



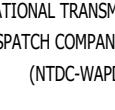
Grid Solutions
A GE and Alstom joint venture

220kV/132kV GIS SUBSTATION GHAZI ROAD , LAHORE

132kV LINE CONTROL PANEL SCHEMATIC DRAWINGS

DOC / DWG REVIEW CODE	
<input type="checkbox"/> A	Approved, Issue IFC.
<input type="checkbox"/> B	Approved with comments as noted, Issue IFC after incorporation of these comments.
<input type="checkbox"/> C	Revise and re-submit for approval.
<input type="checkbox"/> D	Rejected.
Signed	Date
Permission to proceed does not constitute acceptance of approval of design details, analysers, test methods or materials/ selected by the CONTRACTOR and does not relieve the CONTRACTOR from full compliance with AGREEMENT obligations.	

REFERENCE DRAWINGS								
SR. NO.	DRAWING TITLE				DOCUMENT NO.			
1.	220kV / 132kV Metering & Protection SLD				P60194-E-SLMP-001			
REV	DATE	DRW. BY	CHK. BY	APR. BY	REVISION DESCRIPTION			
0	30-10-2018	ASJ	MFT	NAH	AS BUILT			
Scale			Sheet size		A3			
NOT-TO-SCALE								
Client		NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)						
Contractor			Manufacturer					
			Grid Solutions A GE and Alstom joint venture					
			EPESOL 71-B Garden Block, New Garden Town, Lahore Pakistan					
Project								
220kV / 132kV GIS SUBSTATION GHAZI ROAD , LAHORE								
Title								
132kV LINE CONTROL PANEL (=E14+CP31) SCHEMATIC DRAWINGS								
Order no			Document no					
P-60194			P60194-E-ELC-SC-008					
Sheet type		Total sheets		Sheet no				
A		27		1				

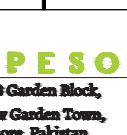
	1	2	3	4	5	6	7	8							
	PAGE NO.	SHEET NAME	SHEET DESCRIPTION			ISSUE / REVISION									
						A	B	C	D	E	F	01	02	03	04
A	01	A	COVER SHEET			X	X	X	X	X	X				
	02	AA	LIST OF CONTENTS			X	X	X	X	X	X				
	03	AB	SYMBOL AND LEGENDS			X	X	X	X	X	X				
	04	AC1	COMPONENT LIST			X	X	X	X	X	X				
	05	AC2	COMPONENT 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-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 GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) LIST OF CONTANTS	Drawing no. P60194-E-ELC-SC-008					
	REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type AA	Sheet no. 02			

