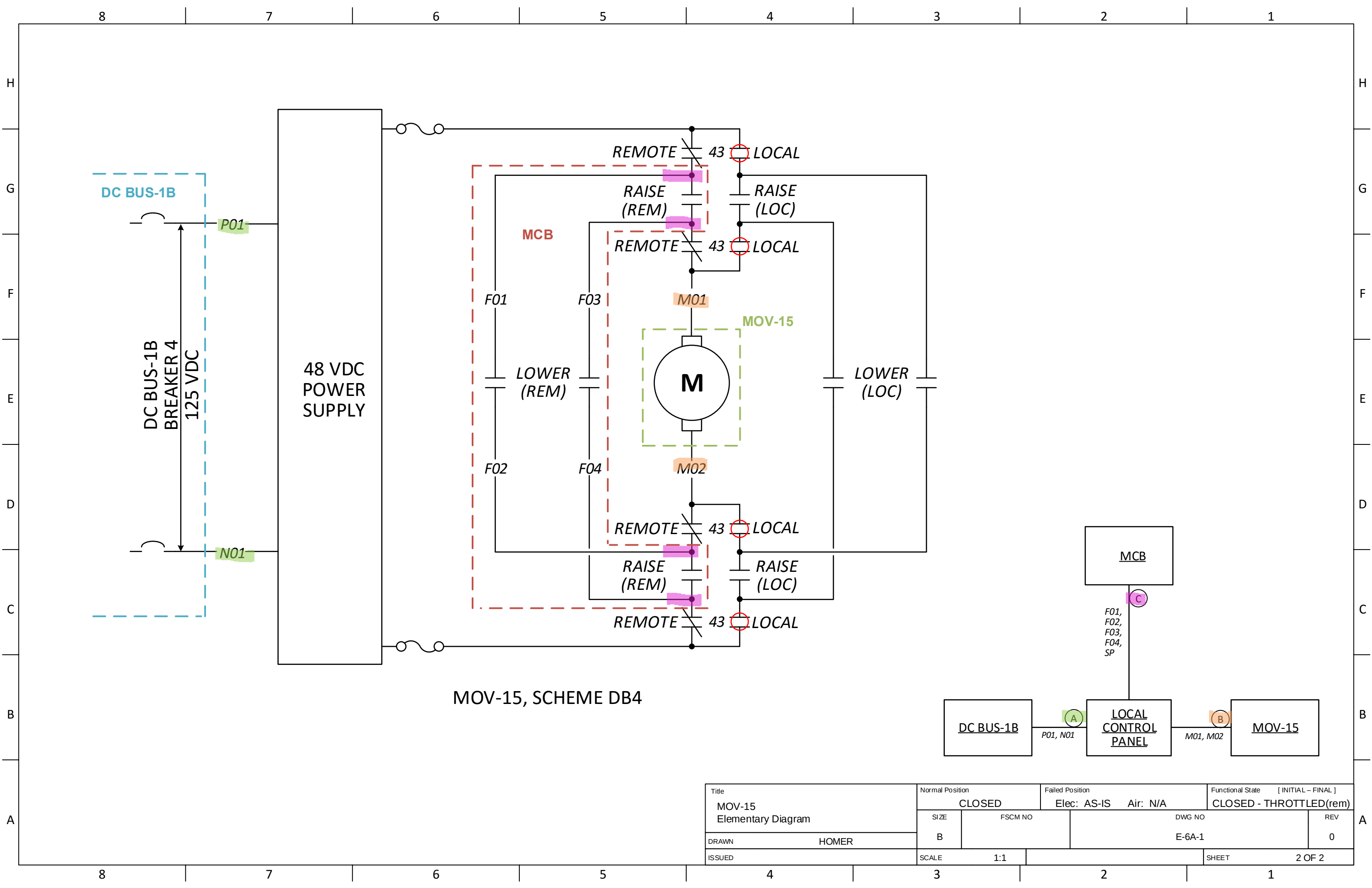
- 2) Cable DB2P could initiate a spurious close with a combination of four (4) proper polarity hot shorts. However, the LOP and LOC failure modes dominate.

Cable Analysis

[illegible]

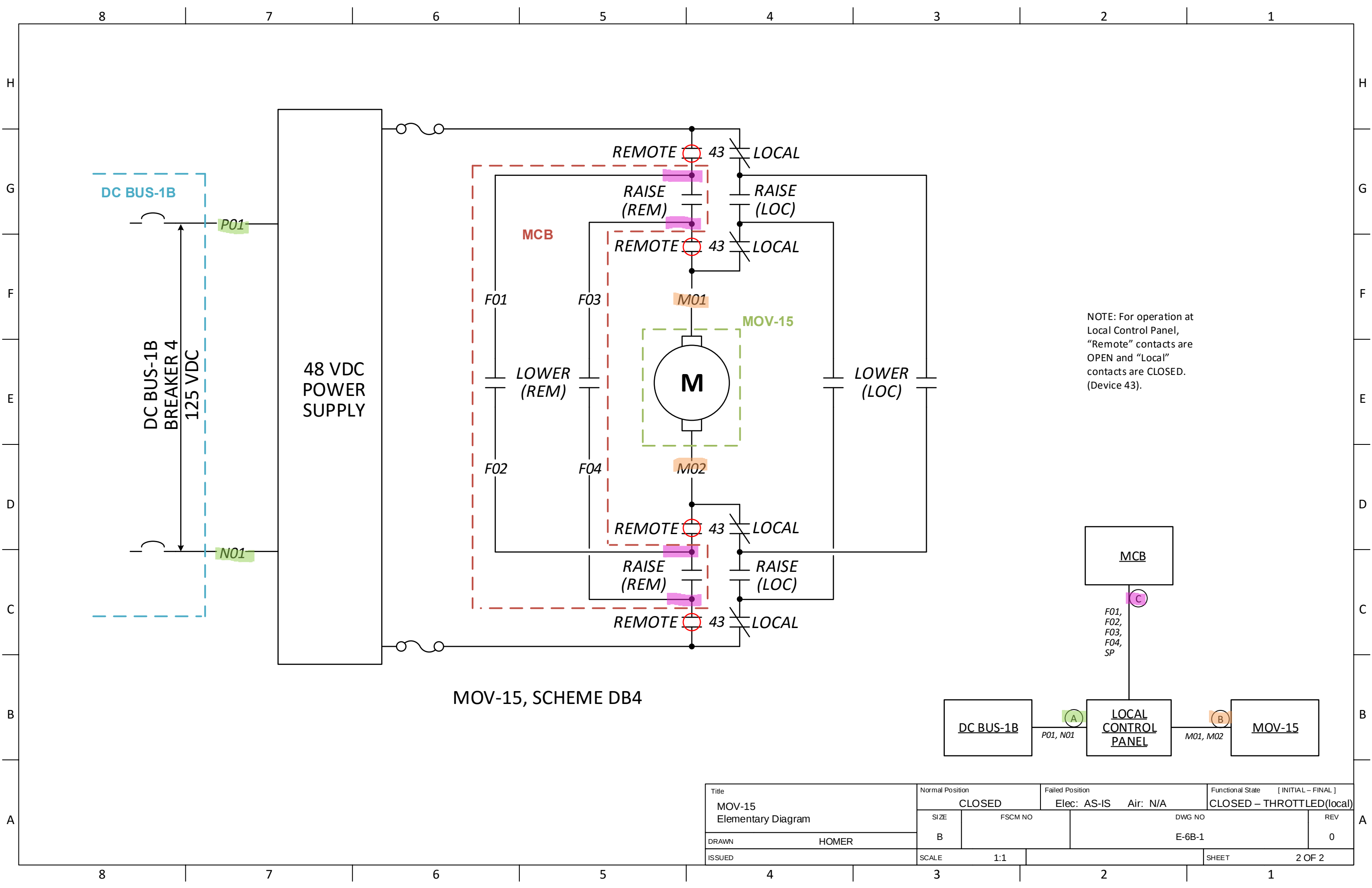


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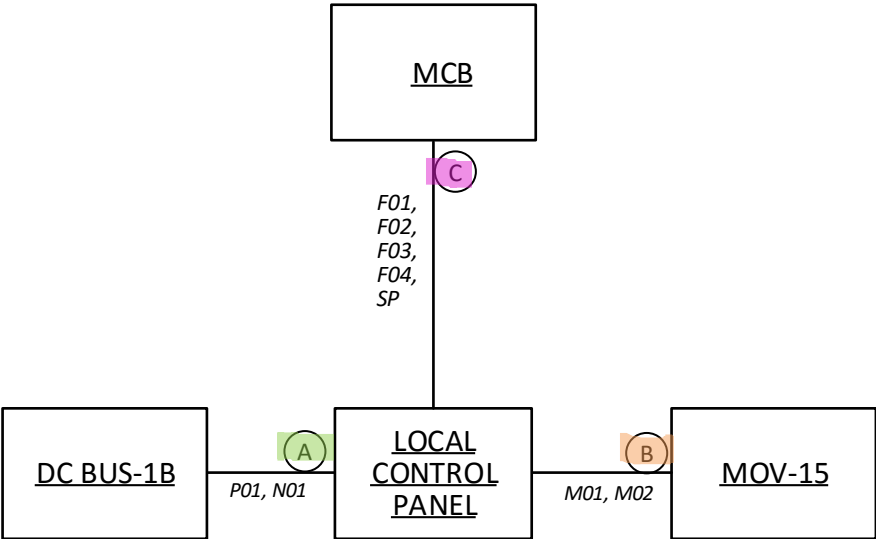


Title MOV-15 Elementary Diagram	Normal Position CLOSED		Failed Position Elec: AS-IS Air: N/A		Functional State [INITIAL - FINAL] CLOSED - THROTTLED(rem)
	SIZE B	FSCM NO		DWG NO E-6A-1	REV 0
	DRAWN HOMER	SCALE 1:1		SHEET 2 OF 2	
ISSUED					

[illegible]



NOTE: For operation at Local Control Panel, "Remote" contacts are OPEN and "Local" contacts are CLOSED. (Device 43).



Title MOV-15 Elementary Diagram	Normal Position CLOSED		Failed Position Elec: AS-IS Air: N/A		Functional State [INITIAL – FINAL]
	SIZE B	FSCM NO		DWG NO E-6B-1	REV 0
	DRAWN HOMER	SCALE 1:1		SHEET 2 OF 2	
ISSUED					

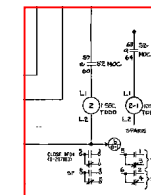
Component ID	CCW-1B	Component Type	Pump
Component Description	Component Cooling Water Pump 1B		

Component Description	Component Cooling Water Pump 1B
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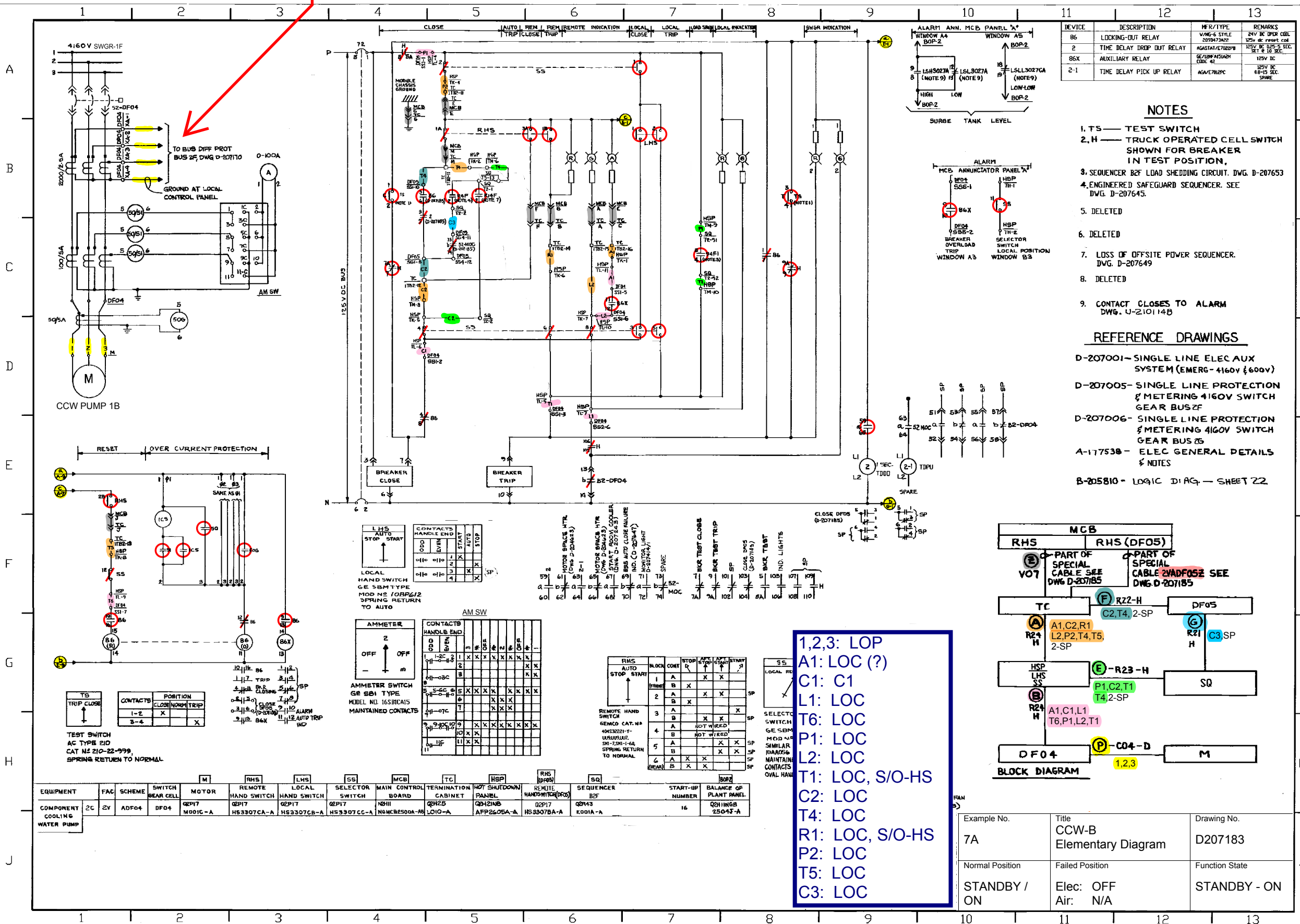
BE Code	CCW-B_FTR
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Breaker Req'd ☐

