



Grid Solutions

A GE and Alstom joint venture

220kV/132kV GIS SUBSTATION GHAZI ROAD , LAHORE

132kV LINE CONTROL PANEL SCHEMATIC DRAWINGS

REFERENCE DRAWINGS

SR. NO.	DRAWING TITLE	DOCUMENT NO.
1.	220kV / 132kV Metering & Protection SLD	P60194-E-SLMP-001

REVISION HISTORY

REV	DATE	DRW. BY	CHK. BY	APR. BY	REVISION DESCRIPTION
0	30.10.2018	ASJ	MFT	NAH	AS BUILT

Scale

NOT-TO-SCALE

Sheet size

A3

Client

NATIONAL TRANSMISSION &
DISPATCH COMPANY LIMITED
(NTDC-WAPDA)

Contractor

Grid Solutions

A GE and Alstom joint venture

Manufacturer

E P E S O L
71-B Garden Block,
New Garden Town,
Lahore, Pakistan

Project

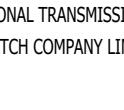
220kV / 132kV GIS SUBSTATION
GHAZI ROAD , LAHORE

Title

132kV LINE CONTROL PANEL (=E09+CP31)
SCHEMATIC DRAWINGS

Order no	Document no
P-60194	P60194-E-ELC-SC-006

Sheet type	Total sheets	Sheet no
A	27	1

	1	2	3	4	5	6	7	8							
	PAGE NO.	SHEET NAME	SHEET DESCRIPTION			ISSUE / REVISION									
						A	B	C	D	E	F	01	02	03	04
A	01	A	COVER SHEET			X	X	X	X	X	X				
	02	AA	LIST OF CONTENTS			X	X	X	X	X	X				
	03	AB	SYMBOL AND LEGENDS			X	X	X	X	X	X				
	04	AC1	COMPONENT LIST			X	X	X	X	X	X				
	05	AC2	COMPONENT LIST			X	X	X	X	X	X				
	06	AD	PANEL VIEW			X	X	X	X	X	X				
	07	AE	SINGLE LINE DIAGRAM			X	X	X	X	X	X				
	08	D	AC SUPPLY DISTRIBUTION CIRCUIT			X	X	X	X	X	X				
	09	E	DC SUPPLY DISTRIBUTION CIRCUIT			X	X	X	X	X	X				
	10	F	DC SUPPLY FAILURE ALARM CIRCUIT			X	X	X	X	X	X				
	11	G	METERING			X	X	X	X	X	X				
	12	H1	CB CONTROL CIRCUIT			X	X	X	X	X	X				
	13	H2	CB CONTROL CIRCUIT			X	X	X	X	X	X				
	14	I1	DISCONNECTOR & EARTH SWITCH CONTROL			X	X	X	X	X	X				
	15	I2	DISCONNECTOR & EARTH SWITCH CONTROL			X	X	X	X	X	X				
	16	K1	DISCONNECTOR CONTACT MULTIPLICATION			X	X	X	X	X	X				
	17	NA1	ALARM MULTIPLICATION			X	X	X	X	X	X				
	18	NA2	DISCREPANCY INITIATION			X	X	X	X	X	X				
	19	NA3	DISCREPANCY INITIATION			X	X	X	X	X	X				
	20	NA4	DISCREPANCY INITIATION			X	X	X	X	X	X				
	21	NA5	DISCREPANCY INDICATIONS			X	X	X	X	X	X				
	22	RA1	ANNUNCIATOR-1 CIRCUIT			X	X	X	X	X	X				
	23	RA2	ANNUNCIATOR-2 CIRCUIT			X	X	X	X	X	X				
	24	RA3	ANNUNCIATOR-3 CIRCUIT			X	X	X	X	X	X				
	25	RA4	ANNUNCIATOR-4 CIRCUIT			X	X	X	X	X	X				
	26	RA5	SCADA & ER SIGNALS			X	X	X	X	X	X				
	27	Z1	COMPONENT DIAGRAM			X	X	X	X	X	X				
F	0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 7-E Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) LIST OF CONTANTS	Drawing no. P60194-E-ELC-SC-006					
	REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type AA	Sheet no. 02			

	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A		CIRCUIT BREAKER		MINIATURE CIRCUIT BREAKER		AUXILIARY CONTACTOR NO+NC	21	DISTANCE
B		SWITCH/ISOLATOR		SELECTOR SWITCH		AMMETER	24	OVEREXCITATION
C		EARTHING		LIMITED SWITCH		VOLTMETER	25	SYCHROCHECK
D		GIS TERMINATION		HUMIDITY & TEMPERATURE CONTROLLER		POWER FACTOR METER	49	THERMAL OVERLOAD
E		SF6 TO AIR BUSHING		PANEL HEATER		DIGITAL PANEL METER	50/51	PHASE OVERCURRENT
F		LINE TRAP		THREE PIN SOCKET		ACTIVE POWER METER	50N/51N	EARTH FAULT
G		SURGE ARRESTOR		INDICATION LIGHT		REACTIVE POWER METER	50BF	CIRCUIT BREAKER FAILURE
H		CURRENT TRANSFORMER		PUSH BUTTON		ENERGY METER	64	RESTRICTED EARTH FAULT
I		COUPLING CAPACITOR VOLTAGE TRANSFORMER		AUXILIARY CONTACTOR COIL			67N	DIRECTIONAL EARTH FAULT
J		POWER TRANSFORMER		POWER SUPPLY AC/DC			68	POWER SWING BLOCKING
K		AUTO TRANSFORMER		TERMINAL			78	OUT OF STEP
L				OPTO CONTACTS			79	AUTO-RECLOSING
M				RELAY CONTACTS			85	COMMUNICATION FAILURE
N				HOOTER			87T	TRAFO DIFFERENTIAL
O				AC BELL			87C	LOW IMPEDANCE DIFFERENTIAL CONNECTION
P							87BB	LOW IMPEDANCE DIFFERENTIAL BUSBAR

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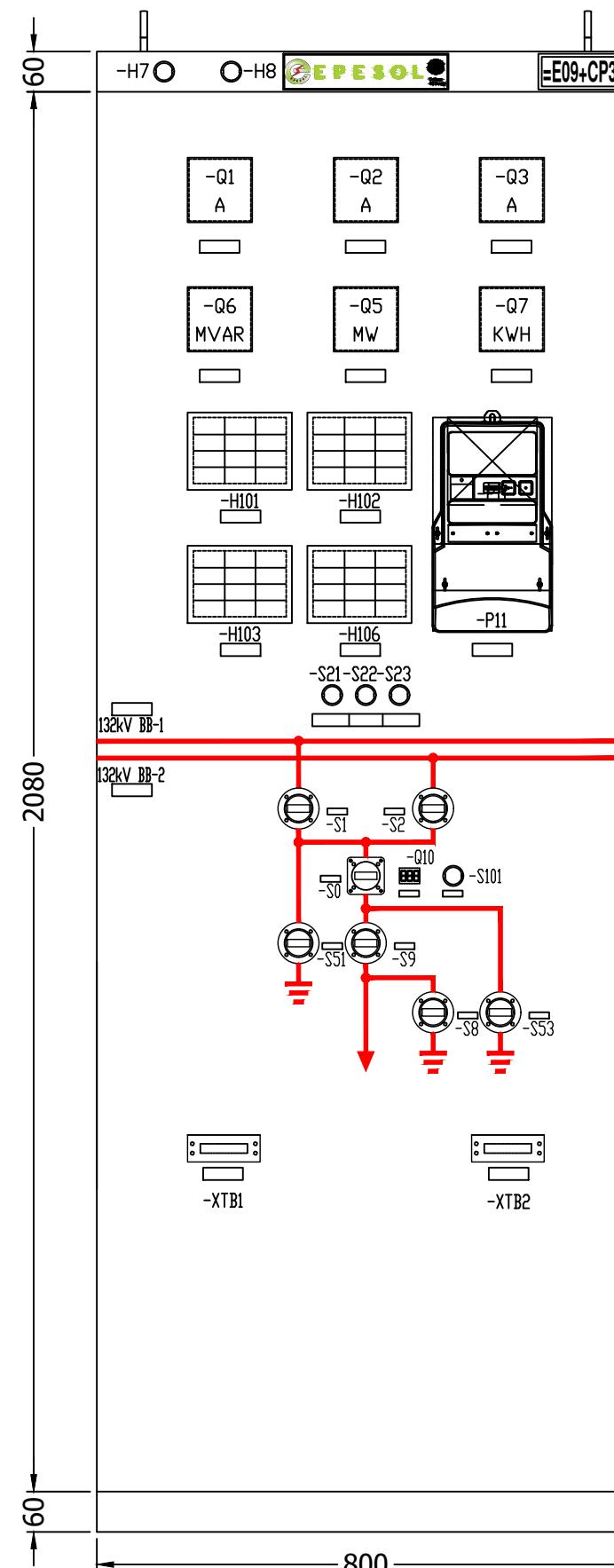
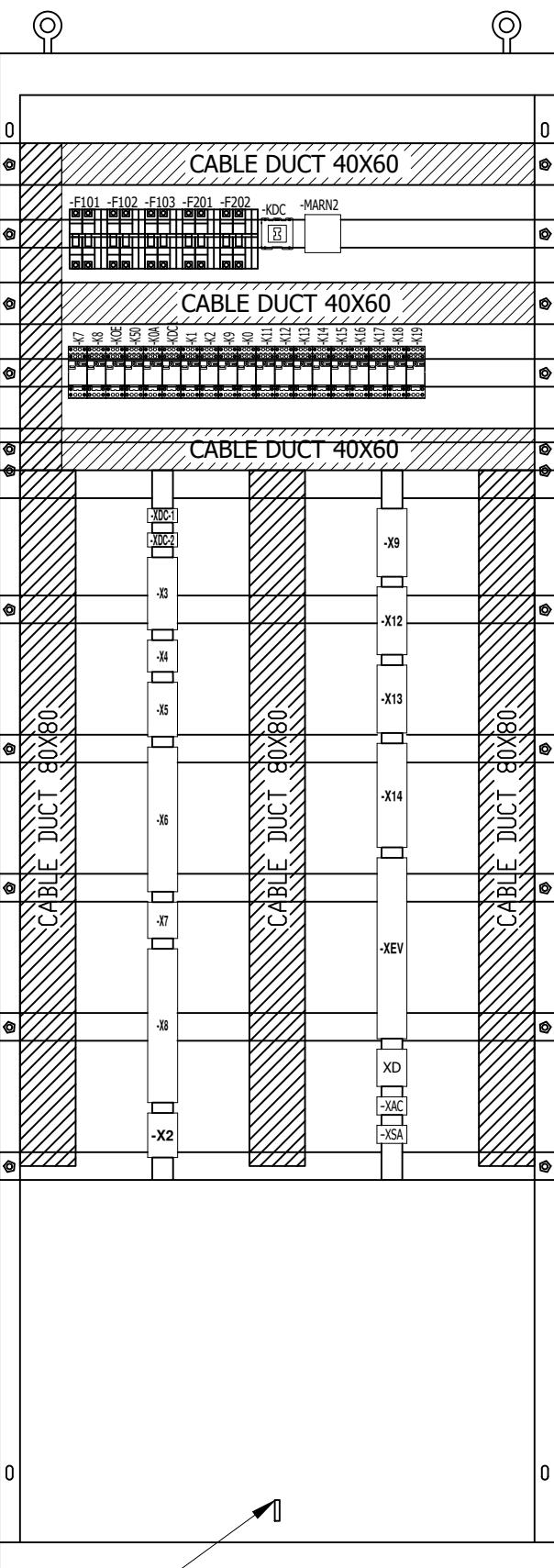
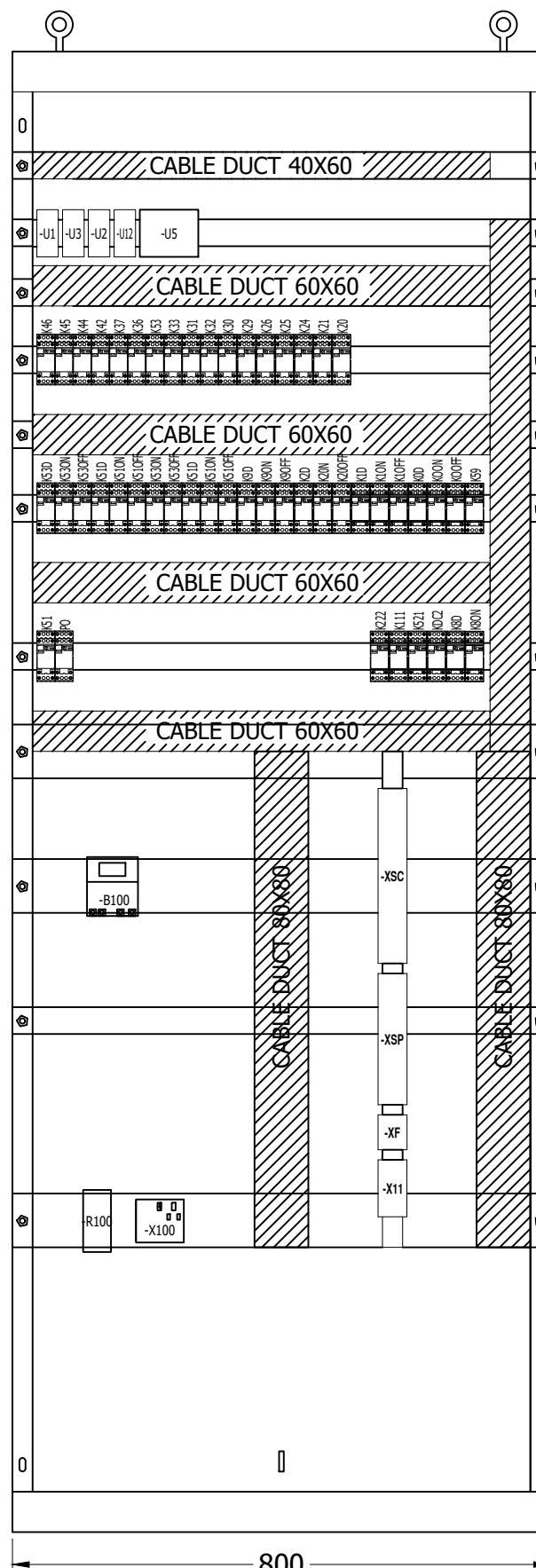
0	AS BUILT	30.10.2018	ASJ	Manufacturer EPESOL 71-B Garden Block, New Garden Town,	Contractor Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) SYMBOL AND LEGENDS	Drawing no. P60194-E-ELC-SC-006
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type AB
									Sheet no. 03