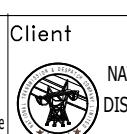
	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
A		CIRCUIT BREAKER		MINIATURE CIRCUIT BREAKER		AUXILIARY CONTACTOR NO+NC	21	DISTANCE
B		SWITCH/ISOLATOR		SELECTOR SWITCH		AMMETER	24	OVEREXCITATION
C		EARTHING		LIMITED SWITCH		VOLTMETER	25	SYCHROCHECK
D		GIS TERMINATION		HUMIDITY & 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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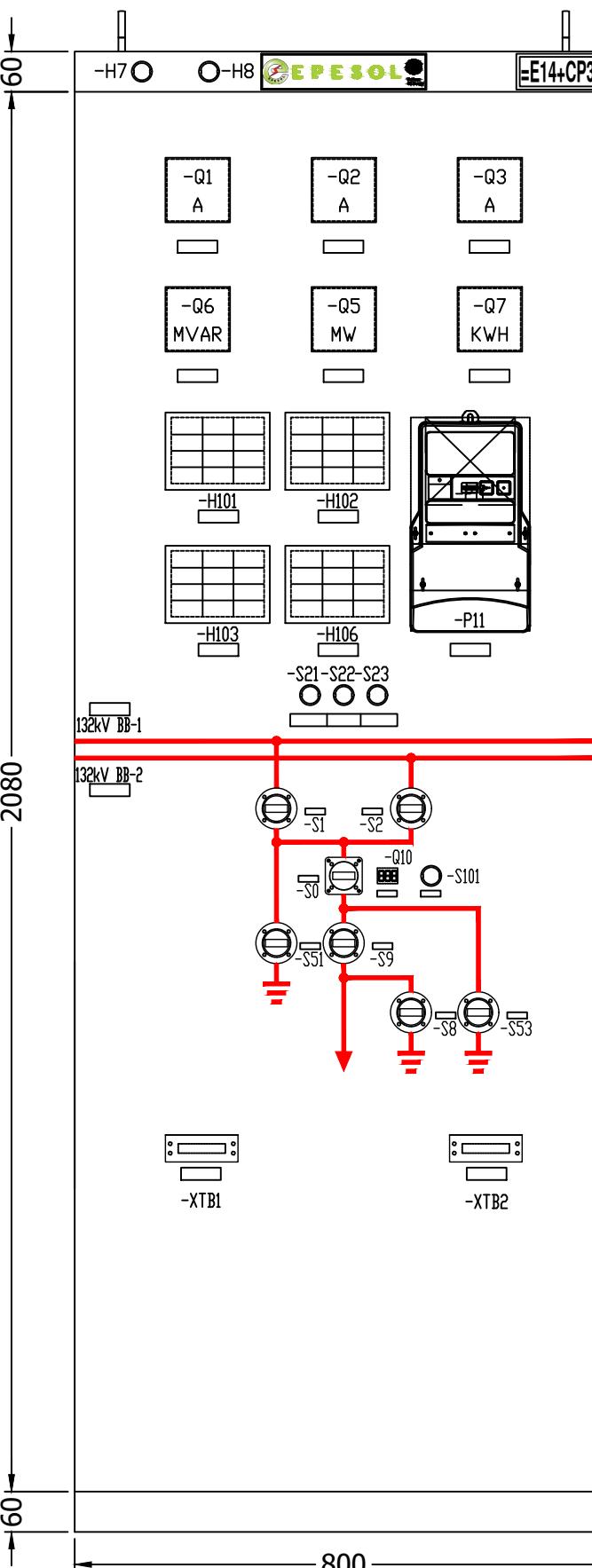
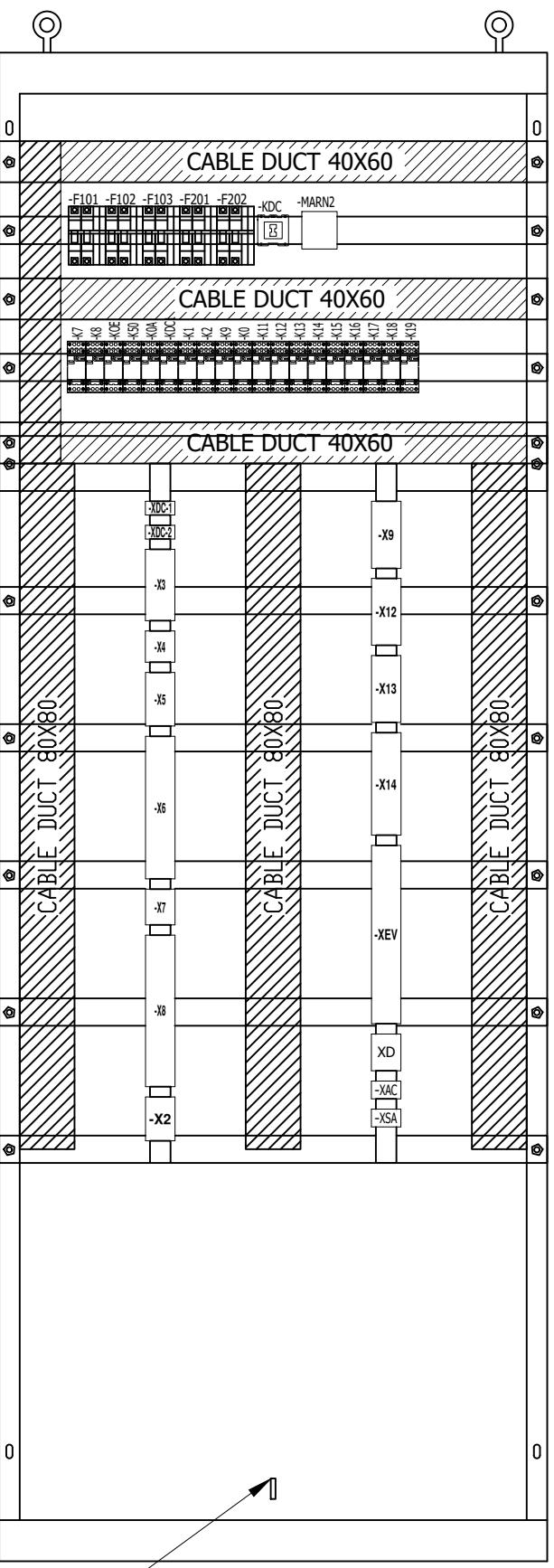
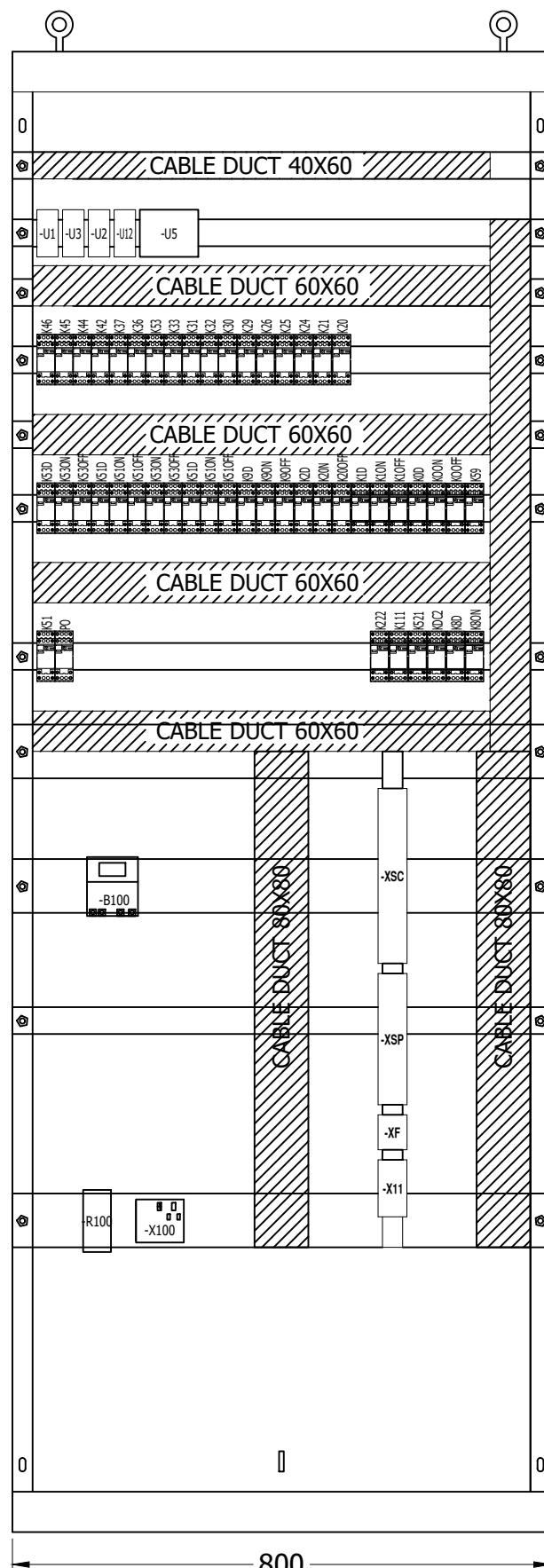
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type AB
									Sheet no. 03

