

SHEET NUMBER	TITLE	REVISION	DATE	DESIGN CHANGE DESCRIPTION
0	COVER SHEET	1	15/11/2010	REVISION 1 CHANGES INDICATED.
1	PANEL EQUIPMENT LAYOUT	1	15/11/2010	REAR OF MODULE R3: COMPONENT ORDER ALTERED.
2	FRONT PANEL LABELS	1	15/11/2010	SEL-487E LED 10 LABEL UPDATED: "WIND." CHANGED TO "WINDING". BREAKER FAIL ISOLATE SWITCH LABEL WORDING ALTERED.
3	SCHEME LOGIC DIAGRAM	1	15/11/2010	LEVEL 5: HV/MV EARTH FAULT PROTECTION APPLIED FROM PHASE CTs. LEVEL 16: APPLICATION OF MV CUST CABLE PROTECTION ALTERED.
4	RELAY LOGIC DIAGRAM	1	15/11/2010	UPDATED AS PER FINALISED SETTINGS TEMPLATE (REV 0). REPLACES PREVIOUS SHEET 4.
5	RELAY LOGIC DIAGRAM	1	15/11/2010	UPDATED AS PER FINALISED SETTINGS TEMPLATE (REV 0). REPLACES PREVIOUS SHEET 5.
6	RELAY LOGIC DIAGRAM	1	15/11/2010	UPDATED AS PER FINALISED SETTINGS TEMPLATE (REV 0). REPLACES PREVIOUS SHEET 6.
7	RELAY LOGIC DIAGRAM	1	15/11/2010	UPDATED AS PER FINALISED SETTINGS TEMPLATE (REV 0). REPLACES PREVIOUS SHEET 7.
8	AC KEY DIAGRAM	1	15/11/2010	AS PER PREVIOUS ISSUE.
9	AC KEY DIAGRAM: STAR-DELTA POWER TRANSFORMER	1	15/11/2010	VOLTAGE TRFRS PREVIOUSLY ON LEVEL 12 MOVED TO LEVEL 11.
9B	AC KEY DIAGRAM: STAR-STAR POWER TRANSFORMER (NOT USED)	1	15/11/2010	VOLTAGE TRFRS PREVIOUSLY ON LEVEL 12 MOVED TO LEVEL 11.
9C	AC KEY DIAGRAM: AUTO TRANSFORMER (NOT USED)	1	15/11/2010	VOLTAGE TRFRS PREVIOUSLY ON LEVEL 12 MOVED TO LEVEL 11.
10	AC KEY DIAGRAM: ESKOM MV CIRCUIT-BREAKER	1	15/11/2010	AS PER PREVIOUS ISSUE.
10B	AC KEY DIAGRAM: CUSTOMER MV CIRCUIT-BREAKER (NOT USED)	1	15/11/2010	PLACEMENT OF TERMINAL T AND U CT INPUTS SWAPPED. CT STAR POINTS REVERSED.
10C	AC KEY DIAGRAM: SECONDARY SIDE HV CIRCUIT BREAKER (FOR AUTO TRANSFORMER APPLICATIONS) (NOT USED)	1	15/11/2010	AS PER PREVIOUS ISSUE.
11	VT SUPPLY KEY DIAGRAM	1	15/11/2010	AS PER PREVIOUS ISSUE.
12	MAIN DC KEY DIAGRAM	1	15/11/2010	AS PER PREVIOUS ISSUE.
13	MAIN DC KEY DIAGRAM	1	15/11/2010	AS PER PREVIOUS ISSUE.
14	BACK-UP DC KEY DIAGRAM	1	15/11/2010	LEVEL 15: FERRULE NUMBERS FOR TERMINAL X2.42 CORRECTED FROM K409 TO K407.
15	BACK-UP DC KEY DIAGRAM	1	15/11/2010	IN313 TERMINAL NO'S CORRECTED FROM A... TO C... LEVEL 16: MV LINE ISOLATOR STATUS ADDED. LEVELS 3, 4 & 5: MIB CONTACT CONFIGS CORRECTED (N/O vs N/C). NOTE 3 ADDED.
16	BACK-UP DC KEY DIAGRAM	1	15/11/2010	FERRULE NO'S OF CB CLOSE COIL -VE SUPPLIES CHANGED FROM K385 TO K384. DC SUPPLY MONITORING NO'S CHANGED FROM K398 & K399 TO K399 & K400. MODULE TERMINAL (MT) ADDED IN FAULT COUNTER CIRCUIT (K302).
17	SPR REWIND DC KEY, AC KEY DIAGRAM	1	15/11/2010	FERRULE NUMBERS ADDED TO TEST POINT WIRING.
18	SUPERVISORY/COMMS KEY DIAGRAM	1	15/11/2010	LEVEL 26: SEL-2886 DIP SWITCH SETTINGS ADDED.
19	PROTECTION REFERENCE DIAGRAM	1	15/11/2010	AS PER PREVIOUS ISSUE.
20	PANEL CABLING DIAGRAM	1	15/11/2010	LEVEL 9: FERRULE NUMBERS ADDED FOR TERMINALS X1.11 & X1.12 AS PER SHEET 10C.
21	PANEL CABLING DIAGRAM	1	15/11/2010	FERRULE NO'S FOR X3.36 & X3.37 CORRECTED FROM K511 & K513 TO K509 & K511. NO'S FOR X4.11, X4.12 & X4.20 UPDATED AS PER SHT 16.
22	PANEL CABLING DIAGRAM	1	15/11/2010	FERRULE NO'S FOR X5.8 UPDATED AS PER SHEET 16. X7.1-X7.2 DESCRIPTION CHANGED FROM "TCNH ALARM" TO "PNH ALARM". LEVEL 16: MV LINE ISOLATOR STATUS ADDED.
23	HV OR PRIMARY-SIDE CT JB CABLING DIAGRAM	1	15/11/2010	AS PER PREVIOUS ISSUE.
24	MV OR SECONDARY-SIDE CT JB CABLING DIAGRAM (NOT USED)	1	15/11/2010	AS PER PREVIOUS ISSUE.
25	MV OR SECONDARY-SIDE VT JB CABLING DIAGRAM (NOT USED)	1	15/11/2010	AS PER PREVIOUS ISSUE.
26	CABLE BLOCK DIAGRAM (NOT USED)	1	15/11/2010	AS PER PREVIOUS ISSUE.
24	RED670 RELAY DC, AC & SUPERVISORY KEY DIAGRAM	0	25/11/2011	SHEET ADDED FOR SITE SPECIFIC APPLICATION
25	RED670 RELAY REFERENCE DIAGRAM	0	25/11/2011	SHEET ADDED FOR SITE SPECIFIC APPLICATION

LEVEL	DESCRIPTION	LEVEL	DESCRIPTION
1	SCHEME RATED FOR 110 V DC SUPPLY. (AFFECTS TYPE OF CONTACT PROTECTION (SNUBBER CTs) SUPPLIED)	16	
2		17	INDOOR SWITCHGEAR AS PER D-DT-5408 SHTs 7 -14 (RT TERMINALS) WITH REMOTE PROTECTION SCHEME
3	STAR-DELTA POWER TRANSFORMER WITH 360 A NEC/R (INCLUDES COOLER FANS: DELETE IF NOT APPLICABLE)	18	
4		19	
5		20	
6		21	
7		22	
8	HIGH IMPEDANCE HV & MV REF FOR TWO-WINDING TRFR - TWO RMS 2V73 RELAYS (ORDERING OPTION)	23	
9		24	APPLICATION WITH RED670 DIFF RELAY INTEGRATION
10	STANDARD DESIGN DRAWING	25	NON-STANDARD DESIGN WITH HV POST CTs AND NO HV BREAKER
11	APPLICATION USING TRFR MV / SECONDARY-SIDE VTs (i.e. WITHOUT MV VT SELECTION OPTION)	26	STANDARD COMMS OPTIONS (RS-485/DNP3 SCADA & RS-485 REMOTE ENG. ACCESS)
12		27	IEC-61850/ETHERNET COMMS (ORDERING OPTION)
13		28	
14		29	
15		30	APPLICATION WITH 4TC-5200 TAP CHANGE CONTROL SCHEME

TRANSFORMER SECONDARY-SIDE CIRCUIT-BREAKER OPTIONS

TRANSFORMER PRIMARY-SIDE CIRCUIT-BREAKER OPTIONS

? MUTUALLY EXCLUSIVE LEVELS/SHEETS. SELECT ONE AND ONLY ONE OF EACH PAIR/SET PER APPLICATION.
 IMPORTANT: OWING TO SPACE CONSTRAINTS WITHIN THE MODULE, LEVELS 15 AND 16 CAN NOT BE APPLIED TOGETHER.

SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 24	RED670 AC/DC & SUP. KEY DIAGRAM
SHEET 23	HV CT JB CABLING DIAGRAM
SHEET 22	PANEL CABLING DIAGRAM
SHEET 21	PANEL CABLING DIAGRAM
SHEET 20	PANEL CABLING DIAGRAM
SHEET 19	REFERENCE DIAGRAM
SHEET 18	SUPERVISORY/COMMS KEY DIAG
SHEET 17	SPR REW. DC, AC KEY DIAGRAM
SHEET 16	BACK-UP DC KEY DIAGRAM
SHEET 15	BACK-UP DC KEY DIAGRAM
SHEET 14	BACK-UP DC KEY DIAGRAM
SHEET 13	MAIN DC KEY DIAGRAM
SHEET 12	MAIN DC KEY DIAGRAM
SHEET 11	VT SUPPLY KEY DIAGRAM
SHEET 10	AC KEY DIAGRAM
SHEET 9	AC KEY DIAGRAM
SHEET 8	AC KEY DIAGRAM
SHEET 7	RELAY LOGIC DIAGRAM
SHEET 6	RELAY LOGIC DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET



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 DESIGN APPROVED: S.J. van ZYL
 DATE 25/06/21
 PROJECT CHECKED: B. HOMANN
 DESIGN CHECKED: P.A. GERBER
 DATE 25/06/21
 DRAWN BY: K. STEYNBERG
 DATE 25/06/21
 CHECKED BY: S.J. van ZYL
 DATE 17/09/09

ISCOR SUBSTATION
 66/11 kV TRANSFORMER 2
 COVER SHEET

D-WC-7104

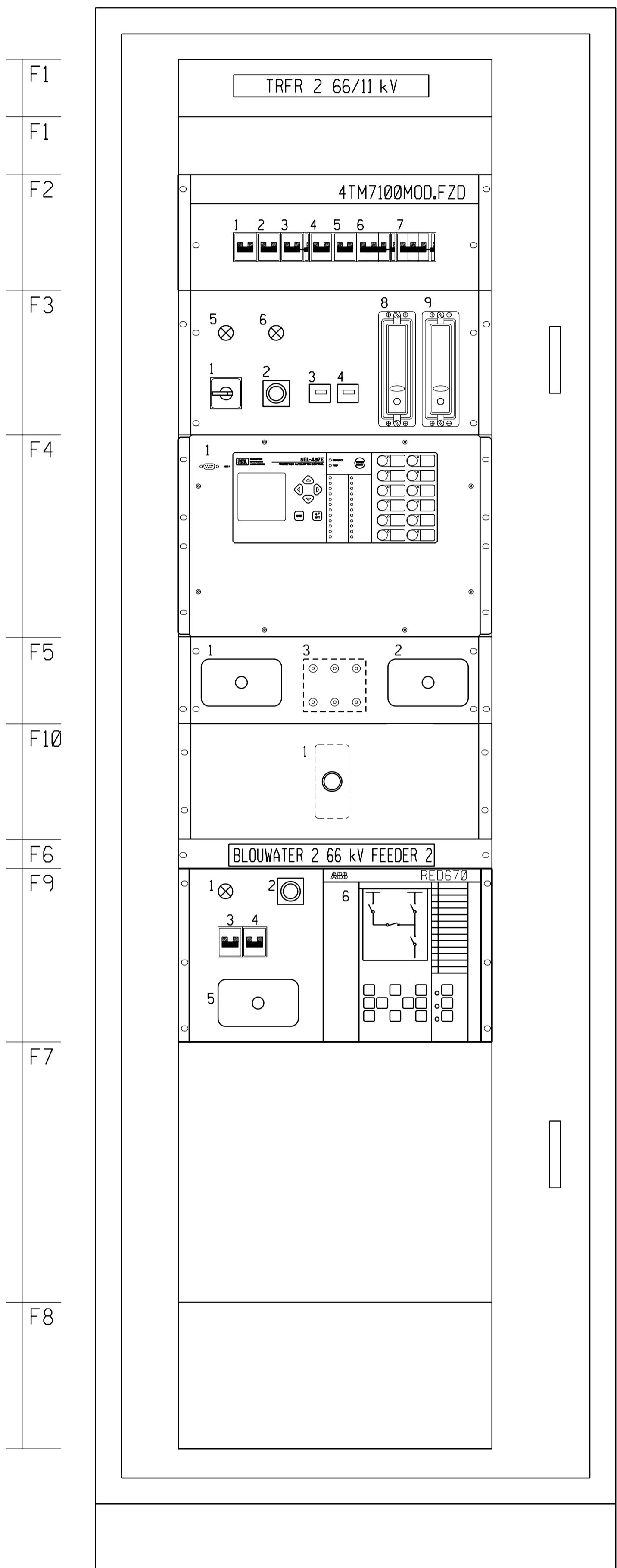
SET NUMBER	83
SHEET NUMBER	00
REVISION	0

PLEASE NOTE!!!!!!!!!!!!

WHEN USING THIS SCHEME PLEASE MAKE SURE THAT REFERENCE FILE title4TM7100r1 IS ATTACHED ON ALL THE SHEETS AT ALL TIMES.

REV	0	DATE	15/11/2010	DESCRIPTION	CHANGES AS PER SHEET 0 - COVER SHEET.	BY	SvZ	SCALE	
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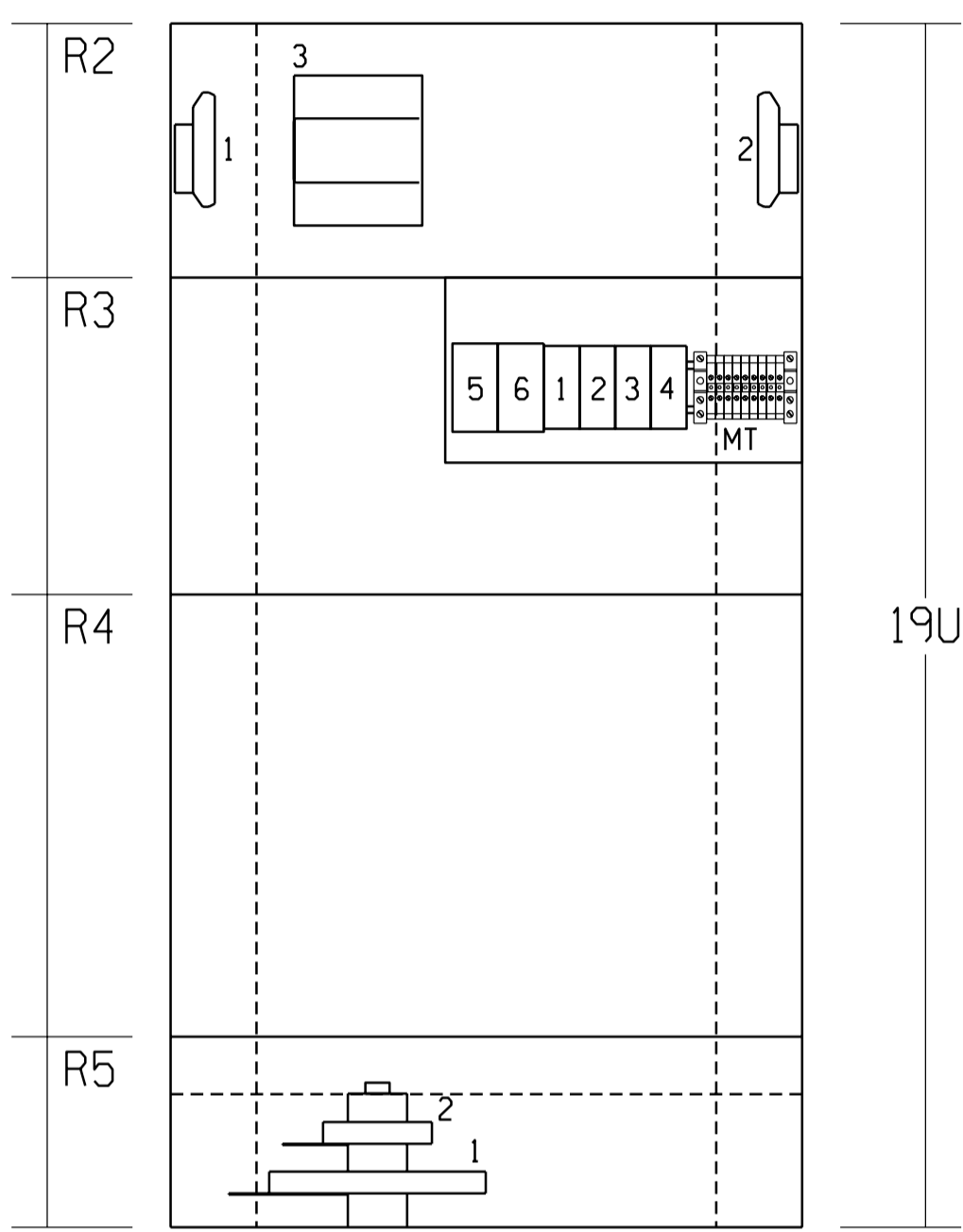
FRONT VIEW



2U
2U
1U
3U
5U
7U
3U
4U
1U
6U
9U
5U

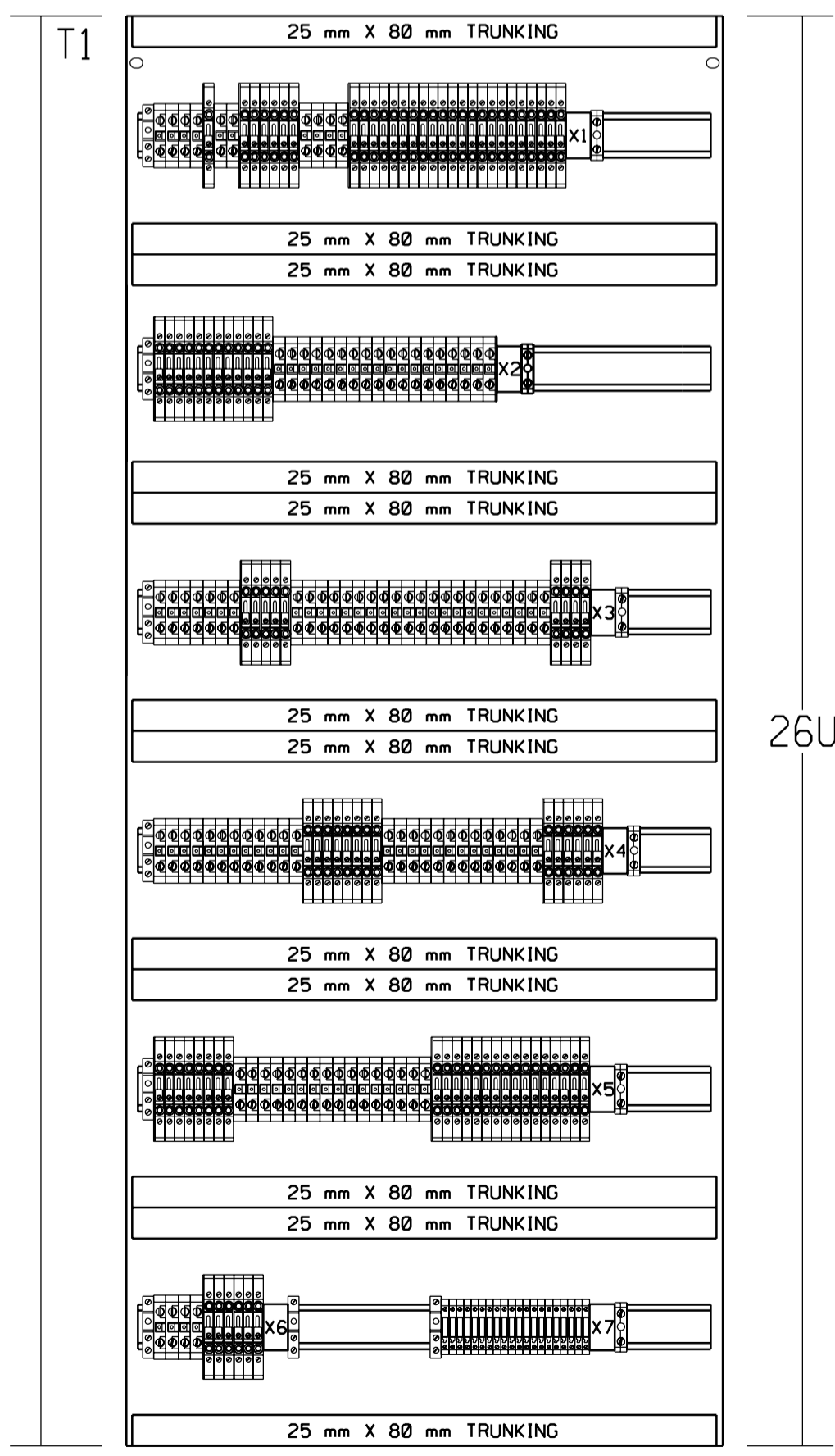
4TM-7100 MODULE

REAR OF MODULE



19U

TERMINAL BACK PLATE

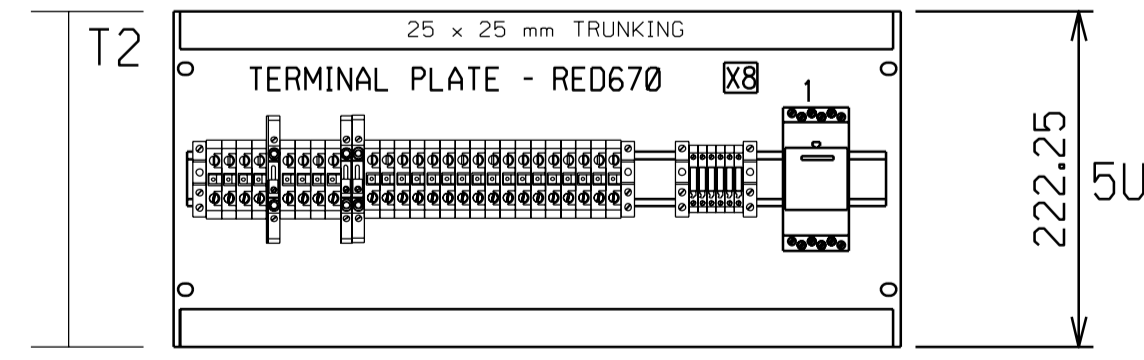


26U

LOCATION	DESIGNATION	DESCRIPTION	TYPE	MANUFACTURER
FRONT VIEW				
F1		BLANKING PLATE		
F2	1	DC1 MCB (M)	DC ISOLATE MINIATURE CIRCUIT-BREAKER (MAIN CCT) (16A)	EP102UC(C16)
	2	DC1 MCB (BU)	DC ISOLATE MINIATURE CIRCUIT-BREAKER (BACK-UP CCT) (16A)	EP102UC(C16)
	3	DC1 MCB (SR)	DC ISOLATE MINIATURE CIRCUIT-BREAKER (SPRING REWIND) (20A)	EP102UC(C20)
	4	MCB (AC)	AC ISOLATE MINIATURE CIRCUIT-BREAKER (10A)	G62(C10) & CA H
	5	MCB (H)	HEATER SUPPLY AC MINIATURE CIRCUIT-BREAKER (6A)	G62(C06)
	6	MCB (VT-HV)	HV VOLTAGE TRANSFORMER MINIATURE CIRCUIT-BREAKER (2A)	G63(C02) & CA H
	7	MCB (VT-MV)	HV VOLTAGE TRANSFORMER MINIATURE CIRCUIT-BREAKER (2A)	G63(C02) & CA H
F3	1	BF1	CIRCUIT-BREAKER FAIL ISOLATE SWITCH	CA-10
	2	ETPB	EMERGENCY TRIP PUSH BUTTON WITH COVER (RED)	MP1-10R / MCBH-20
	3	FC (HV)	HV CIRCUIT-BREAKER FAULT/TRIP COUNTER (3 DIGIT)	3099
	4	FC (MV)	MV CIRCUIT-BREAKER FAULT/TRIP COUNTER (3 DIGIT)	3099
	5	PNH-I	PROTECTION NOT HEALTHY INDICATION (AMBER)	KRE-222-UL (230Vac)
	6	MTR-I	MASTER TRIP OPERATED INDICATION (RED)	KRE-222-UN
	8	(HI-Z) HV REF	HV HIGH IMPEDANCE RESTRICTED EARTH FAULT PROTECTION RELAY	2V73-AAA
	9	(HI-Z) MV REF	MV HIGH IMPEDANCE RESTRICTED EARTH FAULT PROTECTION RELAY	2V73-AAA
F4	1	SEL-487E	TRANSFORMER PROTECTION AND CONTROL RELAY	SEL-487E
F5	1	CTTB(HV)	HV DIFFERENTIAL CURRENT TRANSFORMER TEST BLOCK	PK2 4-WAY
	2	CTTB(MV)	MV DIFFERENTIAL CURRENT TRANSFORMER TEST BLOCK	PK2 4-WAY
	3	TPI-TP6	BANANA PLUG TEST POINTS (BLACK)	RC11 BK
F6		BLANKING PLATE		
F7		BLANKING PLATE		
F8		BLANKING PLATE		
F9	1	PNH-I	PROTECTION NOT HEALTHY INDICATION (RED 670) (AMBER)	KRE-222-UL (230 Vac)
	2	ETPB	TRIP TEST PUSH BUTTON WITH COVER (RED)	MP1-10R-10/ YSF
	3	DC1 MCB (M)	DC ISOLATE MINIATURE CIRCUIT-BREAKER (RED 670 CCT) (5A)	EP102UC(C5)
	4	MCB (AC)	AC ISOLATE MINIATURE CIRCUIT-BREAKER (RED 670 CCT) (2A)	G62(C2)
	5	CTTB(HV) - 2	HV DIFFERENTIAL CURRENT TRANSFORMER TEST BLOCK (RED 670)	PK2 4-WAY
	6	RED 670	LINE PROTECTION AND CONTROL RELAY	RED 670
F10	1	IS20	ARC FAULT RELAY	IS20(CAA)
REAR OF MODULE				
R2	1	DB1	DIODE BOARD 1 (8 TRIPPING DIODES)	10200
	2	DB2	DIODE BOARD 2 (8 TRIPPING DIODES)	10200
	3	MTR	MASTER TRIP RELAY	BJ8T **
R3		MT	MODULE TERMINALS	M4/6
	1	AS-HVM	HV MAIN TRIPPING CIRCUIT ARC SUPPRESSOR	SEL-9501
	2	AS-HVBU	HV BACK-UP TRIPPING CIRCUIT ARC SUPPRESSOR	SEL-9501
	3	AS-MVM	MV MAIN TRIPPING CIRCUIT ARC SUPPRESSOR	SEL-9501
	4	AS-MVBU	MV BACK-UP TRIPPING CIRCUIT ARC SUPPRESSOR	SEL-9501
	5	SEL-2885	ADDRESSABLE RS-232 TO RS-485 CONVERTER (REMOTE ENG. ACCESS)	SEL-2885
	6	SEL-2886	RS-232 TO RS-485 CONVERTER (SCADA COMMUNICATION)	SEL-2886
R4			REAR OF SEL-487E RELAY	
R5	1	HV METROSIL	SINGLE PHASE METROSIL FOR HI-Z HV REF RELAY (6 INCH)	600A/S1/S887
	2	MV METROSIL	SINGLE PHASE METROSIL FOR HI-Z MV REF RELAY (3 INCH)	300A/S1/S646
TERMINAL BACK PLATE				
T1	X1-X7		TERMINAL RAILS (RAISED FROM BACK PLATE BY 70 mm STAND-OFF POSTS). SCHEME WIRING TERMINATED AT BOTTOM SIDE OF TERMINAL STRIPS. REFER TO SHTs 20 - 22 FOR TERMINAL BLOCK MAKES AND TYPES	
T2	X8		TERMINAL RAILS SCHEME WIRING TERMINATED AT BOTTOM SIDE OF TERMINAL STRIPS. REFER TO SHT 22 FOR TERMINAL BLOCK MAKES AND TYPES	
	1	IRF-X	RED670 PNH AUXILIARY RELAY (110=110V DC)	CR-U110DC3L