	1	2	3	4	5	6	7	8			
	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER				
A	01	MWH+MVARH METER	THREE PHASE FOUR WIRE STATIC ENERGY METER, CLASS 0.2, PT RATIO: 132/0.11 KV (L-L), CT RATIO 400:800:1600/1A , MODEL: MT860S-A22R36S33-E12-L21-M3K03-Z7			-P11	ISKRAEMECO				
	02	ANALOG AMMETER	METER: TRANSDUCER OPERATED DIGITAL AMPERE METER, INPUT 0...20/30 mA, ACCURACY CLASS 1, SCALE_1: 0...400/600A, SCALE_2: 0...800/1200A, SCALE_3: 0...1600/2400A. , AUX. VOLTAGE 110 VDC.			-Q1 , -Q3	FRER				
B	02	CURRENT TRANSDUCER	CURRENT TRANSDUCER: 1-INPUT, 2-OUTPUT, NOMINAL INPUT CURRENT 1/1.5A, OUTPUT1: 0...20/30mA, OUTPUT2: 0...20/30mA, AUXILIARY VOLTAGE 110 VDC, ACCURACY CLASS 1, CT RATIO 400:800:1600/1A ORD: A96MMA + MCOEAQ			-U1, -U3	FRER				
	01	DIGITAL AMMETER	METER: TRANSDUCER OPERATED DIGITAL AMPERE METER, INPUT 0...20/30 mA, ACCURACY CLASS 1, SCALE_1: 0...400/600A, SCALE_2: 0...800/1200A, SCALE_3: 0...1600/2400A. , AUX. VOLTAGE 110 VDC.			-Q2	FRER				
C	02	CURRENT TRANSDUCER	CURRENT TRANSDUCER: 1-INPUT, 2-OUTPUT, NOMINAL INPUT CURRENT 1/1.5A, OUTPUT1: 0...20/30mA, OUTPUT2: 0...20/30mA, AUXILIARY VOLTAGE 110 VDC, ACCURACY CLASS 1, CT RATIO 400:800:1600/1A ORD: D96MMA + MCOEAQ			-U2, -U12	FRER				
	01	ANALOG REAL POWER (MW) METER	METER: 240 DEGREE TRANSDUCER OPERATED ANALOGUE MW METER, INPUT -12.5/10...0...+10/12.5 mA, ACCURACY CLASS 1, SCALE_1: 125/100-0-100/125 MW (91.5 MW at 20mA), SCALE_2: 250/200-0-200/250 MW (183 MW at 20mA), SCALE_3: 500/400-0-400/500 MW (366 MW at 20mA).			-Q5	FRER				
D	01	ANALOG REACTIVE POWER (MVAR) METER	METER: 240 DEGREE TRANSDUCER OPERATED ANALOGUE MVAR METER, INPUT -12.5/10...0...+10/12.5 mA, ACCURACY CLASS 1, SCALE_1: 125/100-0-100/125 MVAR (91.5 MVAR at 20mA), SCALE_2: 250/200-0-200/250 MVAR (183 MVAR at 20mA), SCALE_3: 500/400-0-400/500 MVAR (366 MVAR at 20mA).			-Q6	FRER				
	01	PROGRAMMABLE UNIVERSAL TRANSDUCER (for MW and MVAR meters)	TRANSDUCER: 3-PHASE, 4-WIRE BALANCED LOAD, 4 PROGRAMMABLE DC mA OUTPUTS. NOMINAL INPUT VOLTAGE 110/137.5 VAC(L-L), NOMINAL INPUT CURRENT 1/1.25A, AUXILIARY VOLTAGE 110 VDC, ACCURACY CLASS 1, OUTPUT1 to OUTPUT4: -12.5/10...0...+10/12.5 mA, PT RATIO: 132/0.11 KV (L-L), CT RATIO 400:800:1600/1A. ORD: MCOP4			-U5	FRER				
E	01	DIGITAL POWER METER	THREE PHASE DIGITAL POWER METER, ACCURACY CLASS 0.5s, INPUT NOMINAL CURRENT, 1/5A, INPUT NOMINAL VOLTAGE 110 VAC (L-L), AUXILIARY VOLTAGE 110-375 VDC.			-Q7	ENERDIS				
	03	ANNUNCIATOR	TWELVE WINDOW ANNUNCIATOR, RATED VOLTAGE 110 VDC, ORD: AM-101			-H101, -H102, -H103	ELABS				
F	01	ANNUNCIATOR	TWELVE WINDOW ANNUNCIATOR, RATED VOLTAGE 240 VAC, ORD: AM-101			-H106	ELABS				
	01	PUSH BUTTON - LAMP TEST	TYPE: SWITCH (A TYPE:), COLOR : BLACK , SUPPLY : 120VDC, Ord: YS-AP1-2-31-B-D-W			-S21	YONGSUNG				
F	01	PUSH BUTTON - ALARM ACKNOWLEDGMENT	TYPE: SWITCH (A TYPE:), COLOR : RED , SUPPLY : 120VDC, Ord: YS-AP1-2-31-R-D-W			-S22	YONGSUNG				
	0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132KV LINE CONTROL PANEL (=E09+CP31) COMPONENT LIST	Drawing no. P60194-E-ELC-SC-006	
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type AC1	Sheet no. 04

	1	2	3	4	5	6	7	8	
	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER		
A	01	PUSH BUTTON - ALARM RESET	TYPE: SWITCH(A TYPE:), COLOR : GREEN , SUPPLY : 120VDC, Ord: YS-AP1-2-31-G-D-W			-S23	YONGSUNG		
	01	SELECTOR SWITCH - OPERATION (LOCAL-OFF-SCADA)	3-POSITION (STATION-OFF-SCADA), 110VDC, KEYLOCKABLE TYPE, ORD: YS-AK-2-3-44-D			-S101	YONGSUNG		
	60	AUXILIARY CONTACTOR	COIL VOLTAGE: 110VDC, 4 C/O CONTACTS, ORD: PRC4M40DCJL			-K0E, -K50, -K0A, -KDC-1, -K1, -K2, -K9, -K0, -K11 TO -K21, -K24 TO -K33, -K42 TO -K46, -K59 -K0OFF, -K0ON, -K0D, -K1OFF, -K1ON, -K1D, -K2OFF, -K2ON, -K2D, -K9OFF, -K9ON, -K9D, -K51OFF, -K51ON, -K51D, -K53OFF, -K53ON, -K53D, -K8OFF, -K8ON, -K8D, -KDC-2, -KS21, -K111, -K222	GE		
B	01	AUXILIARY CONTACTOR - SUPPLY CHANGEOVER	COIL VOLTAGE: 110VDC, 3 NO + 3 NC CONTACTS, ORD: MCRC022ATWJ-B+MARN211AT			-KDC	GE		
	03	AUXILIARY CONTACTOR	COIL VOLTAGE:: 240VAC, 4 C/O CONTACTS, ORD: PRC4M40ANL			-KAMC, -K7, -K8	GE		
	01	CONTROL DISCREPANCY SWITCH - CIRCUIT BREAKER	CONTROL AND DISCREPANCY SWITCH FOR ISOLATOR CONTROL AND INDICATION, SQUARE TYPE FOUR CONTACTS FOR COMMAND AND FOUR CONTACTS FOR INDICATION			-S0	YONGSUNG		
C	06	CONTROL DISCREPANCY SWITCH - ISOLATORS & EARTHING SW.	CONTROL AND DISCREPANCY SWITCH FOR ISOLATOR CONTROL AND INDICATION, ROUND TYPE FOUR CONTACTS FOR COMMAND AND FOUR CONTACTS FOR INDICATION ORD:YS-IC-4456-R4(49)-PM-K-G-D11-G			-S1, -S2, -S9, -S51, -S53, -S8	YONGSUNG		
	01	FLASHER RELAY	FLASHER RELAY, COIL VOLTAGE 110 VDC, ORD: FR-101-110			-K51	ELABS		
	02	TEST BLOCK	YS-CTT-04-S, YS-PTT-04-S			-XTB1, -XTB2	YONGSUNG		
D	02	INDICATION LIGHT - AC AND DC SUPPLY	TYPE: LED , COLOR : RED , SUPPLY : 240VAC ORD: YS-PL-2-AL-22-R-W			-H7, -H8	YONGSUNG		
	01	OPERATION COUNTER	OPERATION COUNTER FOR CIRCUIT BREAKER, RATED VOLTAGE 110VDC			-Q10	ELABS		
	02	CONTROL MCB - PANEL LIGHT & HEATER	2-Pole, Ratings: 2A, 240VAC, 6kA @ 240VAC, 2 C/O Contacts, Ord: G62C02+CAH(2)			-F101, -F102	GE		
E	01	CONTROL ELCB - PANEL SOCKET	2-Pole, Ratings: 16A, 30mA, 240VAC, 1P+N, 2 C/O Contacts, Ord: DM100C16/030+CAH(2)			-F103	GE		
	02	CONTROL MCB - DC DISTRIBUTION	2-Pole, Ratings: 4A, 250VDC, 10kA @ 250VDC, 2 C/O Contacts, Ord: EP102UCC04+CAH(2)			-F201,-F202	GE		
	01	PANEL LIGHT	230VAC @ 50Hz, 05W, Ord: YS-T8-30-5W			-H100	YONGSUNG		
F	01	DOOR SWITCH	230VAC @ 50Hz, 1 NO Contact, Ord: YS P3315GW-B + YS MS-C			-S100	YONGSUNG		
	01	THREE PIN SOCKET	1N+PE, 16A, 230VAC @ 50Hz			-X100	LOCAL		
	0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132KV LINE CONTROL PANEL (=E09+CP31) COMPONENT LIST
REV.	DESCRIPTION		DATE	DRAWER					

	1	2	3	4	5	6	7	8		
	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER			
A	01	PANEL HEATER	240VAC @ 50Hz, 50W			-R100	E-LABS			
	01	HUMIDITY & TEMPERATURE CONTROLLER	40-90%RH, 25-50 deg.C, 240VAC @ 50Hz			-B100	E-LABS			
	04	TERMINAL BLOCKS FOR AC SUPPLY	TYPE: CBD-4			-XAC	CABUR			
	02	TERMINAL BLOCKS FOR DC SUPPLY1	TYPE: CBD-4			-XDC-1	CABUR			
	02	TERMINAL BLOCKS FOR DC SUPPLY2	TYPE: CBD-4			-XDC-2	CABUR			
	16	TERMINAL BLOCKS FOR METERING	TYPE: CBD-4			-X3	CABUR			
B	08	TERMINAL BLOCKS FOR CB CONTROL CIRCUIT	TYPE: CBD-4			-X4	CABUR			
	12	TERMINAL BLOCKS FOR CB CONTROL CIRCUIT	TYPE: CBD-4			-X5	CABUR			
	35	TERMINAL BLOCKS FOR DS+ES CONTACTOR MULTIPLICATION	TYPE: CBD-4			-X6	CABUR			
	08	TERMINAL BLOCKS FOR CB/DS CONTACTOR MULTIPLICATION	TYPE: CBD-4			-X7	CABUR			
	40	TERMINAL BLOCKS FOR AUXIALARY MULTIPLICATION	TYPE: CBD-4			-X8	CABUR			
	15	TERMINAL BLOCKS FOR DISCRIPANCY INITIATION	TYPE: CBD-4			-X9	CABUR			
C	13	TERMINAL BLOCKS FOR ANNUNCIATOR-1	TYPE: CBD-4			-X11	CABUR			
	16	TERMINAL BLOCKS FOR ANNUNCIATOR-2	TYPE: CBD-4			-X12	CABUR			
	18	TERMINAL BLOCKS FOR ANNUNCIATOR-3	TYPE: CBD-4			-X13	CABUR			
	24	TERMINAL BLOCKS FOR ANNUNCIATOR-4	TYPE: CBD-4			-X14	CABUR			
	45	TERMINAL BLOCKS FOR EVENT RECORDER	TYPE: CBD-4			-XEV	CABUR			
	45	TERMINAL BLOCKS FOR SCADA	TYPE: CBD-4			-XSC	CABUR			
D	30	TERMINAL BLOCKS FOR TRANSDUCER TO SCADA	TYPE: CBD-4			-XSA	CABUR			
	30	TERMINAL BLOCKS FOR SCADA	TYPE: CBD-4			-XSP	CABUR			
	08	TERMINAL BLOCKS FOR BELL AND HOOTER	TYPE: CBD-4			-XF	CABUR			
	0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) COMPONENT LIST	Drawing no. P60194-E-ELC-SC-006
	REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type AC2

	1	2	3	4	5	6	7	8	
	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER		
A	08	TERMINAL BLOCKS FOR METERING CT	TYPE: SCB-6			-X2	CABUR		
B	07	TERMINAL BLOCKS WITH DIODE TYPE IN-D4007, RATED MAXIMUM VOLTAGE 350VDC, RATED BREAK DOWN VOLTAGE 430VDC	TYPE: DAS.4/6			-XD	CABUR		
C									
D									
E									
F									
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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132KV LINE CONTROL PANEL (=E09+CP31) COMPONENT LIST	Drawing no. P60194-E-ELC-SC-006
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194 Sheet type AC2 Sheet no. 05	