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
2VADF04A	Y	N	LOC-BF, S/O-HS	
2VADF04B	Y	N	LOC-BF, S/O-HS	
2VADF04E	Y	N	LOC-BF, S/O-HS	
2VADF04F	Y	N	LOC-BF	
2VADF04G	Y	N	LOC-BF	
2VADF04P	Y	N	LOP	3-phase power cable
2VADF04Z	Y	N	LOC-BF, S/O-HS	
2VADF05Z	Y	N	LOC-BF	



Cable for bus differential relay is included with Bus 1F



Differential Scheme
included with Bus 1F
Analysis

DEVICE	DESCRIPTION	MFR/TYPER	REMARKS
51 LCP	START UP TRANS 1A OVER CURRENT RELAY	GE/IAC55B	
51 LCP	START UP TRANS 2A LOCKOUT RELAY	GE/HEA	
25 SEE REMARKS	BUS 1F SYNCHRONISM CHECK RELAY	GE/I3552A	APPLICABLE TO CELLS DF01 & DF15
51 DF02	4160V SWITCHGEAR 2K OVER CURRENT RELAY	GE/IAC55B	
50G SEE REMARKS	GROUND SENSOR RELAY	GE/RTCHAY	APPLICABLE TO CELLS DF05 TO DF07, DF09 TO DF12
50/51 DF03	STATION SERVICE TRANS 2D OVER CURRENT RELAY	GE/IAC55B	
50/51 DF04	COMP COOLING WATER PUMP B OVER CURRENT RELAY	GE/IAC66B	
50/51 DF05	COMP COOLING WATER PUMP 2B OVER CURRENT RELAY	GE/IAC66B	
50/51 DF06	CHARGING/H.H.S.I. PUMP 2A OVER CURRENT RELAY	GE/IAC66B	
50/51 DF07	CHARGING/H.H.S.I. PUMP 2B OVER CURRENT RELAY	GE/IAC66B	
RPR-2	REPEATING PULSE RELAY	SOLID STATE INSTRUMENT	LOC. IN MAIN CONTROL RM
50/51 DF09	RHR PUMP 2A OVER CURRENT RELAY	GE/IAC66B	
50/51 DF10	AUX FEED WATER PUMP 2A OVER CURRENT RELAY	GE/IAC66B	
50/51 DF11	CTMT SPRAY PUMP 2A OVER CURRENT RELAY	GE/IAC66B	
50/51 DF12	STATION SERVICE TRANS 2F OVER CURRENT RELAY	GE/IAC55B	
51 DF13	4160V SWITCHGEAR 2H OVER CURRENT RELAY	GE/IAC55B	
86 LCP	BUS DIFFERENTIAL LOCKOUT RELAY	GE/HEA	
87 LCP	BUS 1F DIFF. PROTECTIVE RELAY	GE/PV11C	
27-1/2 DF14	BUS 1F UNDER VOLTAGE RELAY	GE/IAVS48	DIESEL GENERATOR 1-2A 2/3 LOGIC CIRCUIT
81-(1,2,4) DF14	BUS 2F UNDER FREQUENCY RELAY	GE/SFF31A	DIESEL GENERATOR 1-2A 2/3 LOGIC CIRCUIT
51 LCP	START UP TRANS 2B OVER CURRENT RELAY	GE/IAC55B	
86 LCP	START UP TRANS 2B LOCKOUT RELAY	GE/HEA	
51G SEE REMARKS	VERY INVERSE TIME GROUND RELAY	GE/IAC55A	APPLICABLE TO CELLS DF02 & DF15
51G LCP	VERY INVERSE TIME GROUND RELAY	GE/IAC55A	APPLICABLE TO CELLS DF01 & DF15

NOTES

- * - DENOTES MAIN CONTROL BOARD IN MAIN CONTROL ROOM.
- BUS 1F UNDER FREQUENCY TRIP BREAKER 52-DF08 ONLY WHEN DIESEL 1-2A IS OPERATING IN PARALLEL WITH SYSTEM.
- WH METER JENSTAR TYPE JS-05601C-B6-IMP. WH METER IS 31-DIRECTIONAL.
- PHYSICAL ARRANGEMENT OF THE SWITCHGEAR CELLS 1 THROUGH 15 IS RIGHT TO LEFT FACING THE FRONT.
- FOR KEY INTERLOCKING OF BKR, 52-DF12 (SEE DWG. D-207118).
- FOR KEY INTERLOCKING OF BKR, 52-DF05 (SEE DWG. D-207113).
- FOR KEY INTERLOCKING OF BKR, 52-DF07 (SEE DWG. D-207120).
- LCP - DENOTES LOCAL CONTROL PANEL.
- ** - DENOTES EMERG. POWER BOARD IN MAIN CONTROL ROOM.

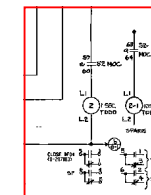
REFERENCE DWGS

- D-207001-SINGLE LINE ELEC. AUX. SYSTEM (EMERG.)
A-207555-ELECTRICAL GENERAL DETAILS & NOTES,
D-207032-LOGIC DIAG. DIESEL 1A AUTOMATIC START & LOADING

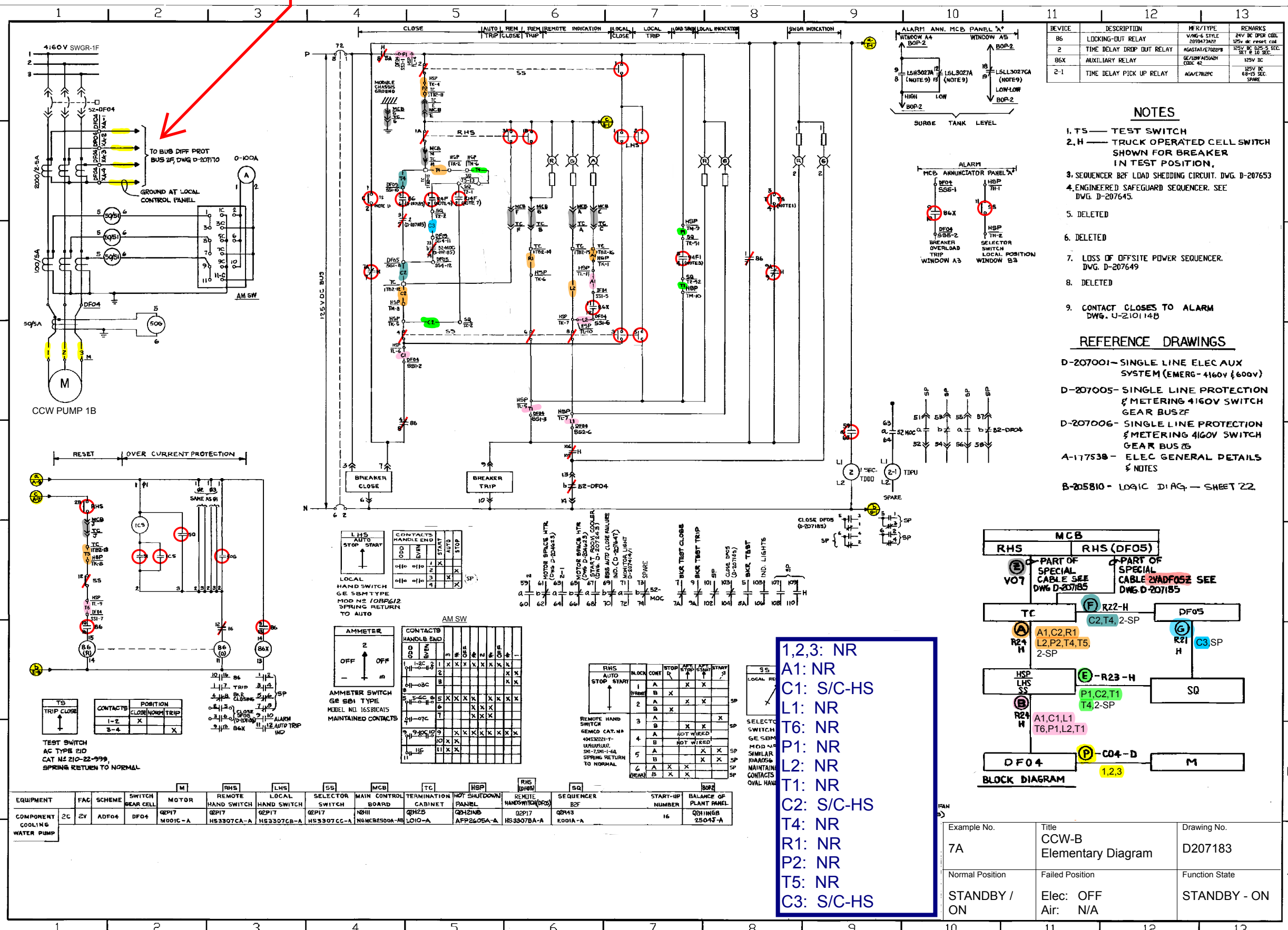
Component ID	CCW-1B	Component Type	Pump
Component Description	Component Cooling Water Pump 1B		

High Consequence Component Yes ☐ No ☒

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
2VADF04A	Y	N	S/C-HS	
2VADF04B	Y	N	S/C-HS	
2VADF04E	Y	N	S/C-HS	
2VADF04F	Y	N	S/C-HS	
2VADF04G	Y	Y	S/C-HS	Dependent on state of DF05 52-MOC
2VADF04P	N	N	NR	3-phase power cable
2VADF04Z	N	N	NR	
2VADFO5Z	N	N	NR	