** SPECIFY 110 Vdc OR 220 Vdc

TERMINAL BACK PLATE



SHEET 8	AC KEY DIAGRAM	SHEET 17	SPR REV DC AC KEY DIAGRAM	SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 7	RELAY LOGIC DIAGRAM	SHEET 16	BACK-UP DC KEY DIAGRAM	SHEET 24	RED670 AC/DC & SUP. KEY DIAGRAM
SHEET 6	RELAY LOGIC DIAGRAM	SHEET 15	BACK-UP DC KEY DIAGRAM	SHEET 23	HV CT JB CABLING DIAGRAM
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SHEET 1	PANEL EQUIPMENT LAYOUT	SHEET 10	AC KEY DIAGRAM	SHEET 18	SUPERVISORY/COMMS KEY DIAG
SHEET 0	COVER SHEET	SHEET 9	AC KEY DIAGRAM		

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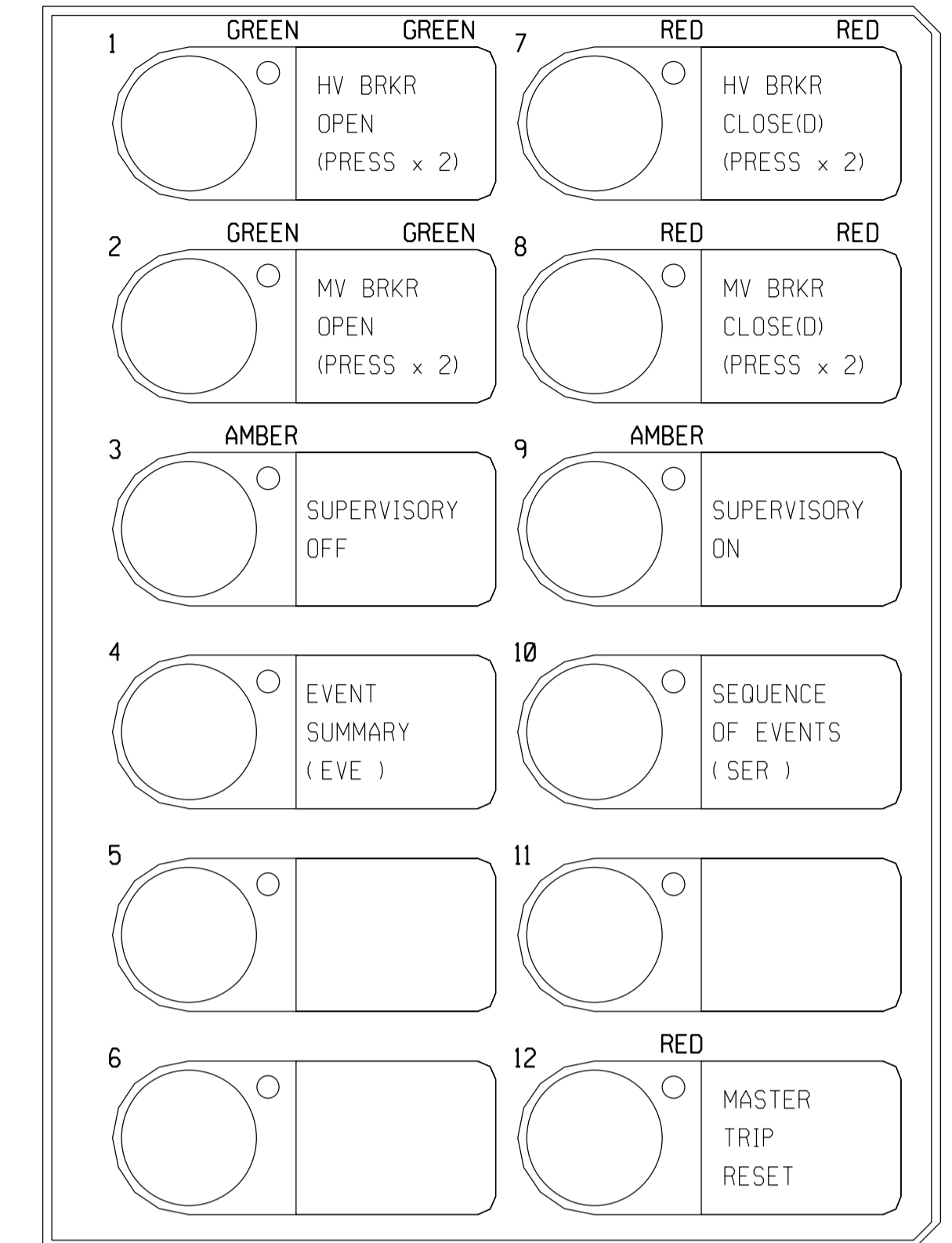
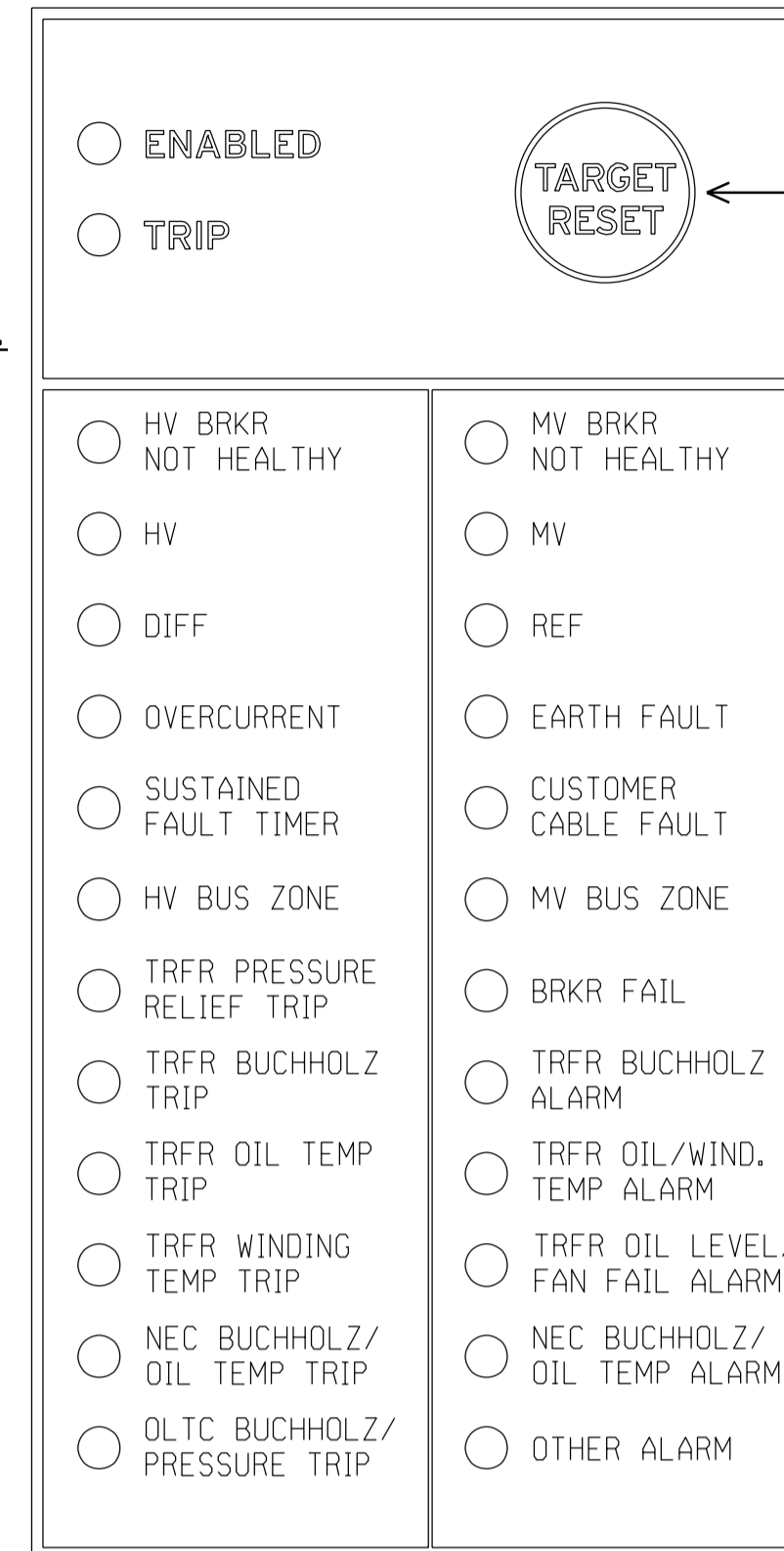
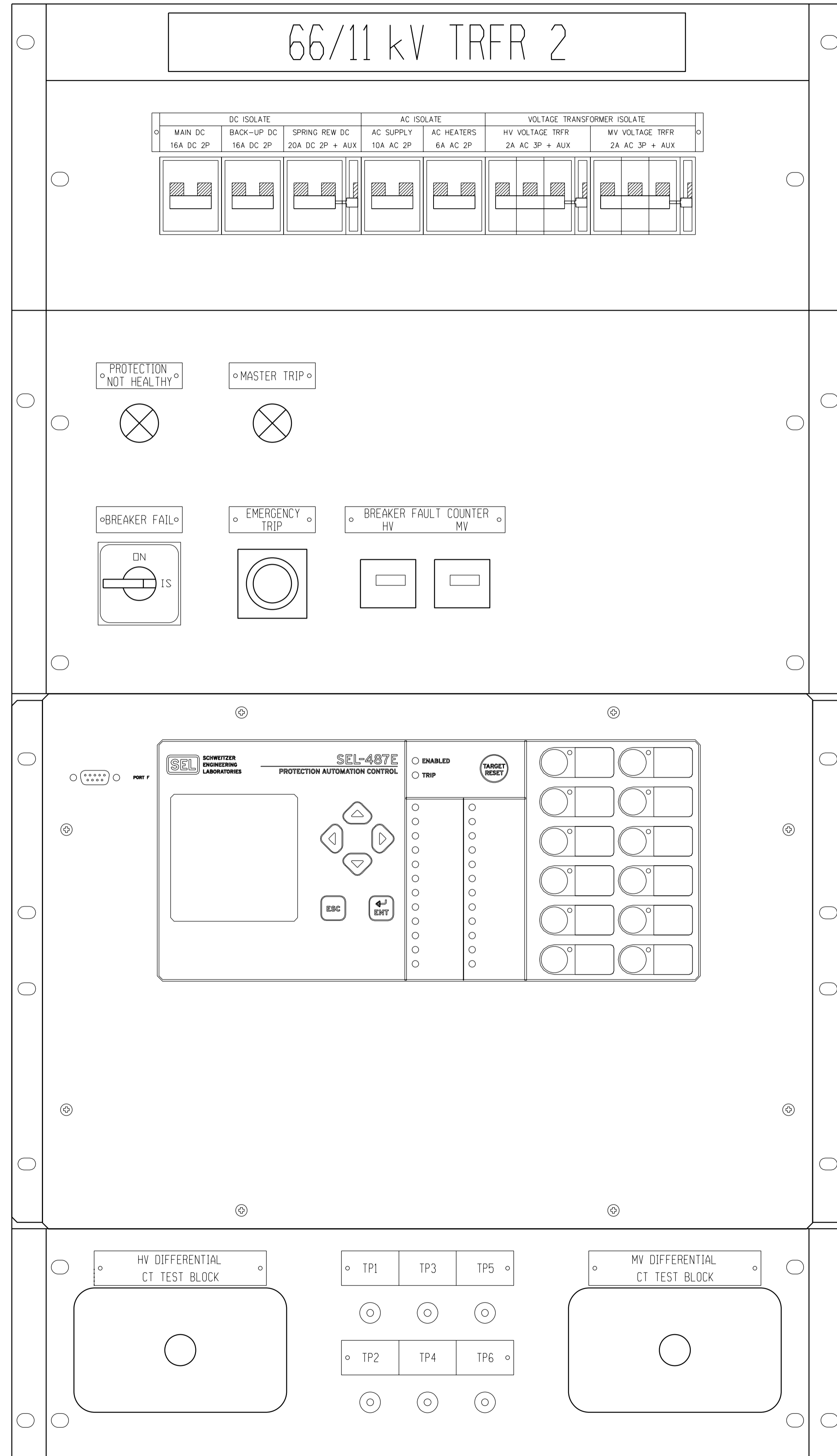
ISCOR SUBSTATION
66/11 kV TRANSFORMER 2
PANEL EQUIPMENT LAYOUT

D-WC-7104 SET NUMBER: 83 SHEET NUMBER: 01 REVISION: 0

SCALE: 1:5

THE SCHEME IS DESIGNED FOR MOUNTING A 19 INCH RACK SYSTEM AS PER IEC 60297. THE MODULE AND BACK PLATE ARE 482.6mm WIDE. THE MODULE IS 300mm DEEP.

DETAIL OF SEL-487E PROGRAMMABLE LEDs AND PUSH BUTTONS



NOTES

- CIRCUIT-BREAKER CONTROLS REQUIRE THE RESPECTIVE BUTTON TO BE PRESSED TWICE WITHIN 3 SECONDS BEFORE ACTIVATION.
- PRESS PUSH BUTTON 3 FOR 5 SECONDS TO ACTIVATE DNP3 TEST MODE. WHILST IN TEST MODE, PUSH BUTTON 3 MAY BE USED TO SUCCESSIVELY SIMULATE EACH DNP3 ALARM POINT TO THE SUPERVISORY SYSTEM. PRESS PUSH BUTTON 9 TO EXIT DNP3 TEST MODE.

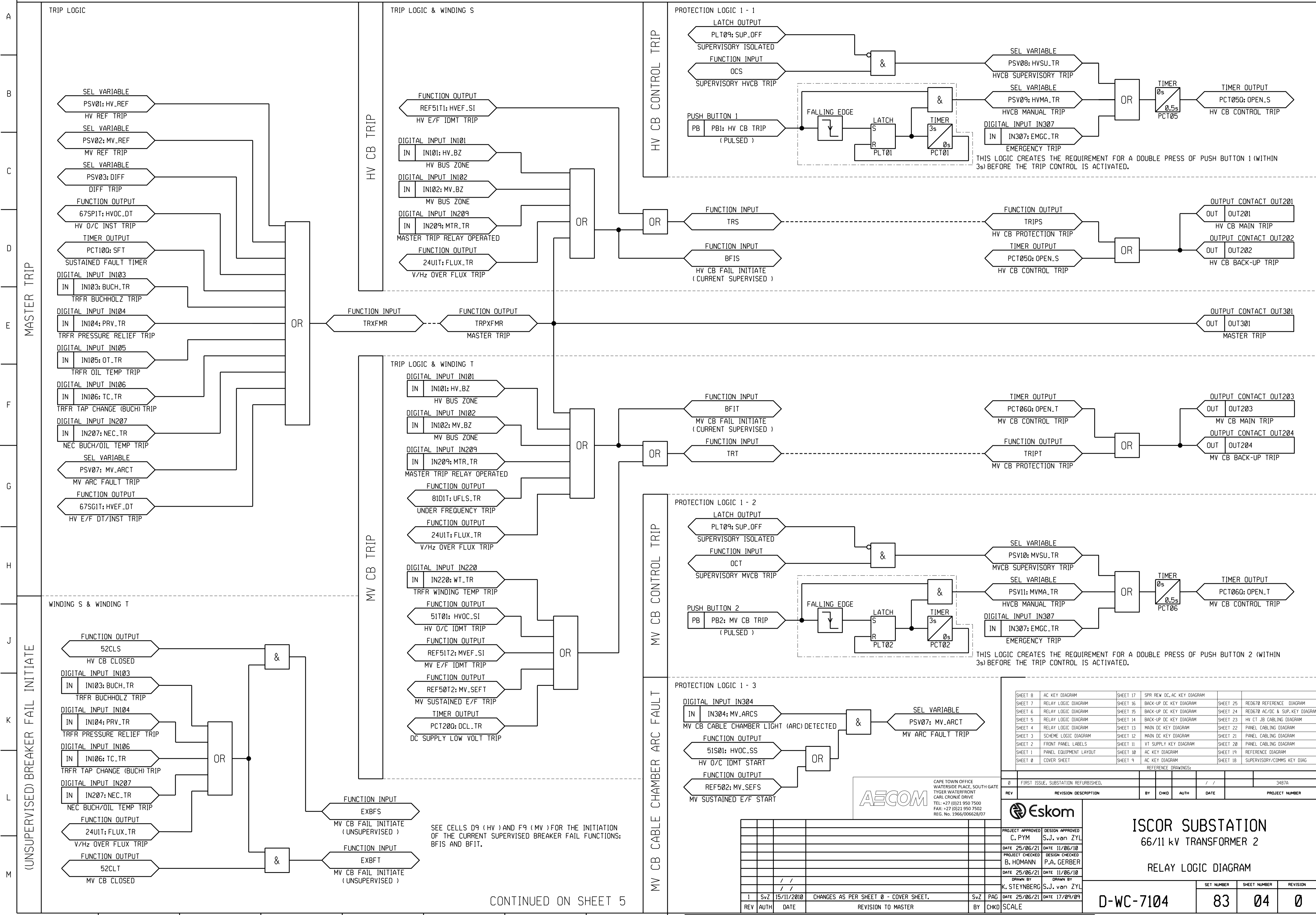
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SHEET 7	RELAY LOGIC DIAGRAM
SHEET 6	RELAY LOGIC DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM
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SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET



0	FIRST ISSUE. SUBSTATION REFURBISHED.	BY	CHKD	AUTH	DATE	3487A
ISCOR SUBSTATION 66/11 kV TRANSFORMER 2 FRONT PANEL LABELS						
PROJECT APPROVED C. PYM DATE 25/06/21			DESIGN APPROVED S.J. van ZYL DATE 11/06/10			
PROJECT CHECKED B. HOMANN DATE 25/06/21			DESIGN CHECKED P.A. GERBER DATE 17/09/09			
DRAWN BY K. STEYNBERG			DRAWN BY S.J. van ZYL			
1	SvZ	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.			SvZ
REV	AUTH	DATE	REVISION TO MASTER			BY
SCALE DATE 25/06/21			SET NUMBER 83			
SCALE DATE 25/06/21			SHEET NUMBER 02			
SCALE DATE 25/06/21			REVISION 0			

MASTER TRACING FILED UNDER D-DT-15202 SHEET 2 OF 26 REVISION 1

SEL-487E RELAY PROGRAMMABLE LOGIC - TRIPPING LOGIC



SEE CELLS D9 (HV) AND F9 (MV) FOR THE INITIATION OF THE CURRENT SUPERVISED BREAKER FAIL FUNCTIONS: BFIS AND BFIT.

CONTINUED ON SHEET 5

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SHEET 0	COVER SHEET	SHEET 9	AC KEY DIAGRAM		