FRONT VIEWLEFT SIDE VIEWRIGHT SIDE VIEW

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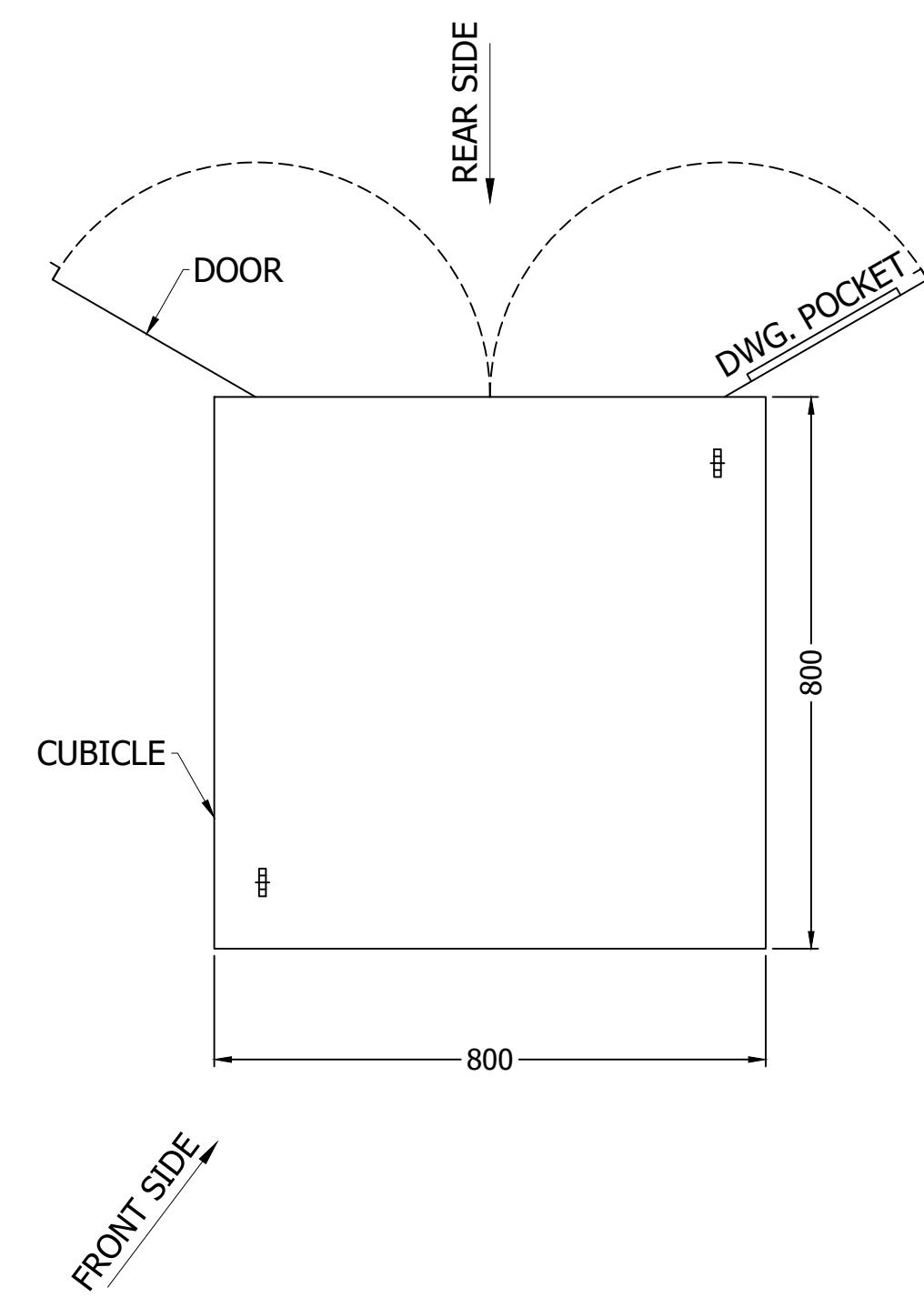
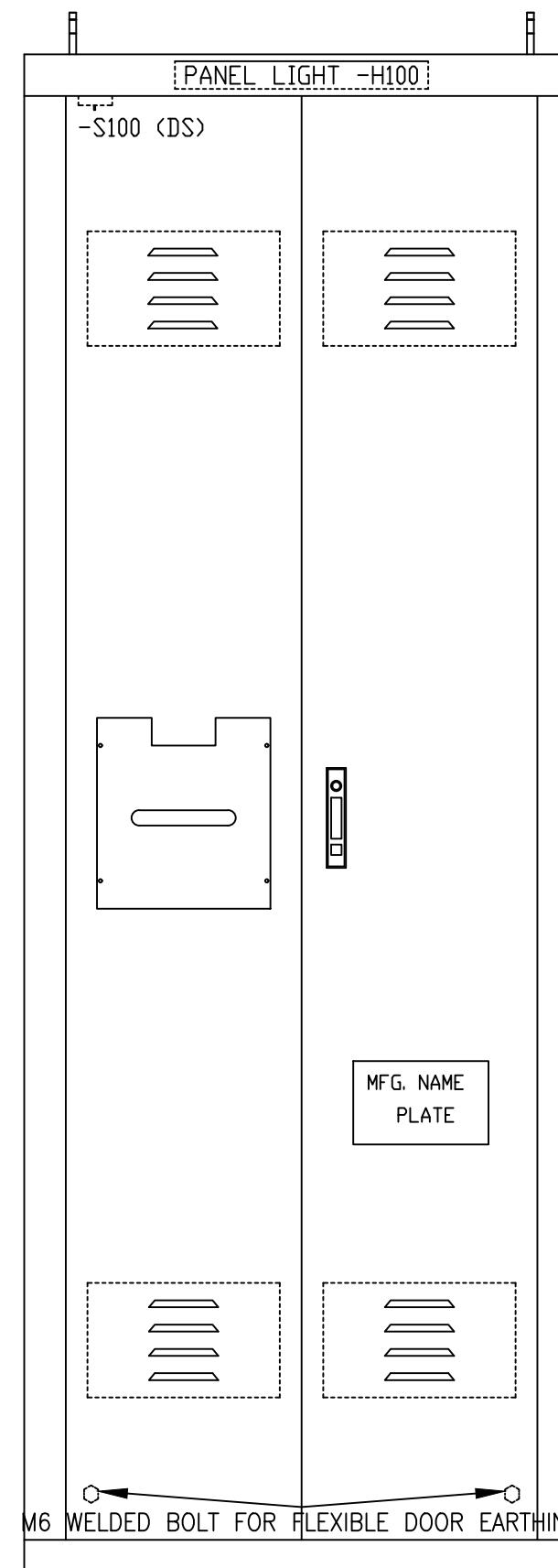
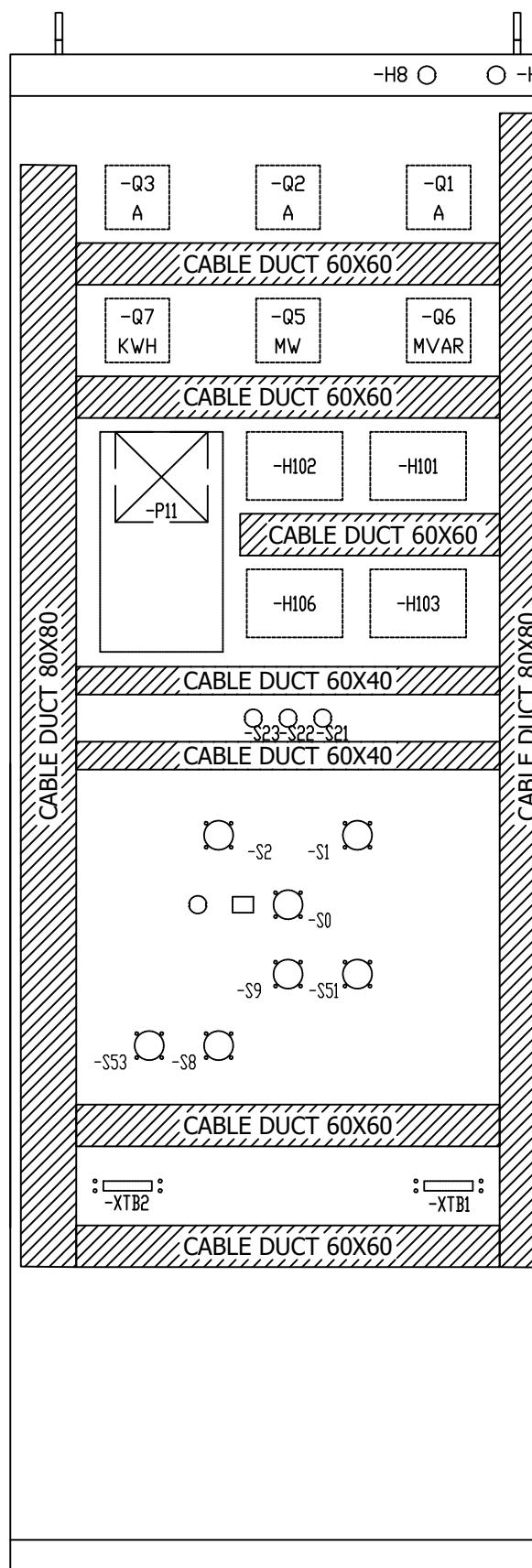
0	AS BUILT	19-10-2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.		
				EPESOL	Grid Solutions	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	132kV LINE CONTROL PANEL (=E09+CP31) PANEL VIEWS	Project no. P-60194	Sheet type AD	Sheet no. 06
REV.	DESCRIPTION	DATE	DRAWER	EPESOL	Grid Solutions	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	132kV LINE CONTROL PANEL (=E09+CP31) PANEL VIEWS	Project no. P-60194	Sheet type AD	Sheet no. 06

BACK VIEW WITHOUT DOO

BACK VIEW WITH DOOR

TOP VIEW

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NOTE:-

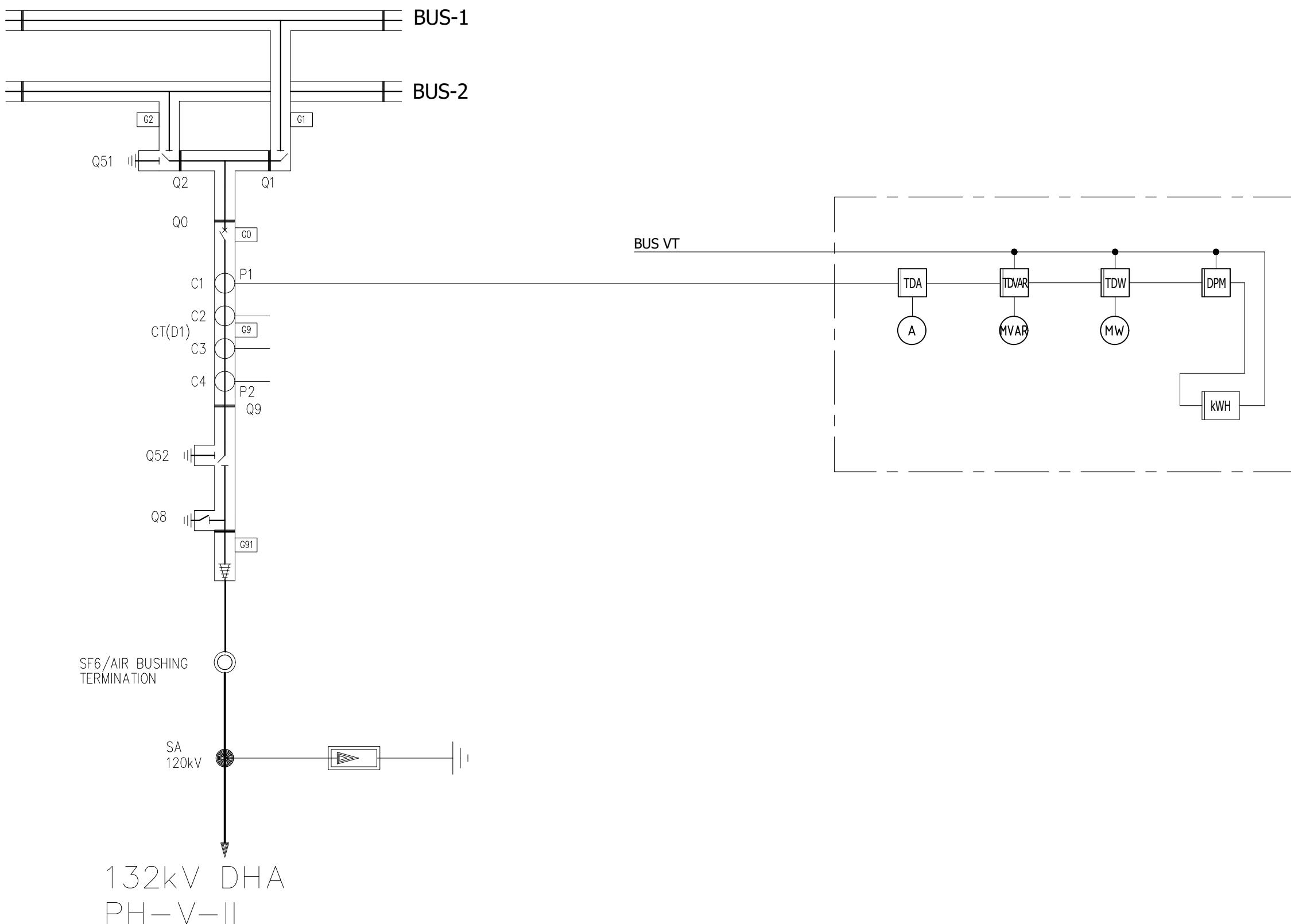
- 1 - PANEL DIMENSION: 800 x 800 x 2200mm (WxDxH)
 - 2 - COLOR : RAL 7032
 - 3 - SHEET THICKNESS : 2-2.5 mm
 - 4- PROTECTION CLASS : IP-51 (INDOOR TYPE)
 - 5 - ALL DOOR FITTED WITH 16mm EARTH STRAP & INSULATED WITH GREEN-YELLOW COLOUR.

0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 7-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) PANEL VIEWS	Drawing no. P60194-E-ELC-SC-006		
									Project no. P-60194		
									Sheet type AD		
									Sheet no. 06		
REV.	DESCRIPTION	DATE	DRAWER								

1 2 3 4 5 6 7 8

=E09

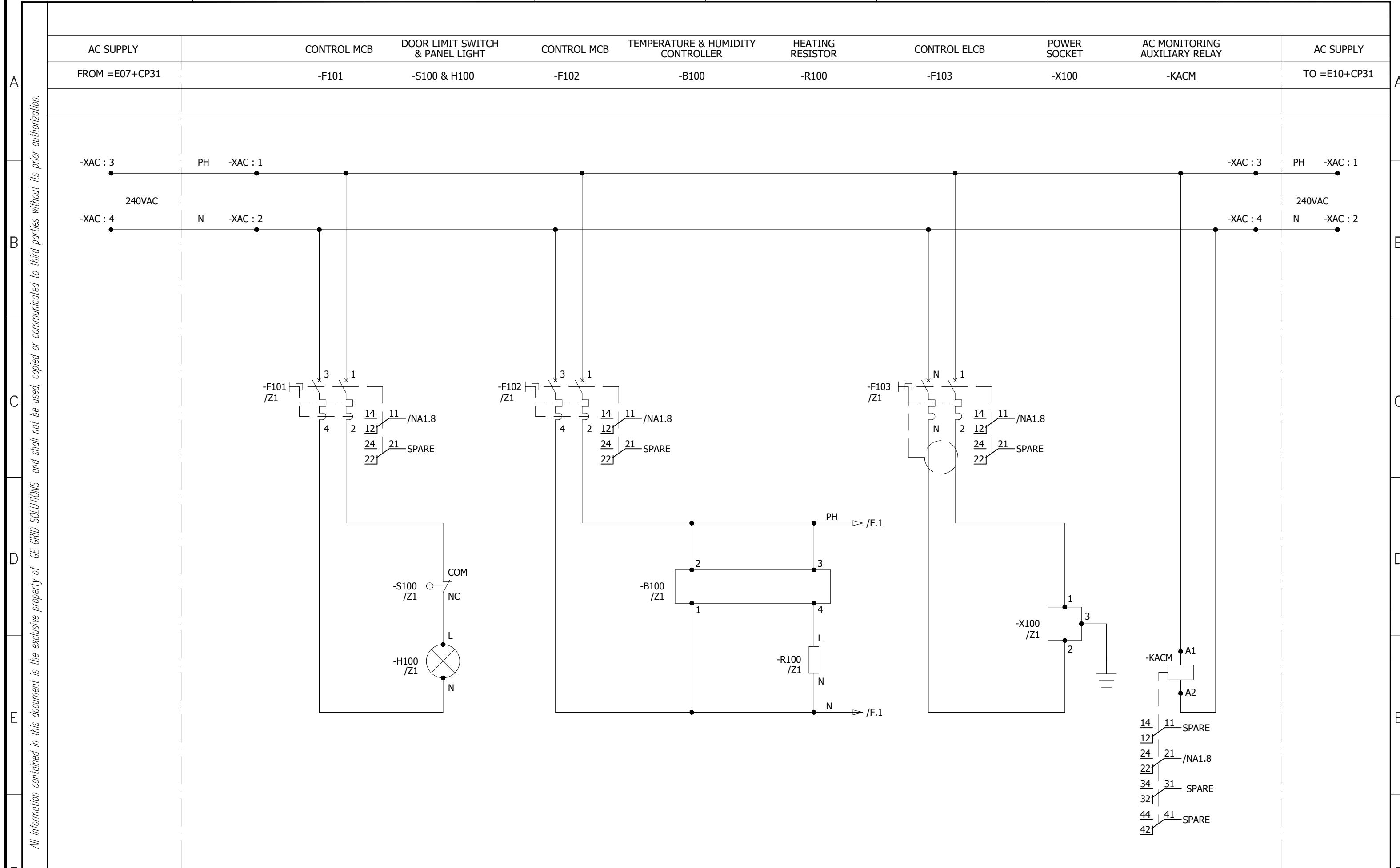
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type AE
									Sheet no. 07