able for bus differential relay
is included with Bus 1F



Differential Scheme
included with Bus 1F
Analysis

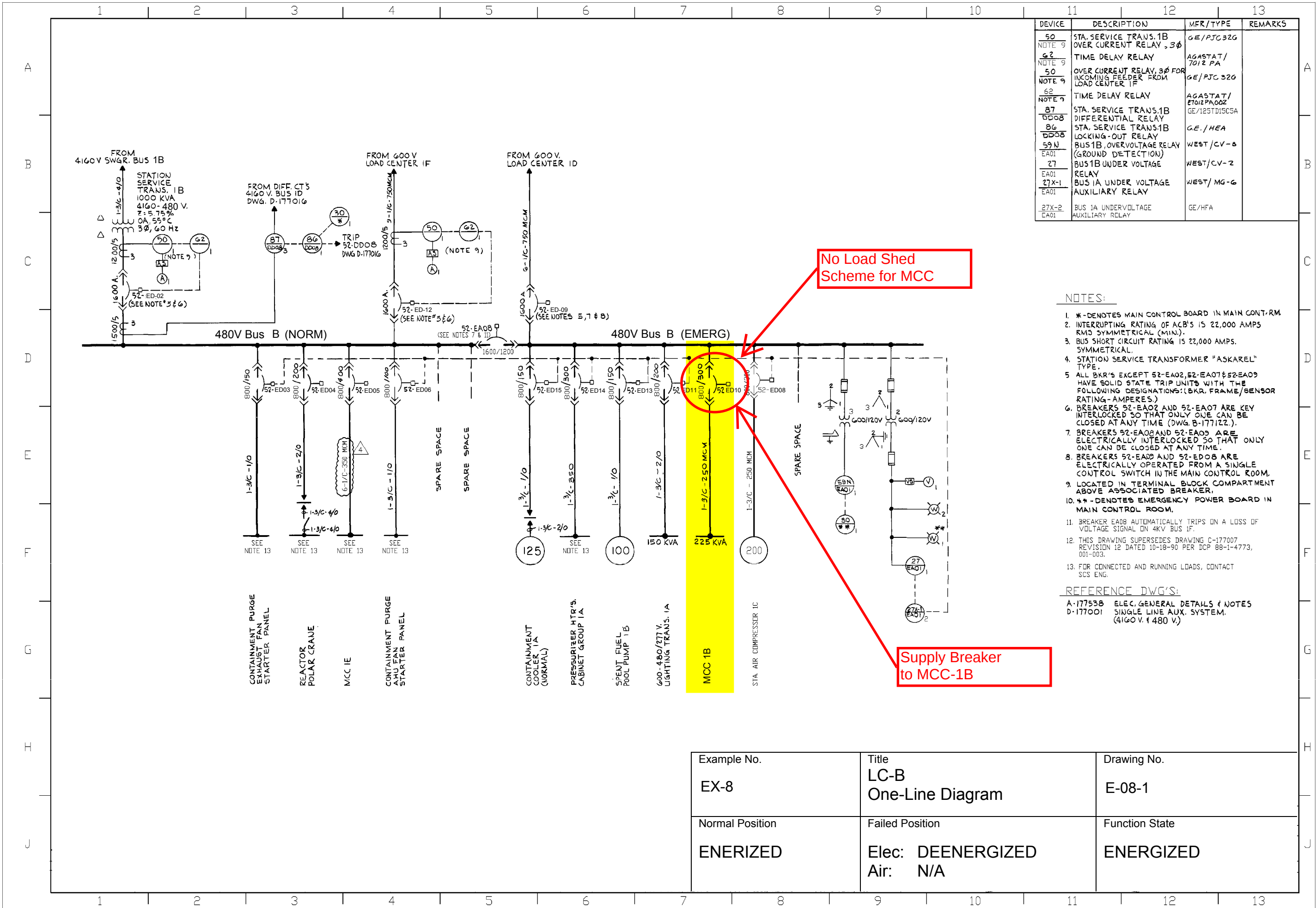
DEVICE	DESCRIPTION	MFR/TYPER	REMARKS
51 LCP	START UP TRANS 1A OVER CURRENT RELAY	GE/IAC55B	
51 LCP	START UP TRANS 2A LOCKOUT RELAY	GE/HEA	
25 SEE REMARKS	BUS 1F SYNCHRONISM CHECK RELAY	GE/I3552A	APPLICABLE TO CELLS DF01 & DF15
51 DF02	4160V SWITCHGEAR 2K OVER CURRENT RELAY	GE/IAC55B	
50G SEE REMARKS	GROUND SENSOR RELAY	GE/RTCHAY	APPLICABLE TO CELLS DF05 TO DF07, DF09 TO DF12
50/51 DF03	STATION SERVICE TRANS 2D OVER CURRENT RELAY	GE/IAC55B	
50/51 DF04	COMP COOLING WATER PUMP B OVER CURRENT RELAY	GE/IAC66B	
50/51 DF05	COMP COOLING WATER PUMP 2B OVER CURRENT RELAY	GE/IAC66B	
50/51 DF06	CHARGING/H.H.S.I. PUMP 2A OVER CURRENT RELAY	GE/IAC66B	
50/51 DF07	CHARGING/H.H.S.I. PUMP 2B OVER CURRENT RELAY	GE/IAC66B	
RPR-2	REPEATING PULSE RELAY	SOLID STATE INSTRUMENT	LOC. IN MAIN CONTROL RM
50/51 DF09	RHR PUMP 2A OVER CURRENT RELAY	GE/IAC66B	
50/51 DF10	AUX FEED WATER PUMP 2A OVER CURRENT RELAY	GE/IAC66B	
50/51 DF11	CTMT SPRAY PUMP 2A OVER CURRENT RELAY	GE/IAC66B	
50/51 DF12	STATION SERVICE TRANS 2F OVER CURRENT RELAY	GE/IAC55B	
51 DF13	4160V SWITCHGEAR 2H OVER CURRENT RELAY	GE/IAC55B	
86 LCP	BUS DIFFERENTIAL LOCKOUT RELAY	GE/HEA	
87 LCP	BUS 1F DIFF. PROTECTIVE RELAY	GE/PVDDIC	
27-1/2 DF14	BUS 1F UNDER VOLTAGE RELAY	GE/IAVS48	DIESEL GENERATOR 1-2A 2/3 LOGIC CIRCUIT
81-(1,2,4) DF14	BUS 2F UNDER FREQUENCY RELAY	GE/SFF31A	DIESEL GENERATOR 1-2A 2/3 LOGIC CIRCUIT
51 LCP	START UP TRANS 2B OVER CURRENT RELAY	GE/IAC55B	
86 LCP	START UP TRANS 2B LOCKOUT RELAY	GE/HEA	
51G SEE REMARKS	VERY INVERSE TIME GROUND RELAY	GE/IAC55A	APPLICABLE TO CELLS DF02 & DF15
51G LCP	VERY INVERSE TIME GROUND RELAY	GE/IAC55A	APPLICABLE TO CELLS DF01 & DF15

NOTES

- * - DENOTES MAIN CONTROL BOARD IN MAIN CONTROL ROOM.
- BUS 1F UNDER FREQUENCY TRIP BREAKER 52-DF08 ONLY WHEN DIESEL 1-2A IS OPERATING IN PARALLEL WITH SYSTEM.
- WH METER JENSTAR TYPE JS-05601C-B6-IMP. WH METER IS 31-DIRECTIONAL.
- PHYSICAL ARRANGEMENT OF THE SWITCHGEAR CELLS 1 THROUGH 15 IS RIGHT TO LEFT FACING THE FRONT.
- FOR KEY INTERLOCKING OF BKR, 52-DF12 (SEE DWG. D-207118).
- FOR KEY INTER-LOCKING OF BKR, 52-DF05 (SEE DWG. D-207113).
- FOR KEY INTERLOCKING OF BKR, 52-DF07 (SEE DWG. D-207120).
- LCP - DENOTES LOCAL CONTROL PANEL.
- ** - DENOTES EMERG. POWER BOARD IN MAIN CONTROL ROOM.

REFERENCE DWGS

- D-207001-SINGLE LINE ELEC. AUX. SYSTEM (EMERG.)
A-207555-ELECTRICAL GENERAL DETAILS & NOTES,
D-207032-LOGIC DIAG. DIESEL 1A AUTOMATIC START & LOADING



DEVICE	DESCRIPTION	MFR/TYPE	REMARKS
50 NOTE 9	STA. SERVICE TRANS. 1B OVER CURRENT RELAY, 3Ø	GE/PJC 32G	
62 NOTE 9	TIME DELAY RELAY	AGASTAT/ 7012 PA	
50 NOTE 9	OVER CURRENT RELAY, 3Ø FOR INCOMING FEEDER FROM LOAD CENTER 1F	GE/PJC 32G	
62 NOTE 9	TIME DELAY RELAY	AGASTAT/ E7012PA00Z	
87 DD08	STA. SERVICE TRANS. 1B DIFFERENTIAL RELAY	GE/125TD15C5A	
86 DD08	STA. SERVICE TRANS. 1B LOCKING-OUT RELAY	GE./HEA	
59N EA01	BUS 1B, OVERVOLTAGE RELAY (GROUND DETECTION)	WEST/CV-8	
27 EA01	BUS 1B UNDER VOLTAGE RELAY	WEST/CV-2	
27X-1 EA01	BUS 1A UNDER VOLTAGE AUXILIARY RELAY	WEST/ MG-6	
27X-2 EA01	BUS 1A UNDERVOLTAGE AUXILIARY RELAY	GE/HFA	

NOTES:

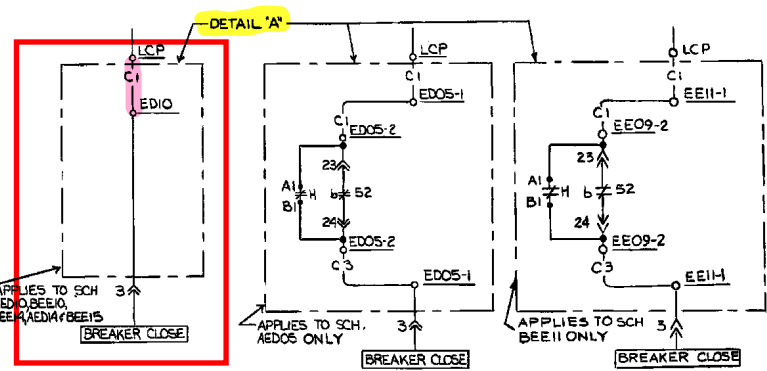
- *-DENOTES MAIN CONTROL BOARD IN MAIN CONT. RM.
- INTERRUPTING RATING OF ACB'S IS 22,000 AMPS
RMS SYMMETRICAL (MIN.).
- BUS SHORT CIRCUIT RATING IS 22,000 AMPS.
SYMMETRICAL.
- STATION SERVICE TRANSFORMER "ASKAREL"
TYPE.
- ALL BKR'S EXCEPT 52-EA02, 52-EA07 & 52-EA09
HAVE SOLID STATE TRIP UNITS WITH THE
FOLLOWING DESIGNATIONS: (BKR. FRAME/SENSOR
RATING-AMPERES.)
- BREAKERS 52-EA02 AND 52-EA07 ARE KEY
INTERLOCKED SO THAT ONLY ONE CAN BE
CLOSED AT ANY TIME (DWG. B-177122.).
- BREAKERS 52-EA08 AND 52-EA09 ARE
ELECTRICALLY INTERLOCKED SO THAT ONLY
ONE CAN BE CLOSED AT ANY TIME.
- BREAKERS 52-EA08 AND 52-ED08 ARE
ELECTRICALLY OPERATED FROM A SINGLE
CONTROL SWITCH IN THE MAIN CONTROL ROOM.
- LOCATED IN TERMINAL BLOCK COMPARTMENT
ABOVE ASSOCIATED BREAKER.
- ** - DENOTES EMERGENCY POWER BOARD IN
MAIN CONTROL ROOM.
- BREAKER EA08 AUTOMATICALLY TRIPS ON A LOSS OF
VOLTAGE SIGNAL ON 4KV BUS 1F.
- THIS DRAWING SUPERSEDES DRAWING C-177007
REVISION 12 DATED 10-18-90 PER DCP 88-1-4773,
001-003.
- FOR CONNECTED AND RUNNING LOADS, CONTACT
SCS ENG.

REFERENCE DWG'S:

- A-177538 ELEC. GENERAL DETAILS & NOTES
D-177001 SINGLE LINE AUX. SYSTEM.
(4160 V. & 480 V.)

A
B
C
D
E
F
G
H
J

REMOTE LOCAL
CLOSE TRIP/RESET INDICATION CLOSE TRIP/RESET LCP IND. L.C. INDICATION ALARM EPB ANNUN. WINDOW NO. SEE TABLE



- NOTES:
1. H-TRUCK OPERATED CELL SWITCH SHOWN FOR BREAKER IN TEST POSITION.
 2. CONTENTS DELETED.
 3. FOR SCHEMES AED05, AND BEE11 ONLY MCC'S IF #10 ARE FED FROM TWO LOAD CENTERS EACH. TO PREVENT SIMULTANEOUS CLOSING, UNIT 1 & UNIT 2 FEEDER BKRS TO THESE MCC'S ARE ELECTRICALLY INTERLOCKED. (SEE TABLE FOR BKRS).
 4. REFER TO FUSE MANUAL A-181987 FOR FUSE RATING AND TYPE.