0	FIRST ISSUE, SUBSTATION REFURBISHED.					3487A
REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER

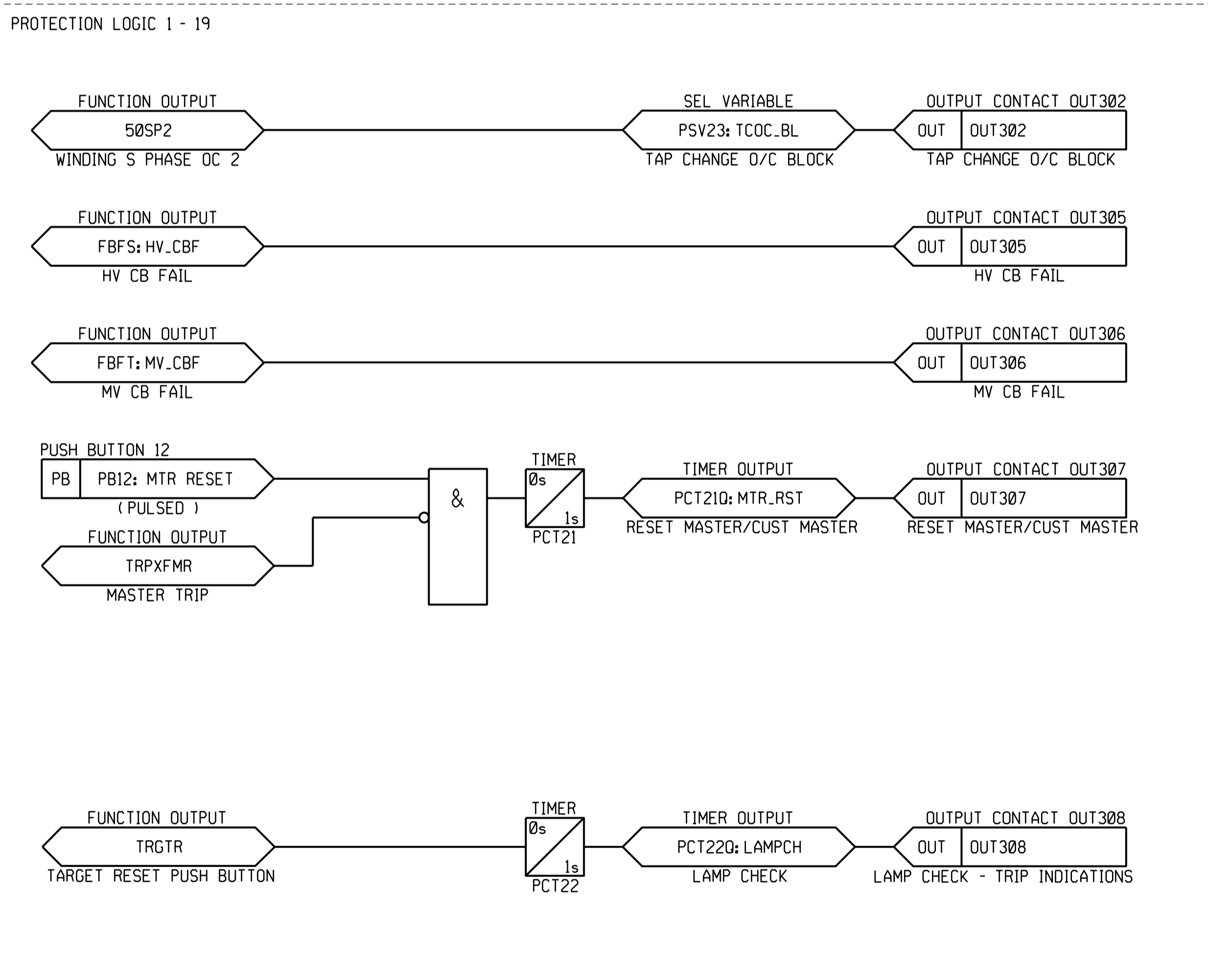
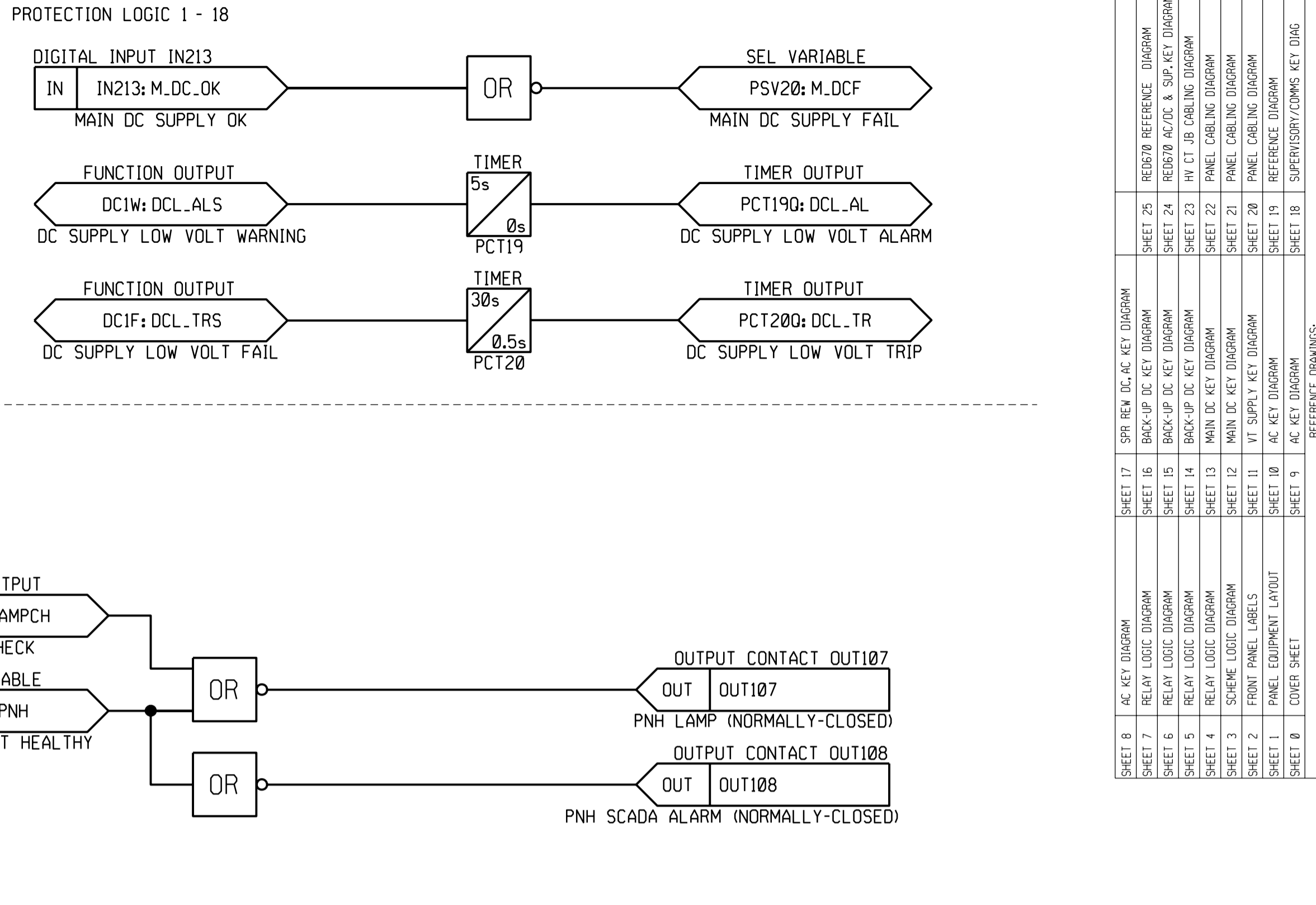
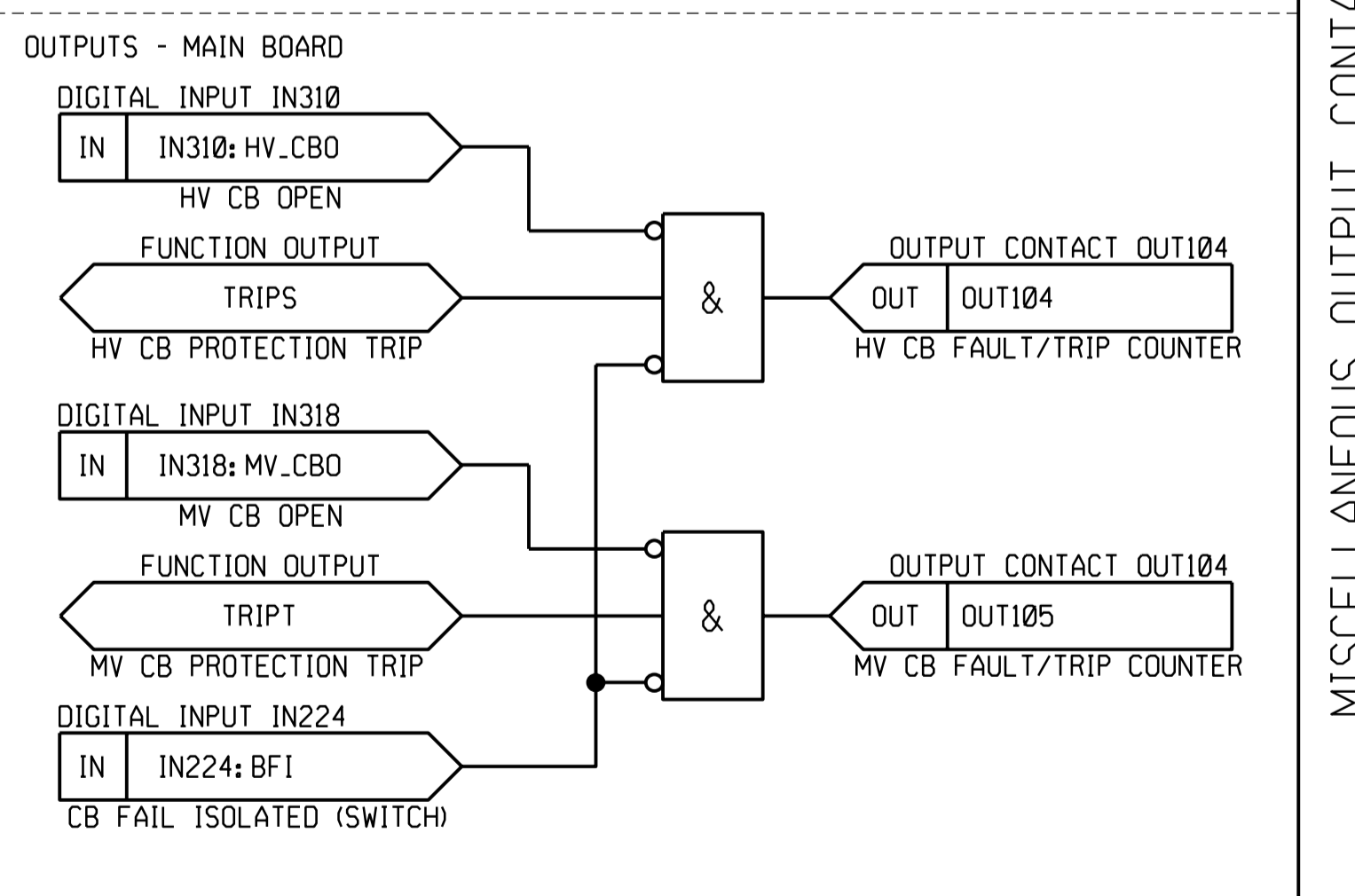
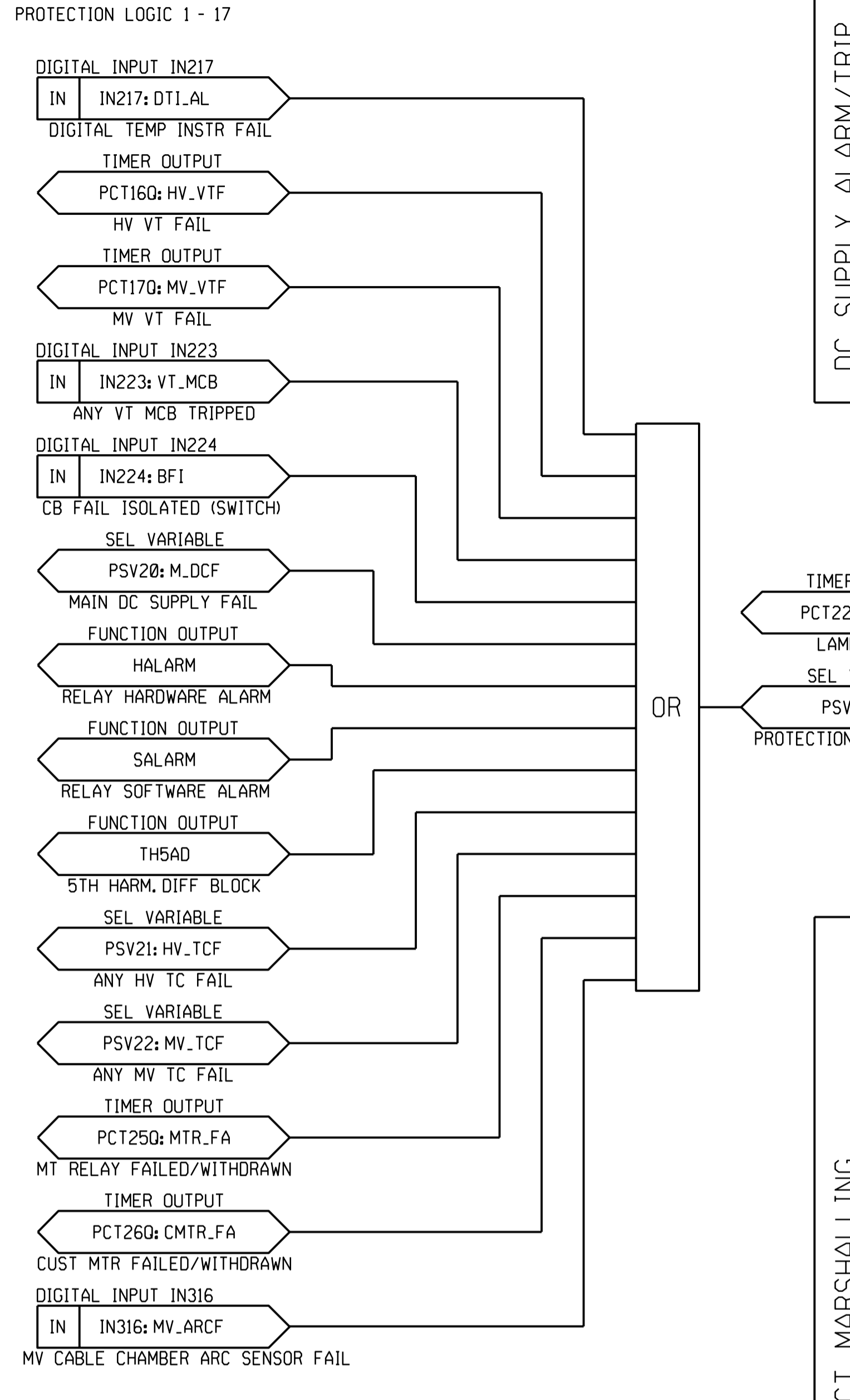
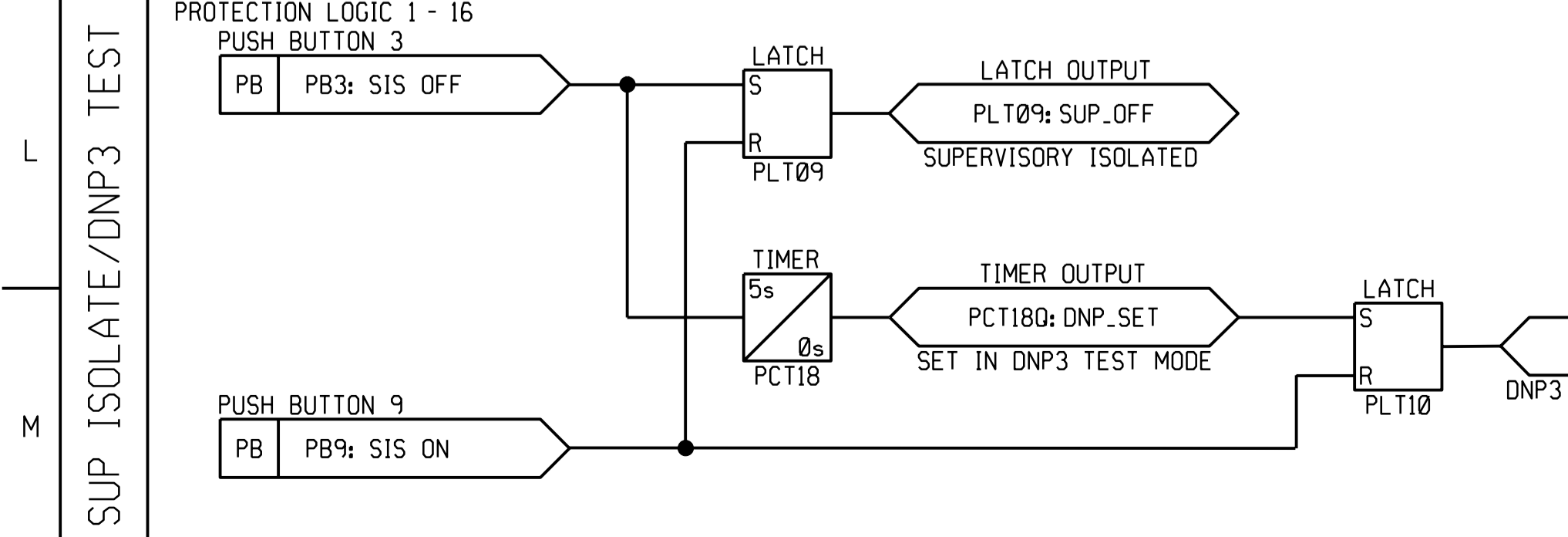
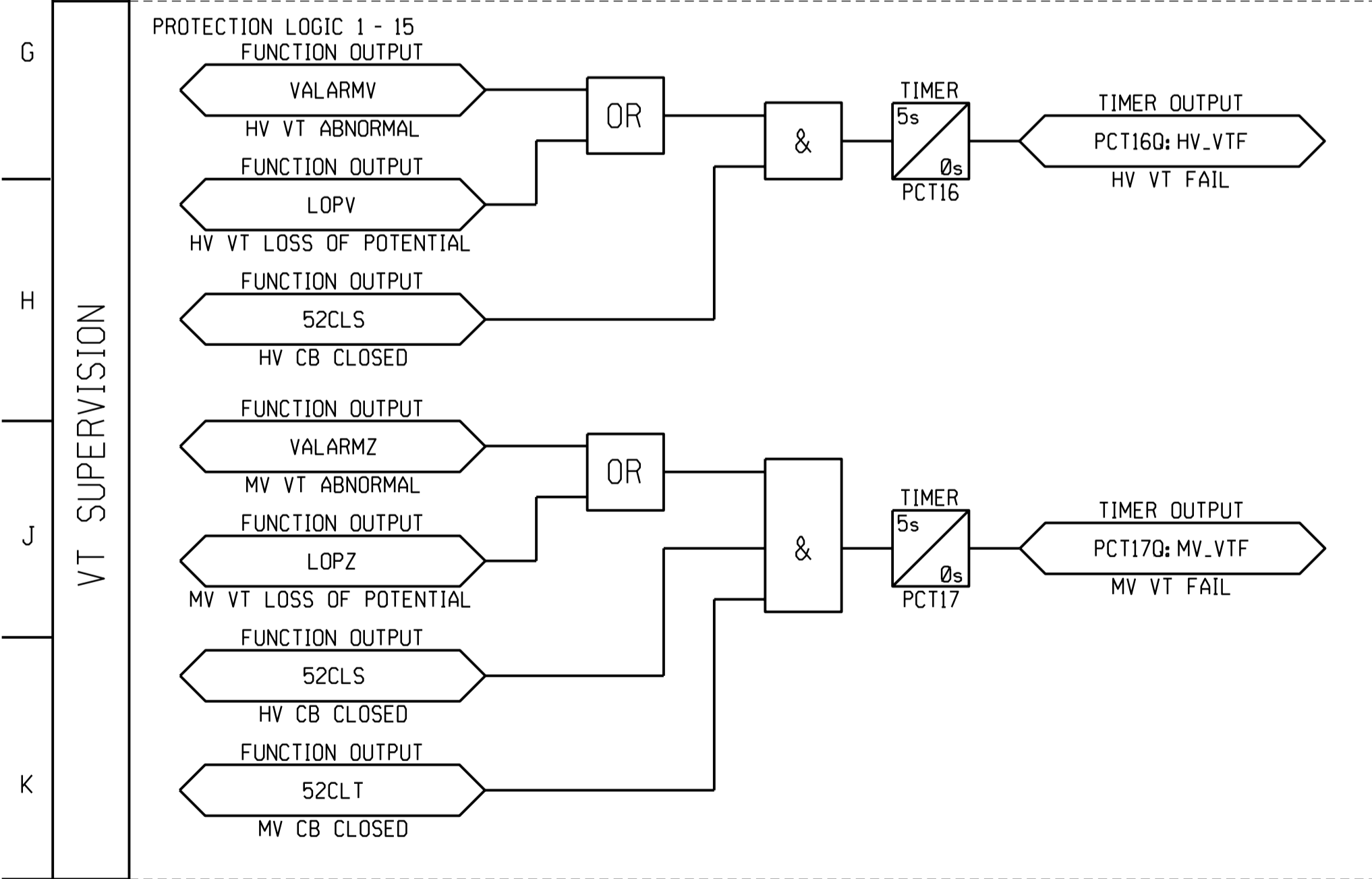
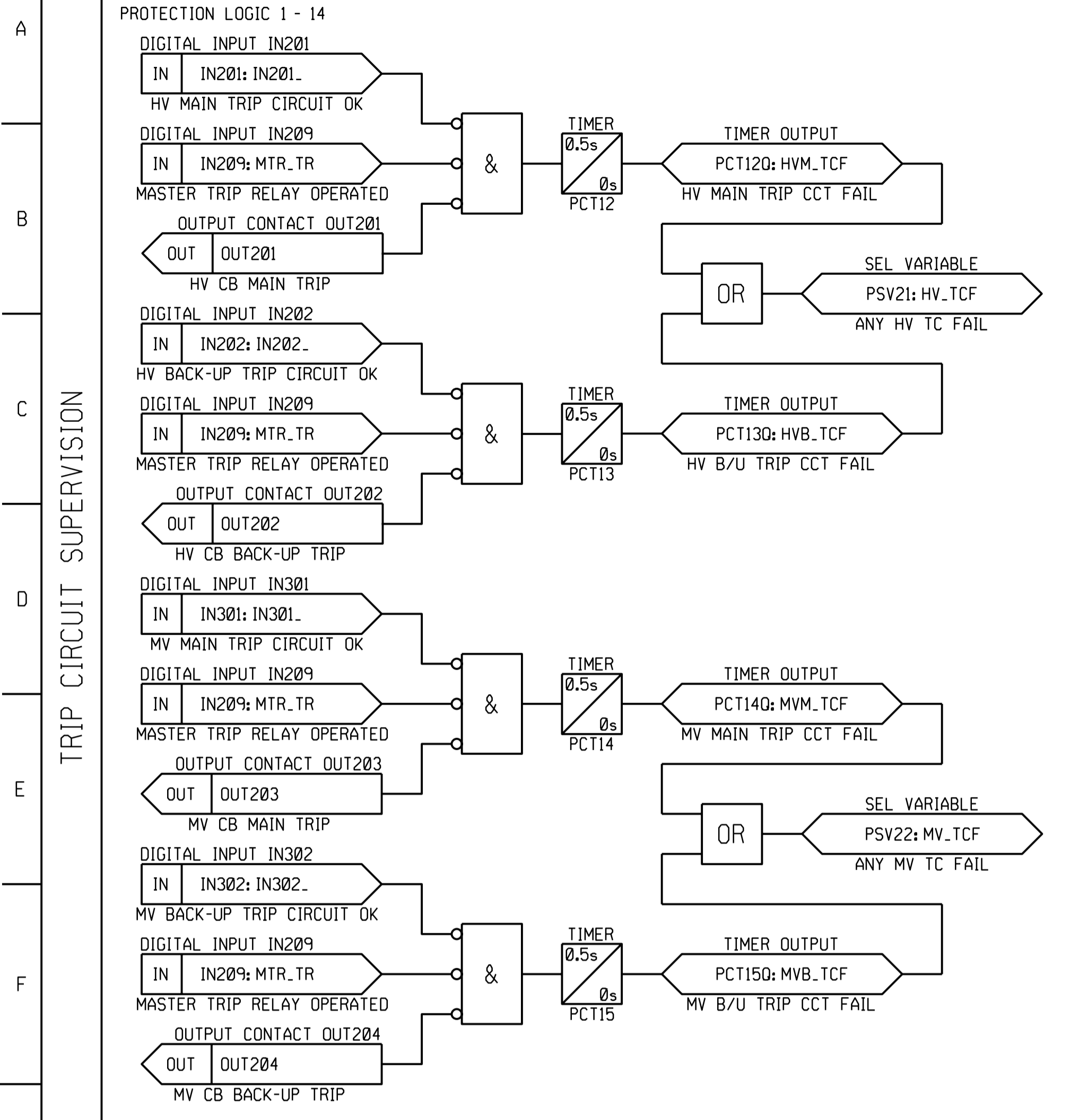


ISCOR SUBSTATION
66/11 kV TRANSFORMER 2
RELAY LOGIC DIAGRAM

D-WC-7104 83 04 0

PROJECT APPROVED: C. PYM DESIGN APPROVED: S.J. van ZYL
DATE 25/06/21 DATE 11/06/10
PROJECT CHECKED: B. HOMANN DESIGN CHECKED: P.A. GERBER
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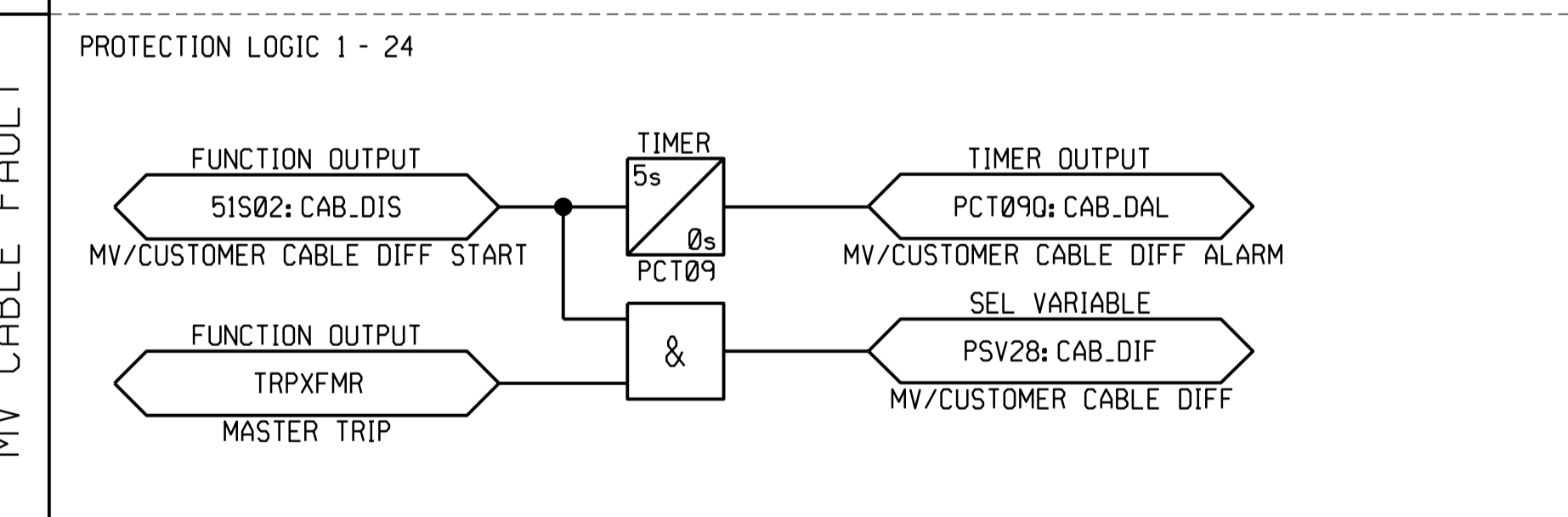
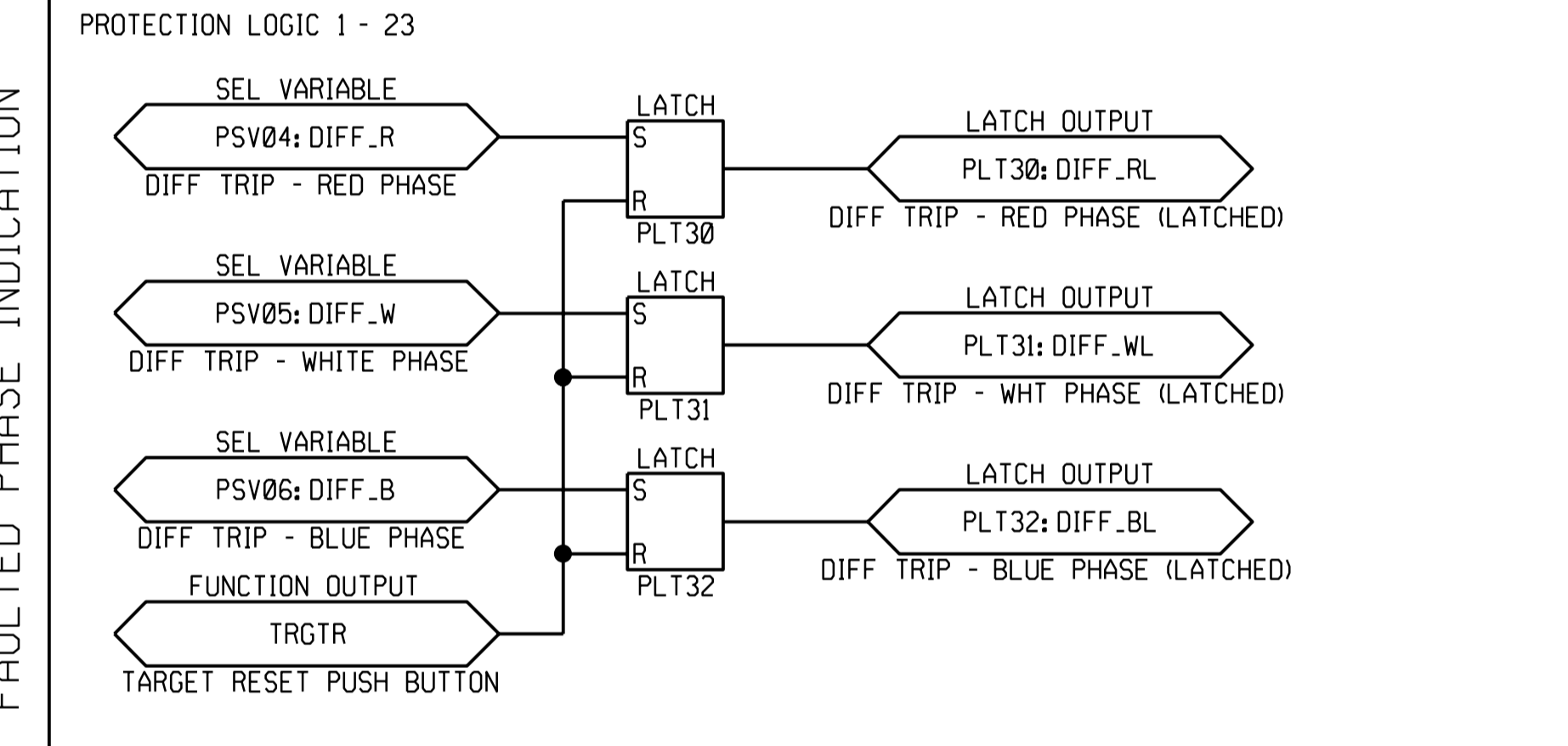
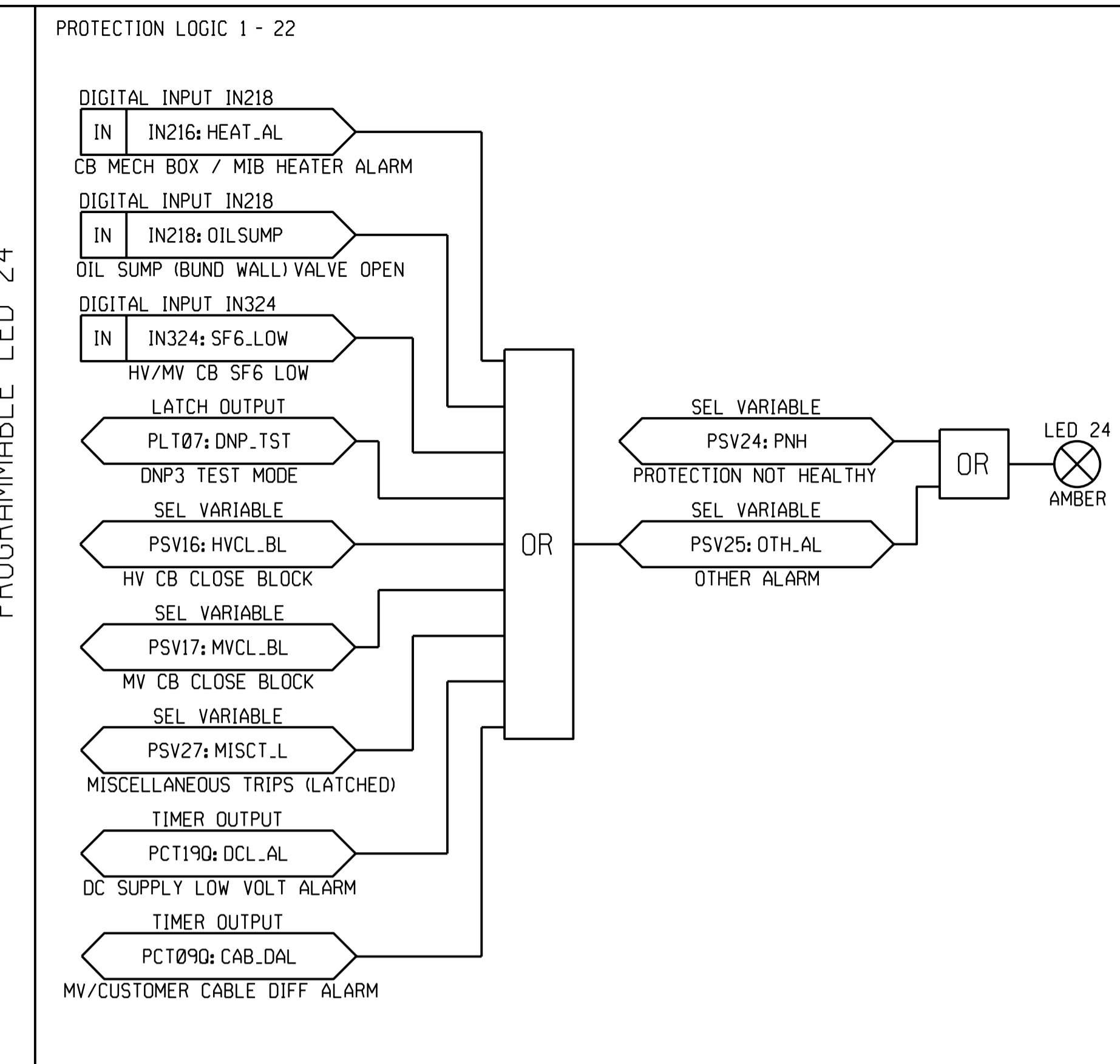
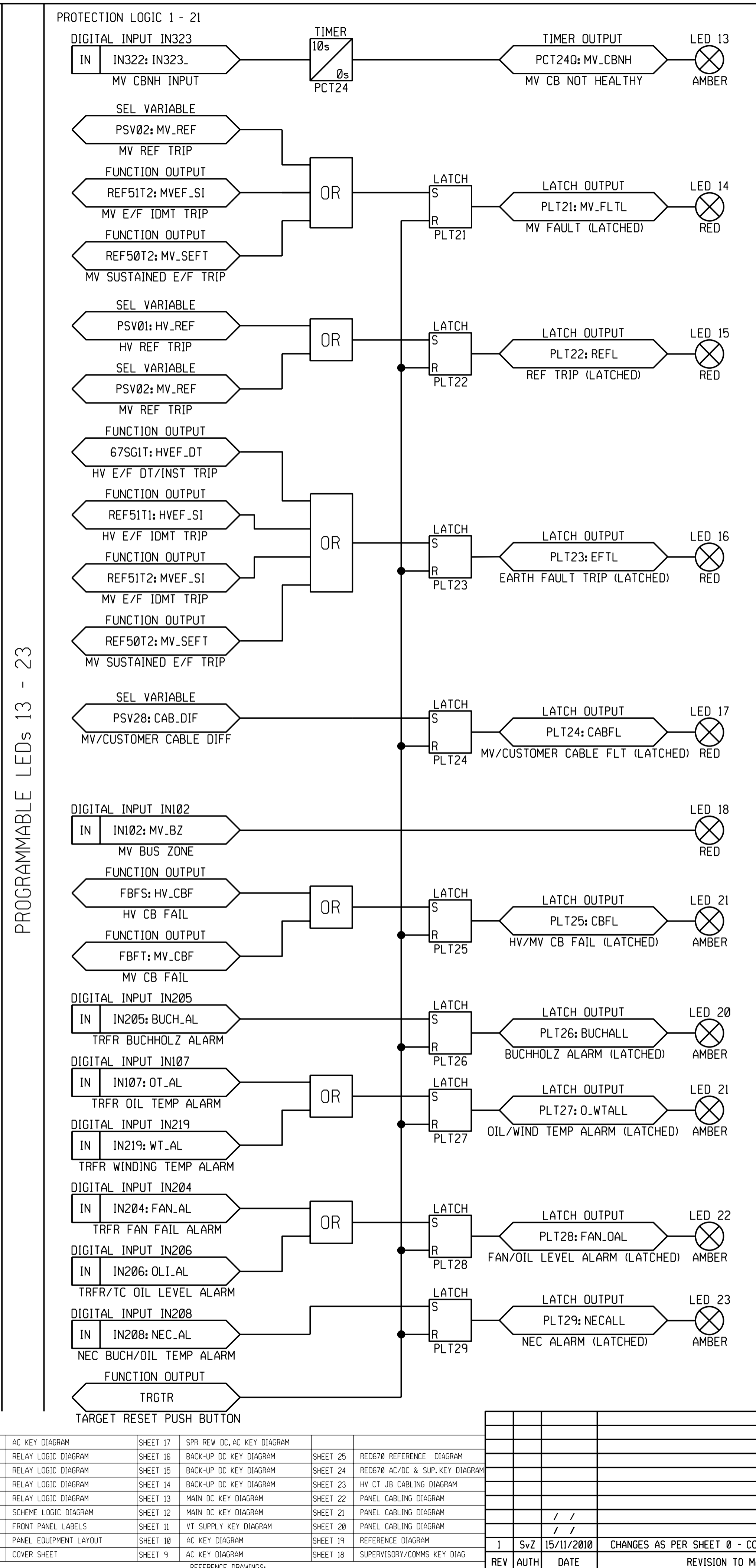
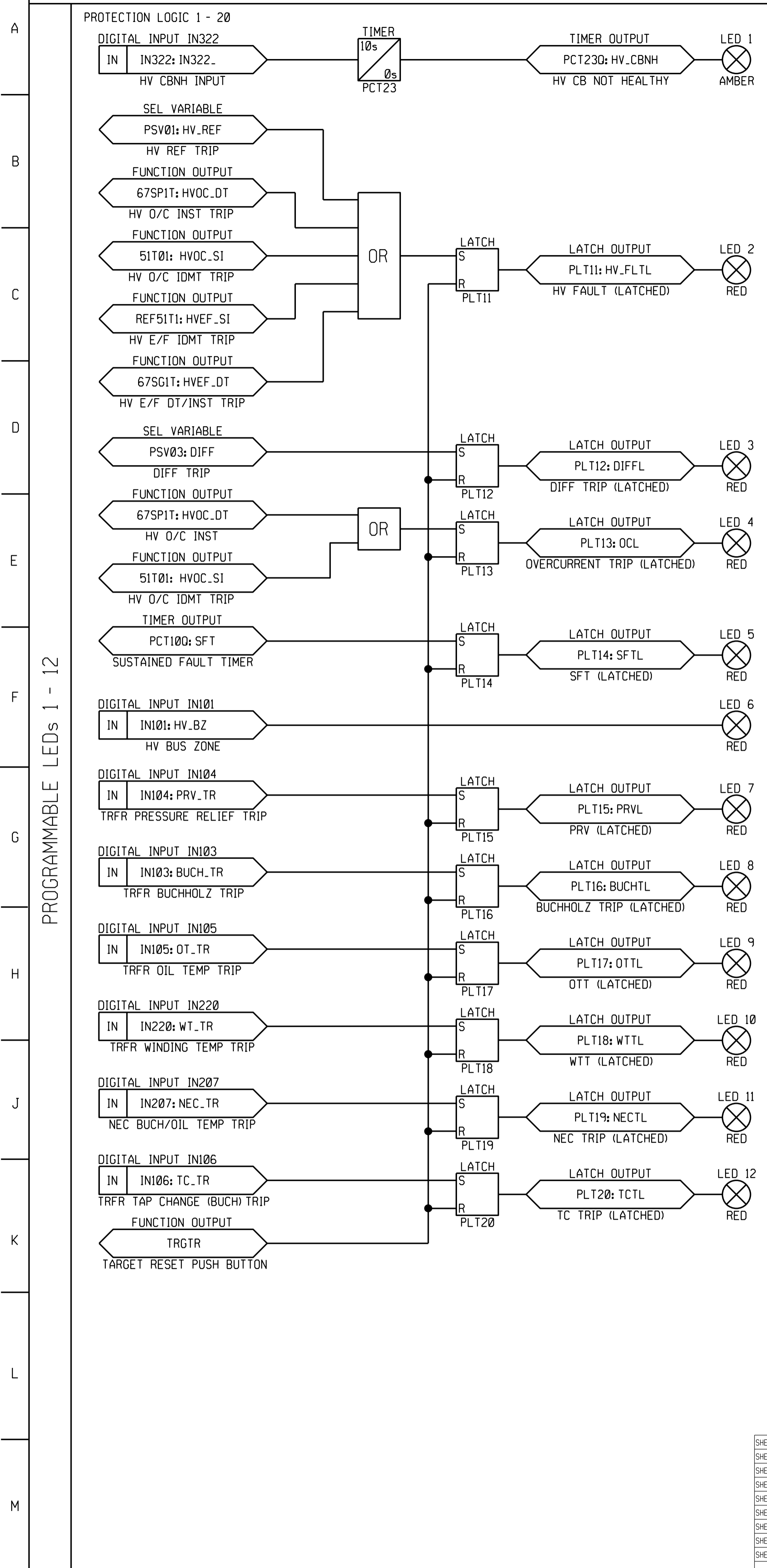
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REV	AUTH	DATE	REVISION TO MASTER	BY	CHKD	SCALE	