	1	2	3	4	5	6	7	8		
	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER			
<i>All information contained in this document is the exclusive property of GE GRID SOLUTIONS and shall not be used, copied or communicated to third parties without its prior authorization.</i>	01	MWH+MVARTH 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			
A	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			
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: 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			
C	Application: 3PH+4W Balanced System		ORD: A96MMA							
	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			
D	Application: 3PH+4W Balanced System		ORD: A96MMA							
	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: MCoup4			-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			
	ORD: ENERIUM 150									
F	03	ANNUNCIATOR	TWELVE WINDOW ANNUNCIATOR, RATED VOLTAGE 110 VDC, ORD: AM-101			-H101, -H102, -H103	ELABS			
	01	ANNUNCIATOR	TWELVE WINDOW ANNUNCIATOR, RATED VOLTAGE 240 VAC, ORD: AM-101			-H106	ELABS			
G	01	PUSH BUTTON - LAMP TEST	TYPE: SWITCH (A TYPE:), COLOR : BLACK , SUPPLY : 120VDC, Ord: YS-AP1-2-31-B-D-W			-S21	YONGSUNG			
	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  EPE SOL 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 GHAZI ROAD, LAHORE	Title 132KV LINE CONTROL PANEL (=E14+CP31) COMPONENT LIST	Drawing no. P60194-E-ELC-SC-008	
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				
	67	AUXILIARY CONTACTOR	COIL VOLTAGE: 110VDC, 4 C/O CONTACTS, ORD: PRC4M40DCJL			-K0E, -K50, -K0A, -KDC-1, -K1, -K2, -K9, -K0, -K11 TO -K20, -K21 TO -K34, -K35 TO -K38, -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, Lahore, Pakistan	Contractor  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 (=E14+CP31) COMPONENT LIST	Drawing no. P60194-E-ELC-SC-008	
	REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type AC2	Sheet no. 05