- REFERENCE DRAWINGS
- A-17753B—ELECTRICAL GENERAL DETAILS AND NOTES
 - D-177001—SINGLE LINE ELECTRICAL AUXILIARY SYSTEM (EMERG-4160V # 480V)
 - D-177010—SINGLE LINE PROTECTION & METERING 600V LOAD CENTER 1D (EMERG)
 - D-177011—SINGLE LINE PROTECTION & METERING 600V LOAD CENTER 1E (EMERG)

Must look at Detail "A"

- 1,2,3: LOP
P1: LOC, LOFP
P2: LOC, LOFP
C2: LOC, LOFP
T2: LOC, LOFP, S/O-HS
L2: LOC, LOFP
A2: LOC, LOFP
R2: LOC, LOFP
C1: LOC, LOFP
T1: LOC, LOFP, S/O-HS
L1: LOC, LOFP
A1: LOC, LOFP
R1: LOC, LOFP

LOCAL HANDSWITCH
TYPE W-2, S#505AG03601
PISTOL GRIP FIXED HANDLE
SPRING RETURN TO NORMAL

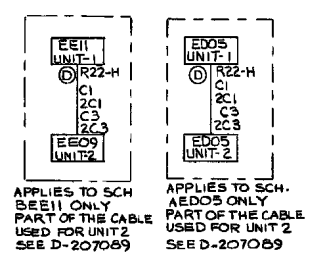
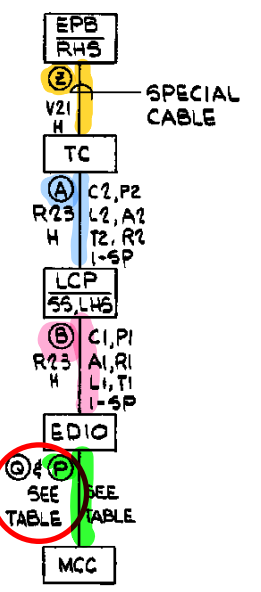
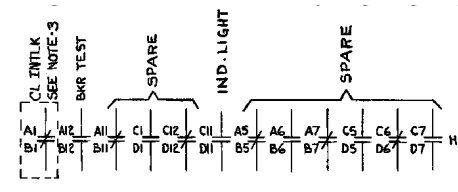
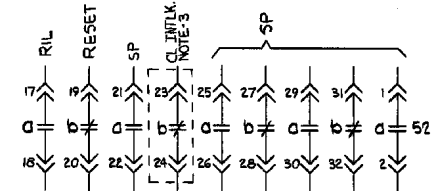
CONTACT	POSITION	TRIP	NORM	CLOSE
A11-B11	X			
A12-B12	X			
A1-B1		X		
A5-B5	X			
A6-B6	X			
A7-B7		X		

REMOTE HANDSWITCH
GEMCO CAT # 404532221-Y-AA3
SPRING RETURN TO NORMAL

CONTACT	POSITION	TRIP	NORM	CLOSE
A11-B11	X			
A12-B12	X			
A1-B1		X		
A5-B5	X			
A6-B6	X			
A7-B7		X		

SELECTOR SWITCH
TYPE W-2
S#505AG03601
MAINTAINED CONTACTS

CONTACT	POSITION	TRIP	NORM	CLOSE
A11-B11	X			
A12-B12	X			
A1-B1		X		
A5-B5	X			
A6-B6	X			
A7-B7		X		



EQUIPMENT	FAC	SCHEME	L.C. COMPT.	LOCAL CONTROL PANEL	EMERGENCY POWER BOARD	TERMINATION CABINET	START-UP NUMBER	POWER CABLE CODE	MOTOR CONT CENTER	CONDUCTOR NGA	REMO. HANDSWITCH	EPB ANNUNCIATOR WINDOW NO.	LC COMPT
480V LOAD CENTER BKRS TO MOTOR CONTROL CENTER	IA	IV	AEET0	EE10	QIH21EO09-A	QIH25L037-A	6	LO9-F	FA-A2	1,2,3	QIR16HS2019KA-A	PANEL V, WINDOW G2	PANEL V, WINDOW G1
	IB	IV	AED10	ED10	QIH21EO10-B	QIH25L039-B	6	LO9-F	FB-A2	1,2,3	QIR16HS2019KA-B	PANEL V, WINDOW G2	PANEL V, WINDOW G1
	IF	IV	AED05	ED05	QIH21EO09-A	QIH25L037-A	6	LO9-F	FA-A2	1,2,3	QIR16HS2019KA-A	PANEL V, WINDOW G2	PANEL V, WINDOW G1
	IG	IV	BEE11	EE11	QIH21EO10-B	QIH25L039-B	6	LO9-F	FB-A2	1,2,3	QIR16HS2019KA-B	PANEL V, WINDOW G2	PANEL V, WINDOW G1
	IT	IV	BEE14	EE14	QIH21EO10-B	QIH25L039-B	6	LO9-F	FT-A1	1,2,3	QIR16HS2019PA-B	PANEL V, WINDOW G2	PANEL V, WINDOW G1
	IU	IV	AED14	ED14	QIH21EO09-A	QIH25L037-A	6	LO9-F	FU-A1	1,2,3	QIR16HS2019PA-A	PANEL V, WINDOW G2	PANEL V, WINDOW G1
	IV	IV	BEE15	EE15	QIH21EO10-B	QIH25L039-B	6	LO9-F	FV-A1	1,2,3	QIR16HS2019PA-B	PANEL V, WINDOW G2	PANEL V, WINDOW G1

Be sure to use correct row in Adapter Table

No "Q" Cable

Example No.	Title	Drawing No.
EX-8	MCC-1B SUPPLY BREAKER ELEMENTARY DIAGM	E-08-2
Normal Position	Failed Position	Function State
ENERIZED	Elec: DEENERGIZED Air: N/A	ENERGIZED

CIRCUIT ANALYSIS WORKSHEET (EX-9)

Component ID LC-1D Component Type 480 V Load Center

Component Description Class 1E Load Center 1D

Normal Position	<u>Energized (Norm)</u>
Failed Electrical Position	<u>Deenergized</u>
Failed Air Position	<u>N/A</u>
Function State	<u>LC1D-E-E</u>
Initial Position	<u>Energized</u>
Desired Position	<u>Energized</u>
BE Code	<u>EDS-LC1D_FTRE</u>

High Consequence Component Yes ☐ No ☒

Power Supplies	<u>SST-1D</u>	Breaker	<u>N/A</u>	Req'd	☒
	<u>PNL-B-1D</u>	Breaker	<u>6</u>	Req'd	☒

Cable Analysis

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
1VAED02A	Y	N	LOC-BF, S/O-HS	Breaker ED02 Control
1VAED02B	Y	N	LOC-BF, S/O-HS	Breaker ED02 Control
1VAED02Z	Y	N	LOC-BF, S/O-HS	Breaker ED02 Control
1VAED08A	Y	N	S/C-HS	Breaker ED08 Control (Close)
1VAED08B	Y	N	S/C-HS	Breaker ED08 Control (Close)
1VAED08C	N	N	NR	Breaker ED08 Control (Trip)
1VAED08D	Y	N	S/C-HS	Breaker ED08 Control (Close)
1VAED08P	N	N	NR	Isolated by ED08
1VAED08Q	N	N	NR	Isolated by ED08
1VAED08Z	Y	N	S/C-HS	Breaker ED08 Control
1VAED08Y	N	N	NR	Used for Breaker EA09
1VAED01A	Y	N	LOP-UV	Bus undervoltage trip
1VAED01B	Y	N	LOP-UV	Bus undervoltage trip

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
1VAEA01Y	Y	N	LOP-UV	Bus undervoltage trip
1VADF14Y	Y	N	LOP-UV	Bus undervoltage trip
1VADF03C	Y	N	LOP-OC	Transformer differential trip

Equipment Dependencies

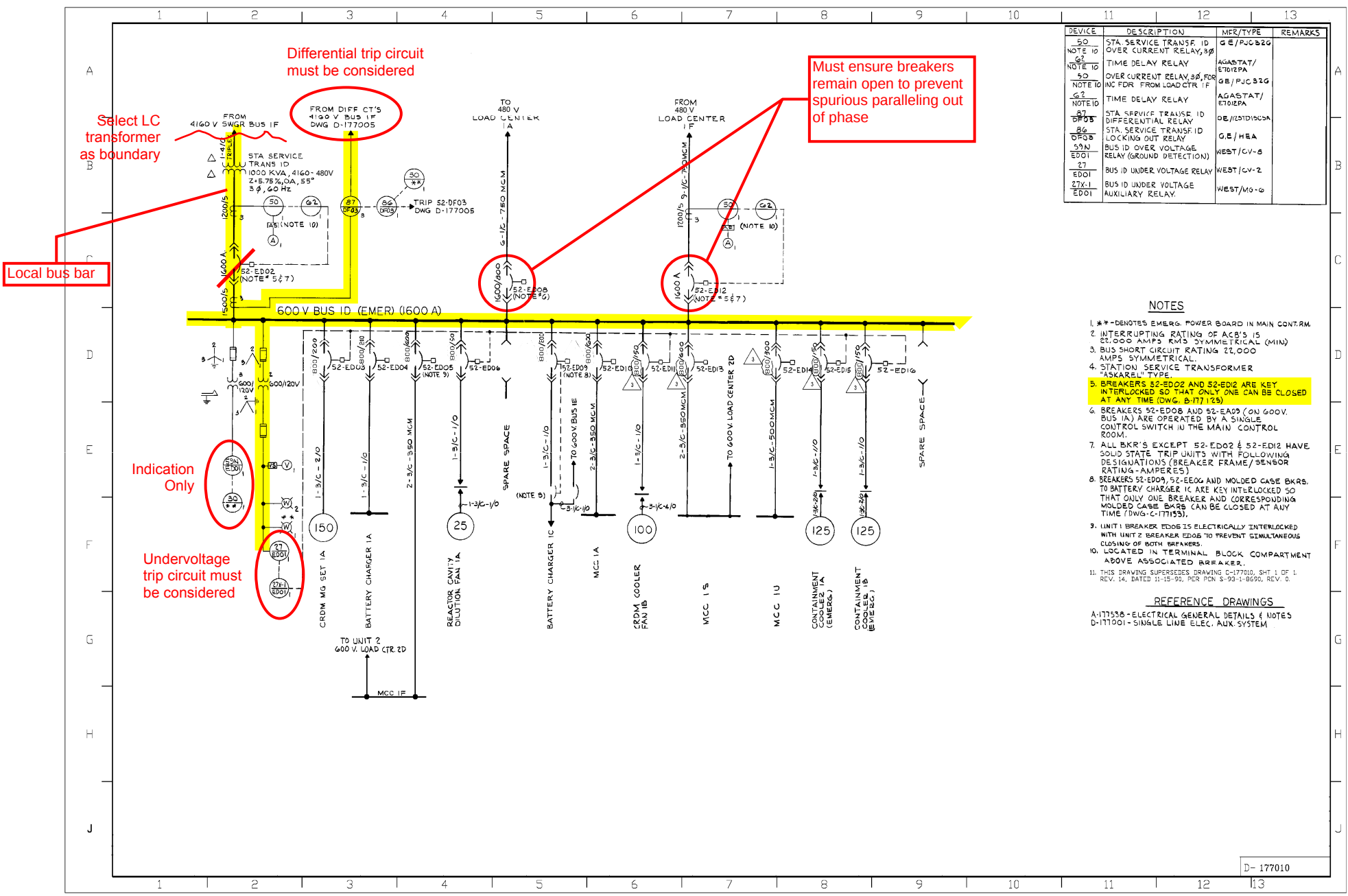
1. SST-1D transformer differential trip and undervoltage trip are included in this analysis.
2. Load Shed (94F3): Breaker ED08 is open so load shed signal is not of concern.
3. LOSEP and ESFAS Sequencer (R-16, R6F, XF): Spurious sequencer signals can result in spurious close of alternate supply breaker ED08, thus dependencies are required.

Comments

1. 125 VDC control power is not needed to maintain breakers in desired position. However, it is required for Breaker ED02 to maintain over current protection.
2. Mechanical interlock prevents spurious close of Breaker ED12, so no cables included.
3. Breaker ED08 is analyzed for spurious close to preclude paralleling 3-phase power out of phase.
4. Bus bar connection between SST-1D and main bus is local to switchgear.