SHEET 1	AC KEY DIAGRAM
SHEET 2	RELAY LOGIC DIAGRAM
SHEET 3	RELAY LOGIC DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM
SHEET 6	RELAY LOGIC DIAGRAM
SHEET 7	RELAY LOGIC DIAGRAM
SHEET 8	AC KEY DIAGRAM
SHEET 9	AC KEY DIAGRAM
SHEET 10	AC KEY DIAGRAM
SHEET 11	AC KEY DIAGRAM
SHEET 12	AC KEY DIAGRAM
SHEET 13	AC KEY DIAGRAM
SHEET 14	AC KEY DIAGRAM
SHEET 15	AC KEY DIAGRAM
SHEET 16	AC KEY DIAGRAM
SHEET 17	SPR REV DC AC KEY DIAGRAM
SHEET 18	BACK-UP DC KEY DIAGRAM
SHEET 19	BACK-UP DC KEY DIAGRAM
SHEET 20	BACK-UP DC KEY DIAGRAM
SHEET 21	BACK-UP DC KEY DIAGRAM
SHEET 22	BACK-UP DC KEY DIAGRAM
SHEET 23	HY CT JTB CABLING DIAGRAM
SHEET 24	HY CT JTB CABLING DIAGRAM
SHEET 25	HY CT JTB CABLING DIAGRAM
SHEET 26	PANEL CABLING DIAGRAM
SHEET 27	PANEL CABLING DIAGRAM
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SHEET 97	PANEL CABLING DIAGRAM
SHEET 98	PANEL CABLING DIAGRAM
SHEET 99	PANEL CABLING DIAGRAM
SHEET 100	PANEL CABLING DIAGRAM



CAPE TOWN OFFICE WATERSIDE PLACE, SOUTH GATE TYGER WATER FRONT CARL CRONJE DRIVE TEL: +27 (0)21 950 7500 FAX: +27 (0)21 950 7502 REG. No. 1966/006628/07		0 FIRST ISSUE, SUBSTATION REFURBISHED.		3487A		
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74	SvZ 15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ	PAG	DATE 25/06/21	DATE 17/09/09
75	SvZ 15					



PROGRAMMABLE LEDs 1 - 12

PROGRAMMABLE LEDs 13 - 23

PROGRAMMABLE LED 24

FAULTED PHASE INDICATION

MV CABLE FAULT

SHEET 8	AC KEY DIAGRAM	SHEET 17	SPR REV DC AC KEY DIAGRAM	SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 7	RELAY LOGIC DIAGRAM	SHEET 16	BACK-UP DC KEY DIAGRAM	SHEET 24	RED670 AC/DC & SUPP. KEY DIAGRAM
SHEET 6	RELAY LOGIC DIAGRAM	SHEET 15	BACK-UP DC KEY DIAGRAM	SHEET 23	HV CT JB CABLING DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM	SHEET 14	BACK-UP DC KEY DIAGRAM	SHEET 22	PANEL CABLING DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM	SHEET 13	MAIN DC KEY DIAGRAM	SHEET 21	PANEL CABLING DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM	SHEET 12	MAIN DC KEY DIAGRAM	SHEET 20	PANEL CABLING DIAGRAM
SHEET 2	FRONT PANEL LABELS	SHEET 11	VT SUPPLY KEY DIAGRAM	SHEET 19	PANEL CABLING DIAGRAM
SHEET 1	PANEL EQUIPMENT LAYOUT	SHEET 10	AC KEY DIAGRAM	SHEET 18	REFERENCE DIAGRAM
SHEET 0	COVER SHEET	SHEET 9	AC KEY DIAGRAM	SHEET 18	SUPERVISORY/COMMS KEY DIAG

1	SvZ	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ	PAG	DATE 25/06/21	DATE 17/09/09
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REG. No. 1966/006628/07

Eskom

PROJECT APPROVED: C. PYM
DESIGN APPROVED: S.J. van ZYL
DATE 25/06/21
DATE 11/06/10
PROJECT CHECKED: B. HOMANN
DESIGN CHECKED: P.A. GERBER
DATE 25/06/21
DATE 11/06/10
DRAWN BY: K. STEYNBERG
DRAWN BY: S.J. van ZYL

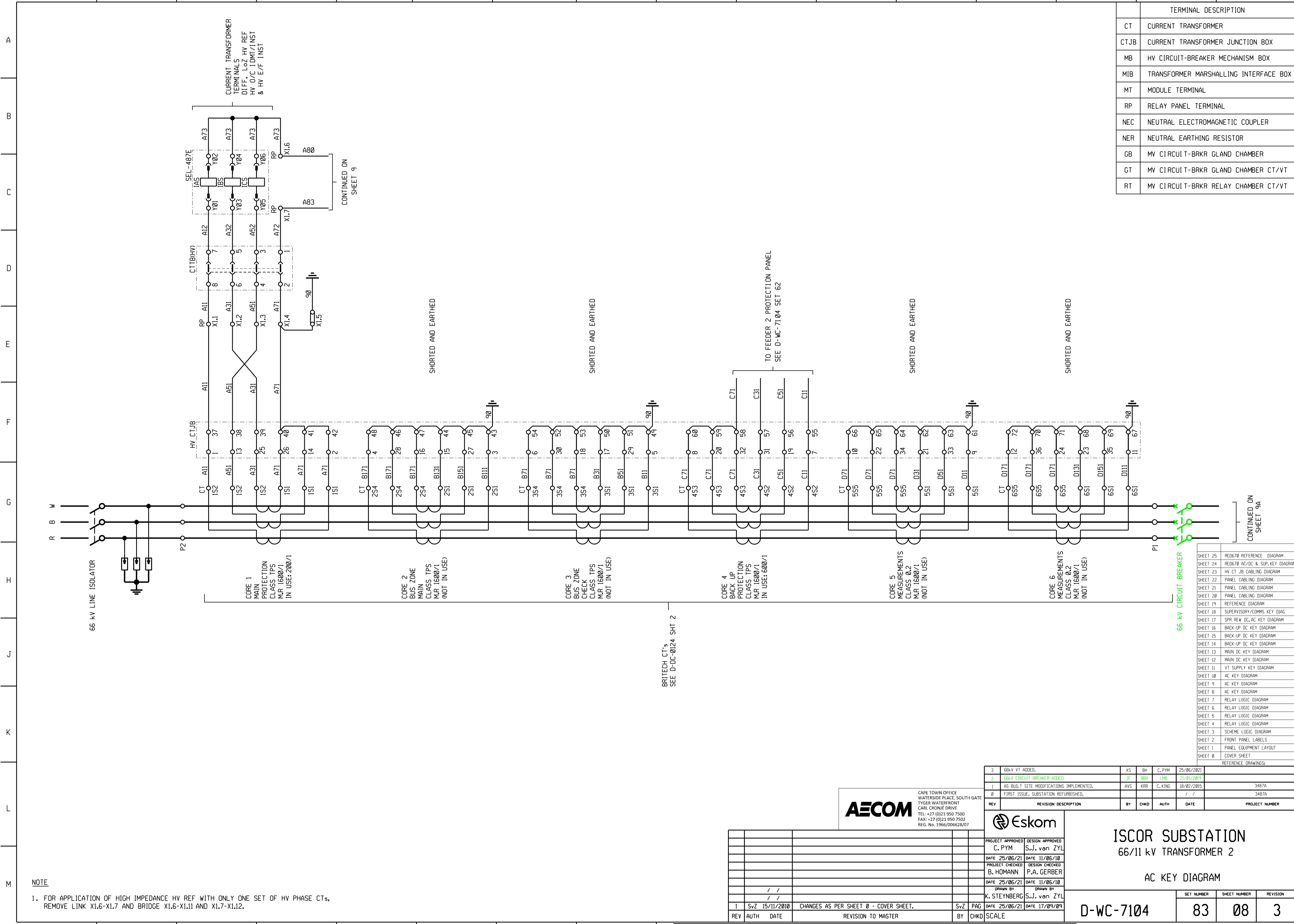
ISCOR SUBSTATION
66/11 kV TRANSFORMER 2
RELAY LOGIC DIAGRAM

D-WC-7104 83 07 0

SET NUMBER SHEET NUMBER REVISION

PANEL TYPE DESIGNATION 4TM710MOD.F.ZD

MASTER TRACING FILED UNDER D-DT-15202 SHEET 7 OF 26 REVISION 1



TERMINAL DESCRIPTION	
CT	CURRENT TRANSFORMER
CTJB	CURRENT TRANSFORMER JUNCTION BOX
MB	HV CIRCUIT-BREAKER MECHANISM BOX
MIB	TRANSFORMER MARSHALLING INTERFACE BOX
MT	MODULE TERMINAL
RP	RELAY PANEL TERMINAL
NEC	NEUTRAL ELECTROMAGNETIC COUPLER
NER	NEUTRAL EARTHING RESISTOR
GB	MV CIRCUIT-BRKR GLAND CHAMBER
GT	MV CIRCUIT-BRKR GLAND CHAMBER CT/VT
RT	MV CIRCUIT-BRKR RELAY CHAMBER CT/VT

66 kV LINE ISOLATOR

CORE 1
MAIN PROTECTION
CLASS TPS
M.R. 16000/1
IN USE: 2000/1

CORE 2
BUS ZONE
MAIN
CLASS TPS
M.R. 16000/1
(NOT IN USE)

CORE 3
BUS ZONE
CHECK
CLASS TPS
M.R. 16000/1
(NOT IN USE)

CORE 4
BACK UP
PROTECTION
CLASS TPS
M.R. 16000/1
IN USE: 6000/1

CORE 5
MEASUREMENTS
CLASS 0.2
M.R. 16000/1
(NOT IN USE)

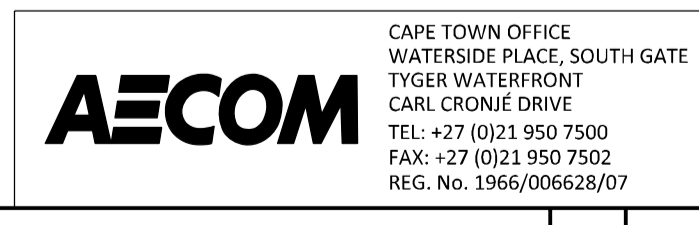
CORE 6
MEASUREMENTS
CLASS 0.2
M.R. 16000/1
(NOT IN USE)

BRITECH CT's
SEE D-DC-0124 SHT 2

66 kV CIRCUIT BREAKER

NOTE
1. FOR APPLICATION OF HIGH IMPEDANCE HV REF WITH ONLY ONE SET OF HV PHASE CTs,
REMOVE LINK X1.6-X1.7 AND BRIDGE X1.6-X1.11 AND X1.7-X1.12.

REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER
3	66kV VT ADDED.	KS	BH	C.PYM	25/06/2021	
2	66kV CIRCUIT BREAKER ADDED	JF	BH	LMB	21/01/2019	
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KING	18/02/2015	3487A
0	FIRST ISSUE. SUBSTATION REFURBISHED.	/	/	/	/	3487A



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ISCOR SUBSTATION
66/11 kV TRANSFORMER 2

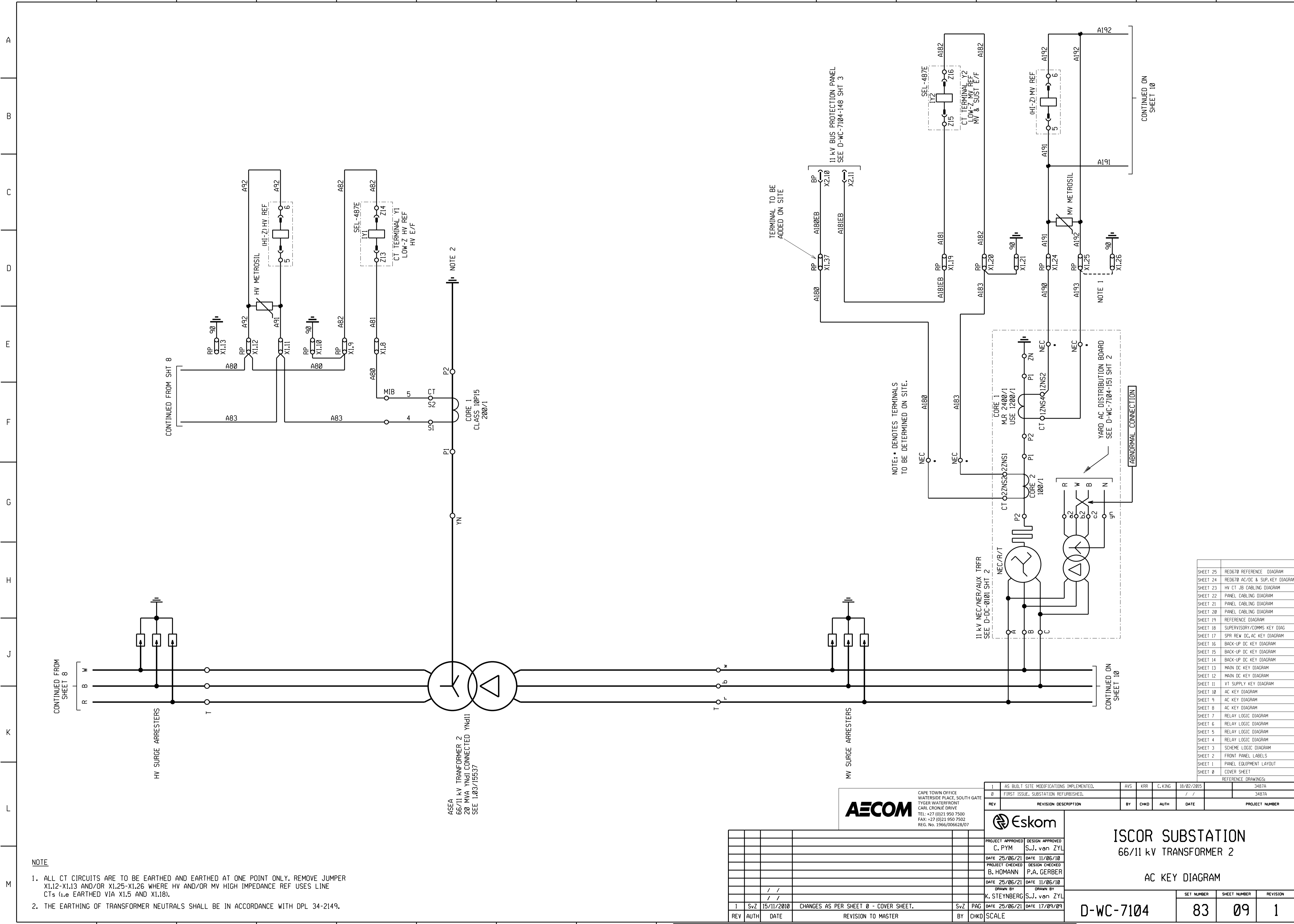
AC KEY DIAGRAM

REV	AUTH	DATE	REVISION TO MASTER	BY	CHKD	SCALE
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						DATE 17/09/09

SET NUMBER	SHEET NUMBER	REVISION
D-WC-7104	83	08
		3

SHEET	DESCRIPTION
SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 24	RED670 AC/DC & SUP. KEY DIAGRAM
SHEET 23	HV CT JB CABLING DIAGRAM
SHEET 22	PANEL CABLING DIAGRAM
SHEET 21	PANEL CABLING DIAGRAM
SHEET 20	PANEL CABLING DIAGRAM
SHEET 19	REFERENCE DIAGRAM
SHEET 18	SUPERVISORY/COMMS KEY DIAG
SHEET 17	SPR REV DC, AC KEY DIAGRAM
SHEET 16	BACK-UP DC KEY DIAGRAM
SHEET 15	BACK-UP DC KEY DIAGRAM
SHEET 14	BACK-UP DC KEY DIAGRAM
SHEET 13	MAIN DC KEY DIAGRAM
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SHEET 11	VT SUPPLY KEY DIAGRAM
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SHEET 8	AC KEY DIAGRAM
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SHEET 6	RELAY LOGIC DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

MASTER TRACING FILED UNDER D-DT-15202 SHEET 8 OF 26 REVISION 1



- NOTE**
- ALL CT CIRCUITS ARE TO BE EARTHED AND EARTHED AT ONE POINT ONLY. REMOVE JUMPER X1.12-X1.13 AND/OR X1.25-X1.26 WHERE HV AND/OR MV HIGH IMPEDANCE REF USES LINE CTs (i.e. EARTHED VIA X1.5 AND X1.18).
 - THE EARTHING OF TRANSFORMER NEUTRALS SHALL BE IN ACCORDANCE WITH DPL 34-2149.

ASEA
66/11 kV TRANSFORMER 2
20 MVA YNd1 CONNECTED YNd11
SEE 1.037/15537

CORE 1
CLASS 10P15
200/1

NOTE 2



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REG. No. 1966/006628/07

REV	DATE	DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER
1	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ	PAG		17/09/09	
0		FIRST ISSUE. SUBSTATION REFURBISHED.					3487A

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1	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ	PAG		17/09/09	
0		FIRST ISSUE. SUBSTATION REFURBISHED.					3487A

PROJECT APPROVED	DESIGN APPROVED
C. PYM	S.J. van ZYL
DATE 25/06/21	DATE 11/06/10
PROJECT CHECKED	DESIGN CHECKED
B. HOMANN	P.A. GERBER
DATE 25/06/21	DATE 11/06/10
DRAWN BY	DRAWN BY
K. STEYNBERG	S.J. van ZYL

SET NUMBER	SHEET NUMBER	REVISION
D-WC-7104	83	09
		1

ISCOR SUBSTATION
66/11 kV TRANSFORMER 2

AC KEY DIAGRAM

PANEL TYPE DESIGNATION 4TM7100MOD.F.ZD SIZE 0000TE A1L

SHEET	DESCRIPTION
SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 24	RED670 AC/DC & SUP. KEY DIAGRAM
SHEET 23	HV CT JB CABLING DIAGRAM
SHEET 22	PANEL CABLING DIAGRAM
SHEET 21	PANEL CABLING DIAGRAM
SHEET 20	PANEL CABLING DIAGRAM
SHEET 19	REFERENCE DIAGRAM
SHEET 18	SUPERVISORY/COMMS KEY DIAG
SHEET 17	SPP REW. DC AC KEY DIAGRAM
SHEET 16	BACK-UP DC KEY DIAGRAM
SHEET 15	BACK-UP DC KEY DIAGRAM
SHEET 14	BACK-UP DC KEY DIAGRAM
SHEET 13	MAIN DC KEY DIAGRAM
SHEET 12	MAIN DC KEY DIAGRAM
SHEET 11	VT SUPPLY KEY DIAGRAM
SHEET 10	AC KEY DIAGRAM
SHEET 9	AC KEY DIAGRAM
SHEET 8	AC KEY DIAGRAM
SHEET 7	RELAY LOGIC DIAGRAM
SHEET 6	RELAY LOGIC DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

NOTE: * DENOTES TERMINALS TO BE DETERMINED ON SITE.

TERMINAL TO BE ADDED ON SITE

11 kV BUS PROTECTION PANEL
SEE D-WC-7104-148 SHT 3

11 kV NEC/NER/AUX TRFR
SEE D-DC-0101 SHT 2

CORE 1
M/R 2400/1
USE 1200/1

CORE 2
CT 0.2ZNS0.2ZNS1

CORE 3
CT 0.2ZNS0.2ZNS2

YARD AC DISTRIBUTION BOARD
SEE D-WC-7104-151 SHT 2

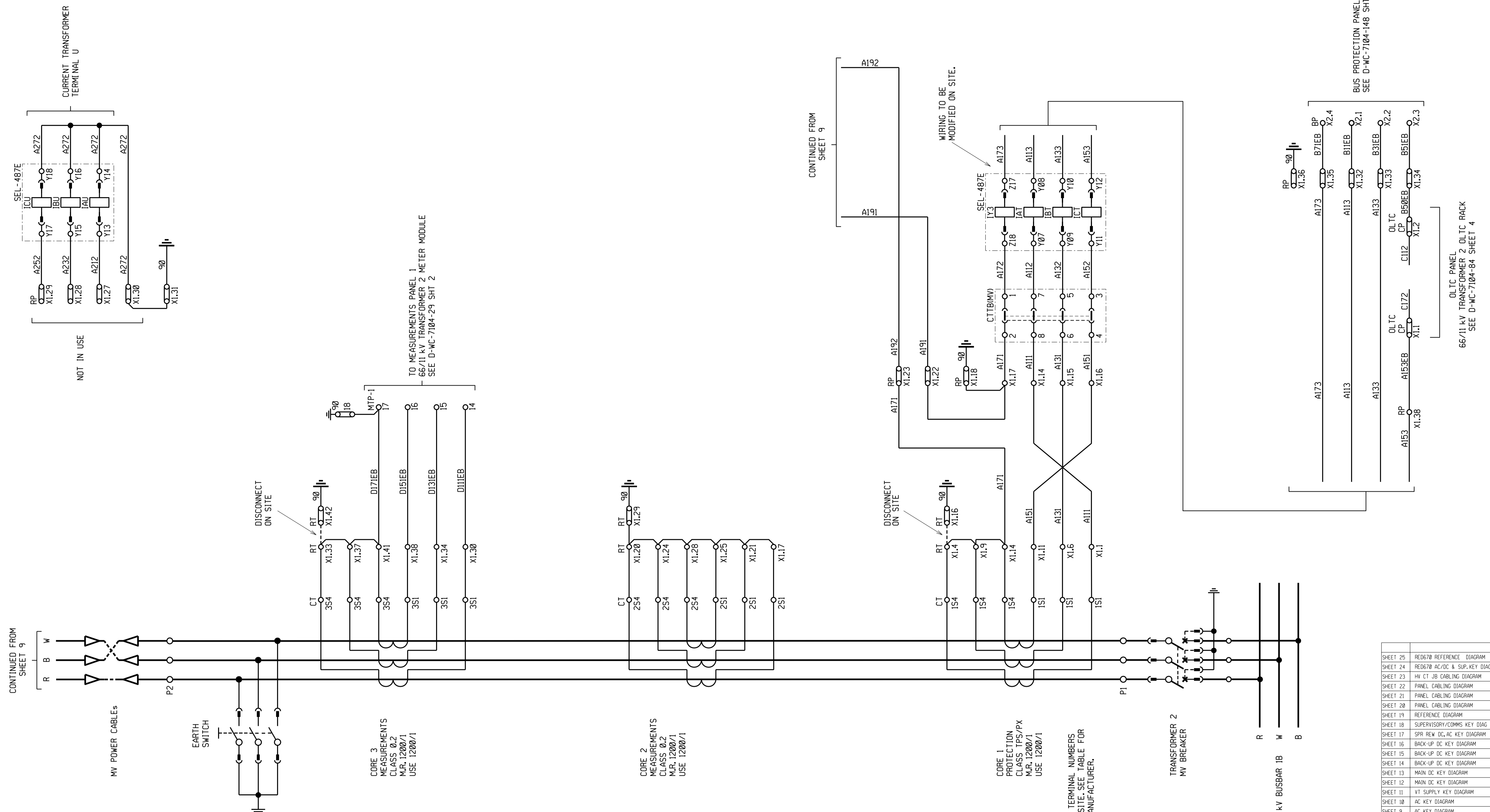
ABNORMAL CONNECTION

CONTINUED ON SHEET 10

CONTINUED ON SHEET 10

CONTINUED FROM SHT 8

CONTINUED FROM SHEET 8



ACTOM BREAKER - METERING CT RATIO SELECTION (CORE 3)

RATIO	R I	W I	B I	N	BRIDGES
200/1A (S1-S2)	RT X1.30	RT X1.34	RT X1.38	RT X1.39	RT X1.31, X1.35 & X1.39
400/1A (S3-S4)	RT X1.32	RT X1.36	RT X1.40	RT X1.41	RT X1.33, X1.37 & X1.41
600/1A (S2-S3)	RT X1.31	RT X1.35	RT X1.39	RT X1.40	RT X1.32, X1.36 & X1.40
800/1A (S1-S3)	RT X1.30	RT X1.34	RT X1.38	RT X1.40	RT X1.32, X1.36 & X1.40
1000/1A (S2-S4)	RT X1.31	RT X1.35	RT X1.39	RT X1.41	RT X1.33, X1.37 & X1.41
1200/1A (S1-S4)	RT X1.30	RT X1.34	RT X1.38	RT X1.41	RT X1.33, X1.37 & X1.41

ACTOM BREAKER - METERING CT RATIO SELECTION (CORE 2)

RATIO	R I	W I	B I	N	BRIDGES
200/1A (S1-S2)	RT X1.17	RT X1.21	RT X1.25	RT X1.26	RT X1.18, X1.22 & X1.26
400/1A (S3-S4)	RT X1.19	RT X1.23	RT X1.27	RT X1.28	RT X1.20, X1.24 & X1.28
600/1A (S2-S3)	RT X1.18	RT X1.22	RT X1.26	RT X1.27	RT X1.19, X1.23 & X1.27
800/1A (S1-S3)	RT X1.17	RT X1.21	RT X1.25	RT X1.27	RT X1.19, X1.23 & X1.27
1000/1A (S2-S4)	RT X1.18	RT X1.22	RT X1.26	RT X1.28	RT X1.20, X1.24 & X1.28
1200/1A (S1-S4)	RT X1.17	RT X1.21	RT X1.25	RT X1.28	RT X1.20, X1.24 & X1.28

ACTOM BREAKER - PROTECTION CT RATIO SELECTION (CORE 1)

RATIO	R I	W I	B I	N	BRIDGES
200/1A (S1-S2)	RT X1.1	RT X1.6	RT X1.11	RT X1.12	RT X1.2, X1.7 & X1.12
400/1A (S3-S4)	RT X1.3	RT X1.8	RT X1.13	RT X1.14	RT X1.4, X1.9 & X1.14
600/1A (S2-S3)	RT X1.2	RT X1.7	RT X1.12	RT X1.13	RT X1.3, X1.8 & X1.13
800/1A (S1-S3)	RT X1.1	RT X1.6	RT X1.11	RT X1.13	RT X1.3, X1.8 & X1.13
1000/1A (S2-S4)	RT X1.2	RT X1.7	RT X1.12	RT X1.13	RT X1.4, X1.9 & X1.14
1200/1A (S1-S4)	RT X1.1	RT X1.6	RT X1.11	RT X1.14	RT X1.4, X1.9 & X1.14

• DENOTES CT RATIO & TERMINAL NUMBERS TO BE DETERMINED ON SITE. SEE TABLE FOR APPLICABLE BREAKER MANUFACTURER.