	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			
B	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			
C	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			
D	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				
E	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			
F	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			
G	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, Lahore, Pakistan	Contractor  GE 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 (=E14+CP31) COMPONENT LIST	Drawing no. P60194-E-ELC-SC-008
	REV.	DESCRIPTION	DATE	DRAWER		Project no. P-60194	Sheet type AC2	Sheet no. 05		

	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	A	
B	07	TERMINAL BLOCKS WITH DIODE TYPE IN-D4007, RATED MAXIMUM VOLTAGE 350VDC, RATED BREAK DOWN VOLTAGE 430VDC	TYPE: DAS.4/6			-XD	CABUR	B	
C								C	
D								D	
E								E	
F								F	
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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-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 GHAZI ROAD, LAHORE	Title 132KV LINE CONTROL PANEL (=E14+CP31) COMPONENT LIST	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194 Sheet type AC2 Sheet no. 05	

FRONT VIEWLEFT SIDE VIEWRIGHT SIDE VIEW

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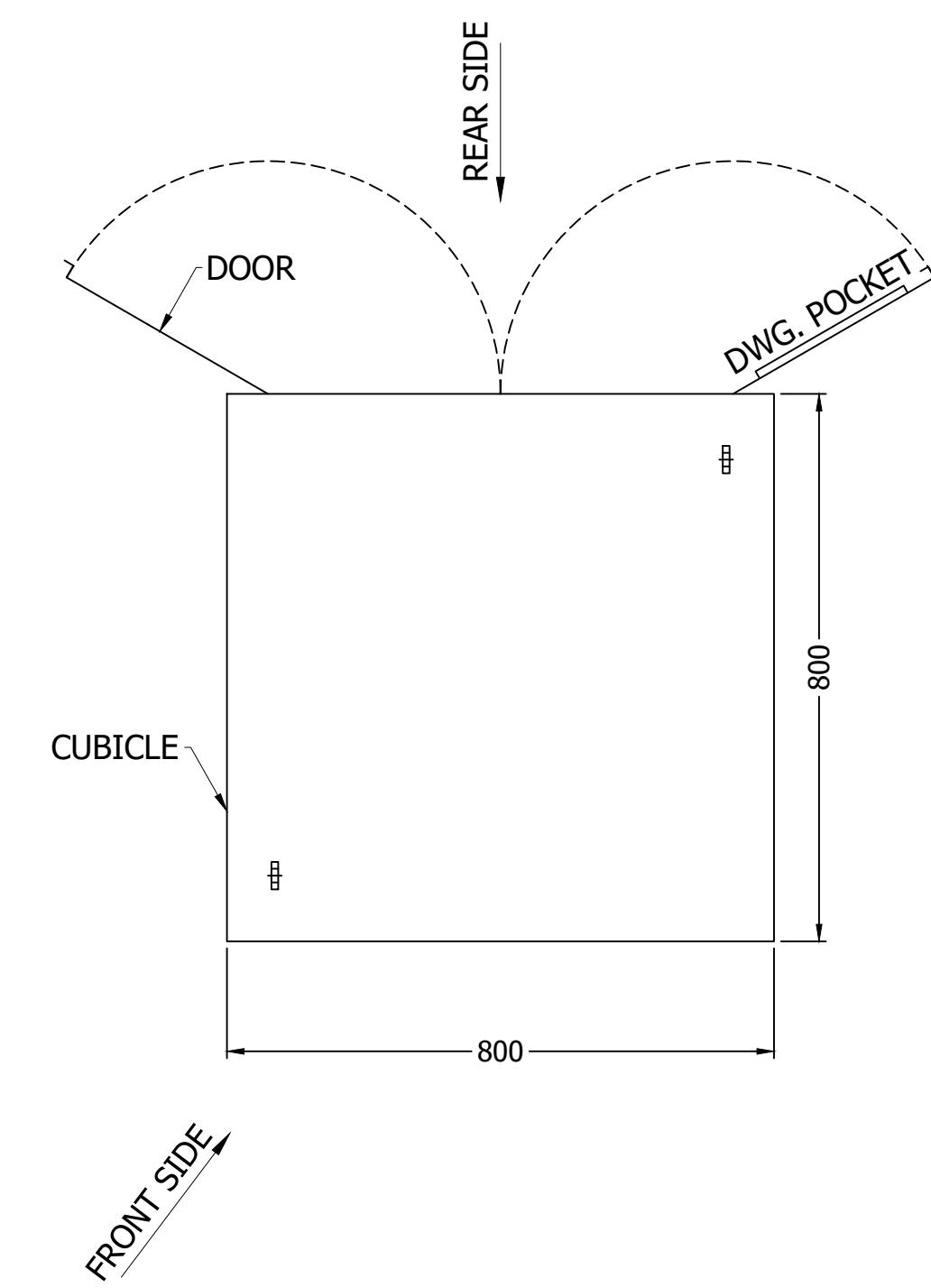
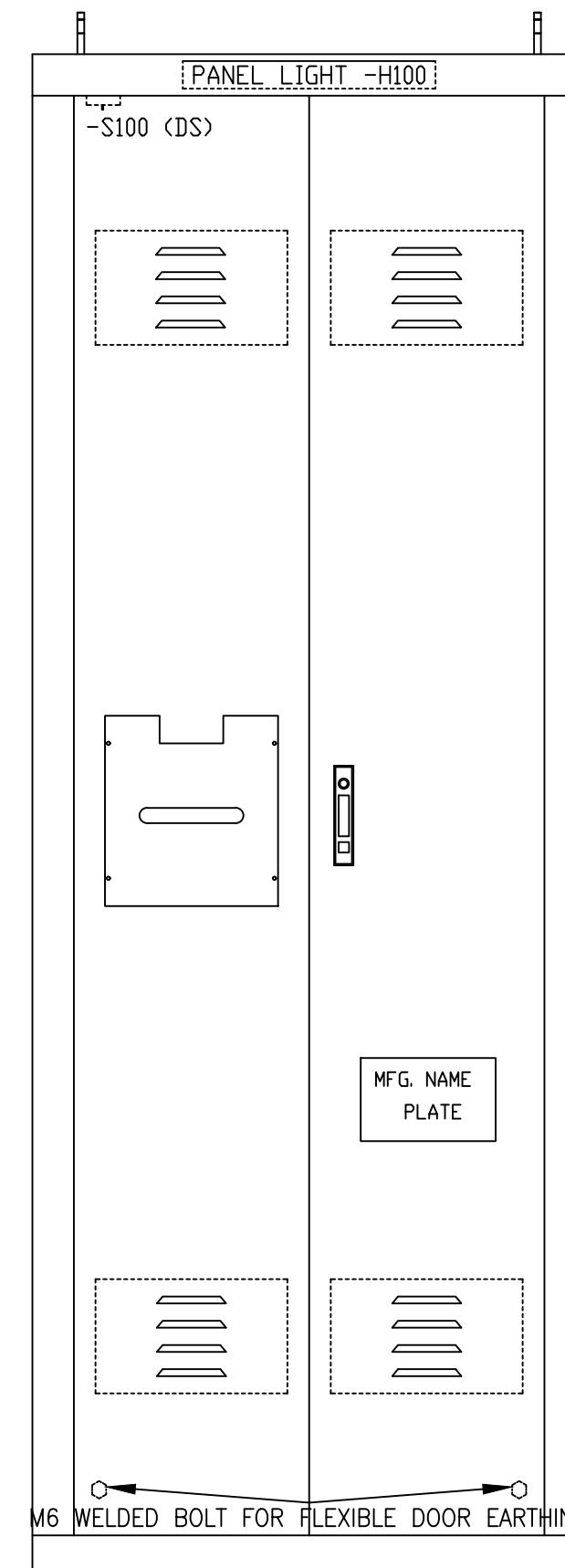
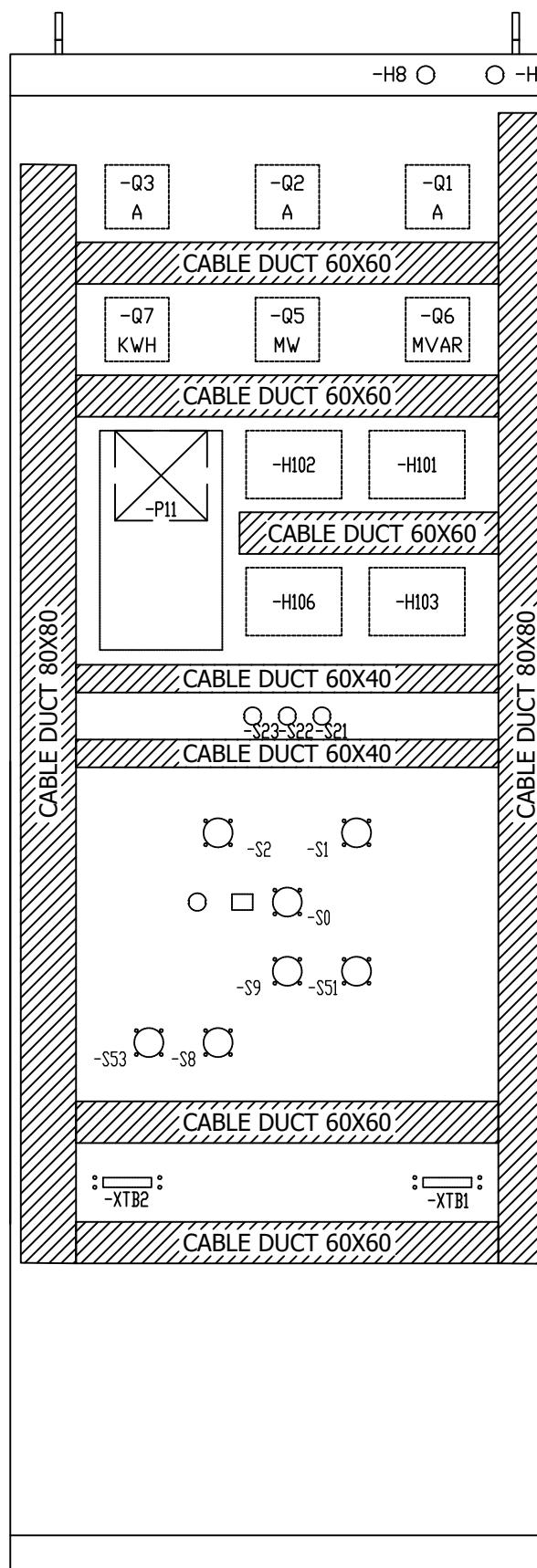
0	AS BUILT	19-10-2018	ASJ	Manufacturer EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) PANEL VIEWS	Drawing no. P60194-E-ELC-SC-002	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type AD	Sheet no. 06