Cable Analysis

Cable ID	Single or Double Break	Circuit Type	Power (AC or DC)	Grounded?	Insulation / Shield	Failure Mode(s)				7150 Table	P(x)
						Intra	Inter	GFEHS	Aggregate		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		
						☐	☐	☐	☐		



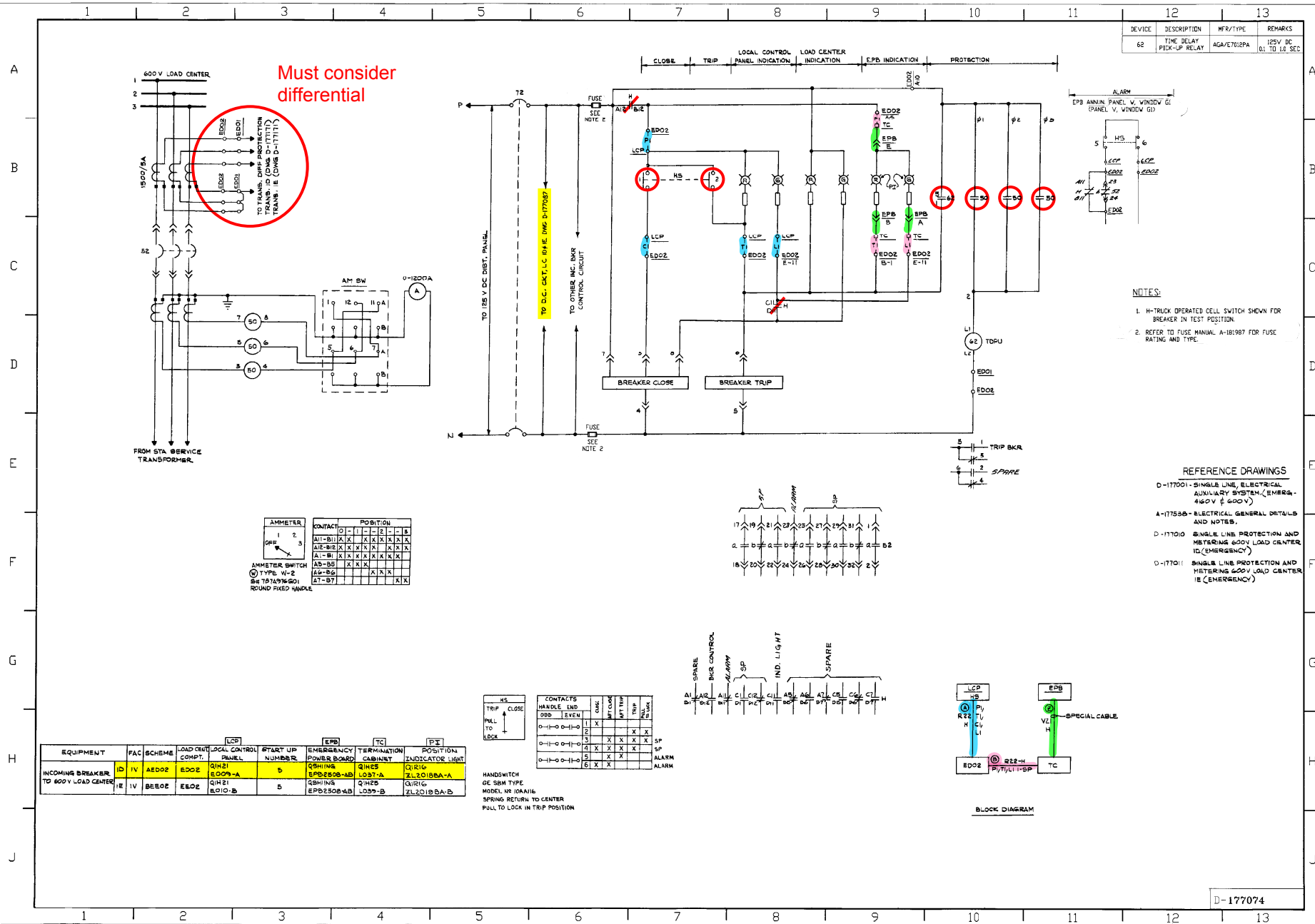
DEVICE	DESCRIPTION	MFR/TYPE	REMARKS
50	STA SERVICE TRANSF. ID	GE/PJCB2G	
NOTE 10	OVER CURRENT RELAY, 30		
51	TIME DELAY RELAY	AGASTAT/	
NOTE 10	OVER CURRENT RELAY, 30, FOR	GE/PJCB2G	
52	MC FOR FROM LOAD CTR IF		
NOTE 10	TIME DELAY RELAY	AGASTAT/	
53	STA SERVICE TRANSF. ID	GE/12D1905A	
54	DIFFERENTIAL RELAY		
55	STA SERVICE TRANSF. ID	GE/HEA	
56	LOCKING OUT RELAY		
57	BUS ID OVER VOLTAGE	WEST/CV-6	
58	RELAY (GROUND DETECTION)		
59	BUS ID UNDER VOLTAGE RELAY	WEST/CV-2	
60	BUS ID UNDER VOLTAGE		
61	AUXILIARY RELAY	WEST/M3-0	

NOTES

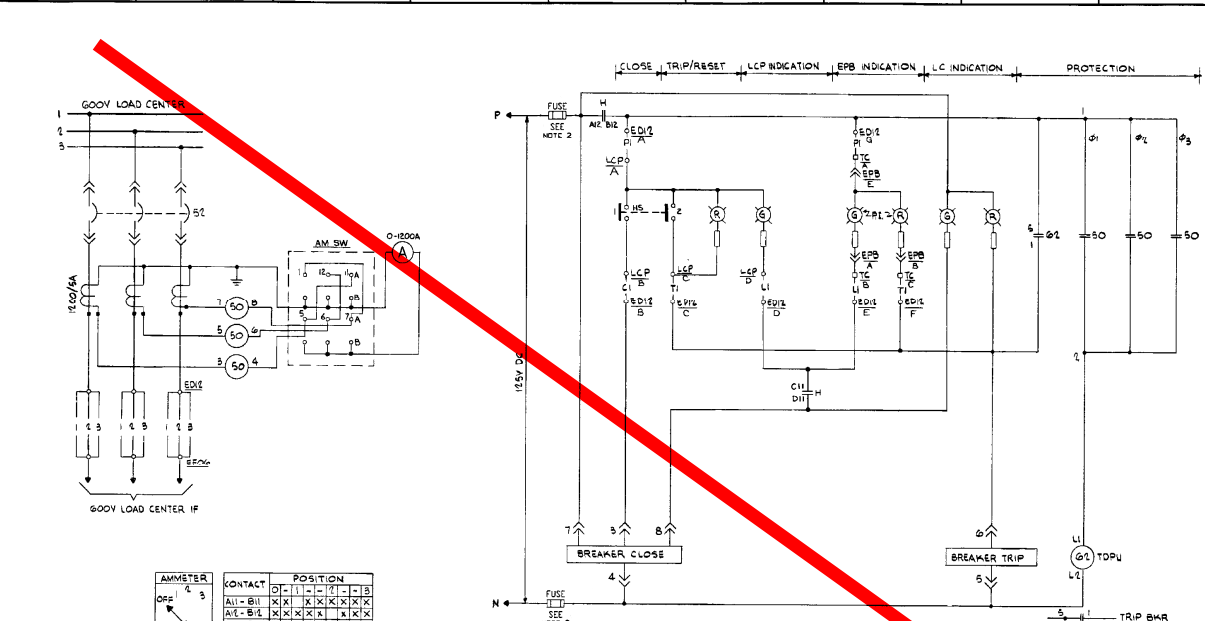
1. ** - DENOTES EMERG. POWER BOARD IN MAIN CONTR.
2. INTERRUPTING RATING OF ACB'S IS 23,000 AMPS RMS SYMMETRICAL (MIN)
3. BUS SHORT CIRCUIT RATING 23,000 AMPS SYMMETRICAL
4. STATION SERVICE TRANSFORMER "ASKAREL" TYPE
5. BREAKERS 52-ED02 AND 52-ED12 ARE KEY INTERLOCKED SO THAT ONLY ONE CAN BE CLOSED AT ANY TIME (DWG. B-177123)
6. BREAKERS 52-ED08 AND 52-EA03 (ON 600V. BUS 1A) ARE OPERATED BY A SINGLE CONTROL SWITCH IN THE MAIN CONTROL ROOM.
7. ALL BKR'S EXCEPT 52-ED02 & 52-ED12 HAVE SOLID STATE TRIP UNITS WITH FOLLOWING DESIGNATIONS (BREAKER FRAME/SENSOR RATING-AMPERES)
8. BREAKERS 52-ED09, 52-ED06 AND MOLDED CASE BKRS. TO BATTERY CHARGER (C) ARE KEY INTERLOCKED SO THAT ONLY ONE BREAKER AND CORRESPONDING MOLDED CASE BKRS CAN BE CLOSED AT ANY TIME (DWG. C-177153).
9. UNIT 1 BREAKER ED06 IS ELECTRICALLY INTERLOCKED WITH UNIT 2 BREAKER ED06 TO PREVENT SIMULTANEOUS CLOSING OF BOTH BREAKERS.
10. LOCATED IN TERMINAL BLOCK COMPARTMENT ABOVE ASSOCIATED BREAKER.
11. THIS DRAWING SUPERSEDES DRAWING C-177010, SHT. 1 OF 1. REV. 14, DATED 11-15-90, PER PCN S-93-1-8690, REV. 0.

REFERENCE DRAWINGS

A-177530 - ELECTRICAL GENERAL DETAILS & NOTES
D-177001 - SINGLE LINE ELEC. AUX. SYSTEM



No analysis is needed because mechanical interlock prevents spurious closure



DEVICE	DESCRIPTION	MFR/TYPE	REMARKS
62	TIME DELAY PICK-UP RELAY	ACASTAT E700PA	125V DC 61 TO 18 SEC

NOTES:

1. H-TRUCK OPERATED CELL SWITCH SHOWN FOR BREAKER IN TEST POSITION.
2. REFER TO FUSE MANUAL R-181987 FOR FUSE RATING AND TYPE.

REFERENCE DRAWINGS

- A-177538 - ELECTRICAL GENERAL DETAILS AND NOTES
- D-177001 - SINGLE LINE ELECTRICAL AUX SYSTEM (EMERG - 480V 3 PH)
- D-177010 - SINGLE LINE PROTECTION AND METERING GOOV L.C. (EMERG)
- D-177011 - SINGLE LINE PROTECTION AND METERING GOOV L.C. (EMERG)
- C-177012 - SINGLE LINE PROTECTION AND METERING GOOV LOAD CENTER IF

CONTACT	POSITION
A1-B1	X X X X X X X X
A2-B2	X X X X X X X X
A3-B3	X X X X X X X X
A4-B4	X X X X X X X X
A5-B5	X X X X X X X X
A6-B6	X X X X X X X X
A7-B7	X X X X X X X X

AMMETER SWITCH
TYPE W-2, 5#707497600
ROUND FIXED HANDLE

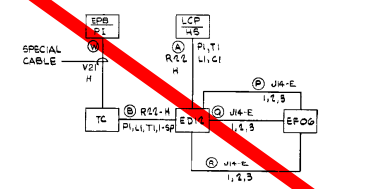
EQUIPMENT	FAC	SCHEME	L.C. COMPT.	LOCAL CONTROL PANEL	EMERG POWER BOARD	TERMINATION CABINET	POSITION IND. LIGHTS	START-UP NUMBER	L.C. COMPT.
INCOMING GOOV LOAD CENTER BREAKER	IV	ARD14	ED14	ED14	ED14	ED14	ED14	5	ED14

LOAD CENTER COMPARTMENT	TERMINAL BLOCK NUMBERS
ED12	A5 A7 B1 E11 B2 A4 B3 B4 C1 C2
ED13	A5 A7 B1 E11 B2 A4 B3 B4 C1 C2

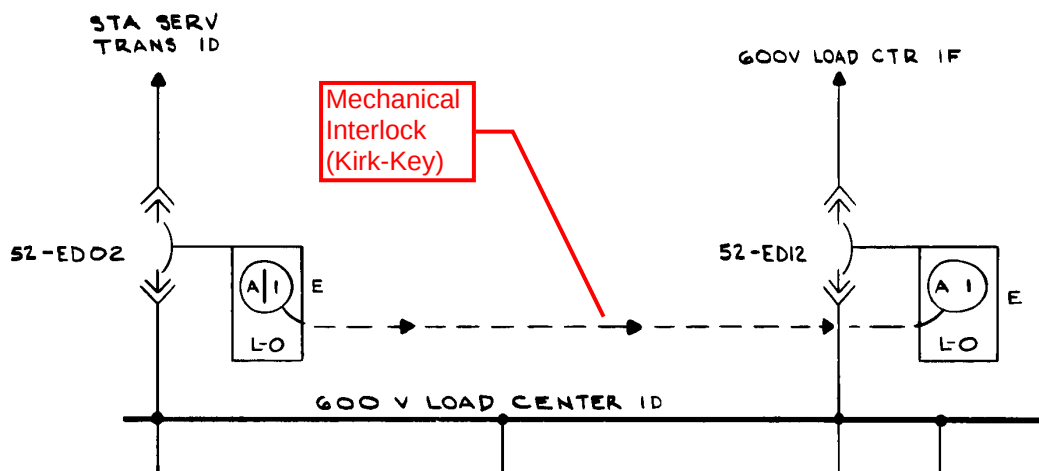


CONTACTS	HANDLE END	TRIP COIL	TRIP COIL	TRIP COIL	TRIP COIL
0-1-0	0-1-0	1	X	X	X
0-1-0	0-1-0	2	X	X	X
0-1-0	0-1-0	3	X	X	X
0-1-0	0-1-0	4	X	X	X
0-1-0	0-1-0	5	X	X	X
0-1-0	0-1-0	6	X	X	X

HANDSWITCH
GE 58M TYPE
MODEL NO 10A116
SPRING RETURN TO CENTER
PULL TO LOCK IN TRIP POSITION



BLOCK DIAGRAM



OPERATION SEQUENCE

KEY IS HELD IN CIRCUIT BREAKER 52-ED02 INTERLOCK. TO ESTABLISH SERVICE THROUGH CIRCUIT BREAKER 52-ED12

1. TRIP CIRCUIT BREAKER 52-ED02
2. TURN KEY AI IN L-O INTERLOCK ON CIRCUIT BREAKER 52-ED02 TO LOCK OPEN. KEY AI IS NOW FREE.
3. INSERT KEY AI IN L-O INTERLOCK ON CIRCUIT BREAKER 52-ED12 AND TURN TO UNLOCK. KEY AI IS NOW HELD.
4. CLOSE CIRCUIT BREAKER 52-ED12.