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REG. No. 1966/00628/07

REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KING	18/02/2015	3487A
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Eskom

PROJECT APPROVED: C. PYM
DESIGN APPROVED: S.J. van ZYL

DATE 25/06/21
DATE 11/06/10

PROJECT CHECKED: B. HOMANN
DESIGN CHECKED: P.A. GERBER

DATE 25/06/21
DATE 11/06/10

DRAWN BY: K. STEYNBERG
DRAWN BY: S.J. van ZYL

DATE 15/11/2010
DATE 25/06/21
DATE 17/09/09

REV 1 SvZ
AUTH SvZ
DATE 15/11/2010
PAG CHANGES AS PER SHEET 0 - COVER SHEET.
BY SvZ
SCALE

ISCOR SUBSTATION
66/11 kV TRANSFORMER 2

AC KEY DIAGRAM

D-WC-7104 83 10 1

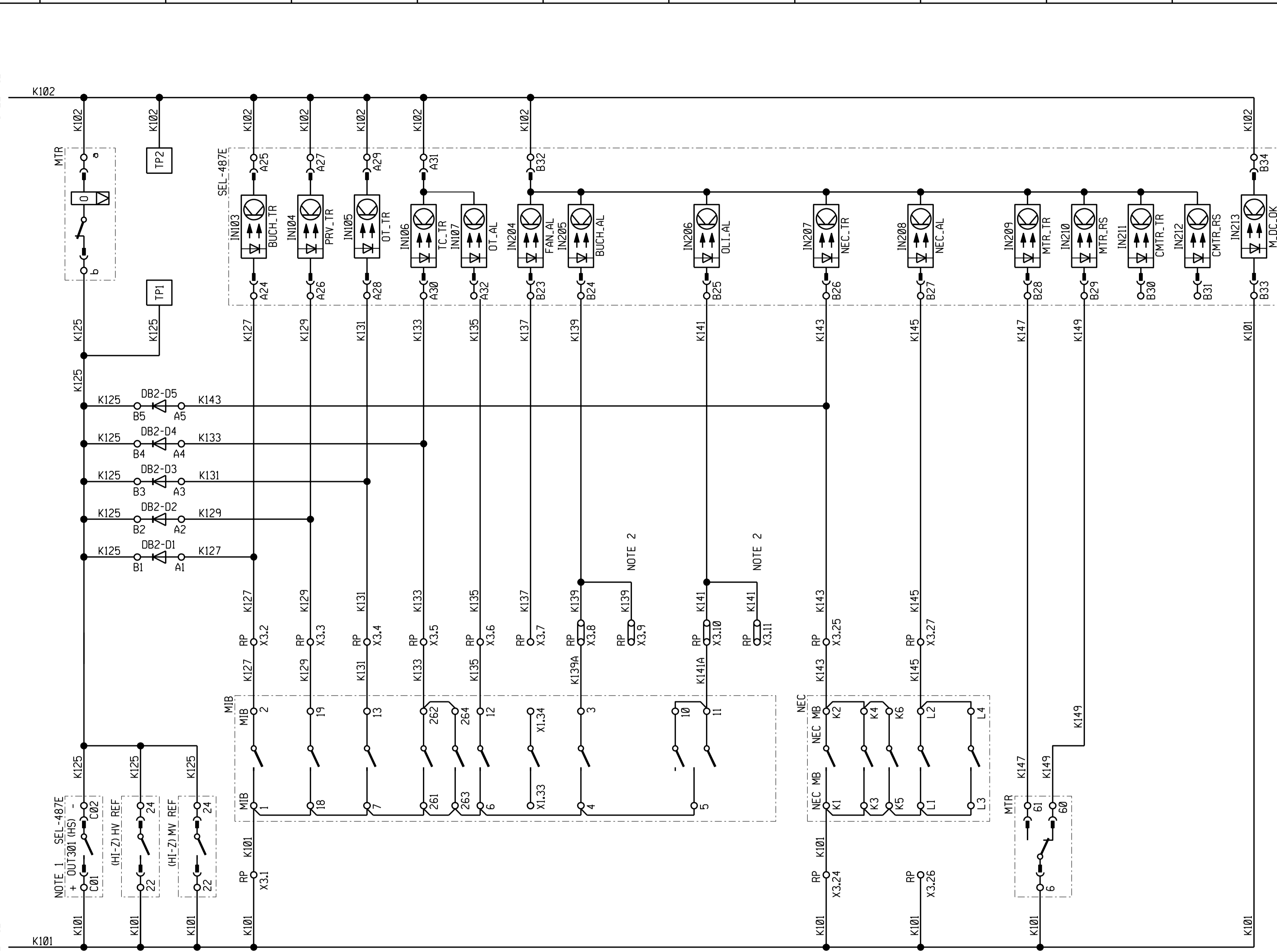
SET NUMBER SHEET NUMBER REVISION

REFERENCE DRAWINGS:

SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 24	RED670 AC/DC & SUP. KEY DIAGRAM
SHEET 23	HV CT JB CABLING DIAGRAM
SHEET 22	PANEL CABLING DIAGRAM
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SHEET 5	RELAY LOGIC DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

CONTINUED FROM SHEET 12

CONTINUED FROM SHEET 12



- DIFFERENTIAL, SUSTAINED FAULT TIMER, HV O/C (HI-SET) TRIP & IDMT (NOT IN USE)
- HIGH IMPEDANCE HV REF TRIP
- HIGH IMPEDANCE MV REF TRIP
- TRANSFORMER BUCHHOLZ TRIP
- TRANSFORMER PRESSURE RELEASE TRIP
- TRANSFORMER OIL TEMPERATURE TRIP
- TAP CHANGER (BUCHHOLZ) TRIP/TEMP
- TRANSFORMER OIL TEMPERATURE ALARM
- (NOT IN USE) TRANSFORMER COOLER ABNORMAL ALARM
- TRANSFORMER BUCHHOLZ ALARM
- (NOT IN USE) TAP CHANGER BUCHHOLZ ALARM
- TRANSFORMER OIL LEVEL HIGH/LOW ALARM
- NOT IN USE TAP CHANGER OIL LEVEL HIGH/LOW ALARM
- NEC BUCHHOLZ TRIP
- NEC OIL TEMPERATURE TRIP
- NEC PRESSURE TRIP
- NEC BUCHHOLZ ALARM OR/AND LOW OIL LEVEL
- NEC OIL TEMPERATURE ALARM
- MASTER TRIP OPERATED, BREAKER FAIL INITIATE
- MASTER TRIP RELAY IN RESET STATE
- (NOT IN USE) CUSTOMER MASTER OPERATED, (ORDERING OPTION)
- (NOT IN USE) CUSTOMER MASTER TRIP RELAY IN RESET STATE (ORDERING OPTION)
- MAIN DC SUPPLY MONITORING

NOTE: * DENOTES TERMINAL NUMBER TO BE DETERMINED ON SITE.

NOTES

1. SEL-487E OUTPUT CONTACTS DESIGNATED 'HS' ARE HIGH SPEED, HIGH CURRENT TYPES, WITH OPERATING TIMES LESS THAN 10ms, AND BREAKING CAPACITY 10Ade, L/R = 20ms.
2. MANY ALSTON/ACTOM POWER TRANSFORMERS FEATURE A TAP CHANGER BUCHHOLZ ALARM WIRED IN PARALLEL WITH THE TAP CHANGER OIL LEVEL ALARM (MIB X1.25-X1.30). THESE ALARMS MUST BE SEPARATED WITH THE TAP CHANGER BUCHHOLZ WIRED IN PARALLEL WITH THE MAIN TANK BUCHHOLZ ALARM, OR TO RP TERMINAL X3.9.

SHEET 25	RED670 REFERENCE DIAGRAM
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SHEET 17	SPR REW. DC AC KEY DIAGRAM
SHEET 16	BACK-UP DC KEY DIAGRAM
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SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET



1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C. KING	18/02/2015	3487A
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REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER

PROJECT APPROVED		DESIGN APPROVED	
C. PYM		S.J. van ZYL	
DATE 25/06/21		DATE 11/06/10	
PROJECT CHECKED		DESIGN CHECKED	
B. HOMANN		P.A. GERBER	
DATE 25/06/21		DATE 11/06/10	
DRAWN BY		DRAWN BY	
K. STEYNBERG		S.J. van ZYL	

Eskom

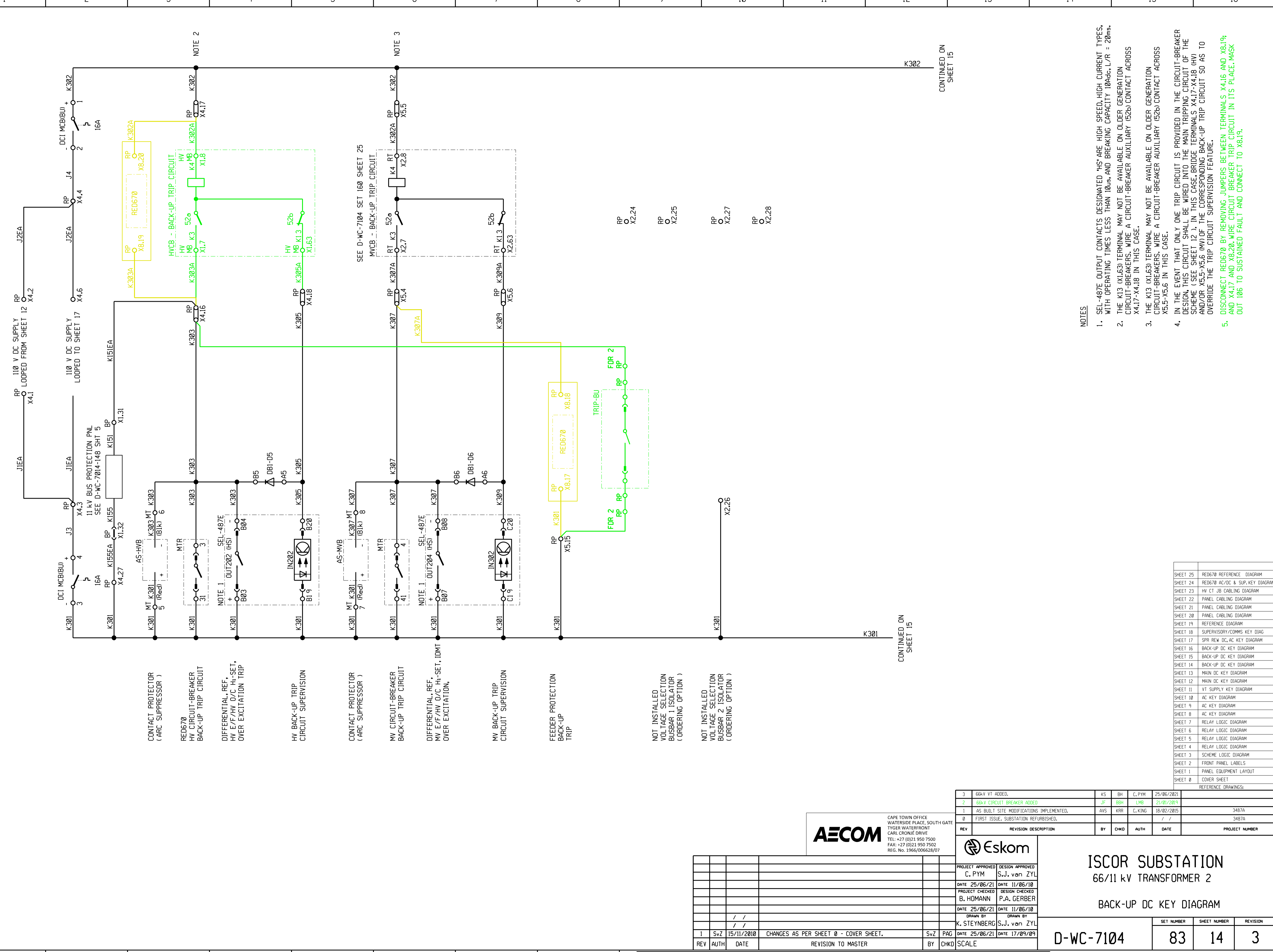
ISCOR SUBSTATION
66/11 kV TRANSFORMER 2

MAIN DC KEY DIAGRAM

SET NUMBER	SHEET NUMBER	REVISION
D-WC-7104	83	13
		1

REV	AUTH	DATE	REVISION TO MASTER	BY	CHKD	SCALE
1	SvZ	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ	PAG	DATE 25/06/21
						DATE 17/09/09

MASTER TRACING FILED UNDER D-DT-15202 SHEET 13 OF 26 REVISION 1



- CONTACT PROTECTOR (AFC SUPPRESSOR)
- RED670 HV CIRCUIT-BREAKER BACK-UP TRIP CIRCUIT
- DIFFERENTIAL, REF. HV E/F/HV D/C HI-SET, OVER EXCITATION TRIP
- HV BACK-UP TRIP CIRCUIT SUPERVISION
- CONTACT PROTECTOR (AFC SUPPRESSOR)
- MV CIRCUIT-BREAKER BACK-UP TRIP CIRCUIT
- DIFFERENTIAL, REF. MV E/F/HV D/C HI-SET, IDMT OVER EXCITATION,
- MV BACK-UP TRIP CIRCUIT SUPERVISION
- FEEDER PROTECTION BACK-UP TRIP
- NOT INSTALLED VOLTAGE SELECTION BUSBAR 1 ISOLATOR (ORDERING OPTION)
- NOT INSTALLED VOLTAGE SELECTION BUSBAR 2 ISOLATOR (ORDERING OPTION)

CONTINUED ON SHEET 15

CONTINUED ON SHEET 15

NOTES

- SEL-487E OUTPUT CONTACTS DESIGNATED 'HS' ARE HIGH SPEED-HIGH CURRENT TYPES, WITH OPERATING TIMES LESS THAN 10ms, AND BREAKING CAPACITY 100dc, L/R = 20ms.
- THE K13 (X1.63) TERMINAL MAY NOT BE AVAILABLE ON OLDER GENERATION CIRCUIT-BREAKERS. WIRE A CIRCUIT-BREAKER AUXILIARY (52b) CONTACT ACROSS X4.17-X4.18 IN THIS CASE.
- THE K13 (X1.63) TERMINAL MAY NOT BE AVAILABLE ON OLDER GENERATION CIRCUIT-BREAKERS. WIRE A CIRCUIT-BREAKER AUXILIARY (52b) CONTACT ACROSS X5.5-X5.6 IN THIS CASE.
- IN THE EVENT THAT ONLY ONE TRIP CIRCUIT IS PROVIDED IN THE CIRCUIT-BREAKER DESIGN, THIS CIRCUIT SHALL BE WIRED INTO THE MAIN TRIPPING CIRCUIT OF THE SCHEME (SEE SHEET 12). IN THIS CASE, BRIDGE TERMINALS X4.17-X4.18 (HV) AND/OR X5.5-X5.6 (MV) OF THE CORRESPONDING BACK-UP TRIP CIRCUIT SO AS TO OVERRIDE THE TRIP CIRCUIT SUPERVISION FEATURE.
- DISCONNECT RED670 BY REMOVING JUMPERS BETWEEN TERMINALS X4.16 AND X8.19; AND X4.17 AND X8.20. WIRE CIRCUIT BREAKER TRIP CIRCUIT IN ITS PLACE. MASK OUT 106 TO SUSTAINED FAULT AND CONNECT TO X8.19.

SHEET	DESCRIPTION
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SHEET 21	PANEL CABLING DIAGRAM
SHEET 20	PANEL CABLING DIAGRAM
SHEET 19	REFERENCE DIAGRAM
SHEET 18	SUPERVISORY/COMMS KEY DIAG
SHEET 17	SPI REV DC, AC KEY DIAGRAM
SHEET 16	BACK-UP DC KEY DIAGRAM
SHEET 15	BACK-UP DC KEY DIAGRAM
SHEET 14	BACK-UP DC KEY DIAGRAM
SHEET 13	MAIN DC KEY DIAGRAM
SHEET 12	MAIN DC KEY DIAGRAM
SHEET 11	VT SUPPLY KEY DIAGRAM
SHEET 10	AC KEY DIAGRAM
SHEET 9	AC KEY DIAGRAM
SHEET 8	AC KEY DIAGRAM
SHEET 7	RELAY LOGIC DIAGRAM
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SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER
3	66kV VT ADDED.	KS	BH	C.PYM	25/06/2021	
2	66kV CIRCUIT BREAKER ADDED	JF	BH	LMB	21/01/2019	
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KING	18/02/2015	3487A
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 REG. No. 1966/006628/07

Eskom
 PROJECT APPROVED
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 DESIGN APPROVED
 S.J. van ZYL
 DATE 25/06/21
 PROJECT CHECKED
 B. HOMANN
 DESIGN CHECKED
 P.A. GERBER
 DATE 25/06/21
 DRAWN BY
 K. STEYNBERG
 DATE 15/11/2010
 Scaled
 DATE 25/06/21
 DATE 17/09/09

ISCOR SUBSTATION
 66/11 kV TRANSFORMER 2
 BACK-UP DC KEY DIAGRAM

D-WC-7104

SET NUMBER	SHEET NUMBER	REVISION
83	14	3

REV	AUTH	DATE	REVISION TO MASTER	SCALE
1	SvZ	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ

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CONTINUED FROM SHEET 14

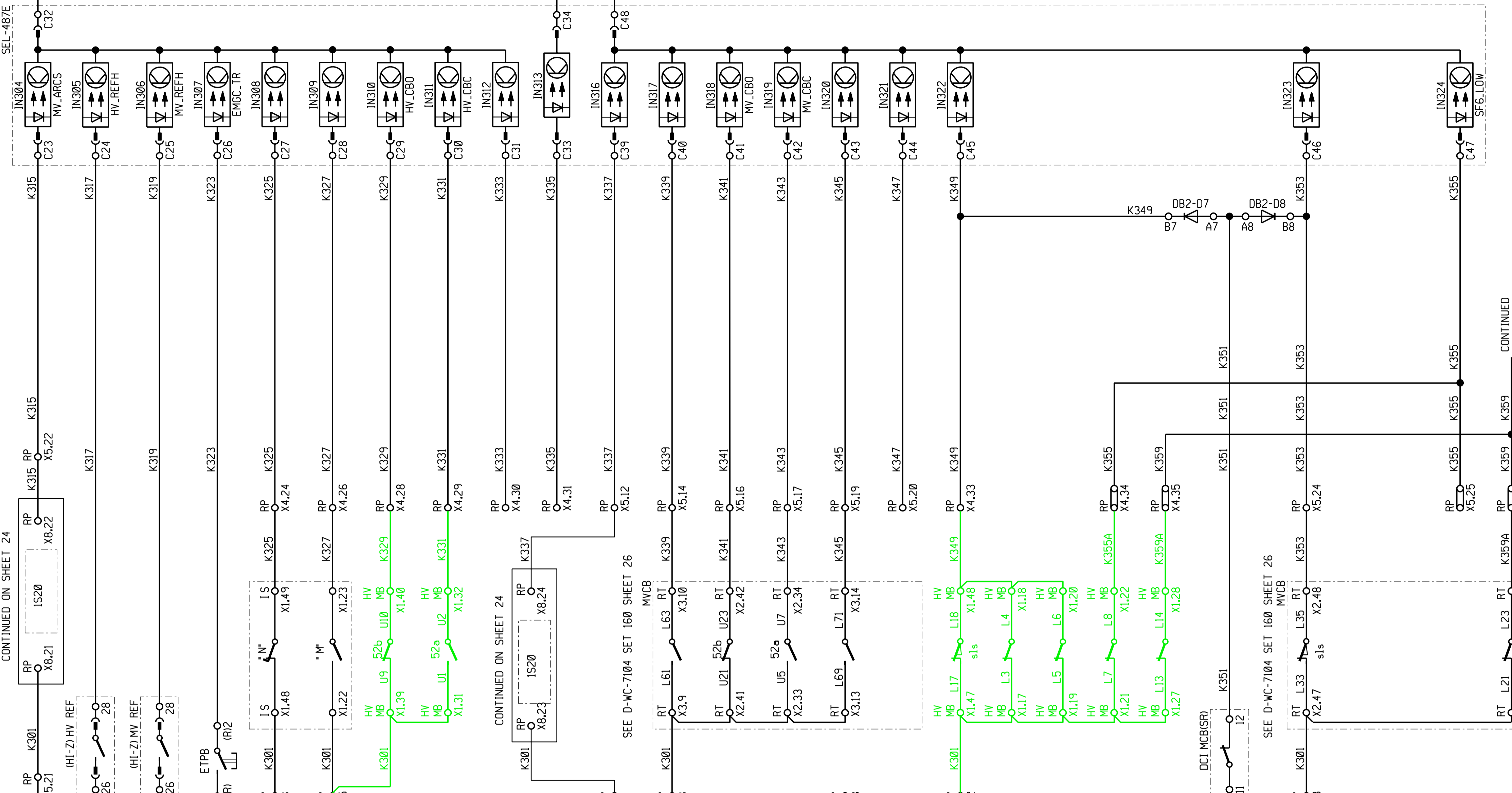
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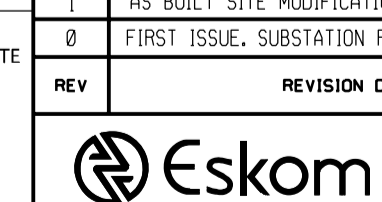
CONTINUED ON SHEET 16

CONTINUED ON SHEET 16



MV INDOOR CIRCUIT-BRKR CABLE CHAMBER ARC FAULT DETECTED
 (NOT IN USE) HIGH IMPEDANCE HV REF TRIP
 HIGH IMPEDANCE MV REF TRIP
 EMERGENCY TRIP
 HV LINE ISOLATOR OPEN
 HV LINE ISOLATOR CLOSED
 HV CIRCUIT-BREAKER OPEN
 HV CIRCUIT-BREAKER CLOSED
 SPARE STATUS INPUT
 SPARE STATUS INPUT
 MV CIRCUIT-BREAKER CABLE CHAMBER ARC FAILED
 MV CIRCUIT-BREAKER RACKED OUT
 MV CIRCUIT-BREAKER OPEN
 MV CIRCUIT-BREAKER CLOSED
 MV CIRCUIT-BREAKER INTEGRAL EARTH APPLIED
 (NOT IN USE) MV BUSBAR EARTH APPLIED
 HV CIRCUIT-BREAKER (NOT INSTALLED) NOT HEALTHY
 HV CIRCUIT-BREAKER COMMON ALARM
 SF6 GAS LOW
 SF6 GAS LOW
 HV CIRCUIT-BREAKER MB HEATER ALARM
 SPRING REMIND MCB TRIPPED
 SPRING DISCHARGED
 MV CIRCUIT-BREAKER NOT HEALTHY
 MV CIRCUIT-BREAKER COMMON ALARM
 SF6 GAS LOW
 (NOT IN USE) SF6 GAS LOW
 MV CIRCUIT-BREAKER MB HEATER ALARM

NOT INSTALLED



CAPE TOWN OFFICE WATERSIDE PLACE, SOUTH GATE TYGER WATER FRONT CARL CRONJE DRIVE TEL: +27 (0)21 950 7500 FAX: +27 (0)21 950 7502 REG. No. 1966/006628/07		JF	BSH	LMB	21/01/2019		
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KING	18/02/2015		3487A
0	FIRST ISSUE. SUBSTATION REFURBISHED.				/ /		3487A
REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE		PROJECT NUMBER
PROJECT APPROVED	C. PYM	DESIGN APPROVED	S.J. van ZYL				
DATE	25/06/21	DATE	11/06/10				
PROJECT CHECKED	B. HOMANN	DESIGN CHECKED	P.A. GERBER				
DATE	25/06/21	DATE	11/06/10				
DRAWN BY	K. STEYNBERG	DRAWN BY	S.J. van ZYL				
DATE	15/11/2010	DATE	25/06/21	DATE	17/09/09		
REV	1	SvZ	PAG	CHKD	SCALE		
CHANGES AS PER SHEET 0 - COVER SHEET.		REVISION TO MASTER					

ISCOR SUBSTATION
 66/11 kV TRANSFORMER 2
 BACK-UP DC KEY DIAGRAM

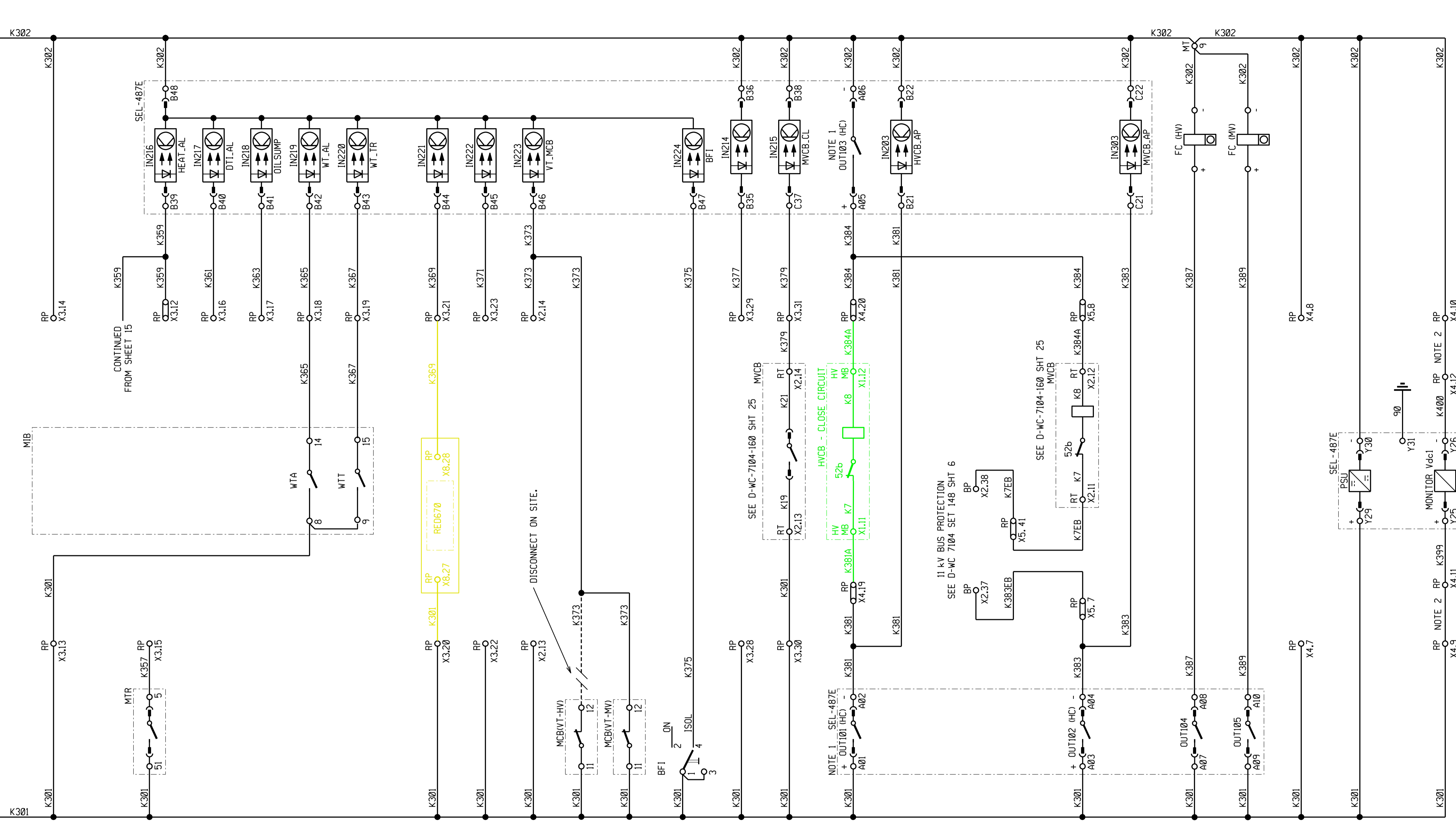
D-WC-7104	83	15	2
SET NUMBER	SHEET NUMBER	REVISION	

SHEET 25	RED670 REFERENCE DIAGRAM
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SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

MASTER TRACING FILED UNDER D-DT-15202 SHEET 15 OF 26 REVISION 1

CONTINUED FROM SHEET 15

CONTINUED FROM SHEET 15



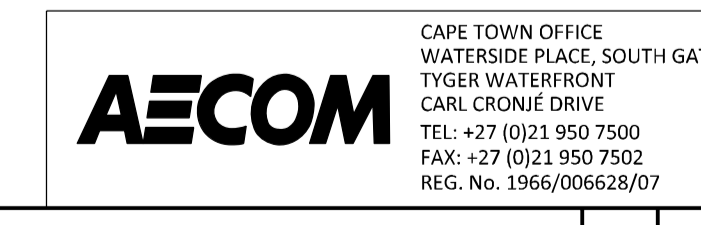
- NOT INSTALLED DIGITAL TEMPERATURE INSTRUMENT POWER SUPPLY
- NOT INSTALLED MIB DC SUPPLY (COOLER CONTROL)
- NOT IN USE COOLER FAN TRIP
- NOT IN USE MIB HEATER ALARM
- NOT IN USE DIGITAL TEMPERATURE INSTRUMENT FAIL
- NOT IN USE OIL SUMP (BUND WALLS) DRAIN VALVE OPEN
- TRANSFORMER WINDING TEMPERATURE ALARM
- TRANSFORMER WINDING TEMPERATURE TRIP
- SPARE INPUT
- SPARE INPUT
- VT MCB TRIPPED
- NOT IN USE HV VOLTAGE TRANSFORMER MCB TRIPPED
- MV VOLTAGE TRANSFORMER MCB TRIPPED
- CIRCUIT-BREAKER FAIL ISOLATED
- SPARE INPUT
- MV CIRCUIT-BREAKER STAND-OFF CLOSE (VIA UMBILICAL CORD)
- NOT IN USE HV CIRCUIT-BREAKER CLOSE & ANTI-PUMP
- NOT IN USE HV CIRCUIT-BREAKER ANTI-PUMP INPUT
- MV CIRCUIT-BREAKER CLOSE
- MV CIRCUIT-BREAKER ANTI-PUMP INPUT
- NOT IN USE HV CIRCUIT-BREAKER FAULT/TRIP COUNTER
- MV CIRCUIT-BREAKER FAULT/TRIP COUNTER
- SPARE SUPPLY
- SEL-487E POWER SUPPLY
- BACK-UP / CUSTOMER DC SUPPLY MONITORING



- NOTES**
- SEL-487E OUTPUT CONTACTS DESIGNATED 'HC' ARE HIGH CURRENT (NORMAL SPEED) TYPES, WITH BREAKING CAPACITY 10Adc, L/R = 20ms.
 - REMOVE LINKS IN THE EVENT THAT THE SEL-487E IS TO BE USED TO MONITOR THE CUSTOMER'S DC SUPPLY. IN THIS CASE, WIRE THE CUSTOMER'S POSITIVE SUPPLY TO X4.11 AND THE NEGATIVE TO X4.12 (MAX 350Vdc).
 - REFERENCE CONDITIONS: DIGITAL TEMPERATURE INSTRUMENT SHOWN IN THE DE-ENERGISED (FAILED) STATE, OIL SUMP DRAIN VALVE SHOWN IN THE OPEN POSITION.