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1 2 3 4 5 6 7 8



0	AS BUILT	30.10.2018	ASJ	Manufacturer EPESOL 71-B Garden Block, New Garden Town,	Contractor Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) AC SUPPLY DISTRIBUTION CIRCUIT	Drawing no. P60194-E-ELC-SC-006
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type D
		2							Sheet no. 08

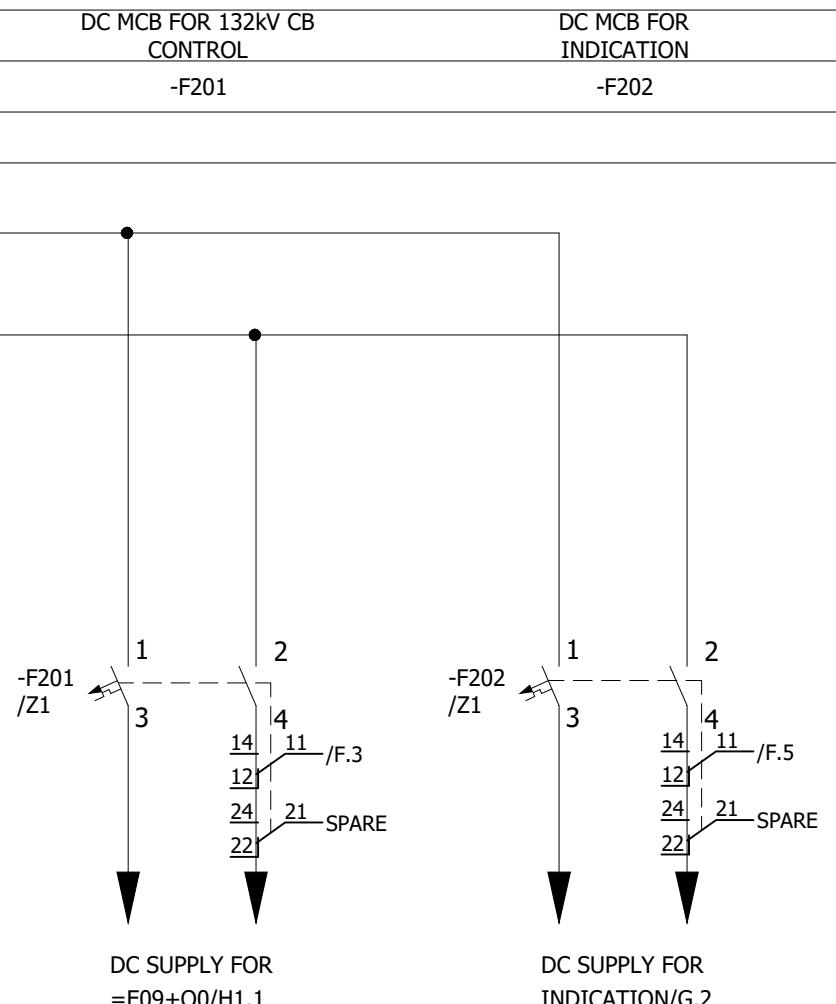
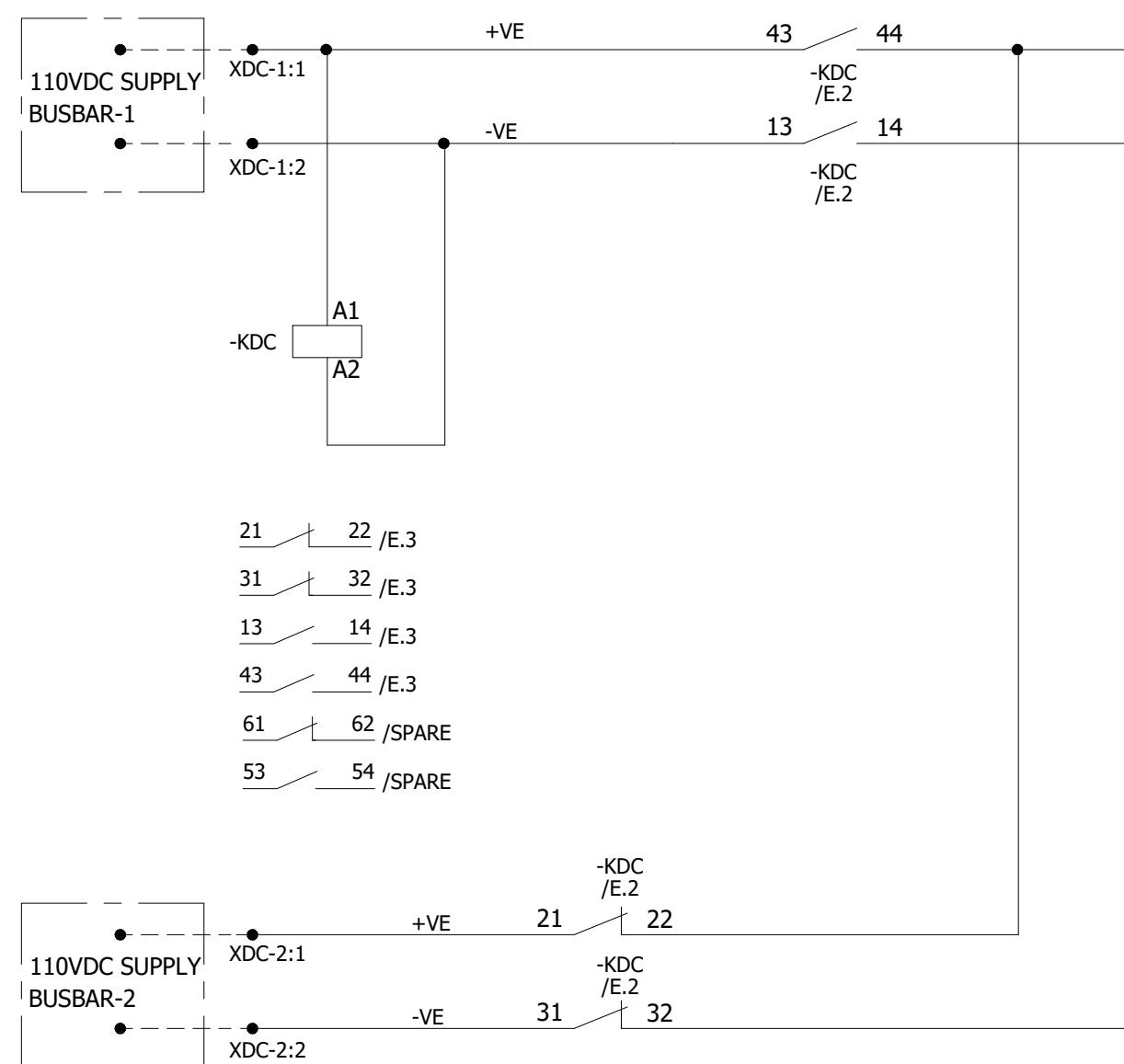
DC MCB FOR 132kV CB
CONTROL

-F201

DC MCB FOR
INDICATION

-F202

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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) DC SUPPLY DISTRIBUTION CIRCUIT	Drawing no. P60194-E-ELC-SC-006
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type E
									Sheet no. 09

1 2 3 4 5 6 7 8

TEST BLOCK

AM METERS

MW METER (-Q5)

MVAR METER (-Q6)

DIGITAL POWER METER

REVENUE METER

TS

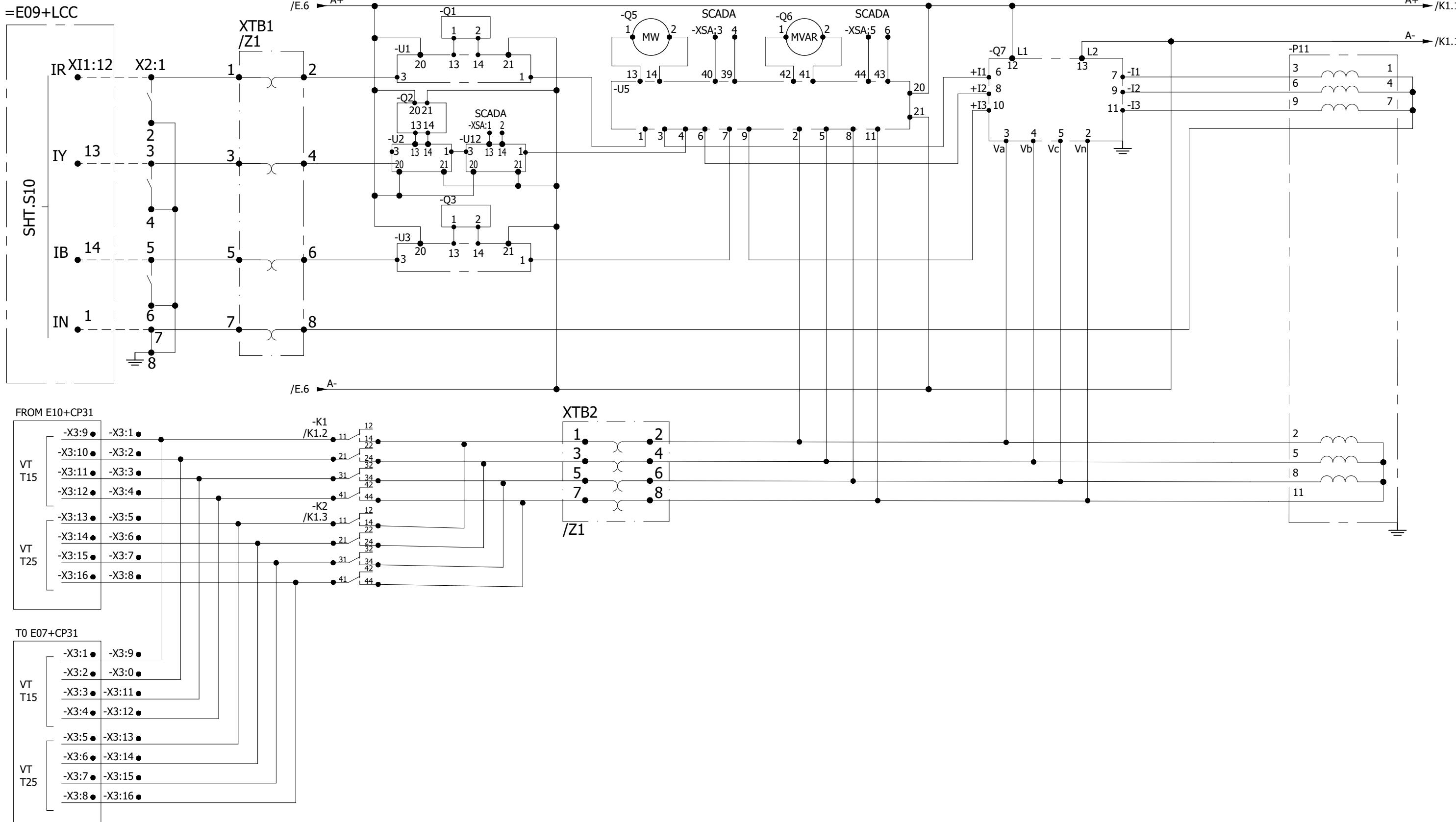
(-Q1, -Q2, -Q3) WITH
TRANSDUCERS
(-U1, , -U2, -U3)

WITH TRANSDUCER (-U5)

(-Q7)

(-P11)

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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 21-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (-E09+CP31) METERING	Drawing no. P60194-E-ELC-SC-006
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type G
									Sheet no. 11