REVERSE SEQUENCE TO RESTORE SERVICE THROUGH CIRCUIT BREAKER 52-ED02.

NOTE: AS AN EXCEPTION FOR MAINTENANCE WORK PER A PLANT PROCEDURE, TWO KEYS MAY BE USED TO OVERRIDE THE NORMAL CIRCUIT BREAKER INTERLOCK FEATURE.

NOTES

1. ALL INTERLOCKS ARE KIRK TYPE
2. CIRCUIT BREAKERS 52-ED09, 52-EE06 & MOLDED CASE BREAKERS TO BATTERY CHARGER IC ARE KEY INTERLOCKED SO THAT ONLY ONE BREAKER AND CORRESPONDING BATTERY CHARGER MOLDED CASE BREAKER CAN BE CLOSED AT ANY TIME (SEE DWG C-177133)

LEGEND

- INTERLOCK WITH KEY HELD.
 — INTERLOCK WITH KEY REMOVED.
 L-O — (LOCKED OPEN) INDICATES THAT THE KEY IS REMOVABLE WHEN THE CIRCUIT BREAKER IS LOCKED IN THE OPEN POSITION.
 E — INDICATES KEY REMOVABLE ONLY WHEN BOLT EXTENDED.

INTERLOCK KEY TABLE

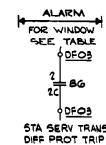
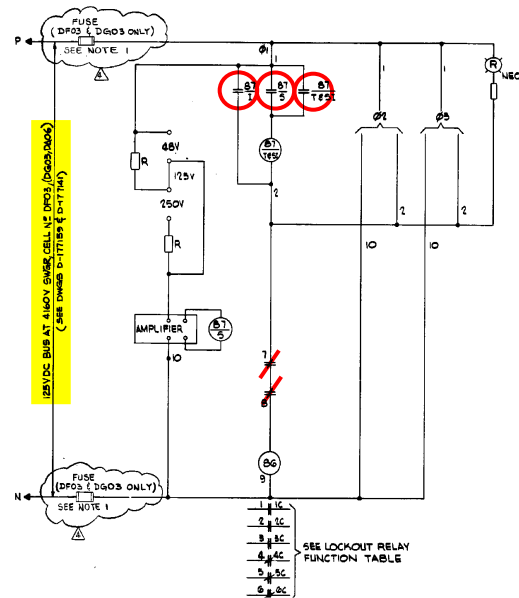
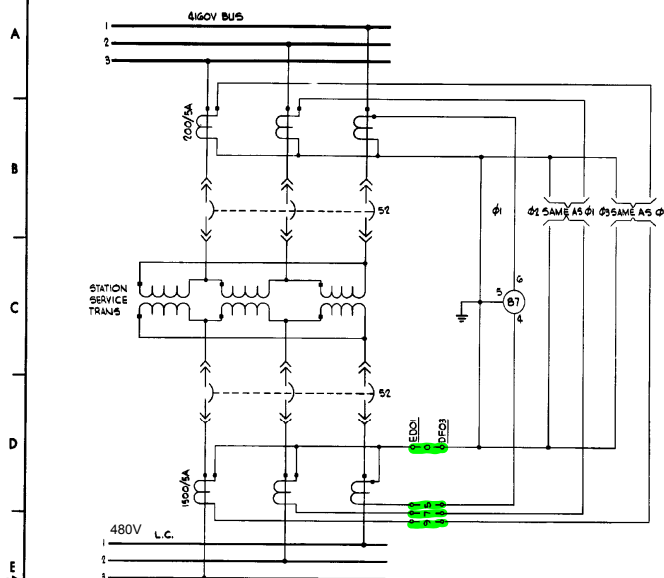
INTERLOCK	KEY NUMBER
AI	RE-14204

REFERENCE DWG.

- D-177001-SINGLE LINE ELEC AUX SYSTEM (4160V & 600V)
 C-177010-SINGLE LINE PROTECTION & METERING 600V LOAD CENTER ID
 A-177538-ELEC GEN DETAILS & NOTES

B-177125

REV
4



DEVICE	DESCRIPTION	MFR/TYPE	REMARKS
BG	LOCKOUT RELAY	GE/HEAGIA213	125V DC

NOTES:
1. SEE DRAWING A-181987 FOR FUSE RATING & TYPE.

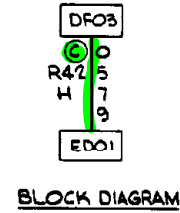
REFERENCE DRAWINGS

- A-177558—ELECTRICAL GENERAL DETAILS AND NOTES
- D-177001—SINGLE LINE ELECTRICAL AUX SYSTEM (EMERG-480V & 800V)
- D-177002—SINGLE LINE PROTECTION AND METERING 480V SWITCHGEAR BUS 1A
- D-177005—SINGLE LINE PROTECTION AND METERING 480V SWITCHGEAR BUS 1G (EMERG)
- D-177006—SINGLE LINE PROTECTION AND METERING 480V SWITCHGEAR BUS 1D (EMERG)
- C-177010—SINGLE LINE PROTECTION AND METERING 800V LOAD CENTER 1D (EMERG)
- C-177011—SINGLE LINE PROTECTION AND METERING 800V LOAD CENTER 1E (EMERG)
- C-177014—SINGLE LINE PROTECTION AND METERING 800V LOAD CENTER 1J
- A-181987—FUSE REPLACEMENT MANUAL FOR SAFETY RELATED EQUIPMENT.

LOCKOUT RELAY FUNCTION TABLE

BG DFO3	FUNCTION	DWG NO	BG DGO3	FUNCTION	DWG NO	BG DAO3	FUNCTION	DWG NO
1-1C	TRIP BAR S1-DFO3	C-177159	1-1C	TRIP BAR S1-DGO3	C-177159	1-1C	TRIP BAR S1-DAO3	D-177141
2-1C	ALARM	TWS DWG	2-1C	ALARM	TWS DWG	2-1C	ALARM	TWS DWG
3-1C	SPARE	---	3-1C	SPARE	---	3-1C	SPARE	---
4-1C	SPARE	---	4-1C	SPARE	---	4-1C	SPARE	---
5-1C	BLOCK CLOSING BAR S1-DFO3	C-177159	5-1C	BLOCK CLOSING BAR S1-DGO3	C-177159	5-1C	BLOCK CLOSING BAR S1-DAO3	D-177141
6-1C	SPARE	---	6-1C	SPARE	---	6-1C	SPARE	---

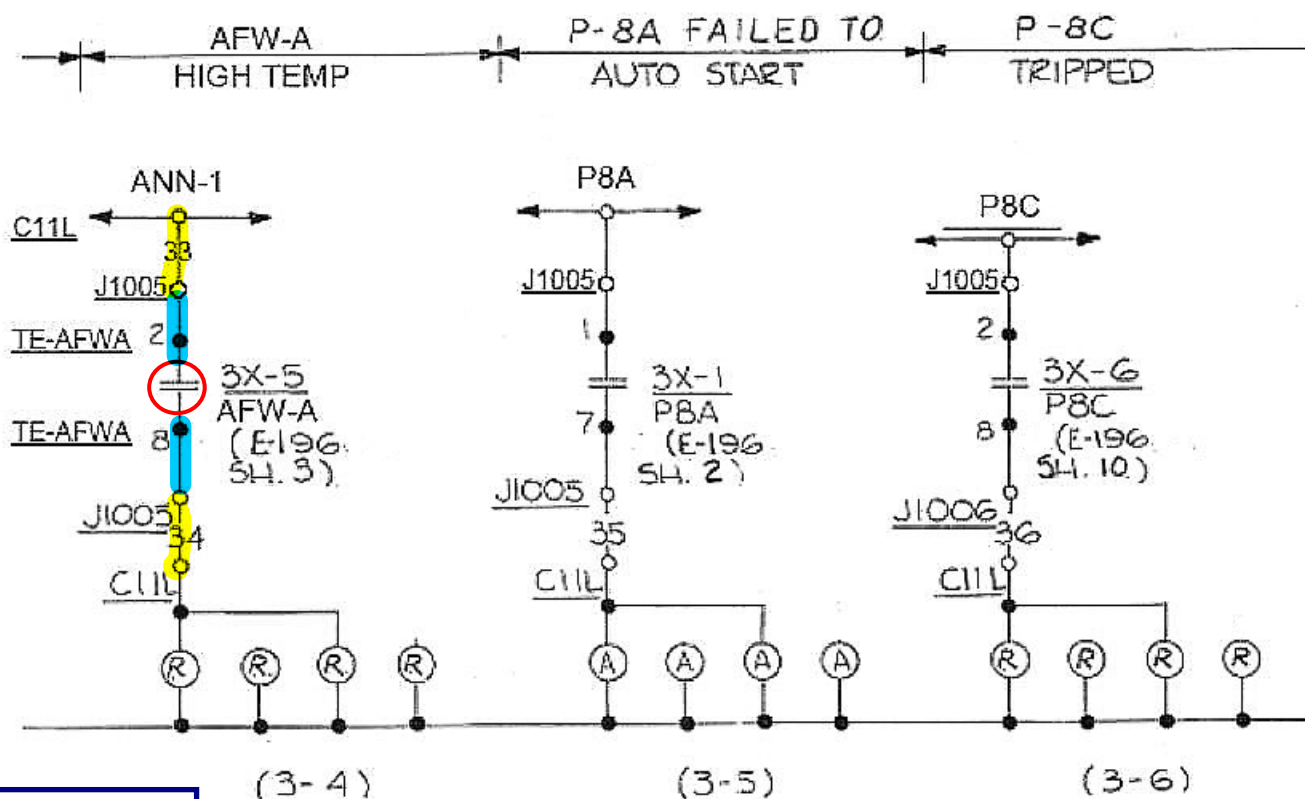
EQUIPMENT	PAC	SCHEME	SWGR CELL	LOAD CENTER	START-UP	ANNUNCIATOR
DIFFERENTIAL RELAY FOR STATION SERV TRANSFORMER	ID	IV	ADFO3	DFO3	EDOI	5
	IE	IV	BDO3	DGO3	EDOI	5
	IT	IV	XDAO3	DAO3	EDOI	5



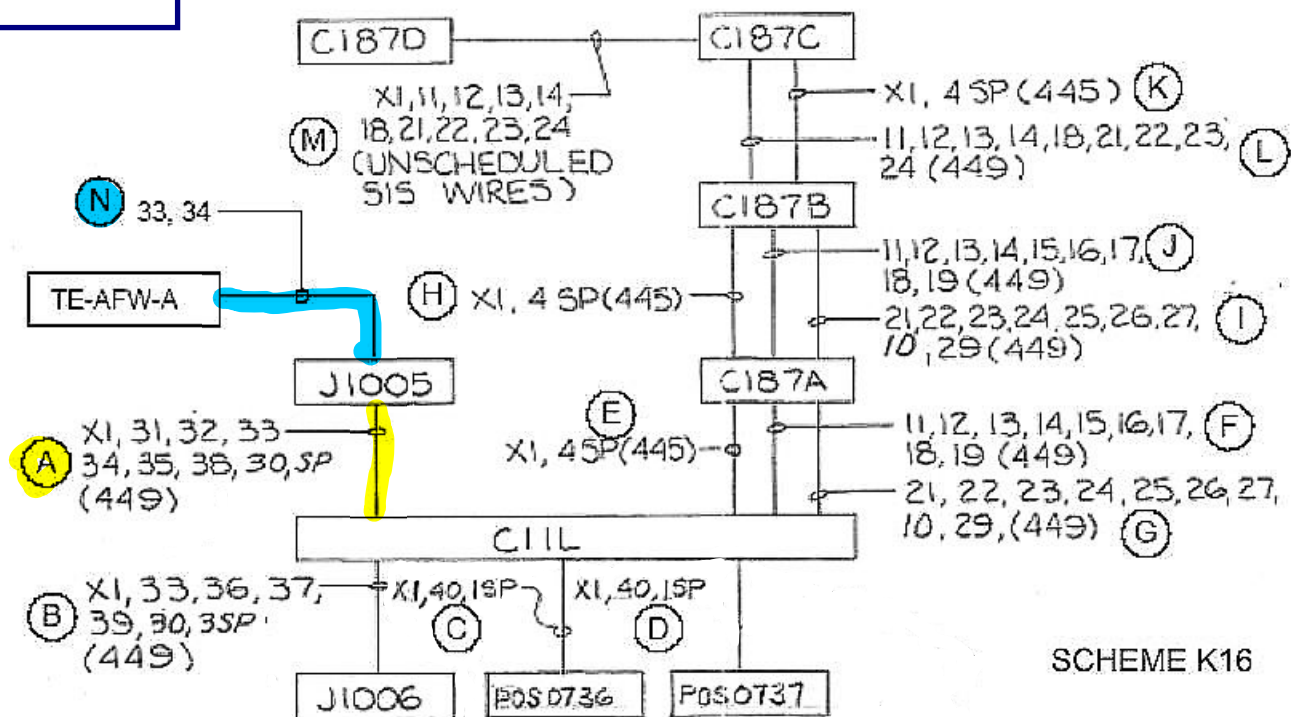
BLOCK DIAGRAM

D-177171

[illegible]