SHEET	DESCRIPTION
SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 24	RED670 AC/DC & SUP. KEY DIAGRAM
SHEET 23	HV CT JB CABLING DIAGRAM
SHEET 22	PANEL CABLING DIAGRAM
SHEET 21	PANEL CABLING DIAGRAM
SHEET 20	PANEL CABLING DIAGRAM
SHEET 19	REFERENCE DIAGRAM
SHEET 18	SUPERVISORY/COMMS KEY DIAG
SHEET 17	SPP REV DC AC KEY DIAGRAM
SHEET 16	BACK-UP DC KEY DIAGRAM
SHEET 15	BACK-UP DC KEY DIAGRAM
SHEET 14	BACK-UP DC KEY DIAGRAM
SHEET 13	MAIN DC KEY DIAGRAM
SHEET 12	MAIN DC KEY DIAGRAM
SHEET 11	VT SUPPLY KEY DIAGRAM
SHEET 10	AC KEY DIAGRAM
SHEET 9	AC KEY DIAGRAM
SHEET 8	AC KEY DIAGRAM
SHEET 7	RELAY LOGIC DIAGRAM
SHEET 6	RELAY LOGIC DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER
3	66kV VT ADDED.	KS	BH	C.PYM	25/06/2021	
2	66kV CIRCUIT BREAKER ADDED	JF	BH	LMB	21/01/2019	3487A
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KING	18/02/2015	3487A
0	FIRST ISSUE. SUBSTATION REFURBISHED.	/	/	/	/	3487A



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REG. No. 19666/006628/07

PROJECT APPROVED C. PYM	DESIGN APPROVED S.J. van ZYL
DATE 25/06/21	DATE 11/06/18
PROJECT CHECKED B. HOMANN	DESIGN CHECKED P.A. GERBER
DATE 25/06/21	DATE 11/06/18
DRAWN BY K. STEYNBERG	DRAWN BY S.J. van ZYL
DATE 15/11/2010	DATE 25/06/21
DATE 25/06/21	DATE 17/09/09
REV AUTH DATE	REVISION TO MASTER
BY CHKD SCALE	

Eskom

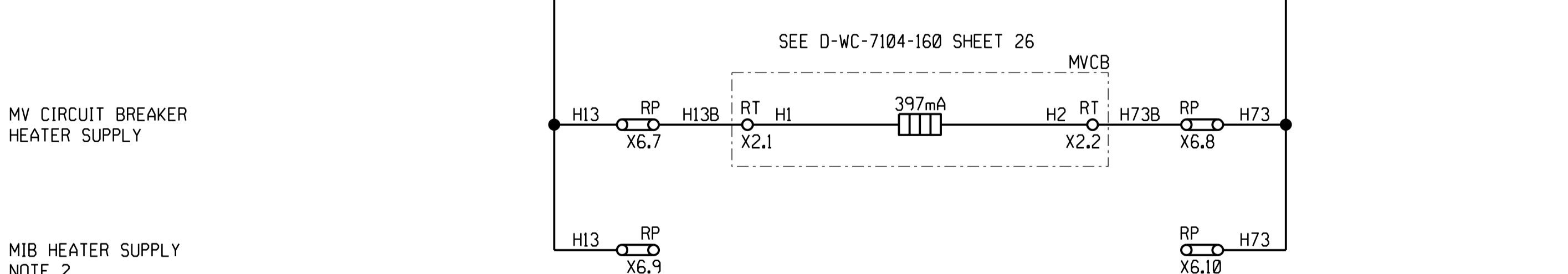
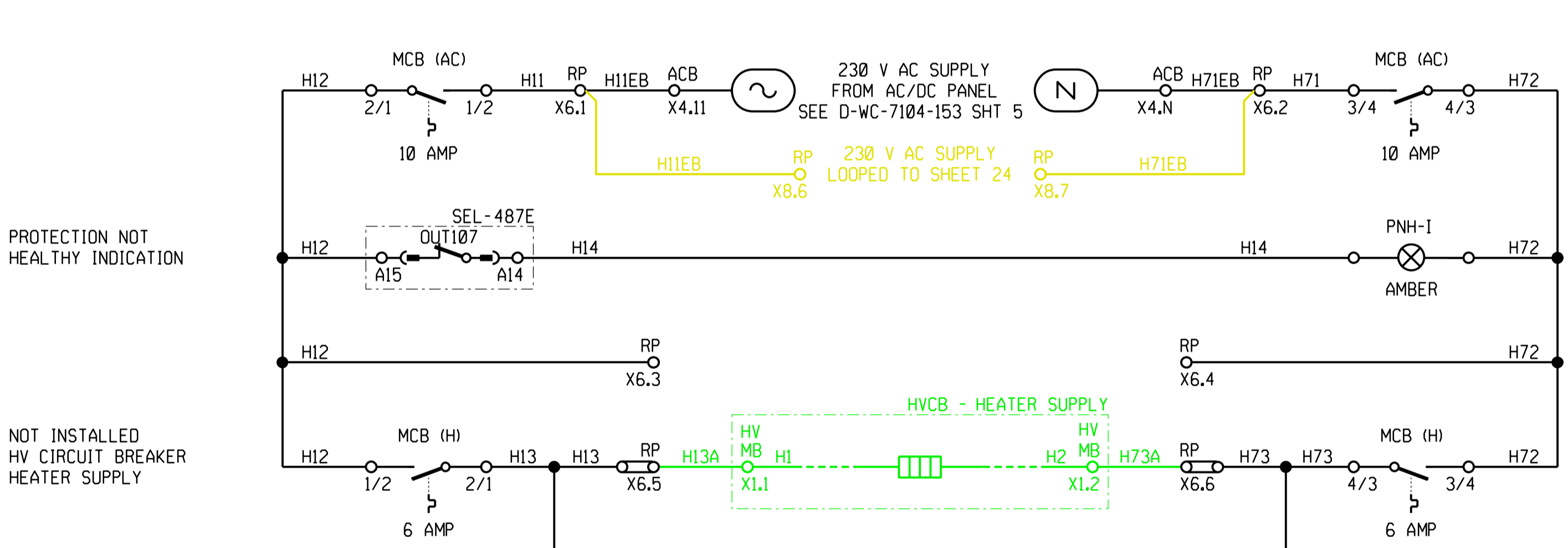
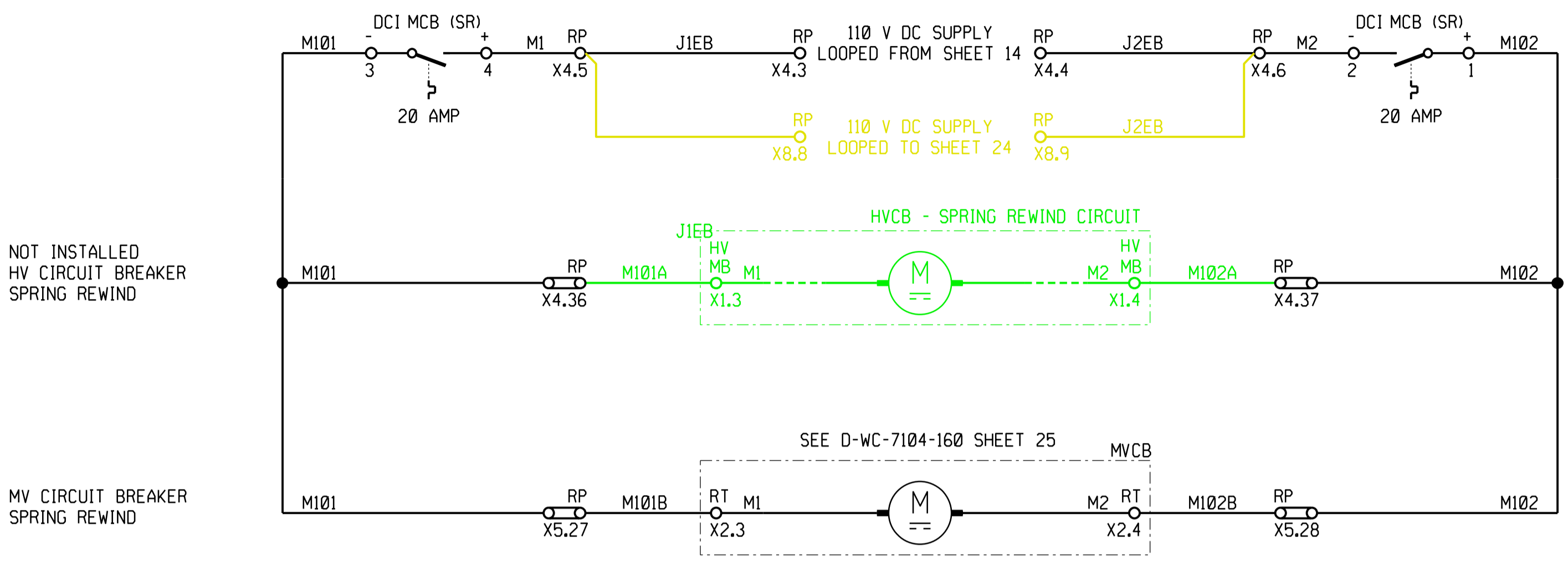
ISCOR SUBSTATION
66/11 kV TRANSFORMER 2

BACK-UP DC KEY DIAGRAM

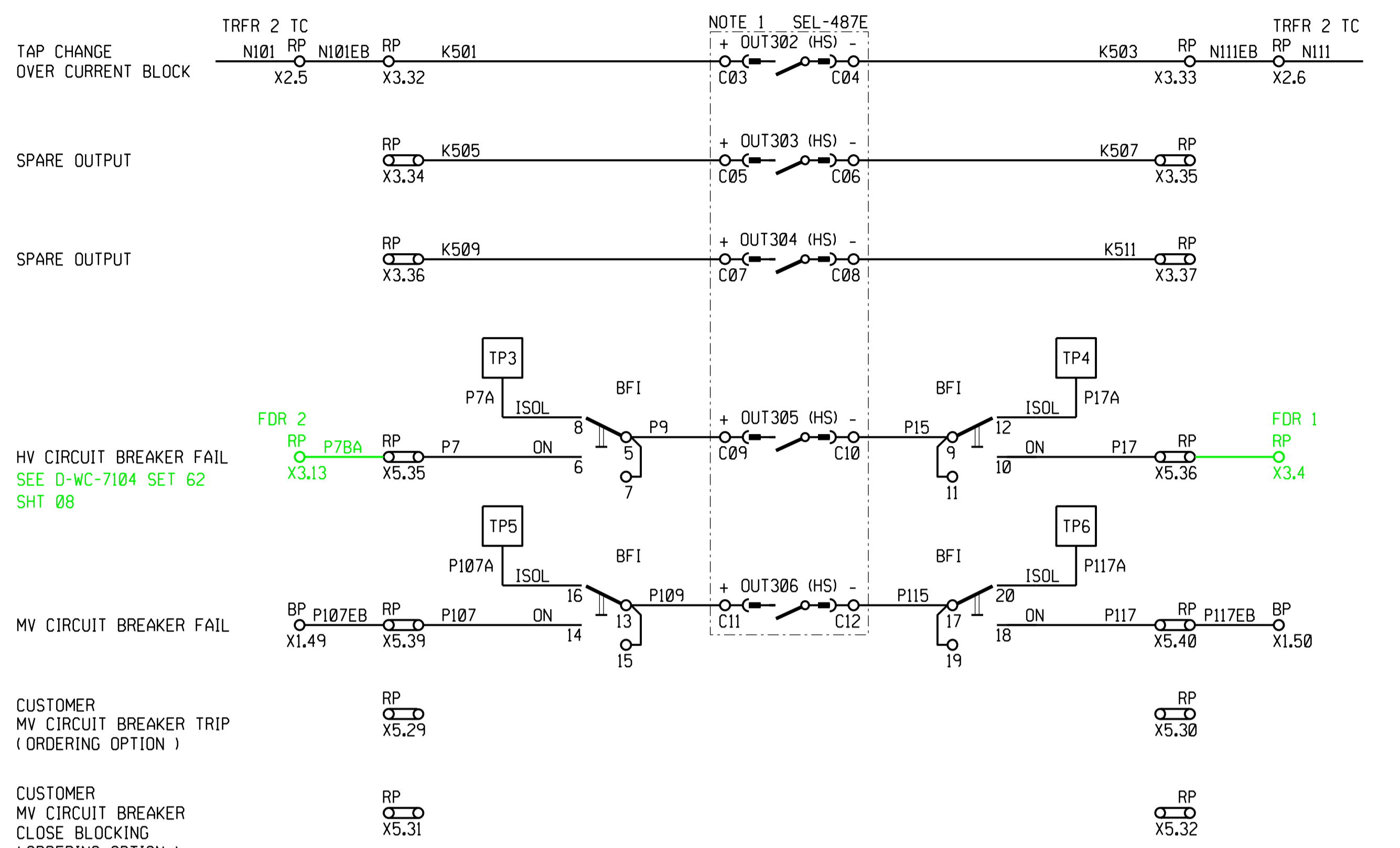
D-WC-7104

SET NUMBER	SHEET NUMBER	REVISION
83	16	3

MASTER TRACING FILED UNDER D-DT-15202 SHEET 16 OF 26 REVISION 1

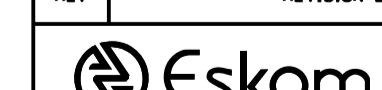


- NOTES**
- SEL-487E OUTPUT CONTACTS DESIGNATED 'HS' ARE HIGH SPEED, HIGH CURRENT TYPES, WITH OPERATING TIMES LESS THAN 10µs, AND BREAKING CAPACITY 10Adc, L/R = 20ms.
 - THE TRANSFORMER HEATER SUPPLY IS USUALLY LOOPED FROM THE THREE PHASE AC SUPPLY FOR THE COOLER FANS (WHERE PROVIDED). A SEPARATE SINGLE PHASE AC SUPPLY IS NOT REQUIRED IN THIS CASE.



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SHEET 22	PANEL CABLING DIAGRAM
SHEET 21	PANEL CABLING DIAGRAM
SHEET 20	PANEL CABLING DIAGRAM
SHEET 19	REFERENCE DIAGRAM
SHEET 18	SUPERVISORY/COMMS KEY DIAG
SHEET 17	SPR REW DC, AC KEY DIAGRAM
SHEET 16	BACK-UP DC KEY DIAGRAM
SHEET 15	BACK-UP DC KEY DIAGRAM
SHEET 14	BACK-UP DC KEY DIAGRAM
SHEET 13	MAIN DC KEY DIAGRAM
SHEET 12	MAIN DC KEY DIAGRAM
SHEET 11	VT SUPPLY KEY DIAGRAM
SHEET 10	AC KEY DIAGRAM
SHEET 9	AC KEY DIAGRAM
SHEET 8	AC KEY DIAGRAM
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SHEET 5	RELAY LOGIC DIAGRAM
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SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER
3	66kV VT ADDED.				25/06/2021	
2	66kV CIRCUIT BREAKER ADDED	JF	BSH	LMB	21/01/2019	
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C. KING	18/02/2015	3487A
0	FIRST ISSUE. SUBSTATION REFURBISHED.				/ /	3487A



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66/11 kV TRANSFORMER 2

SPR REWIND DC, AC KEY DIAGRAM

D-WC-7104

SET NUMBER	SHEET NUMBER	REVISION
83	17	3

REV	AUTH	DATE	REVISION TO MASTER	PAG	SCALE
1	SvZ	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ	

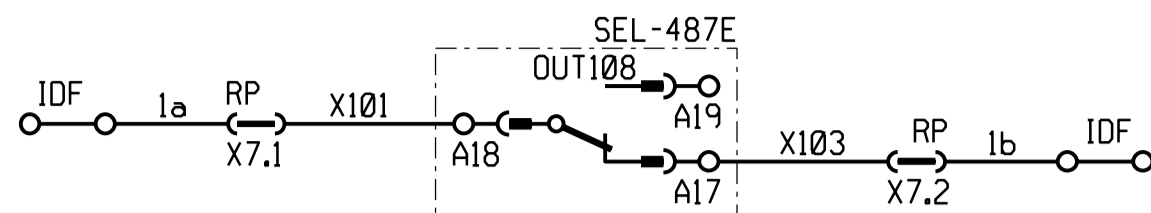
MASTER TRACING FILED UNDER D-DT-15202 SHEET 17 OF 26 REVISION 1

ALARM WORDING

SUPERVISORY ALARM

PNT NAME DESCRIPTION/
PNT NAME

PROTECTION
NOT HEALTHY



PROTECTION
(PNH)

SEL-487E MAIN PRINTED CIRCUIT (PC) BOARD JUMPER SETTINGS

THE FOLLOWING MAIN PC BOARD JUMPER SELECTIONS SHALL BE MADE BY CONCO PRIOR TO DELIVERY OF SCHEMES TO ESKOM.

JUMPER NAME	SETTING	FUNCTION
J21-A	N/A	RESERVED FOR USE BY SEL
J21-PASSWORD	OFF	DISABLE PASSWORD PROTECTION
J21-BREAKER	ON	ALLOW ASCII SERIAL COMMANDS 'OPEN', 'CLOSE' AND 'PULSE'
J21-D	N/A	RESERVED FOR USE BY SEL
JMP1	OFF	IRIG-B TERMINATING Z (OFF = 2550 Ohms, ON = 50 Ohms)
JMP2	ON	PORT 3 PIN 1 (ON = +5Vdc, OFF = NO FUNCTION)
JMP3	ON	PORT 2 PIN 1 (ON = +5Vdc, OFF = NO FUNCTION)
JMP4	OFF	PORT 1 PIN 1 (ON = +5Vdc, OFF = NO FUNCTION)

COMMS INTERFACE AND TIME SYNCHRONISATION

SEL-2886 DIP SWITCH SETTINGS

THE FOLLOWING DIP SWITCH SELECTIONS SHALL BE MADE BY CONCO PRIOR TO DELIVERY OF SCHEMES TO ESKOM.

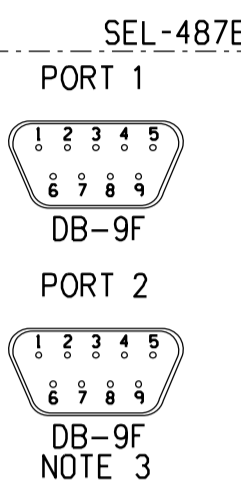
NO.	1	2	3	4	5	6	7	8
ON-1								
OFF-0								

THE SEL-2886 IS SET IN SEND DATA CONTROL (SDC) MODE (DIP SWITCH 4 OFF), CONFIGURED FOR COMPATIBILITY WITH 9600 BAUD (DIP SWITCHES 1-3) AND WITH ECHO OFF (DIP SWITCH 6).

ALTERNATIVE BAUD RATE SETTINGS ARE AS FOLLOWS:

BAUD	1	2	3
1200	1	1	1
2400	0	1	1
4800	1	0	1
9600	0	0	1
19200	1	1	0
38400	0	1	0
57600	1	0	0
115200	0	0	0

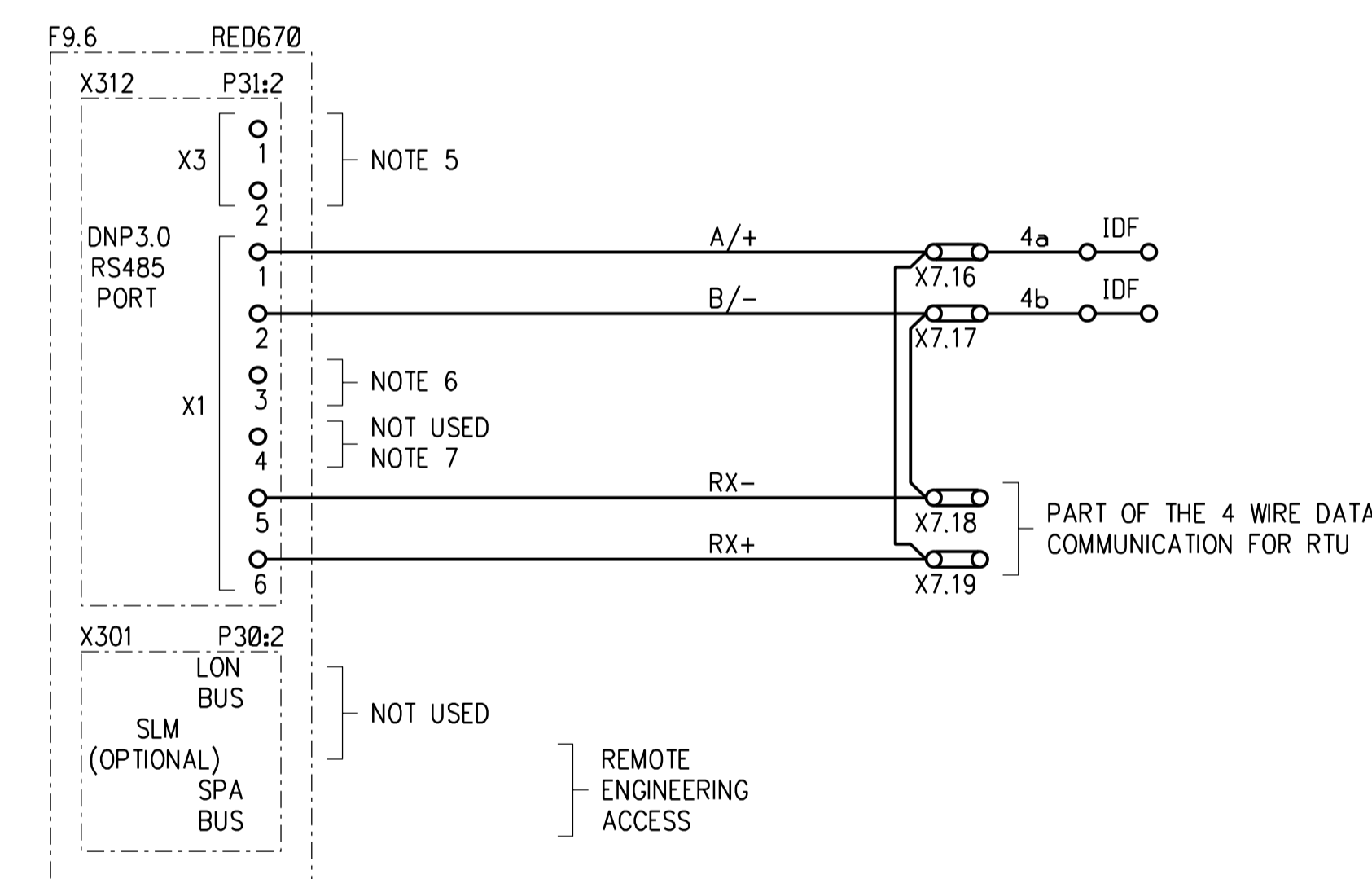
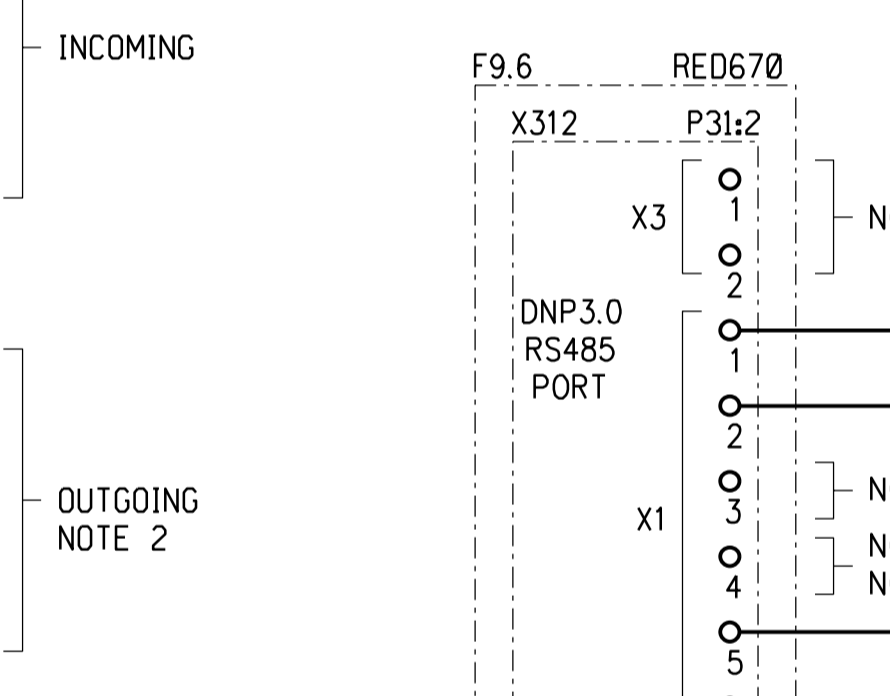
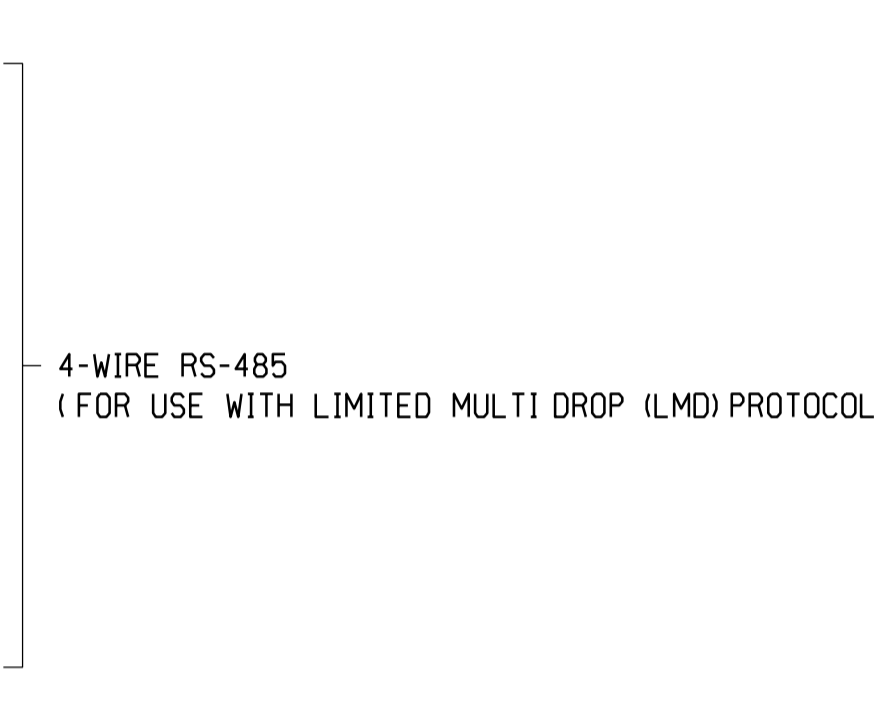
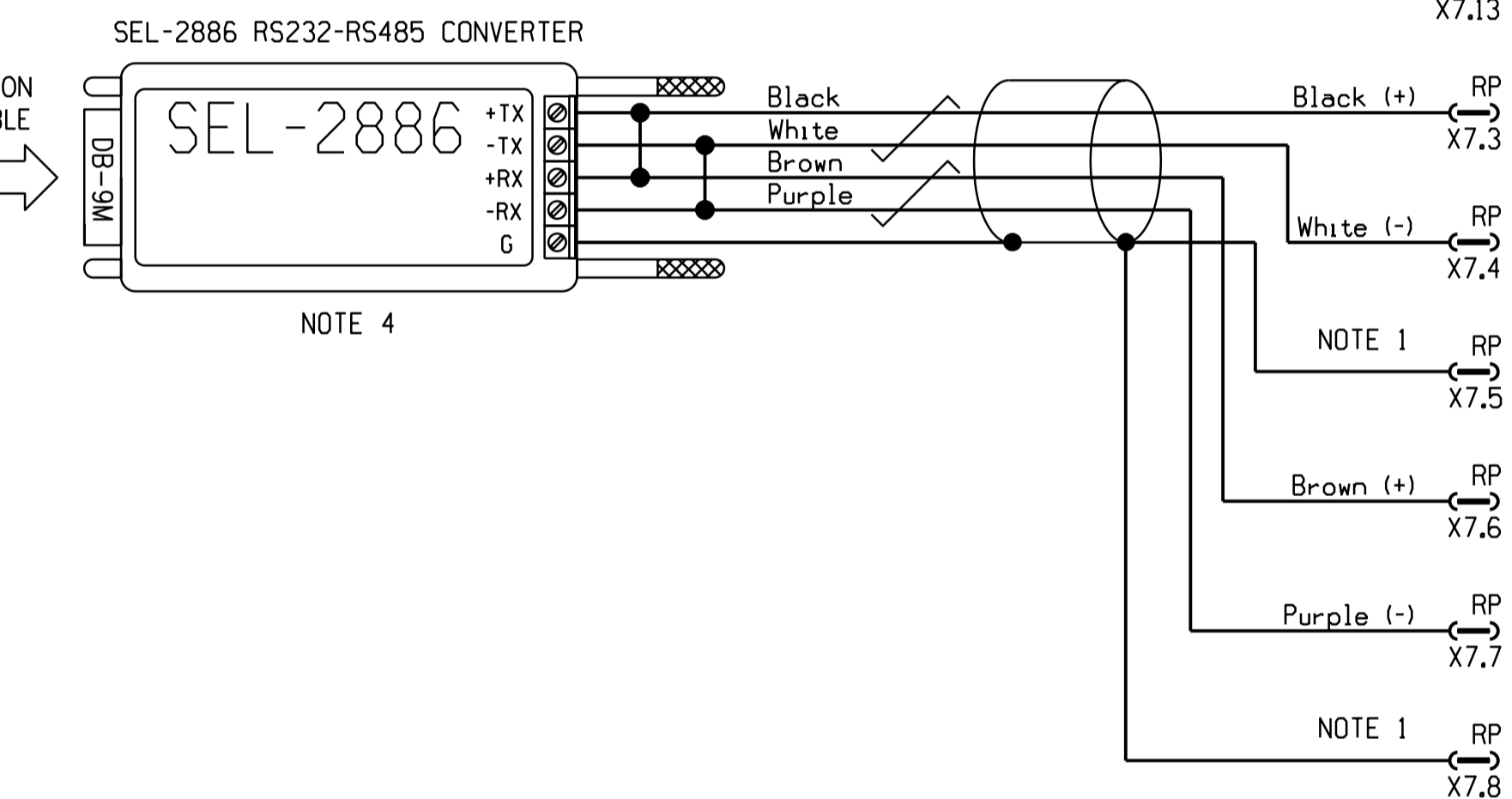
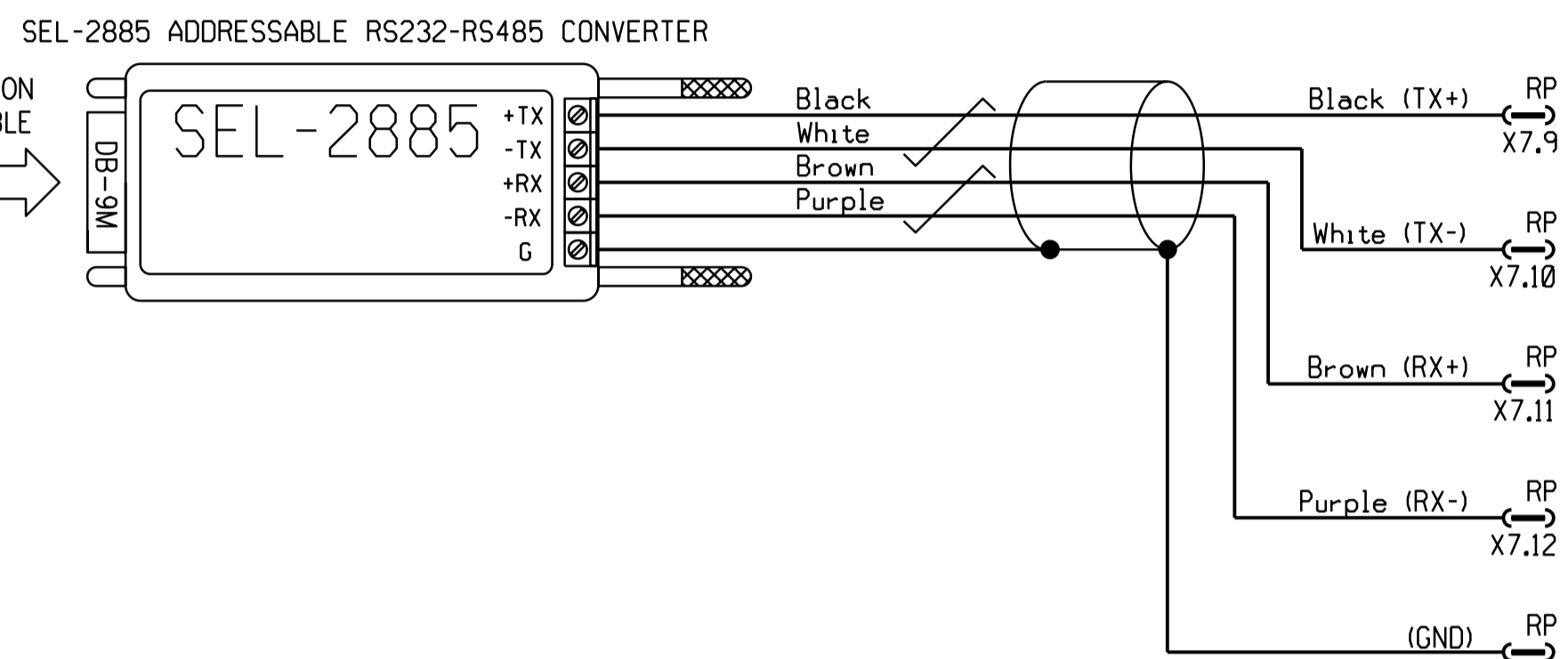
SPARE RS232 PORT
(e.g. FOR MIRROR-BIT COMMUNICATION)



REMOTE ENGINEERING ACCESS
RS232 REAR PORT SUPPORTING SEL OR LMD PROTOCOL

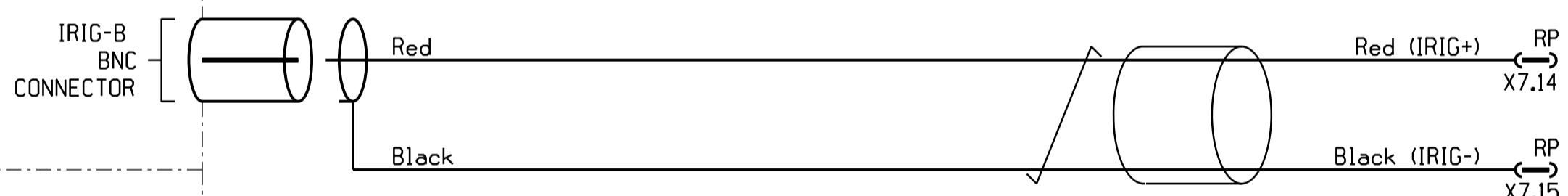


SERIAL SCADA COMMUNICATION
RS232 REAR PORT SUPPORTING DNP3 PROTOCOL



- NOTE:
- X3 OF THE RED670 IS THE SOFT GROUND CONNECTOR. IT MAY BE UNCONNECTED OR IT CAN BE CONNECTED TO THE GND WITH AN RC NET PARALLEL WITH A MOV.
 - TERMINATION RESISTOR FOR TRANSMITTER AND RECEIVER. ESKOM PERSONNEL TO CONNECT TO A/+ IF USED.
 - TERMINATION RESISTOR FOR RECEIVER IN THE 4 WIRE CASE (CONNECT TO RX+).

TIME SYNCHRONISATION
IRIG-B



ETHERNET CARD
(ORDERING OPTION)
PORTS SUPPORTING DNP3 OR IEC 61850 AS PER ORDER

FIBRE OPTIC (ST CONNECTORS)
820nm MULTIMODE FIBRE

100 BASE-FX

COPPER (RJ45 CONNECTOR)

10/100 BASE-T

NOTES

- RS485 COMMUNICATION CIRCUITS TO BE EARTHED AT ONE POINT ONLY.
- THE SEL-2886 PRODUCT MANUAL INDICATES THAT TERMINATING RESISTORS SHOULD SELDOM BE REQUIRED ON THE RS485 CIRCUITS (e.g. COMMUNICATION AT UP TO 115200bps CAN BE ACHIEVED OVER A 230M CABLE RUN WITHOUT THE NEED FOR RESISTORS). WHERE REQUIRED, REFER TO THE PRODUCT MANUAL FOR RESISTOR SIZING AND INSTALLATION PRACTICE NOTES.
- THE SEL-2885 AND SEL-2886 CONVERTERS REQUIRE A +5Vdc AUXILIARY SUPPLY. THIS IS PROVIDED VIA PIN 1 OF THE SEL-487E COMM PORT. SEE MAIN PC BOARD JUMPER SETTINGS, TOP RIGHT.
- SEL-2886 CONVERTERS ARE CAPABLE OF 2- OR 4-WIRE RS485 MULTI-DROP CONNECTIONS. THE SEL-2886 IS WIRED FOR 2-WIRE CONNECTION IN THE STANDARD SCHEME APPLICATION.



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REG. No. 1966/006628/07

REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KING	18/02/2015	3487A
0	FIRST ISSUE. SUBSTATION REFURBISHED.	/	/	/	/	3487A

PROJECT APPROVED C. PYM	DESIGN APPROVED S.J. van ZYL
DATE 25/06/21	DATE 11/06/10
PROJECT CHECKED B. HOMANN	DESIGN CHECKED P.A. GERBER
DATE 25/06/21	DATE 11/06/10
DRAWN BY K. STEYNBERG	DRAWN BY S.J. van ZYL
DATE 25/06/21	DATE 17/09/09

ESKOM

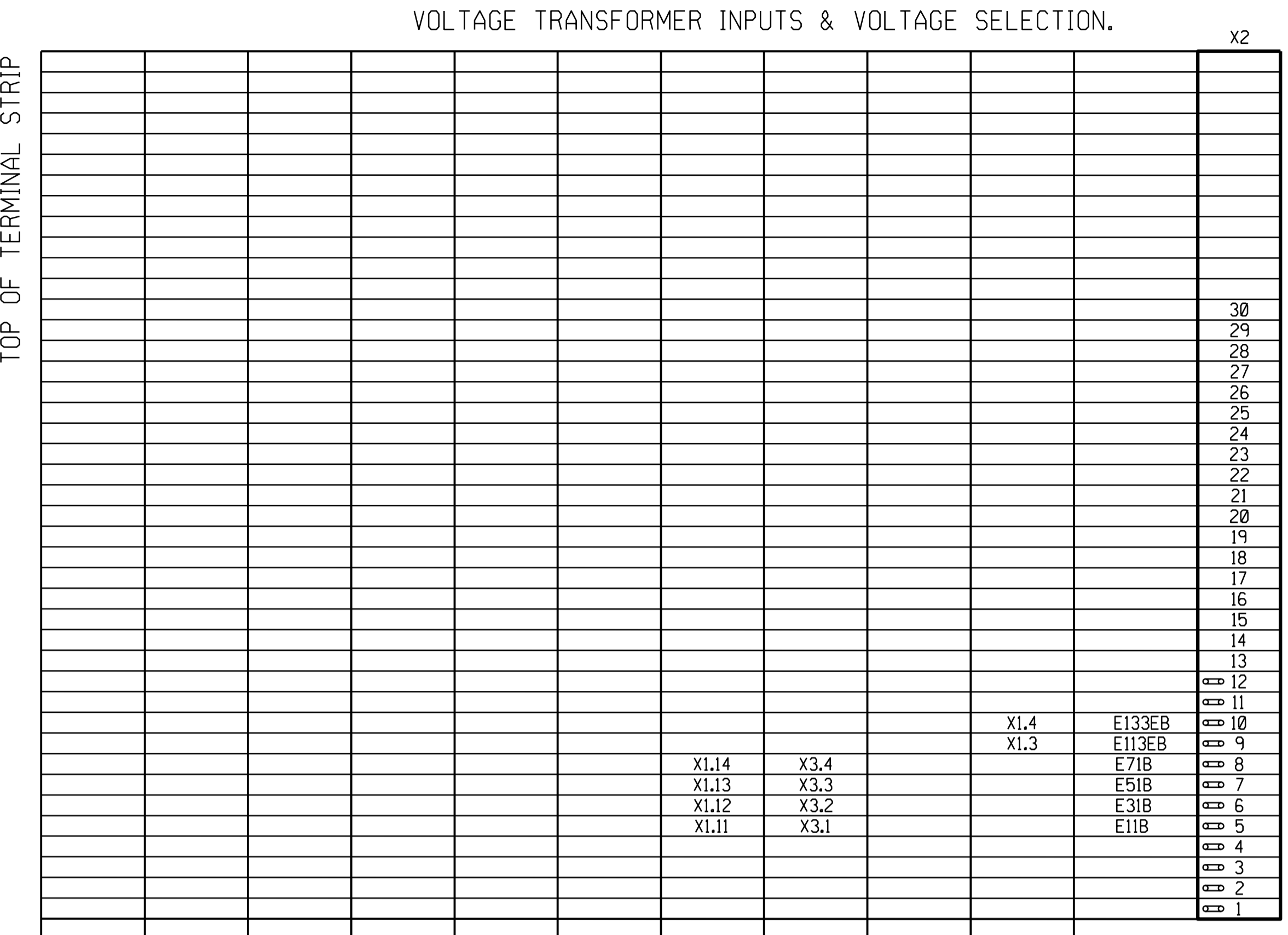
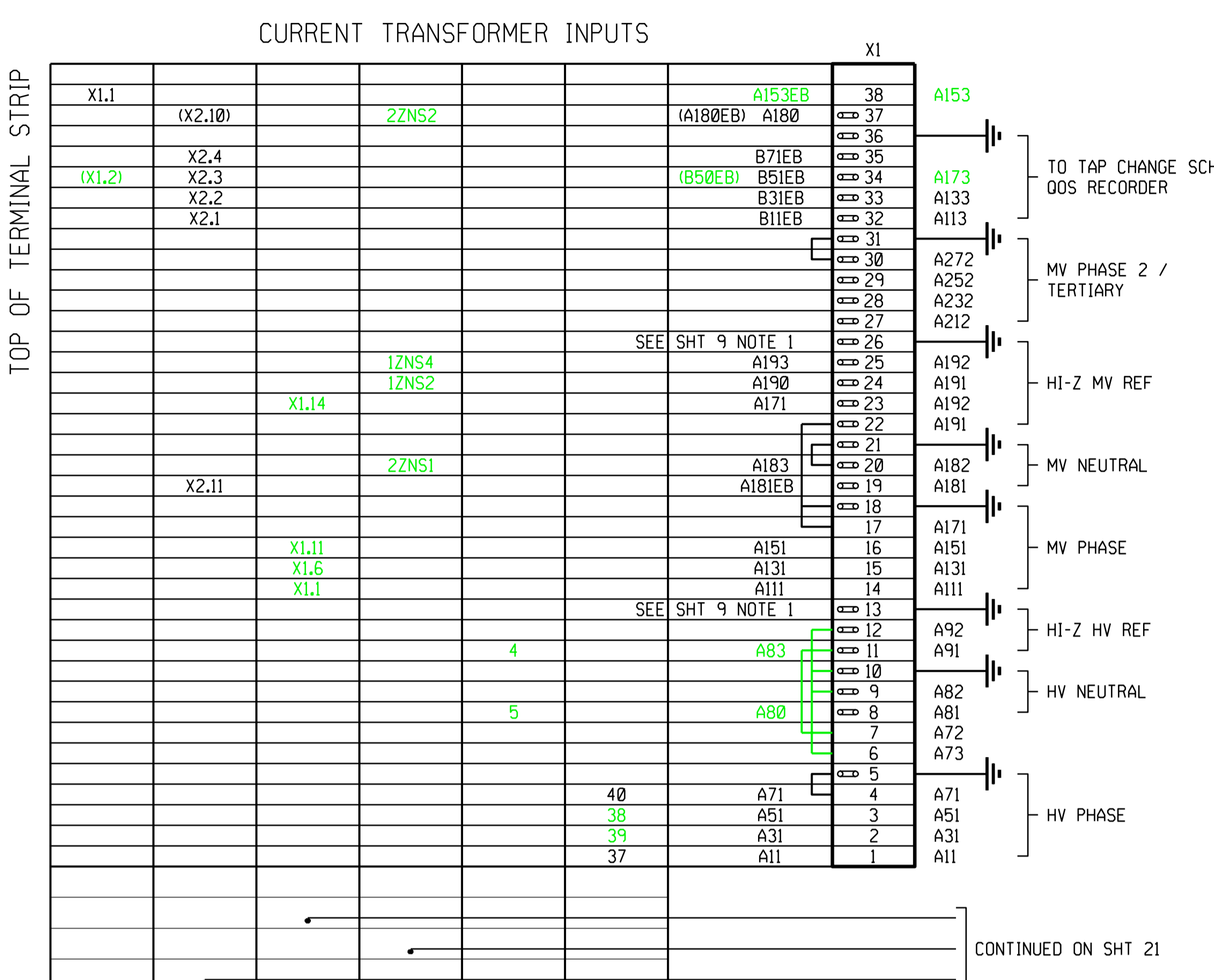
ISCOR SUBSTATION
66/11 kV TRANSFORMER 2

SUPERVISORY/COMMS KEY DIAGRAM

REV	AUTH	DATE	REVISION TO MASTER	BY	CHKD	SCALE
1	SvZ	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ	PAG	DATE 25/06/21 DATE 17/09/09

SET NUMBER	SHEET NUMBER	REVISION
D-WC-7104	83	18
		1

MASTER TRACING FILED UNDER D-DT-15202 SHEET 18 OF 26 REVISION 1



EB522	EB508	EB506	EB514	EB512	EB504	CABLE NUMBER
12	19	19	12	12	12	CABLE SIZE
4	3	4	5	10	8	NUMBER OF SPARES
OLTC PANEL 66/11 kV TRFR 2 OLTC RACK	11 kV BUS PROTECTION PANEL	11 kV BREAKER MECH BOX RT TERMINALS	NECRT	TRANSFORMER MIB	66 kV CT JUNCTION BOX	DESTINATION

32	31	EB522	CABLE NUMBER
4	4	-	CABLE SIZE
0	0	-	NUMBER OF SPARES
11 kV FEEDER 3 RELAY PANEL (LOOP CABLE)	11 kV BUSBAR 1B 11 kV VT RT (LOOP CABLE)	OLTC PANEL 66/11 kV TRFR 2 OLTC RACK	DESTINATION

LOOPED TERMINALS

66 kV CT JB	40-41-42; 43-44-45-46-47-48-EARTH; 49-50-51-52-53-54-EARTH; 58-59-60; 61-62-63-64-65-66-EARTH; 67-68-69-70-71-72-EARTH;
MIB	1-18-7-261-6-4-5-263; 11-10; 262-264-8-9;
NECRT	K1-K3-K5-L1-L3; K2-K4-K6; L2-L4
11 kV BKR MB RT TERMINALS	X1.4-X1.9-X1.14; X1.17-X1.20-X1.21-X1.24-X1.25-X1.28-X1.29-EARTH; X1.33-X1.37-X1.41; X2.15-X2.9; X2.10-X2.31; X2.5-X2.32; X3.9-X2.41-X2.33-X3.13; X2.47-X2.27;
66 kV LINE ISOLATOR	X1.50-X1.24;

- NOTES:**
- (2) INDICATES TWO LEADS IN PARALLEL.
 - SPARE CABLE LEADS TO BE LEFT LONG ENOUGH TO REACH THE FURTHEST TERMINAL.
 - LEAD NUMBERS SHOWN THUS
P7 INDICATES NO CHANGE IN LEAD NUMBER.
P7 P7A INDICATES CHANGE IN LEAD NUMBER.
 - SEE CABLE BLOCK DIAGRAM FOR PREFIXING.
 - SLIDING LINK TERMINALS ARE TO BE ORIENTED SUCH THAT THE LINK FALLS/REMAINS CLOSED WHEN THE SECURING SCREW IS LOOSENED.

UNLESS INDICATED OTHERWISE, STANDARD TERMINALS; ENTRELEC M10/10.RS
ENTRELEC D6/8-ST1-RS SLIDING LINK TEST TERMINAL

NOTE: * INDICATES TERMINAL NUMBER TO BE DETERMINED ON SITE.

HATCH **Eskom**

PROJECT APPROVED C. PYM	DESIGN APPROVED S.J. van ZYL
DATE 25/06/21	DATE 11/06/18
PROJECT CHECKED B. HOMANN	DESIGN CHECKED P.A. GERBER
DATE 25/06/21	DATE 11/06/18
DRAWN BY K. STEYNBERG	DRAWN BY S.J. van ZYL
DATE 15/11/2010	DATE 25/06/21
DATE 25/06/21	DATE 17/09/09

1 SvZ 15/11/2010 CHANGES AS PER SHEET 0 - COVER SHEET. SvZ PAG DATE 25/06/21
REV AUTH DATE REVISION TO MASTER BY CHKD SCALE

ISCOR SUBSTATION
66/11 kV TRANSFORMER 2

PANEL CABLING DIAGRAM

D-WC-7104

SET NUMBER	SHEET NUMBER	REVISION
83	20	2

PANEL TYPE DESIGNATION 4TM710MOD.FZD SIZE 0000TE A1L

SHEET 25	RED670 REFERENCE DIAGRAM
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SHEET 23	HV CT JB CABLING DIAGRAM
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SHEET 6	RELAY LOGIC DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

2	66kV VT ADDED.	KS	BH	C.PYM	25/06/2021	
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KINC	18/02/2019	3487A
0	FIRST ISSUE. SUBSTATION REFURBISHED.				/ /	3487A

MV CIRCUIT-BREAKER & ISOLATORS, CUST MTR, BUS ZONE.

TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION
X2.38		X2.11	K7EB	X5	42
X1.50			P117EB		41
X1.49			P107EB		40
X2.18/X2.30			K113EB		39
X2.17/X2.29			K101EB		38
					37
					36
					35
					34
X8.15			K101		33
					32
					31
					30
					29
					28
		X2.4	M102B		27
		X2.3	M101B		26
			K359A		25
					24
		X2.48	K353		23
		X2.47	K301		22
X8.22			K315		21
X8.21			K301		20
		X3.15	K347		19
		X3.14	K345		18
					17
		X2.34	K343		16
		X2.42	K341		15
X8.17			K301		14
		X3.10	K339		13
		X3.9	K301		12
X8.24			K337		11
X8.23			K301		10
		X2.16	K102		9
		X2.15	K101		8
		X2.12	K384A		7
			K383EB		6
		X2.63	K309A		5
		X2.8	K302A		4
X8.18		X2.7	K307A		3
		X2.61	K109A		2
		X2.6	K102A		1
X8.16		X2.5	K107A		1

- SPARE
- P117 P107 K113 K101 P17 P7 K111 K101 } MV BUS ZONE / BREAKER FAIL
- SPARE
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } HV BUS ZONE / BREAKER FAIL
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } MV CB SPRING REWIND
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } MV CBNH
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } MV ARC SENSOR
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } MV CB STATUS
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } MV ISOL/PLANT STATUS
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } MV CB AUX DC SUPPLY
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } MV CB CLOSE CCT
- M102 M101 K359 K355 K353 K301 K315 K301 K347 K345 K301 K343 K341 K301 K339 K301 K337 K301 K102 K101 K384 K383 K309 K302 K307 K109 K102 K107 } MV CB TRIP CCTs

CONTINUED FROM SHT 21
CONTINUED FROM SHT 20

TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION
	EB508	EB506	EB507		CABLE NUMBER
			12		CABLE SIZE
			0		NUMBER OF SPARES
BUS WIRING TO SCHEME TERMINALS					DESTINATION
11 kV PROTECTION PANEL					DESTINATION
11 kV BREAKER MECH BOX RT TERMINALS					DESTINATION
11 kV BREAKER MECH BOX RT TERMINALS					DESTINATION

SCADA ALARM & COMMS

TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION
				X7	20
					19
					18
					17
					16
					15
					14
					13
					12
					11
					10
					9
					8
					7
					6
					5
					4
					3
					2
					1

- SPARE
- RED670 RS-485 SEE SHEET 18
- IRIG-B TIME SYNCH INPUT
- RS-485 REMOTE ACCESS
- RS-485/DNP3 SCADA COMMS
- PNH SCADA ALARM

AC SUPPLIES

TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION
				X6	10
					9
					8
					7
					6
					5
					4
					3
X8.7		X4.N	H71EB		2
X8.6		X4.9	H11EB		1

- MIB HEATER
- MV CB HEATER
- HV CB HEATER
- AC SUPPLIES

TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION
	EB526	EB515			CABLE NUMBER
	4				CABLE SIZE
	0				NUMBER OF SPARES
BUS WIRING TO SCHEME TERMINALS					DESTINATION
11 kV BREAKER MECH BOX RT TERMINALS					DESTINATION
AC/DC PANEL					DESTINATION

CONTINUED FROM SHT 21

TERMINAL STRIP TO BE ADDED BY ESKOM. RED 670

TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION
				X8	34
					33
					32
					31
					30
					29
					28
					27
					26
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					11
					10
					9
					8
					7
					6
					5
					4
					3
					2
					1

TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION	TERMINAL	DESCRIPTION
	EB505				CABLE NUMBER
	4				CABLE SIZE
	0				NUMBER OF SPARES
					DESTINATION
					DESTINATION
					DESTINATION

- NOTES:
- (2) INDICATES TWO LEADS IN PARALLEL.
 - SPARE CABLE LEADS TO BE LEFT LONG ENOUGH TO REACH THE FURTHEST TERMINAL.
 - LEAD NUMBERS SHOWN THUS
P7 INDICATES NO CHANGE IN LEAD NUMBER.
P7 P7A INDICATES CHANGE IN LEAD NUMBER.
 - SEE CABLE BLOCK DIAGRAM FOR PREFIXING.
 - SLIDING LINK TERMINALS ARE TO BE ORIENTED SUCH THAT THE LINK FALLS/REMAINS CLOSED WHEN THE SECURING SCREW IS LOOSENED.
TERMINAL DISCONNECTORS ARE TO PIVOT FROM THE BOTTOM SIDE OF THE TERMINAL RAIL.