1 2 3 4 5 6 7 8

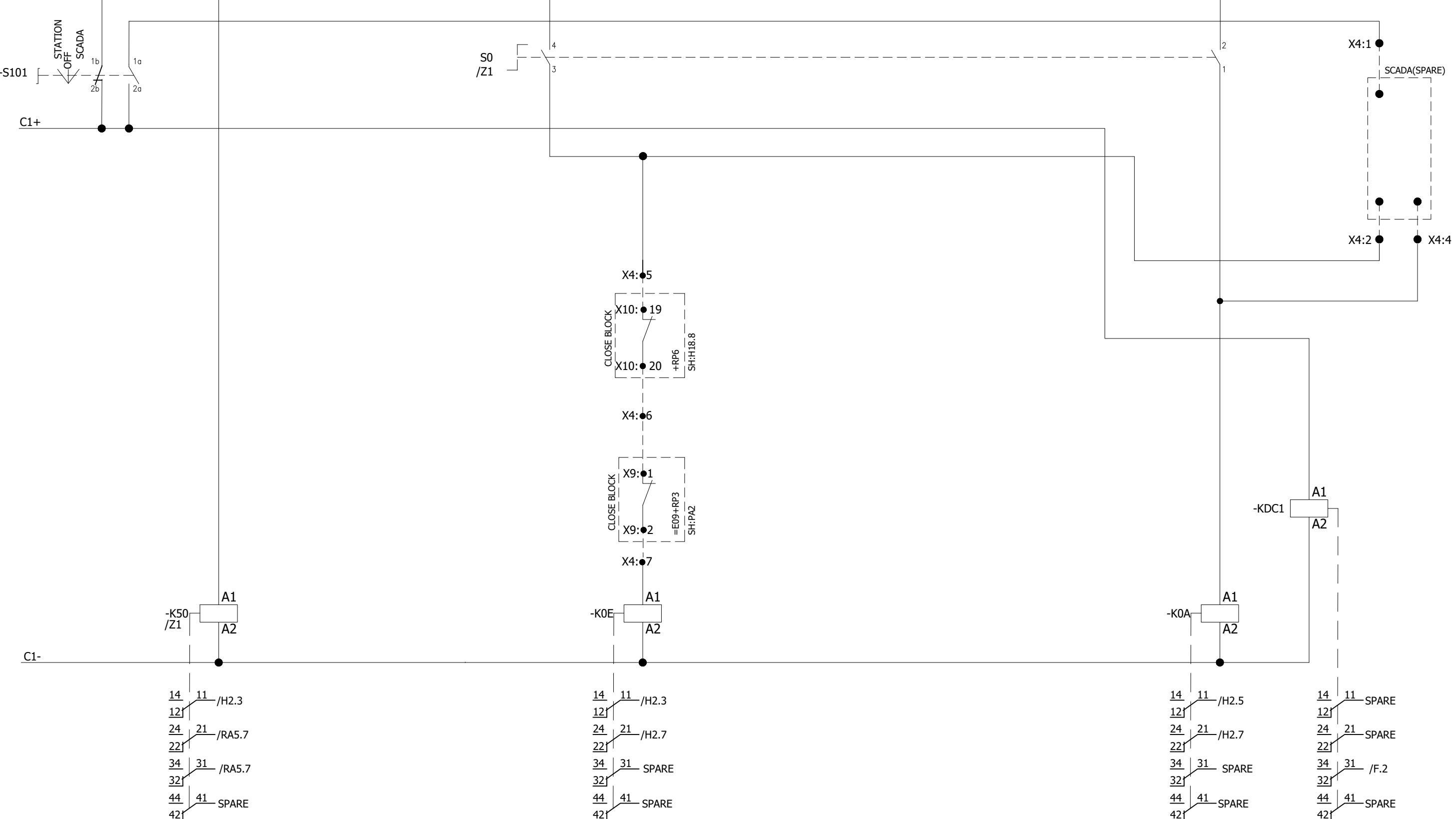
C O N T R O L R O O M

DC SUPERVISION
RELAY SCADA
CONTROL

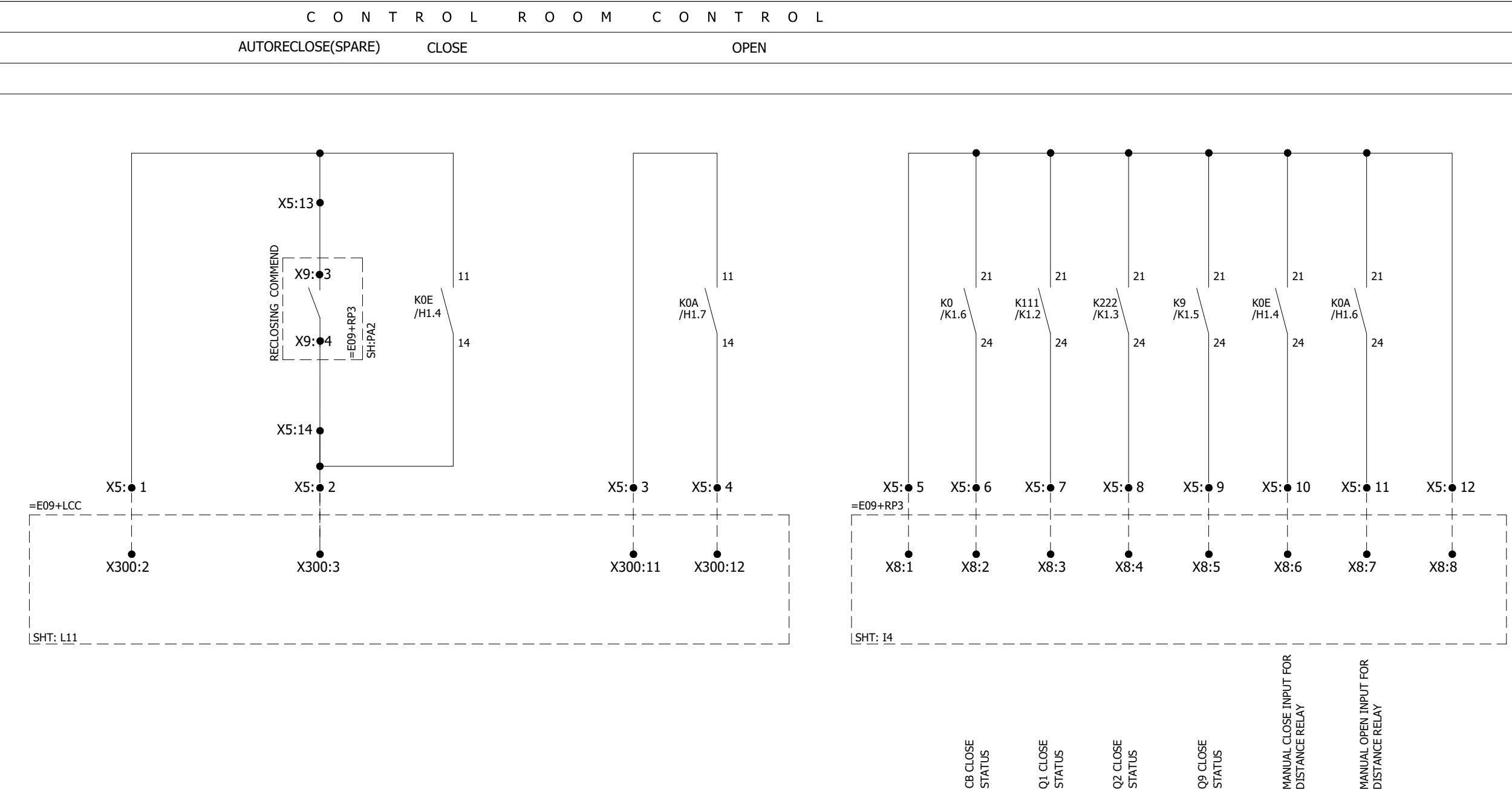
CLOSE

OPEN KDC-1 CLOSE OPEN

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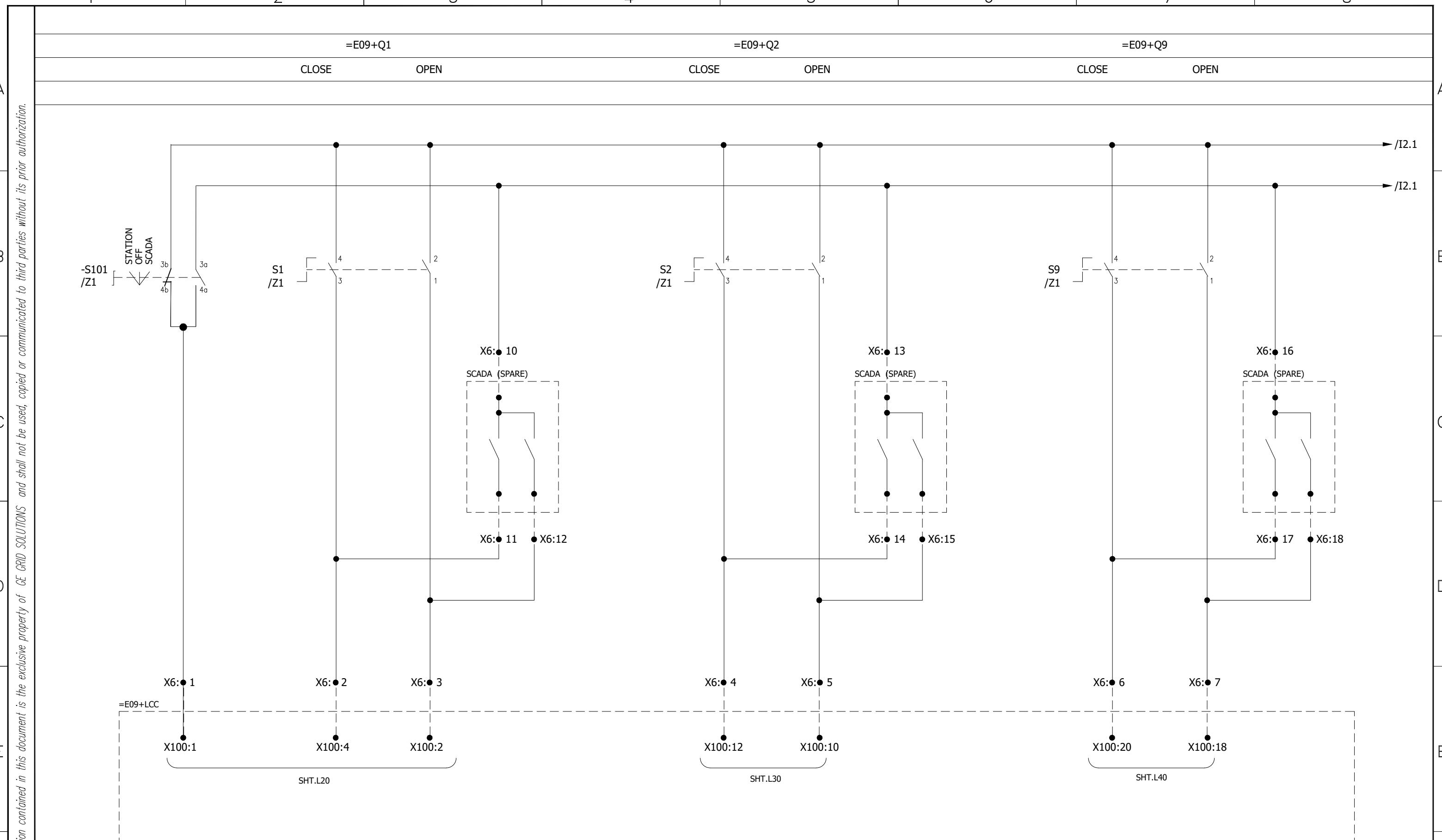
0	AS BUILT	30.10.2018	ASJ	Manufacturer EPE SOL 71-B Garden Block, New Garden Town,	Contractor Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) CB CONTROL CIRCUIT	Drawing no. P60194-E-ELC-SC-006
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type H1



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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) CB CONTROL CIRCUIT	Drawing no. P60194-E-ELC-SC-006		
									Project no. P-60194		
									Sheet type H2		
									Sheet no. 13		
REV.	DESCRIPTION	DATE	DRAWER								

1 2 3 4 5 6 7 8



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0	AS BUILT	30.10.2018	ASJ	Manufacturer EPE SOL 71-B Garden Block, New Garden Town,	Contractor Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) DISCONNECTOR & EARTH SWITCH CONTROL	Drawing no. P60194-E-ELC-SC-006
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type I1

1 2 3 4 5 6 7 8

1

2

3

4

5

6

7

8

=E09+Q51

CLOSE

OPEN

=E09+Q53

CLOSE

OPEN

=E09+Q8

CLOSE

OPEN

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A

A

B

B

C

C

D

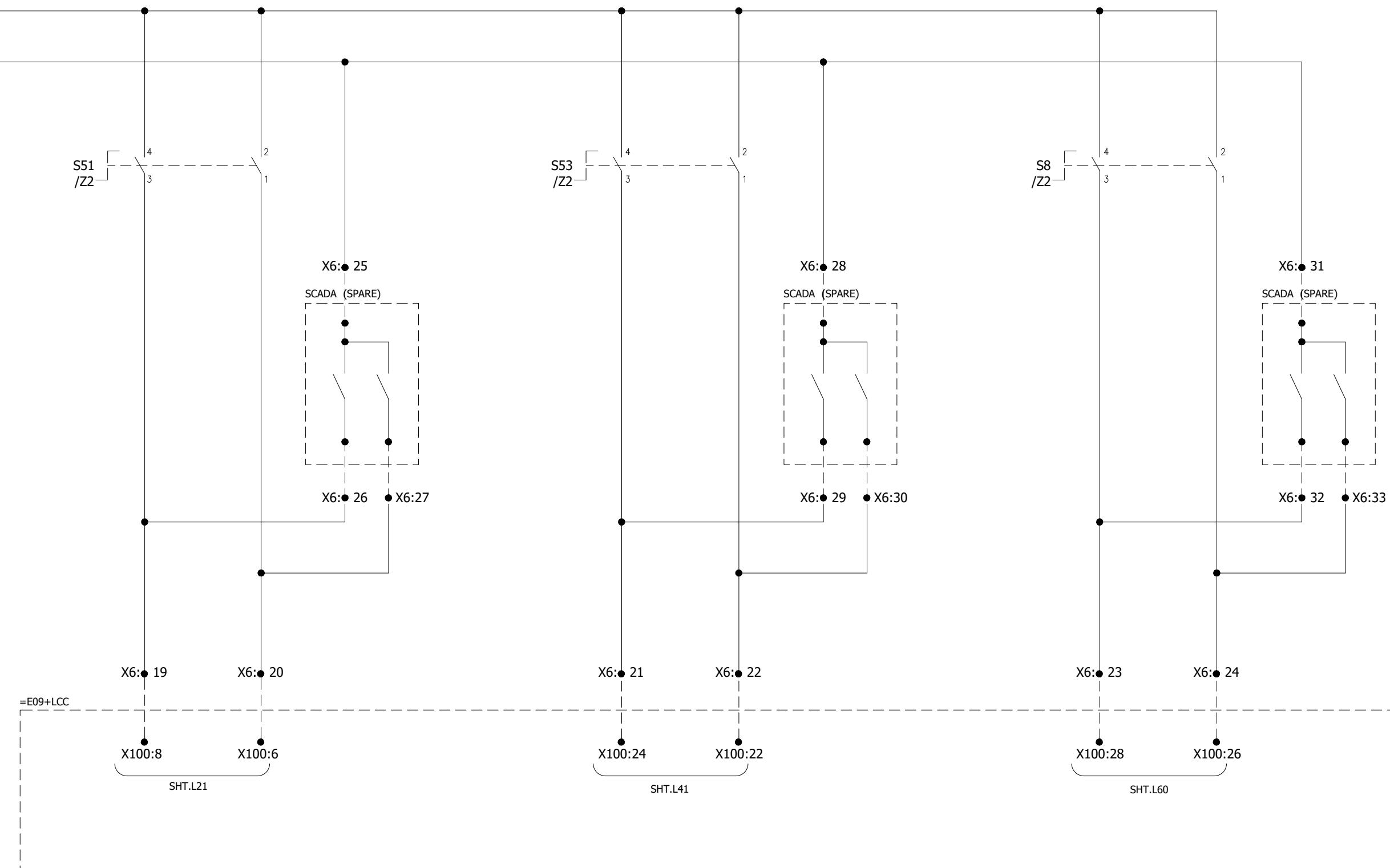
D

E

E

F

F



0	AS BUILT	30.10.2018	ASJ	Manufacturer  71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) DISCONNECTOR & EARTH SWITCH CONTROL	Drawing no. P60194-E-ELC-SC-006
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type I2
									Sheet no. 15