33: NR
34: S/I-HS



Example No.	Title	Drawing No.
11	ANN-1 Elementary Diagram	E-11-1
Normal Position	Failed Position	Function State
AVAILABLE	Elec: UNAVAILABLE Air: N/A	AVAILABLE – NON-SPURIOUS

CIRCUIT ANALYSIS WORKSHEET (EX-11)

Component ID FCV-605A Component Type Throttling AOV
Component Description RHR Flow Control Valve

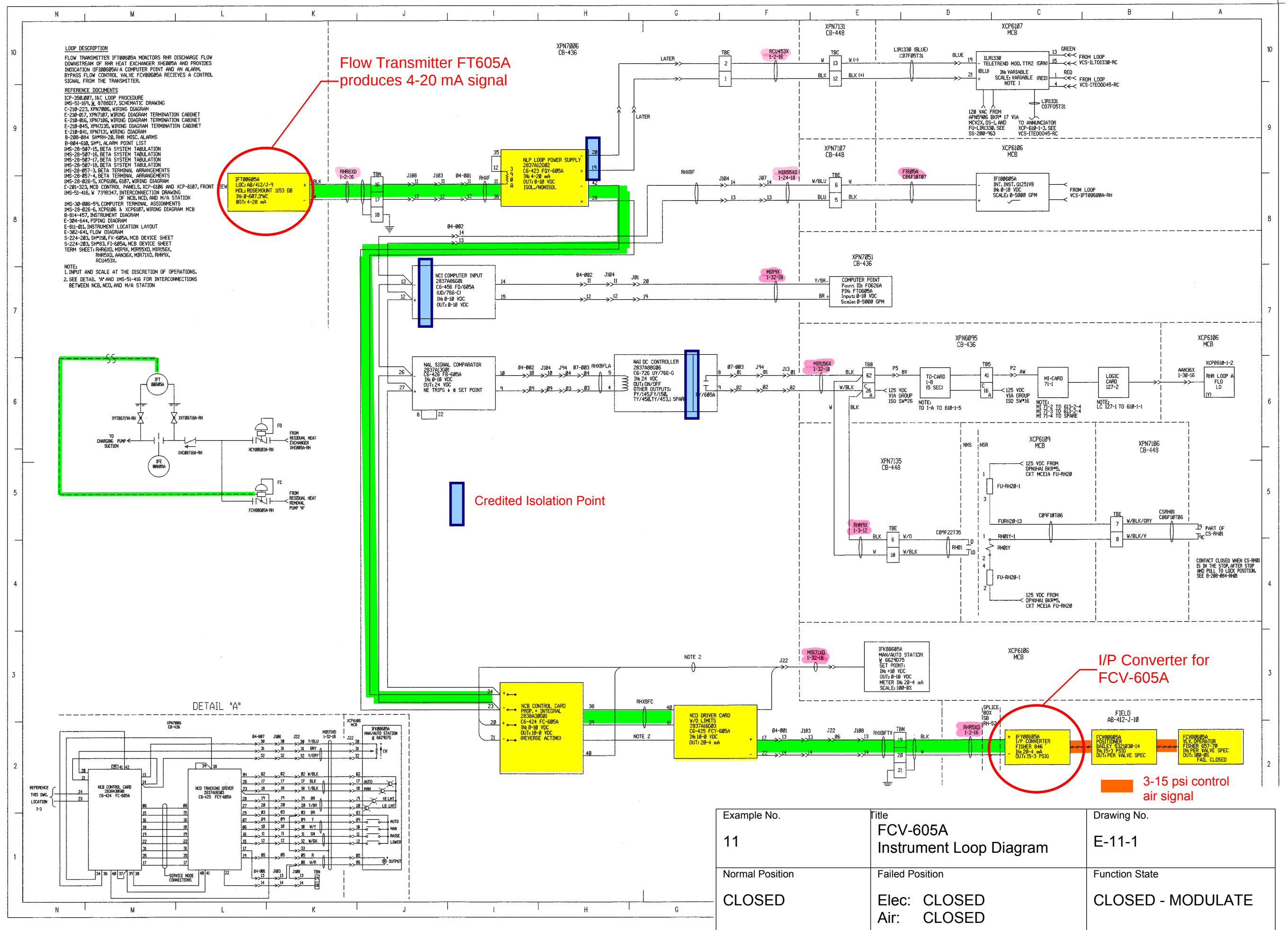
Normal Position Closed
Failed Electrical Position Closed
Failed Air Position Closed
Function State FCV605A-C-MOD
Initial Position Closed
Desired Position Modulate
BE Code RHR-605A_FTM

High Consequence Component Yes ☐ No ☒

Power Supplies APN5902 Breaker 13 Req'd ☒
APN1FA Breaker 12 Req'd ☒

Cable Analysis

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
RHR6XD	Y	N	LCS, ECS	
RCU453X	N	N	ISOL	Isolation at Loop Power Supply
MIR55XD	Y	N	LCS, ECS	
MIR9X	N	N	ISOL	Isolation at NCI Computer Input
MIR156X	N	N	ISOL	Isolation at NAI DC Controller
RHN9X	N	N	ISOL	Isolation at NAI DC Controller
MIR71XD	Y	N	LCS, ECS	M/A Station could introduce spurious signal
RHR5XD	Y	N	LCS, ECS	
FI605A	Y	N	LCS, ECS	



CIRCUIT ANALYSIS WORKSHEET (EX-12)

Component ID TTR2 Component Type Indicator
Component Description RHR Flow Indication Recorder

Normal Position Available
Failed Electrical Position Unavailable
Failed Air Position N/A
Function State TTR2-AV-AV
Initial Position Available
Desired Position Available
BE Code RHR-TTR2_FTRA

High Consequence Component Yes ☐ No ☒

Power Supplies APN5902 Breaker 13 Req'd ☒
APN1FA Breaker 12 Req'd ☒
APN5906 Breaker 17 Req'd ☒

Cable Analysis

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
RHR6XD	Y	N	LIS, EI	
RCU453X	Y	N	LIS, EI	
MIR55XD	N	N	ISOL	Isolation at Loop Power Supply
MIR9X	N	N	ISOL	Isolation at Loop Power Supply
MIR156X	N	N	ISOL	Isolation at Loop Power Supply
RHN9X	N	N	ISOL	Isolation at Loop Power Supply
MIR71XD	N	N	ISOL	Isolation at Loop Power Supply
RHR5XD	N	N	ISOL	Isolation at Loop Power Supply
LIR1330	Y	N	LIS, EI	

Component ID	COMP-1B	Component Type	Air Compressor
Component Description	Air Compressor 1B		

High Consequence Component Yes ☐ No ☒

Cable ID	Req'd?	MHS?	Fault Consequence	Comments
1UYEQ17J	Y	N	S/O-HS, LOCP	Breaker control circuit
1UYEQ17P	Y	N	LOP	3-phase power
1UYEQ17A	Y	N	LOC-BF	Cooling water
1UYEQ17B	Y	N	LOC-BF	
1UYEQ17E	Y	N	LOC-BF	
1UYEQ17H	Y	N	LOC	High water temperature
1UYEQ17I	Y	N	LOC-BF	Sequence controller
1UYEQ17M	Y	N	LOC-BF	
1UYEQ17N	N	N	NR	Annunciation
1UYEQ17T	N	N	NR	Annunciation

Cable ID	Req'd?	MHS?	Fault Consequence	Comments

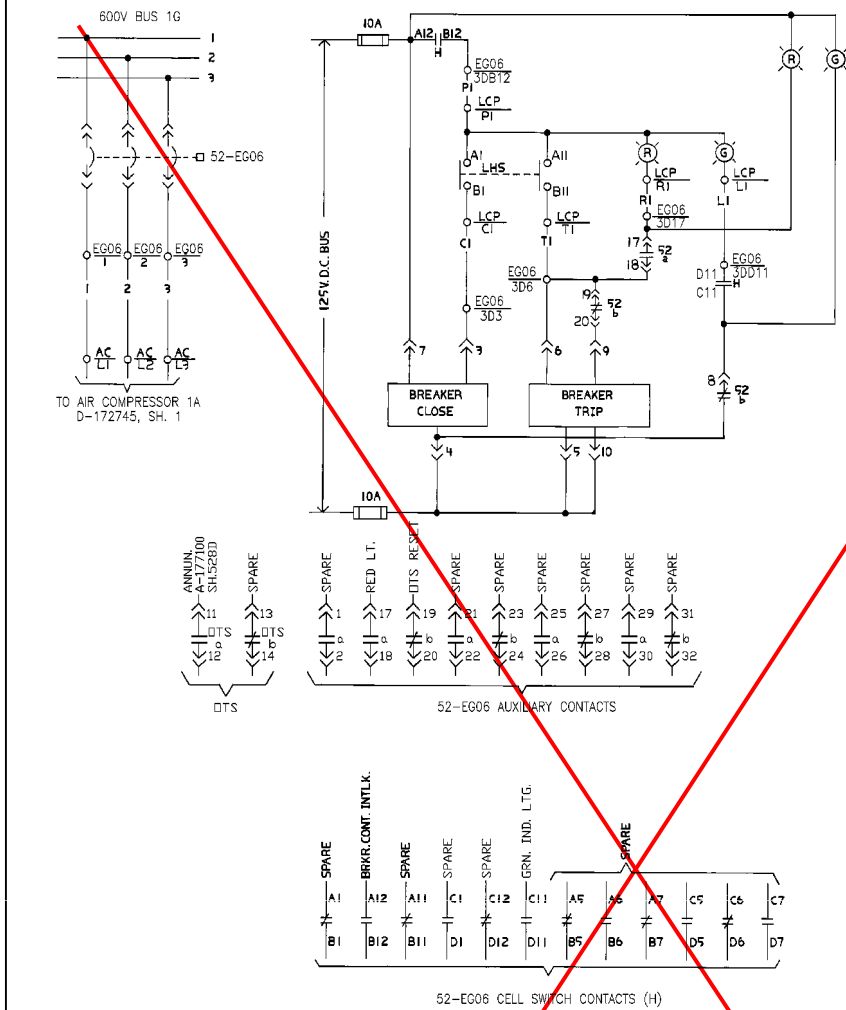
Equipment Dependencies

Comments

125 VDC control power for Breaker EQ-17 is included with analysis for LC-1.

Cable Analysis

[illegible]

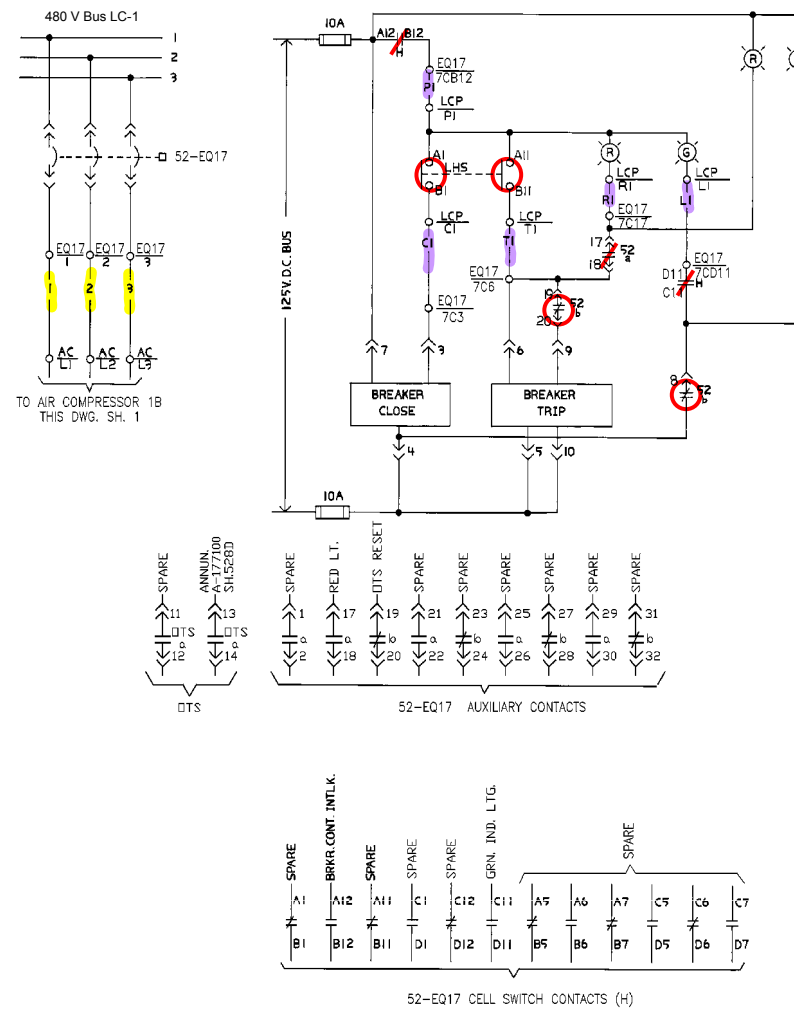
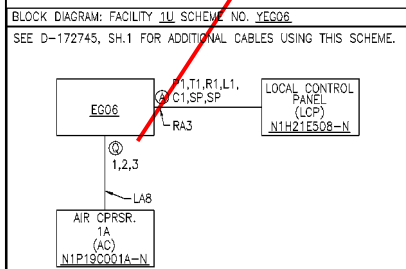