UNLESS INDICATED OTHERWISE, STANDARD TERMINALS: ENTRELEC M10/10.RS
ENTRELEC D6/8-ST1-RS SLIDING LINK TEST TERMINAL
ENTRELEC M4/6.SNTS SPRING LOADED TERMINAL WITH DISCONNECTOR

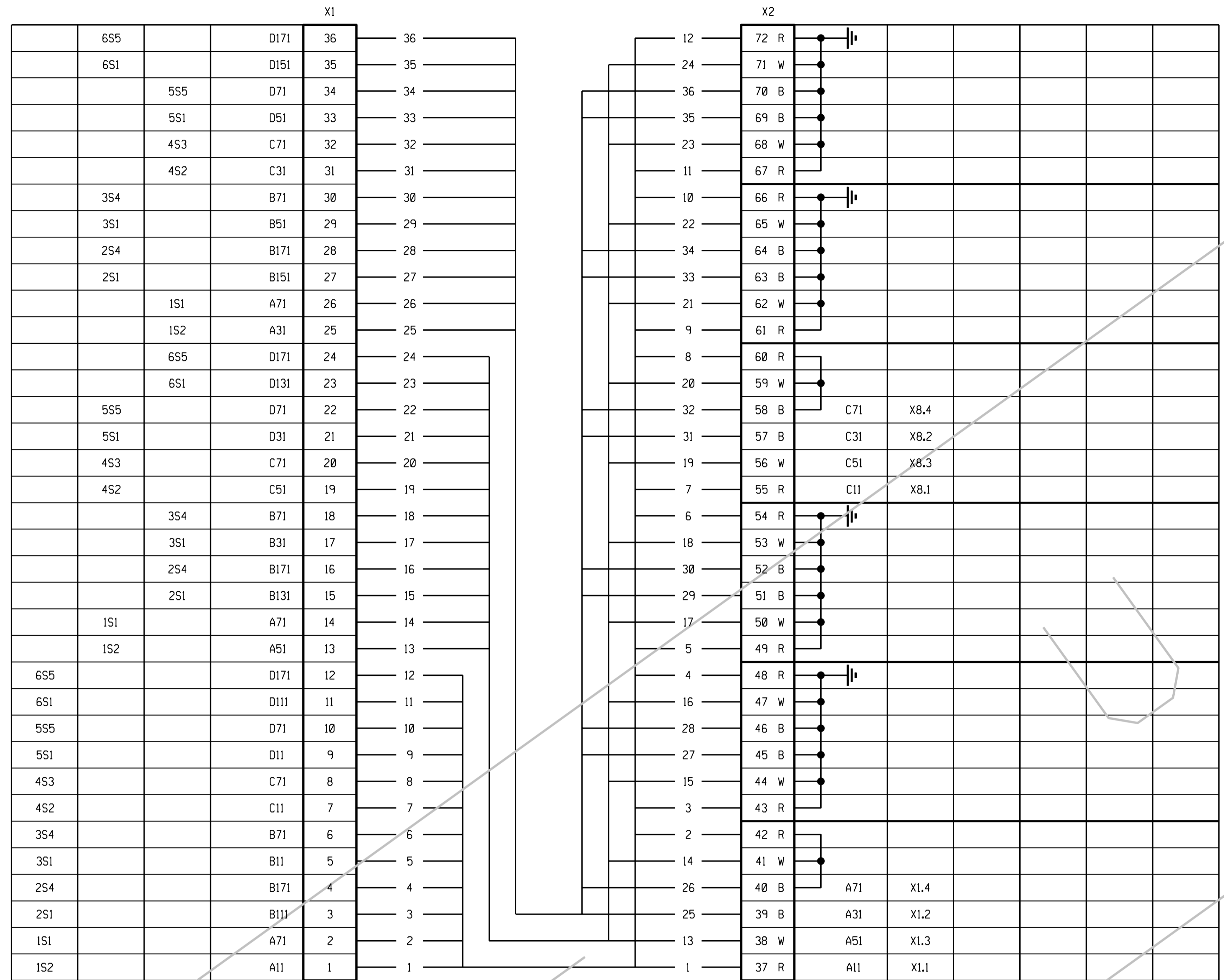


2	66kV VT ADDED.	KS	BH	C.PYM	25/06/2021	
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KING	18/02/2015	3487A
0	FIRST ISSUE. SUBSTATION REFURBISHED.				/ /	3487A
REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER

PROJECT APPROVED	DESIGN APPROVED
C. PYM	S.J. van ZYL
DATE 25/06/21	DATE 11/06/10
PROJECT CHECKED	DESIGN CHECKED
B. HOMANN	P.A. GERBER
DATE 25/06/21	DATE 11/06/10
DRAWN BY	DRAWN BY
K. STEYNBERG	S.J. van ZYL
DATE 25/06/21	DATE 17/09/09

ISCOR SUBSTATION		
66/11 kV TRANSFORMER 2		
PANEL CABLING DIAGRAM		
D-WC-7104	83	22
		2

TOP OF TERMINAL STRIP



CORE 6
CORE 5
CORE 4
CORE 3
CORE 2
CORE 1

NOTE : ALL SPARE CABLE CORES TO BE EARTHED ON ONE END ONLY.
NOTE: USE JUNCTION BOX
VRW 6 CORE CT INSERT
DRG D-DT-5404

EB501	EB502	EB503	CABLE NUMBER
12	12	12	CABLE SIZE
0	0	0	NUMBER OF SPARES
R CT	BI CT	WI CT	DESTINATION

CABLE NUMBER	EB504
CABLE SIZE	12
NUMBER OF SPARES	4
DESTINATION	RELAY PANEL

SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 24	RED670 AC/DC & SUP. KEY DIAGRAM
SHEET 23	HV CT JB CABLING DIAGRAM
SHEET 22	PANEL CABLING DIAGRAM
SHEET 21	PANEL CABLING DIAGRAM
SHEET 20	PANEL CABLING DIAGRAM
SHEET 19	REFERENCE DIAGRAM
SHEET 18	SUPERVISORY/COMMS KEY DIAG
SHEET 17	SPR REV DC, AC KEY DIAGRAM
SHEET 16	BACK-UP DC KEY DIAGRAM
SHEET 15	BACK-UP DC KEY DIAGRAM
SHEET 14	BACK-UP DC KEY DIAGRAM
SHEET 13	MAIN DC KEY DIAGRAM
SHEET 12	MAIN DC KEY DIAGRAM
SHEET 11	VT SUPPLY KEY DIAGRAM
SHEET 10	AC KEY DIAGRAM
SHEET 9	AC KEY DIAGRAM
SHEET 8	AC KEY DIAGRAM
SHEET 7	RELAY LOGIC DIAGRAM
SHEET 6	RELAY LOGIC DIAGRAM
SHEET 5	RELAY LOGIC DIAGRAM
SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET
	REFERENCE DRAWINGS:



2	66kV VT ADDED.	KS	BH	C.PYM	25/06/2021	
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C.KING	18/02/2019	3487A
0	FIRST ISSUE, SUBSTATION REFURBISHED.				/ /	3487A
REV	REVISION DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER

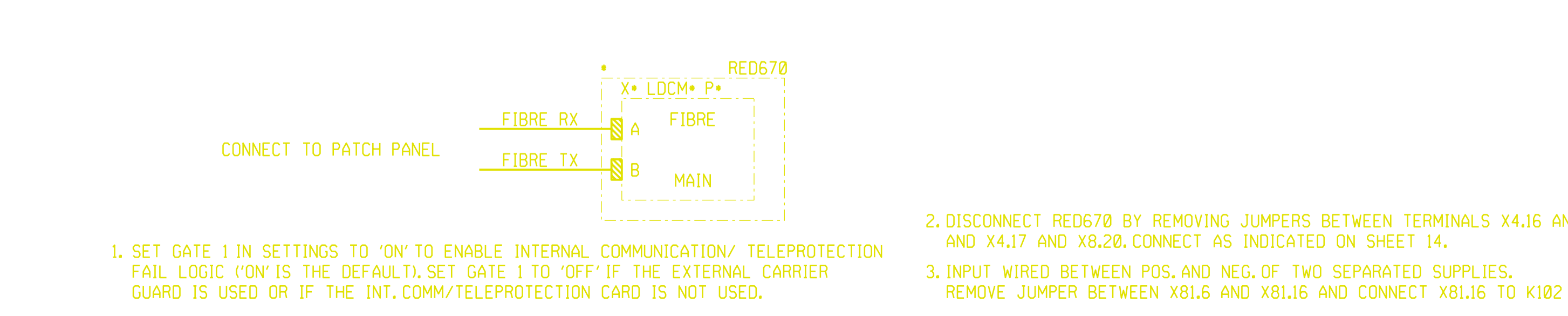
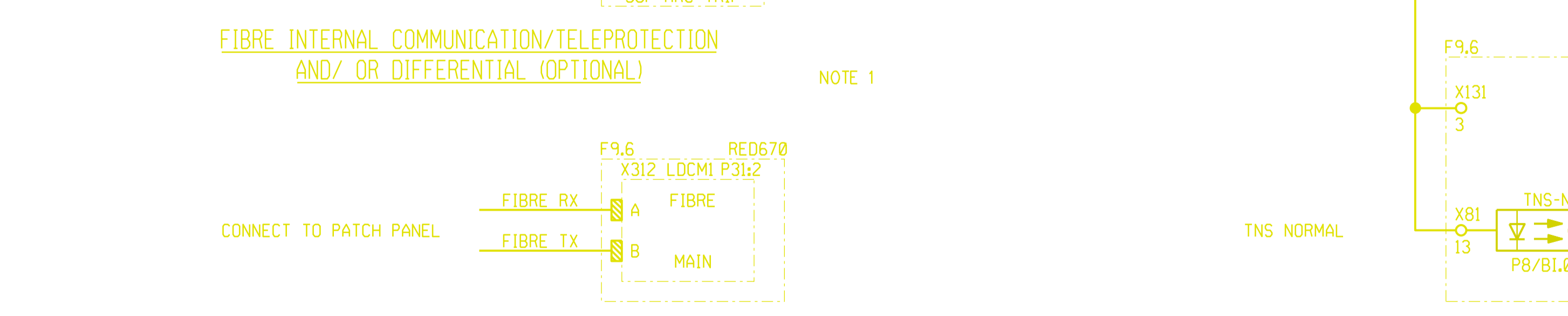
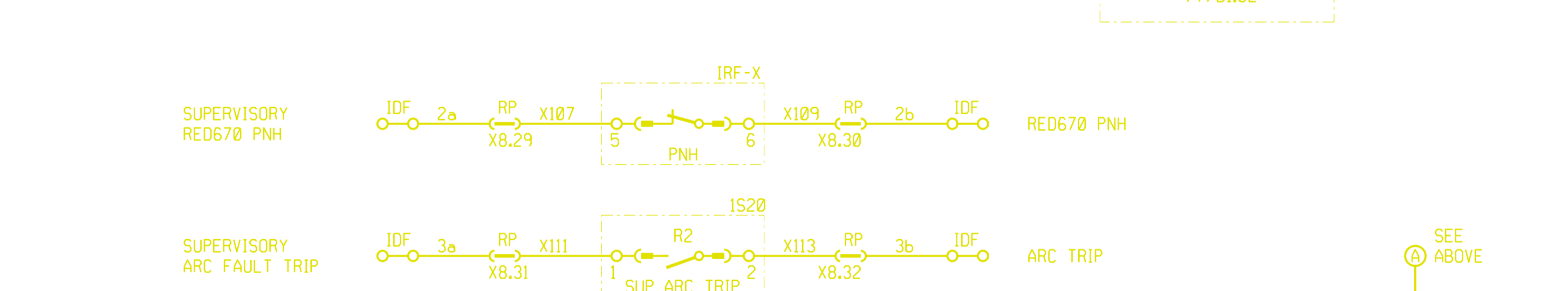
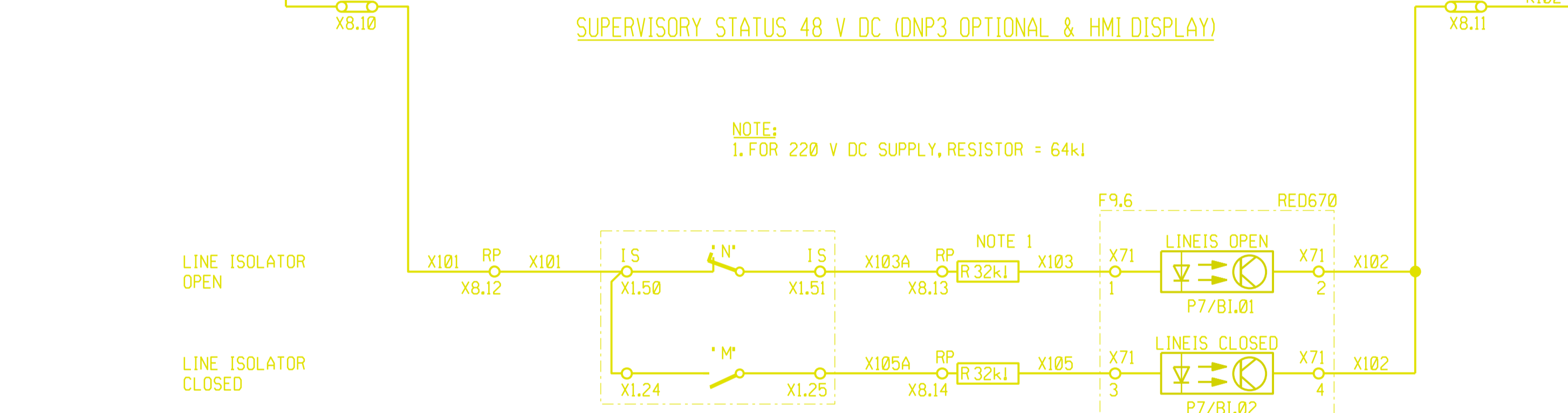
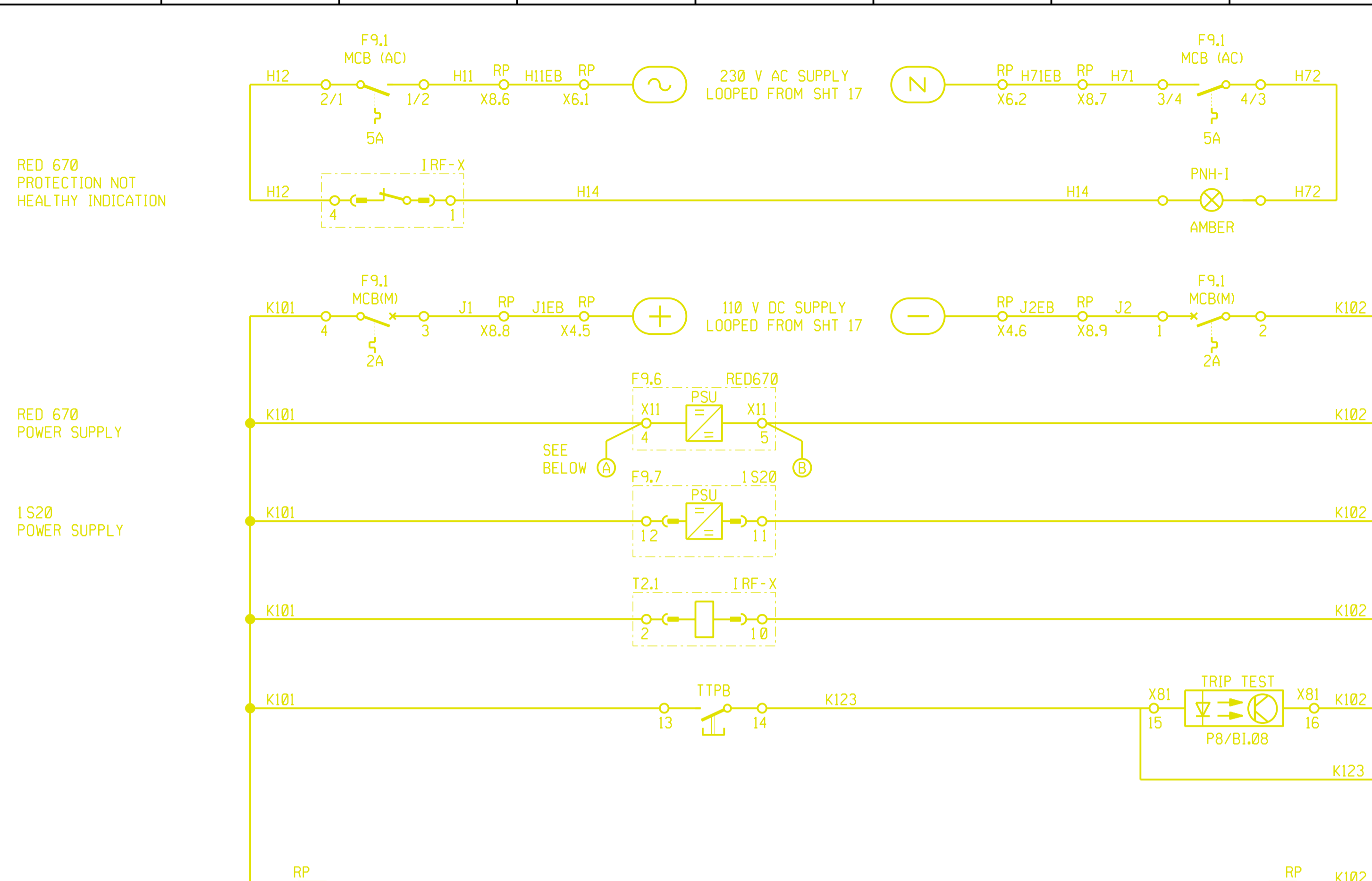


ISCOR SUBSTATION
66/11 kV TRANSFORMER 2
HV CT JB CABLING DIAGRAM

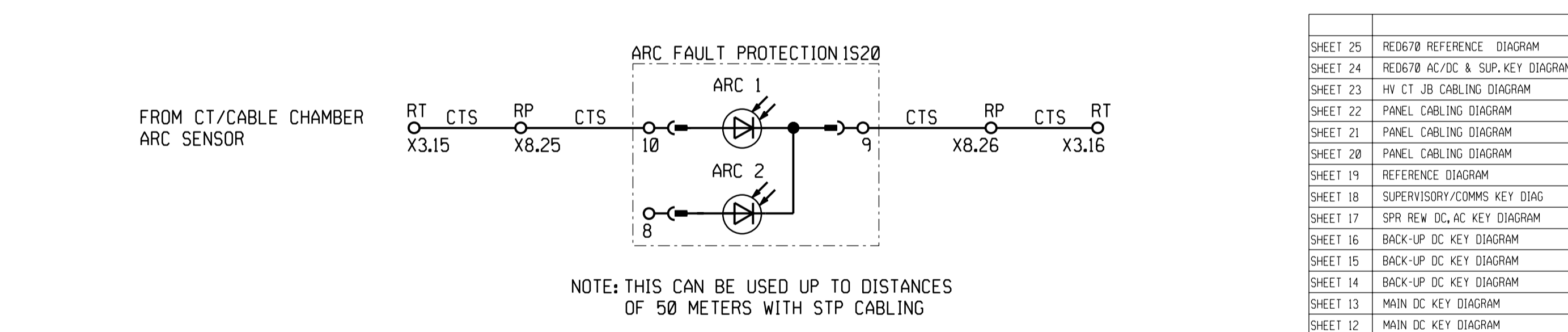
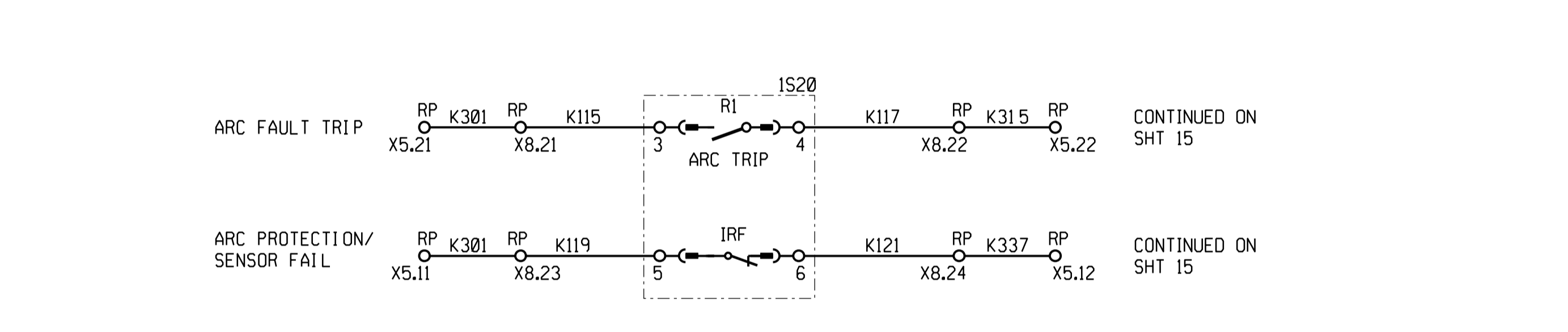
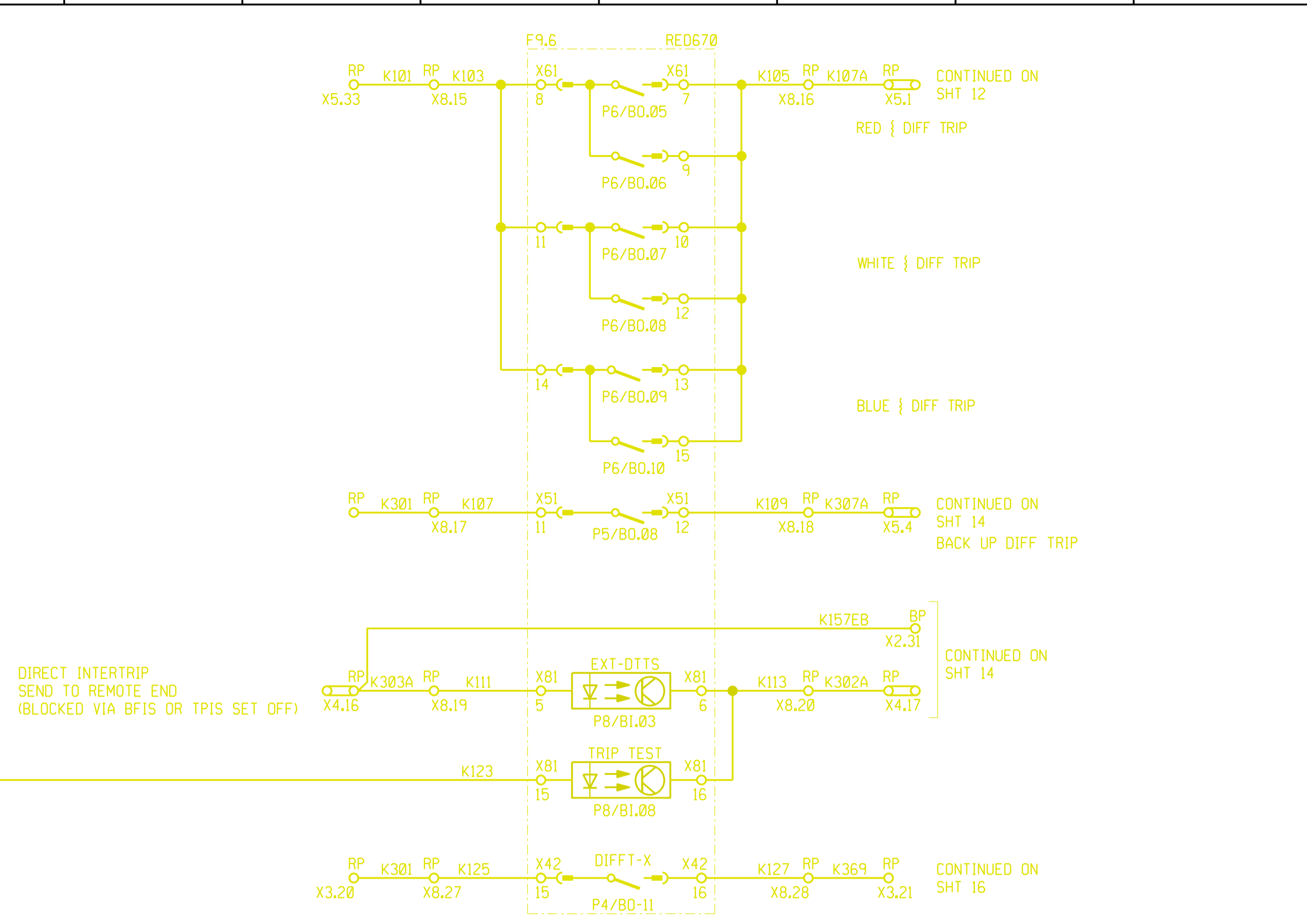
PROJECT APPROVED	DESIGN APPROVED						
C. PYM	S.J. van ZYL						
DATE 25/06/21	DATE 11/06/10						
PROJECT CHECKED	DESIGN CHECKED						
B. HOMANN	P.A. GERBER						
DATE 25/06/21	DATE 11/06/10						
DRAWN BY	DRAWN BY						
K. STEYNBERG	S.J. van ZYL						
DATE 25/06/21	DATE 17/09/09						
REV 1	SvZ	15/11/2010	CHANGES AS PER SHEET 0 - COVER SHEET.	SvZ	PAG	DATE 25/06/21	DATE 17/09/09
REV	AUTH	DATE	REVISION TO MASTER	BY	CHKD	SCALE	

D-WC-7104	83	23	2
PANEL TYPE DESIGNATION 4TM7100MOD.F.ZD			SIZE 00001TE

MASTER TRACING FILED UNDER D-DT-15202 SHEET 23 OF 26 REVISION 1



- SET GATE 1 IN SETTINGS TO 'ON' TO ENABLE INTERNAL COMMUNICATION/ TELEPROTECTION FAIL LOGIC ('ON' IS THE DEFAULT). SET GATE 1 TO 'OFF' IF THE EXTERNAL CARRIER GUARD IS USED OR IF THE INT. COMM/TELEPROTECTION CARD IS NOT USED.
- DISCONNECT RED670 BY REMOVING JUMPERS BETWEEN TERMINALS X4.16 AND X8.19; AND X4.17 AND X8.20, CONNECT AS INDICATED ON SHEET 14.
- INPUT WIRED BETWEEN POS. AND NEG. OF TWO SEPARATED SUPPLIES. REMOVE JUMPER BETWEEN X8.16 AND X8.16 AND CONNECT X8.16 TO K102 NEG. SUPPLY.



NOTE: THIS CAN BE USED UP TO DISTANCES OF 50 METERS WITH STP CABLING

SHEET 25	RED670 REFERENCE DIAGRAM
SHEET 24	RED670 AC/DC & SUP. KEY DIAGRAM
SHEET 23	HV CT JB CABLING DIAGRAM
SHEET 22	PANEL CABLING DIAGRAM
SHEET 21	PANEL CABLING DIAGRAM
SHEET 20	PANEL CABLING DIAGRAM
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SHEET 4	RELAY LOGIC DIAGRAM
SHEET 3	SCHEME LOGIC DIAGRAM
SHEET 2	FRONT PANEL LABELS
SHEET 1	PANEL EQUIPMENT LAYOUT
SHEET 0	COVER SHEET

3	66kV VT ADDED.	KS	BH	C. PYM	25/06/2021	
2	66kV CIRCUIT BREAKER ADDED	JF	BSH	LMB	21/01/2019	
1	AS BUILT SITE MODIFICATIONS IMPLEMENTED.	AVS	KRR	C. KING	18/02/2015	3487A
0	FIRST ISSUE. SUBSTATION REFURBISHED.				/ /	3487A

REV	DESCRIPTION	BY	CHKD	AUTH	DATE	PROJECT NUMBER

CAPE TOWN OFFICE
WATERSIDE PLACE, SOUTH GATE
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REG. No. 1966/006628/07

AECOM

Eskom

PROJECT APPROVED
C. PYM

DESIGN APPROVED

DATE 25/06/21 DATE

PROJECT CHECKED
B. HOMANN

DESIGN CHECKED

DATE 25/06/21 DATE

DRAWN BY
K. STEYNBERG

DRAWN BY

DATE 25/06/21 DATE

SCALE

ISCOR SUBSTATION
66/11 kV TRANSFORMER 2

RED670 AC, DC & SUPERVISORY KEY DIAGRAM

D-WC-7104

SET NUMBER	SHEET NUMBER	REVISION
83	24	3

PANEL TYPE DESIGNATION 4TM7100MOD.FZD