1

2

3

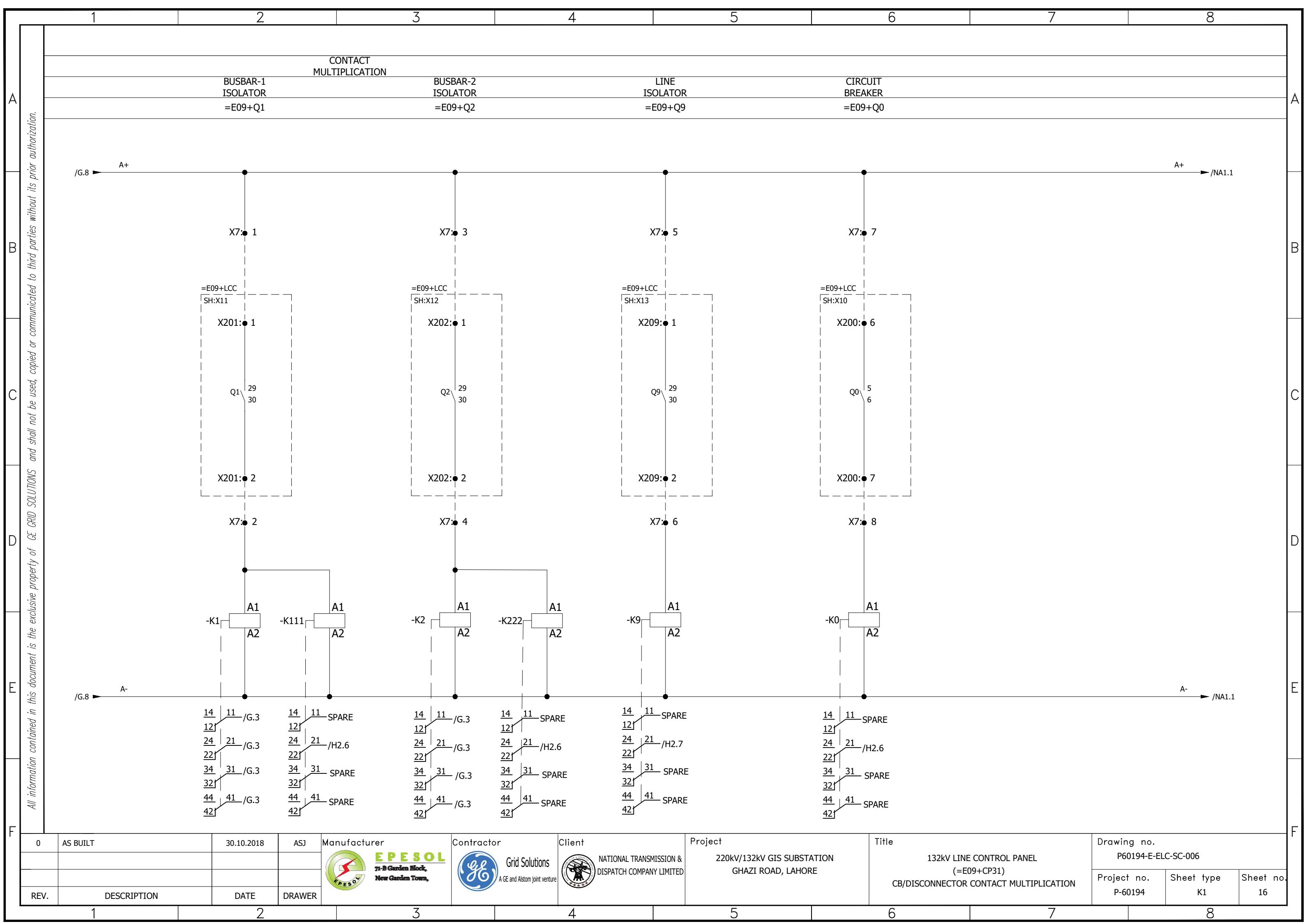
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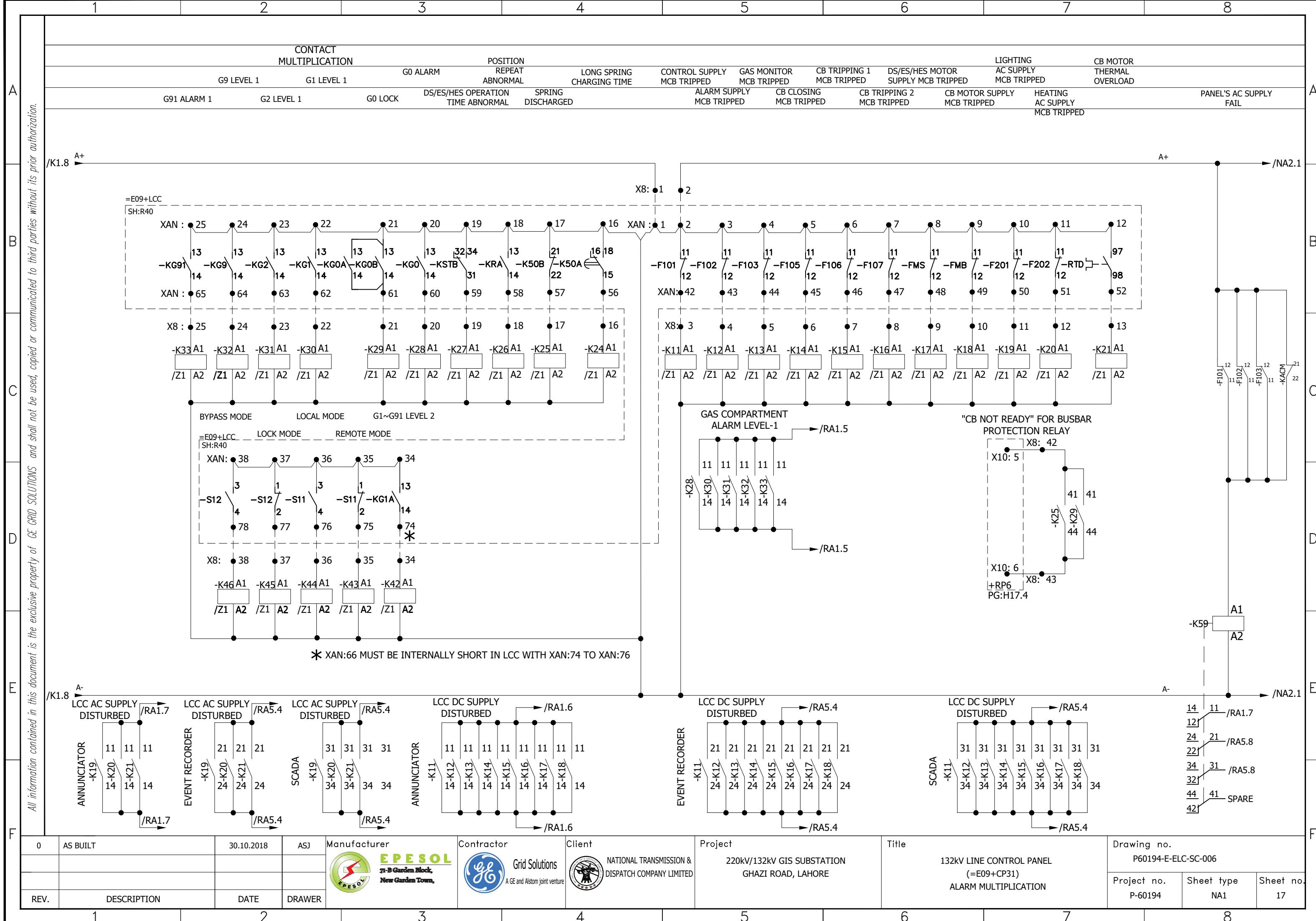
5

6

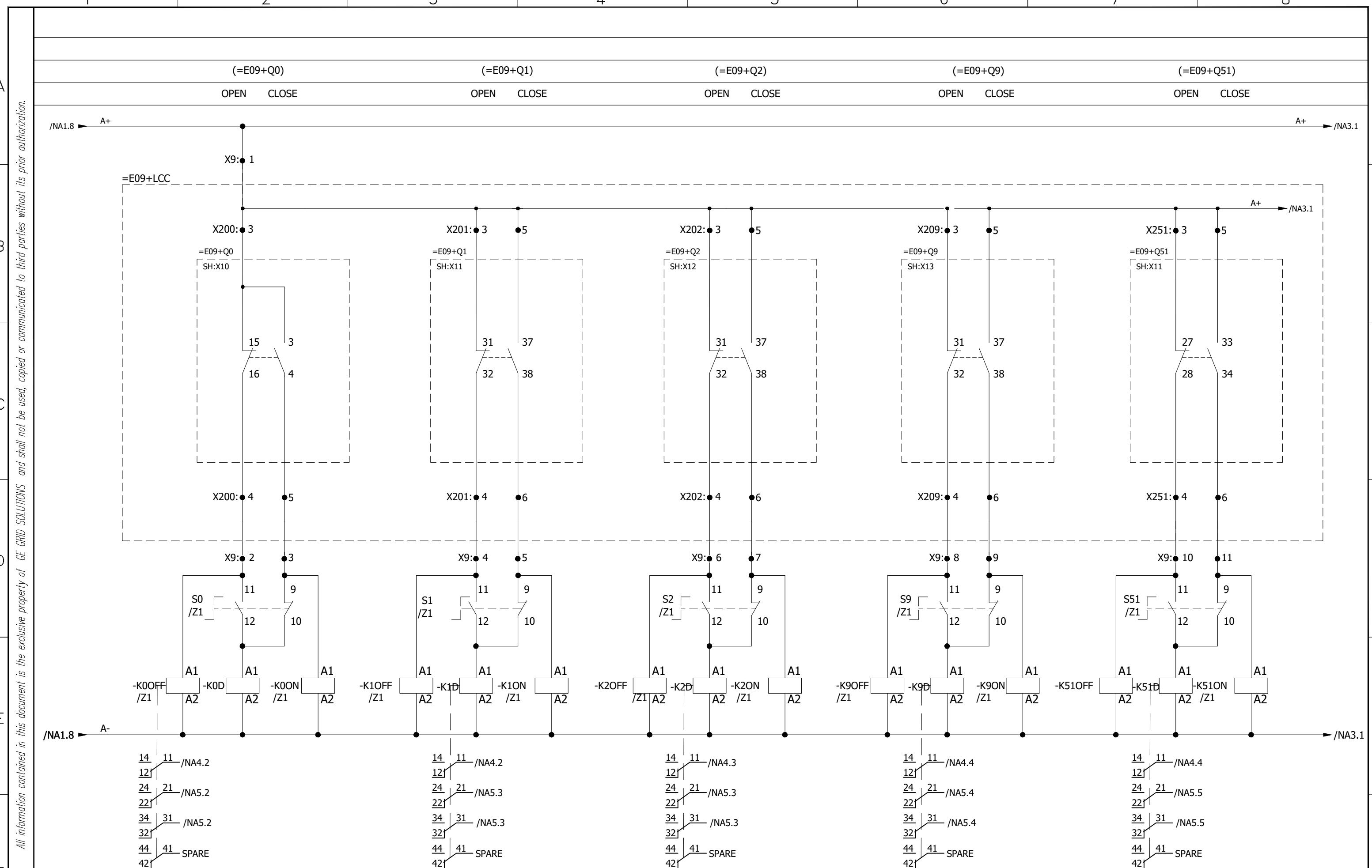
7

8





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1 2 3 4 5 6 7 8

(=E09+Q53)

(=E09+Q8)

OPEN CLOSE

OPEN CLOSE

/NA2.8 → A+

A+ → /NA4_1

=E09+LC

| /NA2 8

This figure is a detailed map of the X253 region, featuring several key astronomical objects:

- X253:** A central star marked with a black dot and labeled "X253".
- 3**: A star located to the upper left of the center.
- 5**: A star located to the upper right of the center.
- =E09+Q53**: A label positioned above the central star.
- SH:X13**: A label enclosed in a rectangular box to the left of the central star.
- 27**: A star located below and to the left of the central star.
- 33**: A star located below and to the right of the central star.
- 28**: A star located below and to the left of star 27.
- 34**: A star located below and to the right of star 33.

The map also features dashed horizontal and vertical lines forming a grid, and solid lines connecting specific points of interest.

The diagram shows a logic gate circuit. A dashed box labeled "SH:X14" contains a rectangle representing a logic gate. The input terminal is labeled "X208:• 1". The output terminal is labeled "E09+Q8". The internal structure of the gate is as follows: a vertical line connects the input to a horizontal line. From the bottom of this horizontal line, two diagonal lines branch out: one going up-right labeled "5" and one going down-right labeled "6". From the top of the horizontal line, another diagonal line branches out labeled "13". From the bottom of the horizontal line, another diagonal line branches out labeled "14".