LOCAL HANDSWITCH (LHS)

BREAKER CONTROL		CONTACT		POSITION		
I	II	I	II	I	II	
TRIP	CLOSE	A11-B11	X	O	O	BREAKER TRIP
		A12-B12	O	X	O	SPARE
		A1-B1	O	O	X	BREAKER CLOSE
		A5-B5	X	O	O	
		A6-B6	O	X	O	SPARE
		A7-B7	O	O	X	

WEST. TYPE W2
NAMEPLATE -
502A054H02
HANDLE -
310C624H02
SWITCH -
508A107G01

SPRING RETURN
TO NORMAL

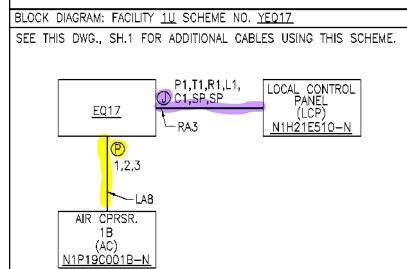


LOCAL HANDSWITCH (LHS)

BREAKER CONTROL		CONTACT		POSITION		
I	II	I	II	I	II	
TRIP	CLOSE	A11-B11	X	O	O	BREAKER TRIP
		A12-B12	O	X	O	SPARE
		A1-B1	O	O	X	BREAKER CLOSE
		A5-B5	X	O	O	
		A6-B6	O	X	O	SPARE
		A7-B7	O	O	X	

WEST. TYPE W2
NAMEPLATE -
502A054H02
HANDLE -
310C624H02
SWITCH -
508A107G01

SPRING RETURN
TO NORMAL



LEGEND

H - TRUCK OPERATED CELL SWITCH SHOWN WITH
BREAKER IN TEST POSITION
OTS - OVERCURRENT TRIP SWITCH

REFERENCES:

D-177013, SH.1 SINGLE LINE PROTECTION &
METERING 600V LOAD CTR. 1G
D-177676, SH.1 SINGLE LINE PROTECTION &
METERING 600V LOAD CTR. 1Q

A

B

C

D

E

F

G

H

J

A

B

C

D

E

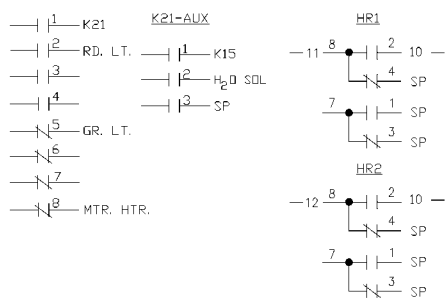
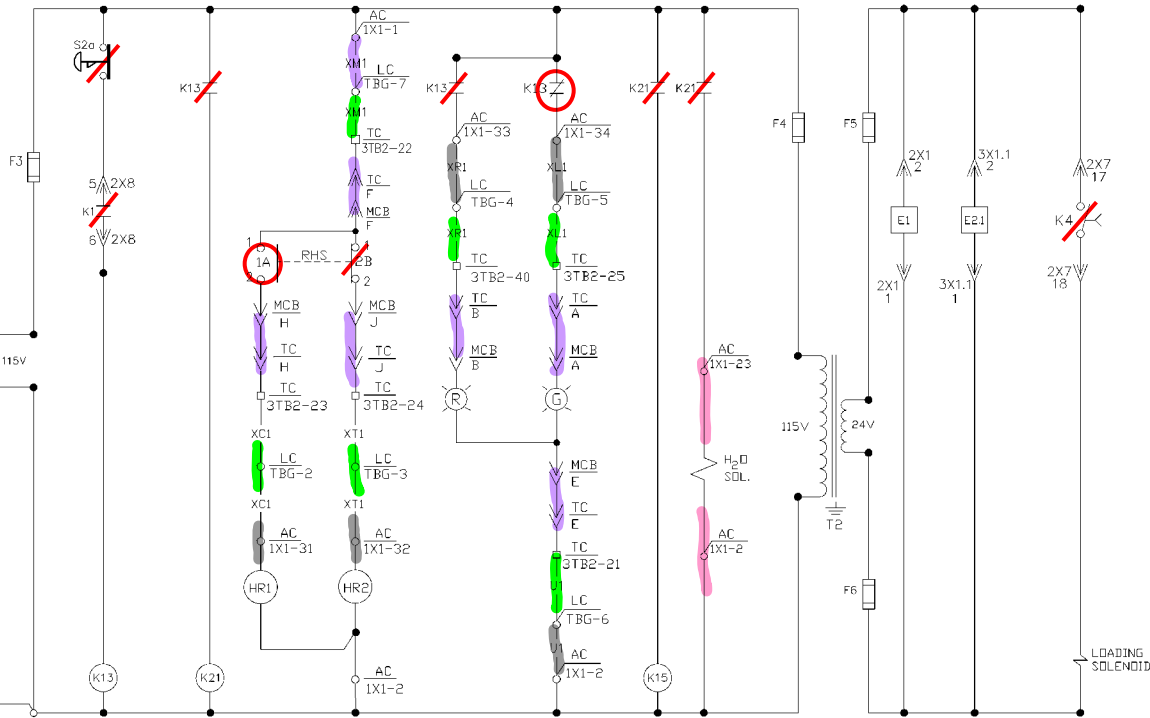
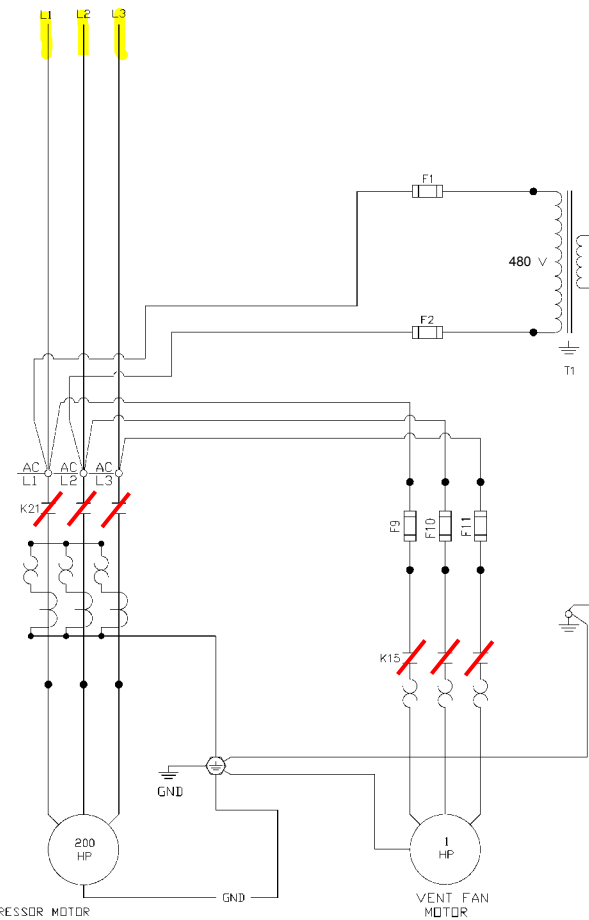
F

G

H

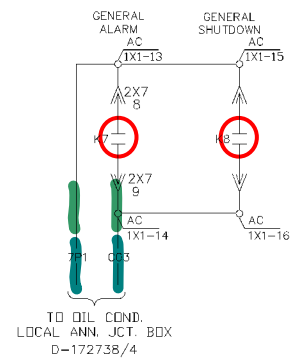
J

LOAD CENTER
BREAKER E017
INCOMING POWER
3 PH, 60 HZ, 480 V



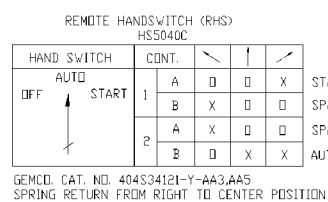
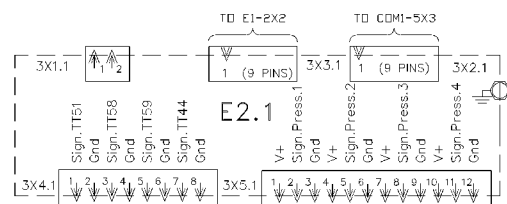
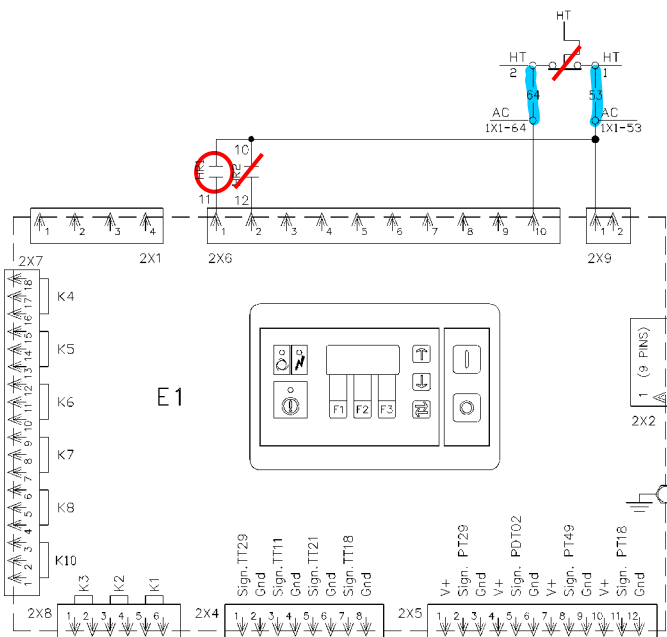
LEGEND

- F1-F6 & F9-F11 } FUSE
LC 600V SWITCHGEAR
TC TERMINATION CABINET
MCB MAIN CONTROL BOARD
AC AIR COMPRESSOR
K1,2,...,13 CONTROL RELAY
HR1,2 AUX RELAY
TT1,2 CONTROL TRANSFORMER
E1 ELEKTRONIKON REGULATOR
E2.1 SENSOR EXPANSION MODULE
S2a,b,c EMERGENCY STOP PUSH BUTTON
K15,21 CONTACTOR
RHS MCB HAND SWITCH
HT HIGH DISCHARGE WATER TEMP. SW.



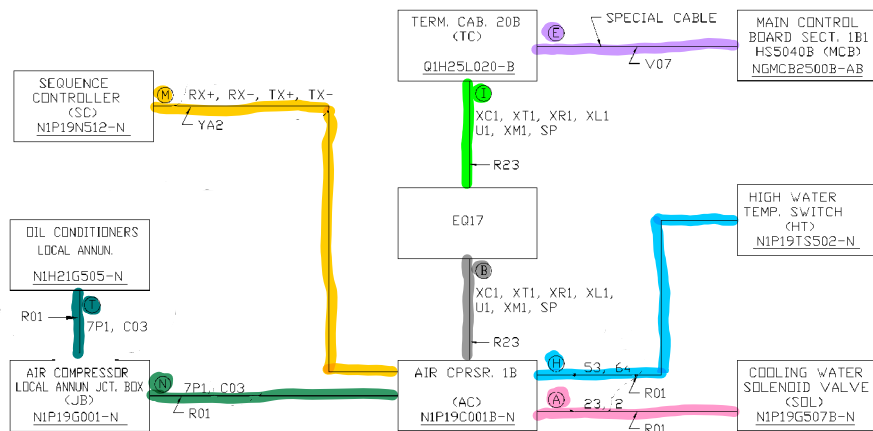
REFERENCES:

- A-177538 ELEC. GEN. DETAILS & NOTES
D-172745/2 ELEM. DIAG-SEQUENCE CONTROLLER
D-172746 SINGLE LINE PROTECTION & METERING
600V. LOAD CRT. 10
U-418371 AIR COMPRESSOR INSTRUCTION BOOK



BLOCK DIAGRAM: SCHEME NO. YE017

SEE D-172746, SH.3 FOR ADDITIONAL CABLES USING THIS SCHEME.



FACILITY NO. 1U
START UP NO. 19

CABLES (C), (D) & (E) OF THIS SCHEME ARE PULLED BUT DELETED