X253: • 4 • 6

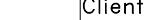
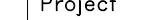
3: ● 2 ● 3

```

graph TD
    NA4[NA4] --- NA4_11[11]
    NA4 --- NA4_12[12]
    NA4_12 --- NA5_21[21]
    NA4_12 --- NA5_22[22]
    NA5_22 --- NA5_31[31]
    NA5_22 --- NA5_32[32]
    NA5_32 --- SPAR[SPAR]
    NA5_32 --- NA5_42[42]

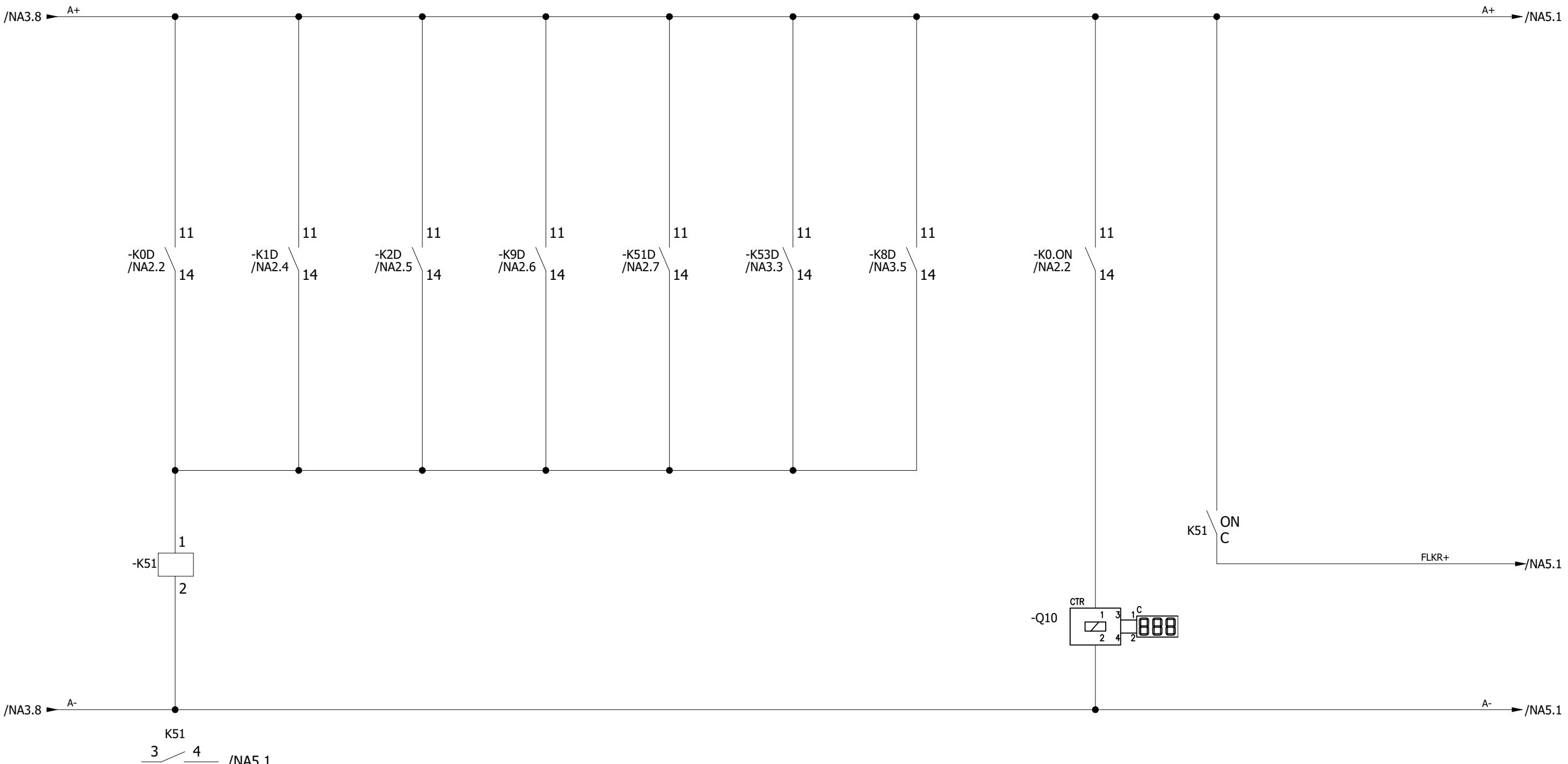
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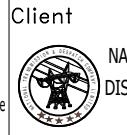
 11 /NA4.5
 21 /NA5.7
 31 /NA5.7
 41 SPARE

	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) DISCREPANCY INITIATION	Drawing no. P60194-E-ELC-SC-006		
.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type NA3	Sheet no. 19

1 2 3 4 5 6 7 8

OFF/ON OFF/ON OFF/ON OFF/ON OFF/ON OFF/ON OFF/ON CIRCUIT BREAKER
 (=E09+Q0) (=E09+Q1) (=E09+Q2) (=E09+Q9) (=E09+Q51) (=E09+Q53) (=E09+Q8) OPERATION COUNTER
 (-Q10)



0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) DISCREPANCY INITIATION	Drawing no. P60194-E-ELC-SC-001
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type NA4
									Sheet no. 20

1 2 3 4 5 6 7 8

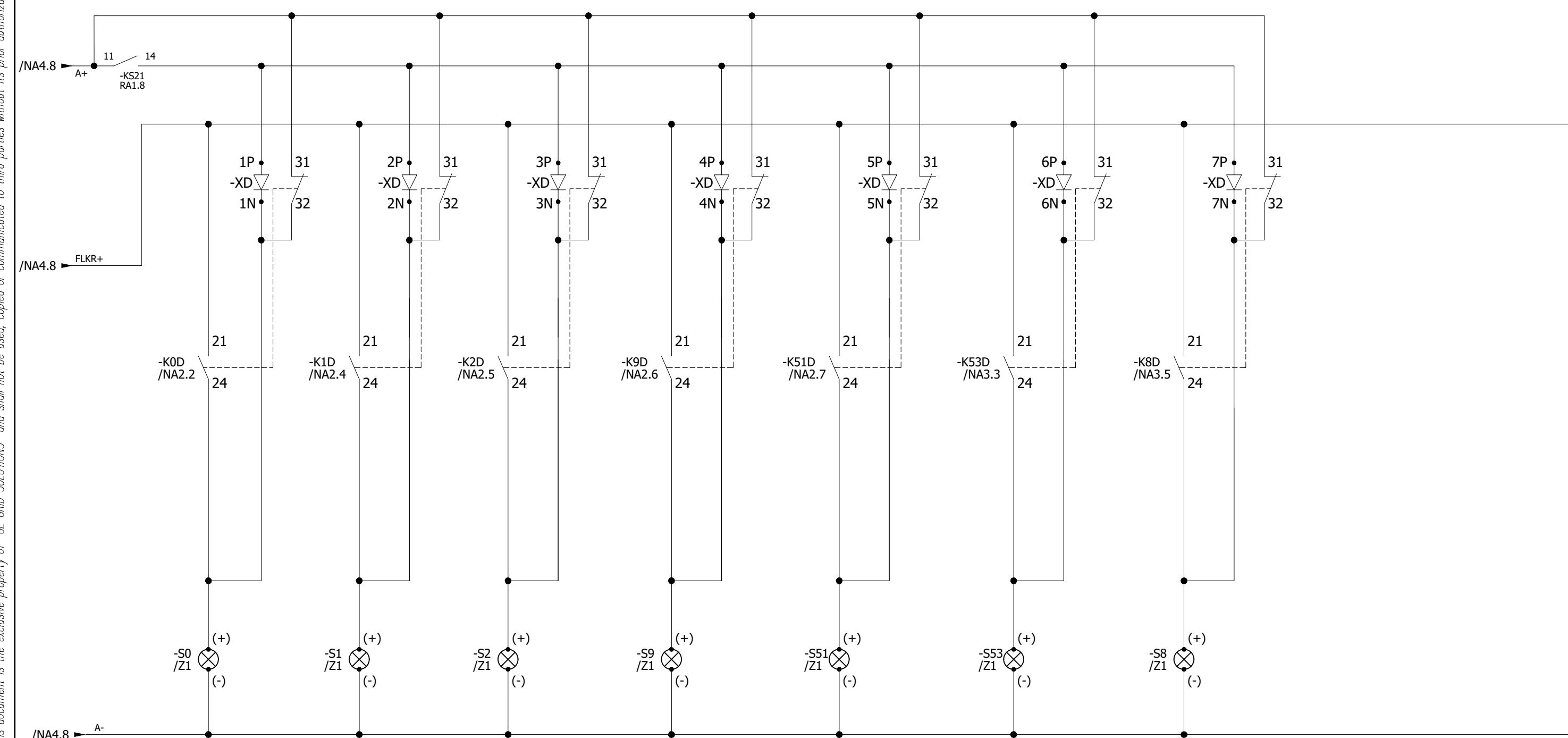
1 2 3 4 5 6 7 8

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(=E09+Q0) (=E09+Q1) (=E09+Q2) (=E09+Q9) (=E09+Q51) (=E09+Q53) (=E09+Q8)

A

A



B

B

C

C

D

D

E

E

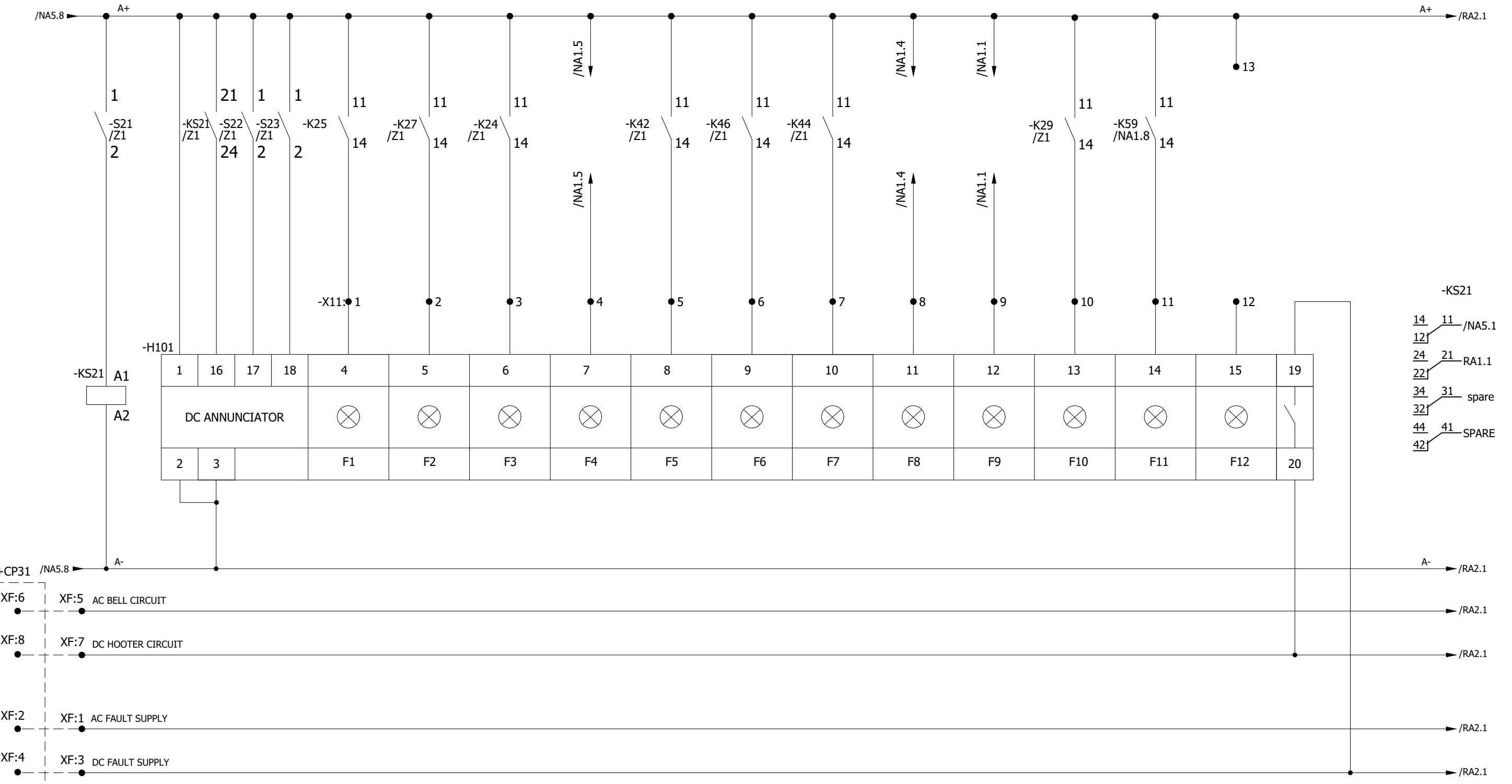
F

F

0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132KV LINE CONTROL PANEL (=E09+CP31) DISCREPANCY INDICATIONS	Drawing no. P60194-E-ELC-SC-006
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type NA5 Sheet no. 21
1	2	3	4	5	6	7	8		

SPRING DISCHARGED DS/ES/HES OPERATION LONG SPRING GAS COMPARTMENT GAS COMPARTMENT LCC BYPASS MODE LCC LOCAL MODE DC SUPPLY DISTURBED AC SUPPLY DISTURBED GO LOCK CONTROL PANEL AC SUPPLY FAILURE SPARE HOOTER

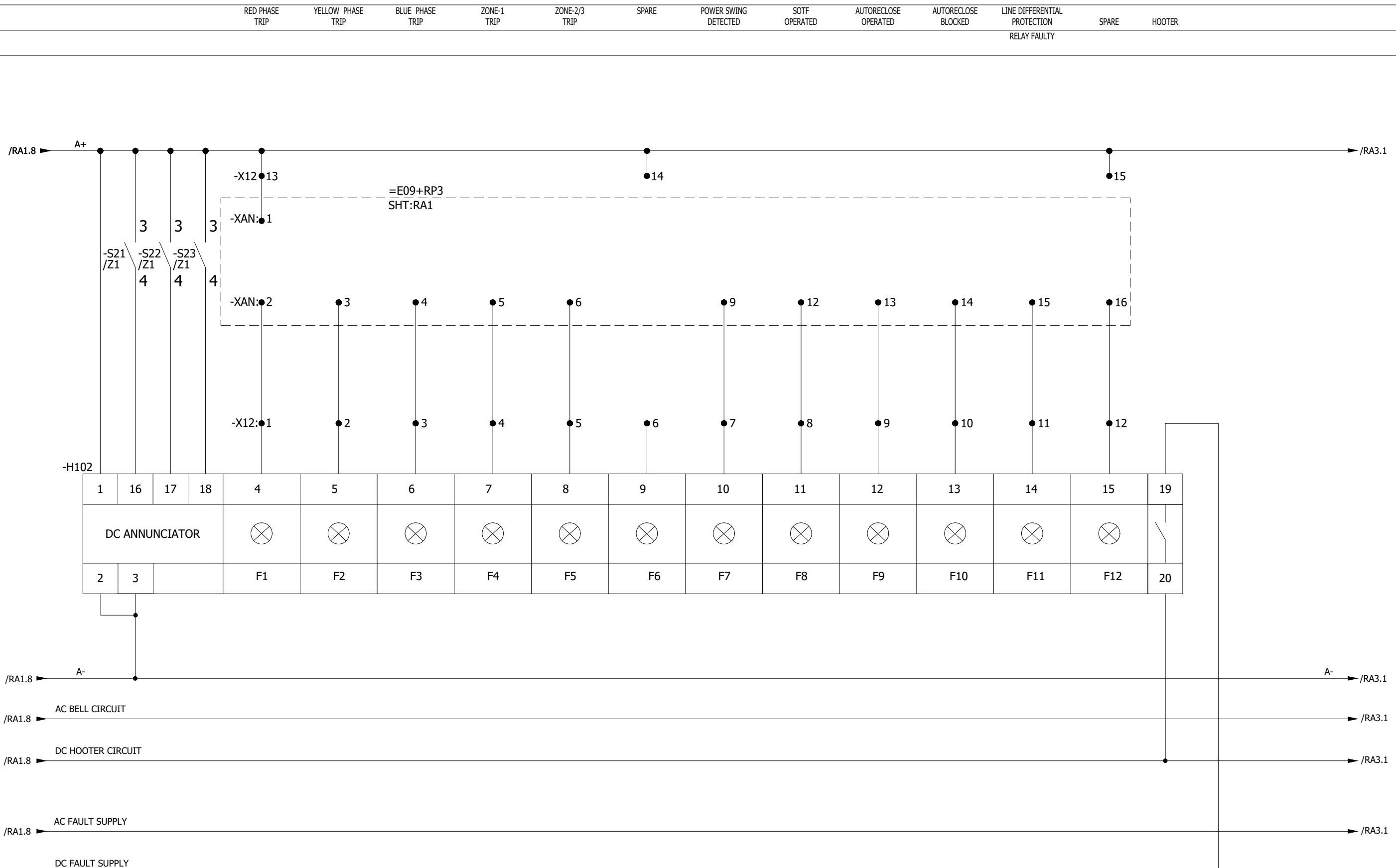
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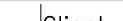


-KS21
14 11 /NA5.1
12 21 RA1.1
24 22
34 31 spare
32 41 SPARE
44 42

0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 7-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) ANNUNCIATOR-1 CIRCUIT	Drawing no. P60194-E-ELC-SC-006
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type RA1
									Sheet no. 22

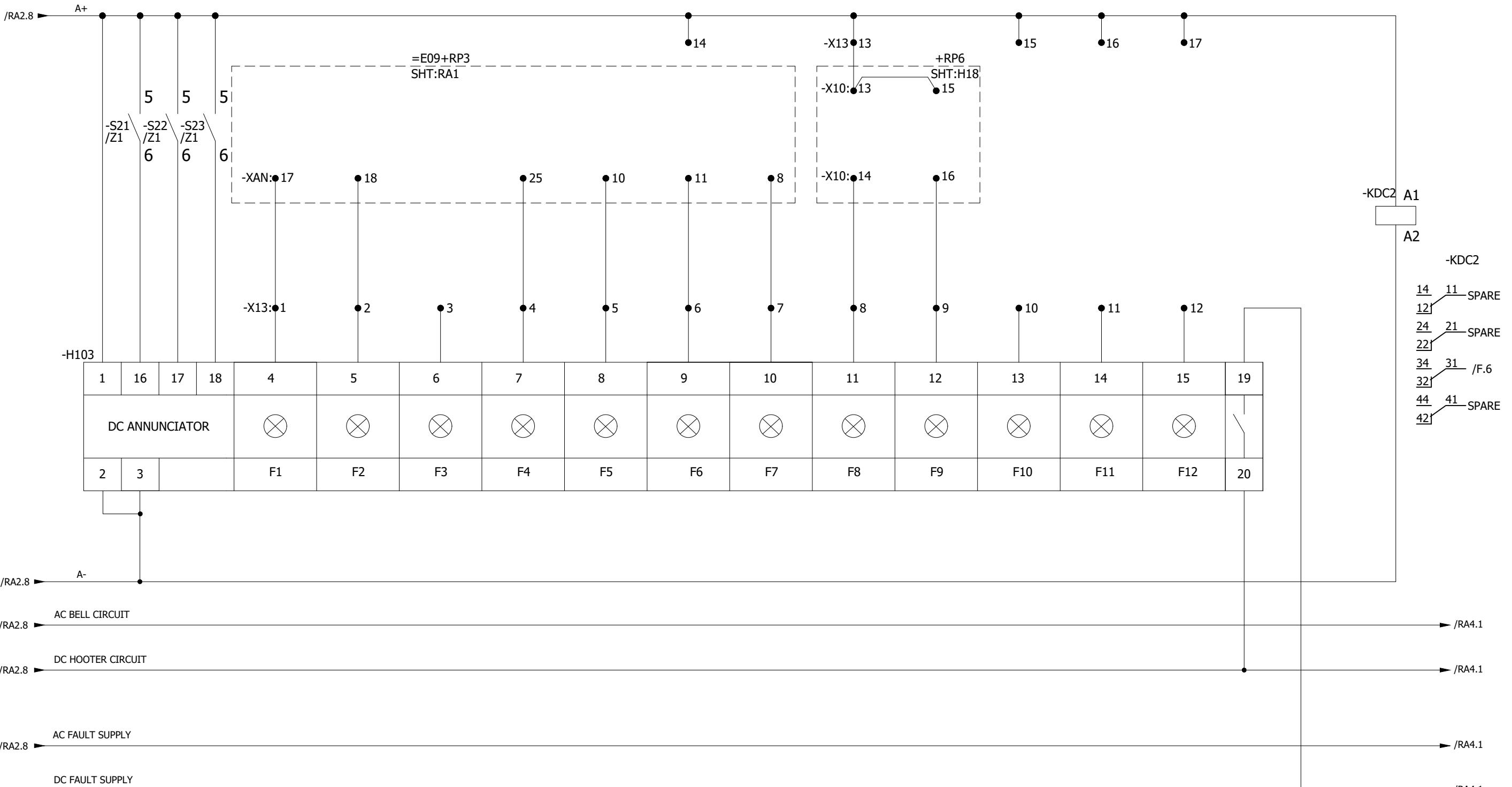
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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 7-B Garden Block, New Garden Town.	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) ANNUNCIATOR-2 CIRCUIT	Drawing no. P60194-E-ELC-SC-006		
									Project no. P-60194		
									Sheet type RA2	Sheet no. 23	
REV.	DESCRIPTION	DATE	DRAWER	1	2	3	4	5	6	7	8

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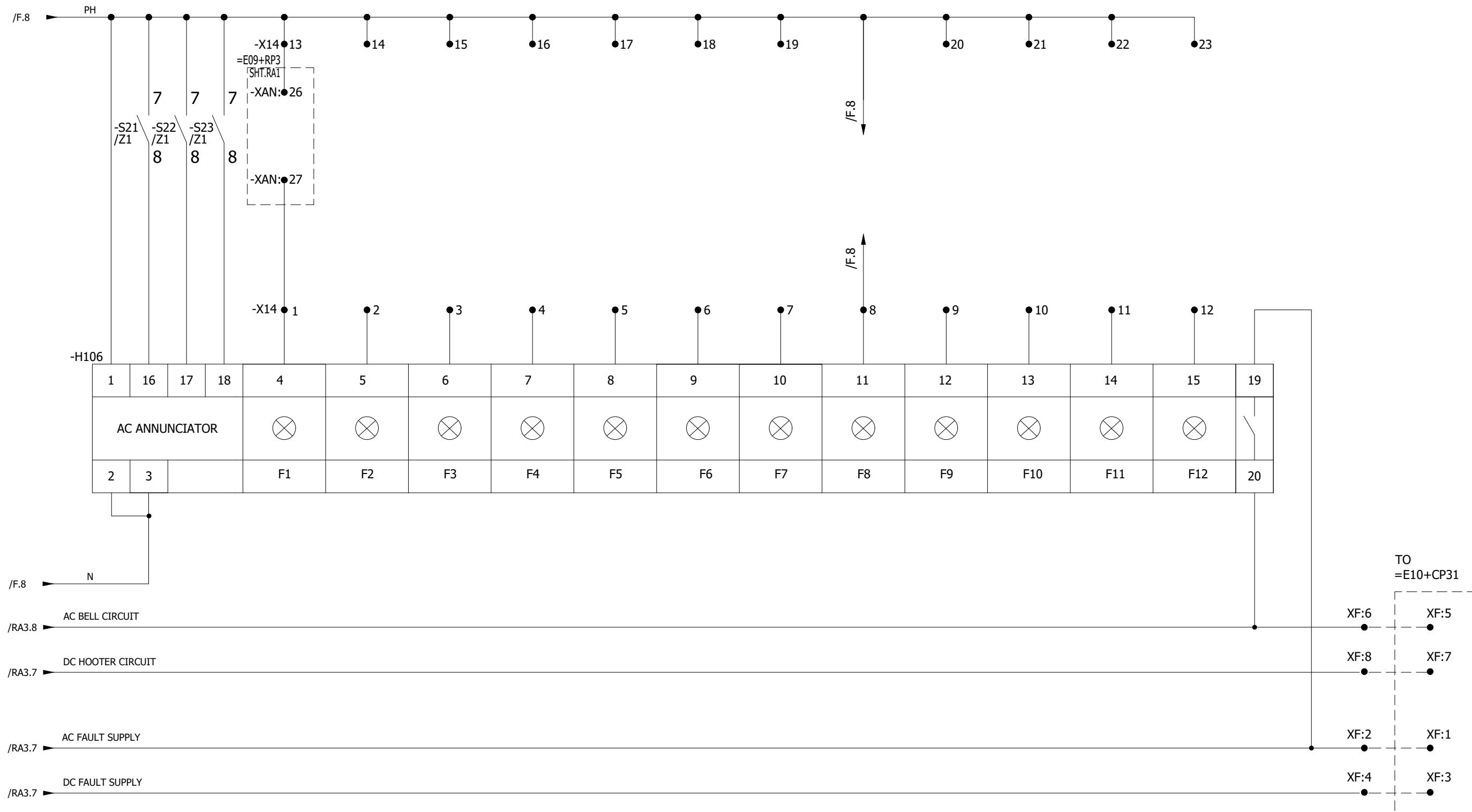
BUS VT SECONDARY CIRCUIT MCB UNHEALTHY	O/C & E/F PROT. RELAY FAULTY	SPARE	LINE RELAY PANEL 230VAC CIRCUIT/SUPPLY FAULTY	TRIP CIRCUIT-1 FAULTY	TRIP CIRCUIT-2 FAULTY	O/C & E/F PROT. OPERATED	DTT SEND	CBF STG-1 OPERATED	SPARE	SPARE	SPARE	HOOTER
--	---------------------------------	-------	--	--------------------------	--------------------------	-----------------------------	-------------	-----------------------	-------	-------	-------	--------



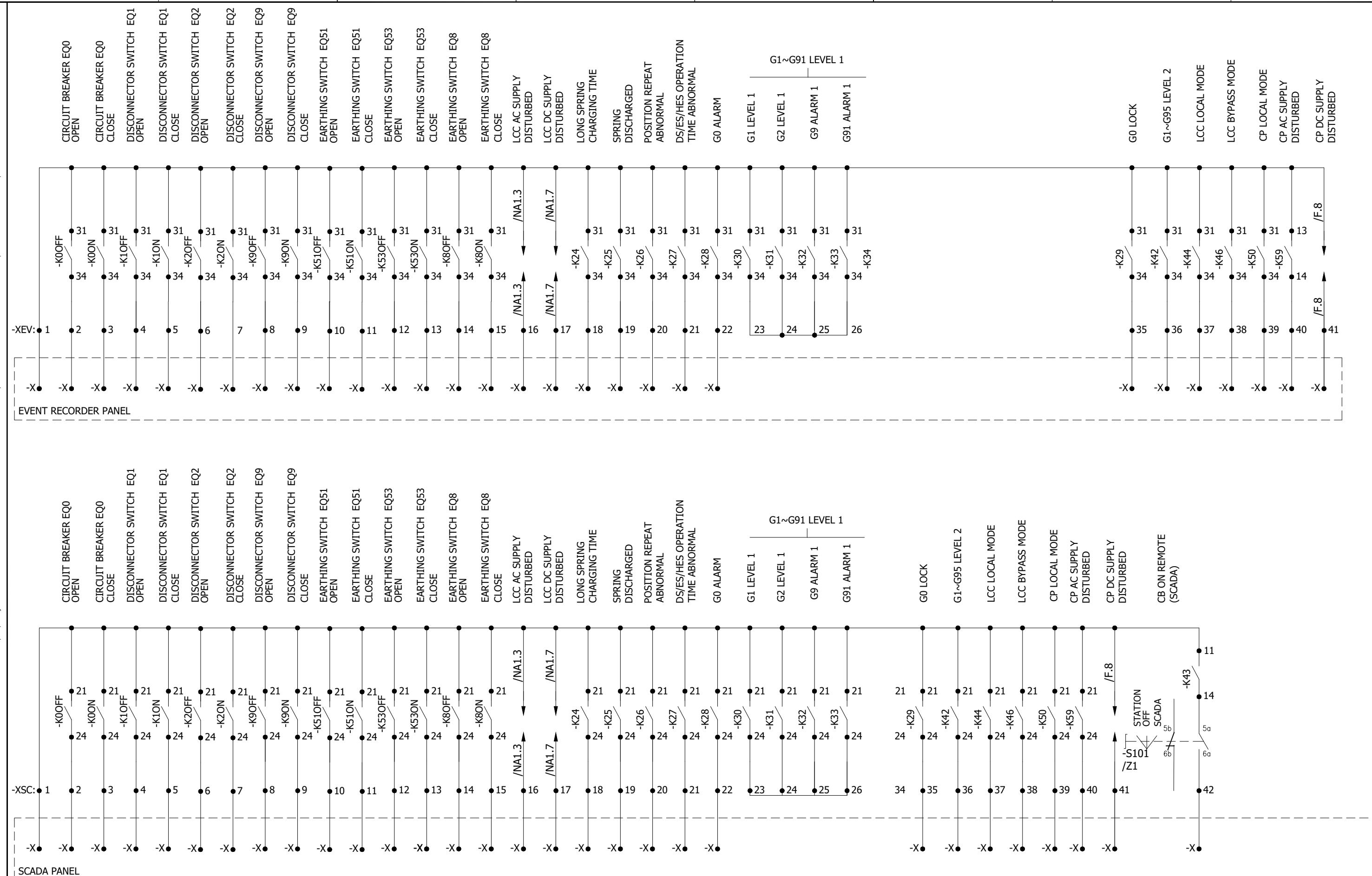
0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) ANNUNCIATOR-3 CIRCUIT	Drawing no. P60194-E-ELC-SC-006		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA3	Sheet no. 24
1	2	3	4	5	6	7	8				

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LINE RELAY PANEL
110VDC
CIRCUIT/SUPPLY FAULTY SPARE SPARE SPARE SPARE SPARE CONTROL PANEL
DC FAIL SPARE SPARE SPARE SPARE AC BELL



0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town,	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) ANNUNCIATOR-4 CIRCUIT	Drawing no. P60194-E-ELC-SC-006
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type RA4
									Sheet no. 25



0	AS BUILT	30.10.2018	ASJ	Manufacturer EPE SOL 71-B Garden Block, New Garden Town,	Contractor Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E09+CP31) SCADA & ER SIGNALS	Drawing no. P60194-E-ELC-SC-006		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA5	Sheet no. 26

1

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3

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5

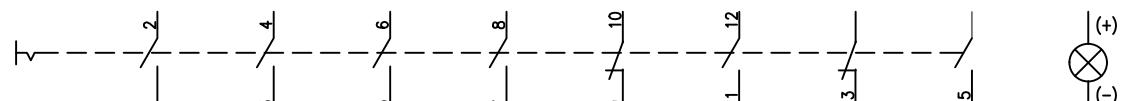
6

7

8

A

	A1	12	14	22	24	32	34	42	44
-K11	NA1.5	NA1.3	NA1.5	NA1.6					
-K12	NA1.5	NA1.3	NA1.5	NA1.6					
-K13	NA1.5	NA1.3	NA1.5	NA1.7					
-K14	NA1.5	NA1.4	NA1.5	NA1.7					
-K15	NA1.6	NA1.4	NA1.5	NA1.7					
-K16	NA1.6	NA1.4	NA1.5	NA1.7					
-K17	NA1.6	NA1.4	NA1.5	NA1.7					
-K18	NA1.6	NA1.4	NA1.6	NA1.7					
-K19	NA1.7	NA1.1	NA1.2	NA1.3					
-K20	NA1.7	NA1.1	NA1.2	NA1.3					
-K21	NA1.7	NA1.1	NA1.2	NA1.3					
-K24	NA1.4	RA1.4	RA5.4	RA5.4					
-K25	NA1.4	RA1.3	RA5.4	RA5.4	NA1.7				
-K26	NA1.4		RA5.4	RA5.4					
-K27	NA1.3	RA1.4	RA5.5	RA5.5					
-K28	NA1.3	NA1.5	RA5.5	RA5.5					
-K29	NA1.3	RA1.7	RA5.7	RA5.7	NA1.7				
-K30	NA1.2	NA1.5	RA5.5	RA5.5					
-K31	NA1.2	NA1.5	RA5.5	RA5.5					
-K32	NA1.2	NA1.5	RA5.5	RA5.5					
-K33	NA1.1	NA1.5	RA5.6	RA5.5					
-K35	NA1.1	NA1.6	RA5.6	RA5.6					
-K36	NA1.4	NA1.6	RA5.6	RA5.6					
-K37	NA1.4	NA1.6	RA5.6	RA5.6					
-K42	NA1.3	RA1.5	RA5.7	RA5.7					
-K43	NA1.3	RA5.8							
-K44	NA1.2	RA1.6	RA5.7	RA5.7					
-K45	NA1.2								
-K46	NA1.2	RA1.5	RA5.8	RA5.7					
-K50	H1.2		RA5.8	RA5.8					
-K0OFF	NA2.2		RA5.1	RA5.1					
-K0ON	NA2.3	NA4.6	RA5.1	RA5.1					
-K1OFF	NA2.3		RA5.2	RA5.2					
-K1ON	NA2.4		RA5.2	RA5.2					
-K2OFF	NA2.5		RA5.2	RA5.2					
-K2ON	NA2.6		RA5.2	RA5.2					
-K9OFF	NA2.6		RA5.3	RA5.2					
-K9ON	NA2.7		RA5.3	RA5.3					
-K51OFF	NA2.7		RA5.3	RA5.3					
-K51ON	NA2.8		RA5.3	RA5.3					
-K53OFF	NA3.3		RA5.3	RA5.3					
-K53ON	NA3.4		RA5.4	RA5.3					
-K8OFF	NA3.4		RA5.4	RA5.3					
-K8ON	NA3.5		RA5.4	RA5.4					



-S0	H1.7	H1.4			NA2.2	NA5.1			NA5.2
-S1	I1.2	I1.3			NA2.4	NA5.2			NA5.2
-S2	I1.4	I1.5			NA2.5	NA5.3			NA5.3
-S9	I1.7	I1.7			NA2.6	NA5.3			NA5.3
-S51	I2.2	I2.3			NA3.1	NA5.5			NA5.5
-S53	I2.4	I2.5			NA3.3	NA5.5			NA5.5
-S8	I2.6	I1.7			NA3.4	NA5.6			NA5.6

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DN

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DP

DQ