BACK VIEW WITHOUT DOOR

BACK VIEW WITH DOOR

TOP VIEW

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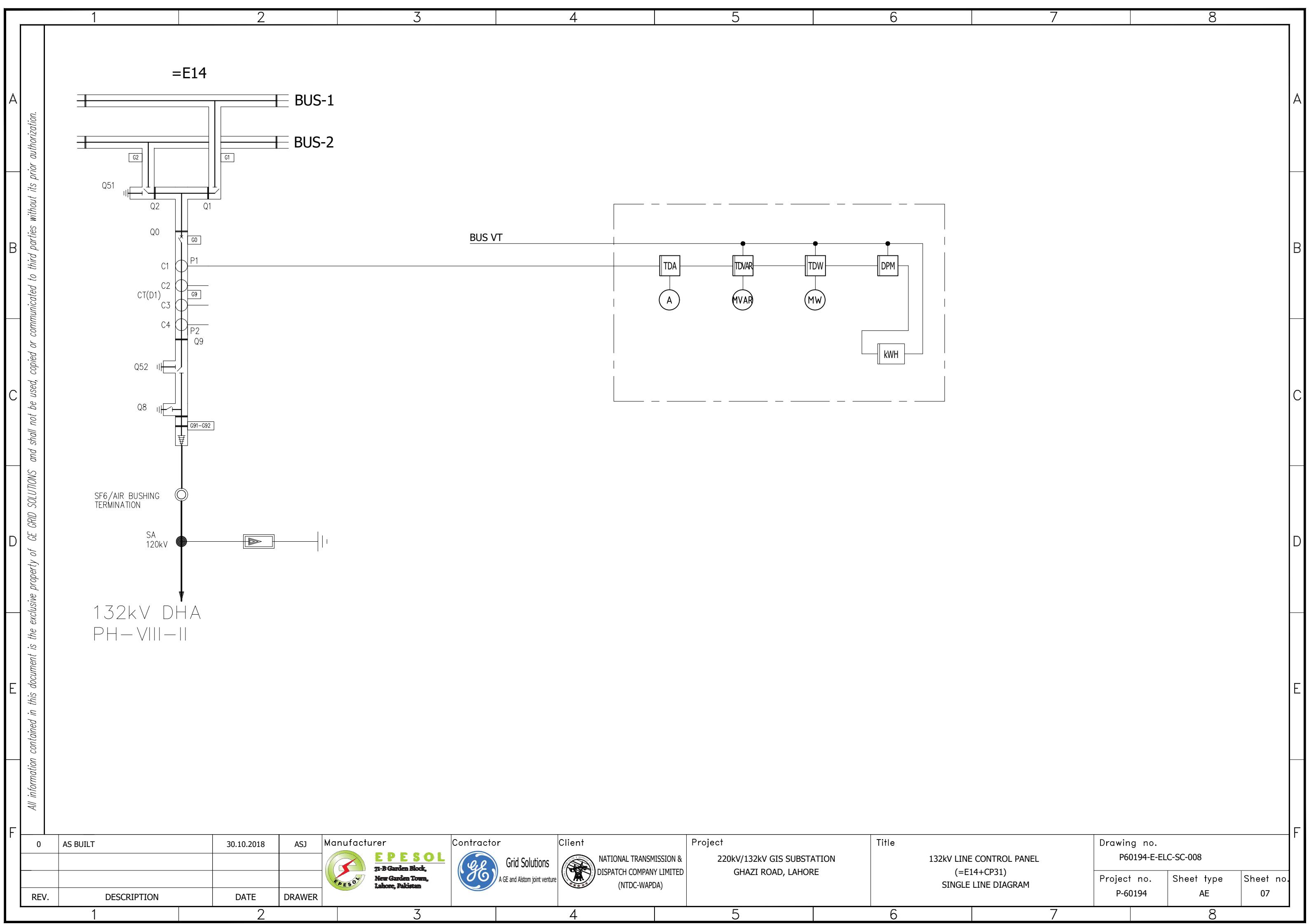


NOTE:-

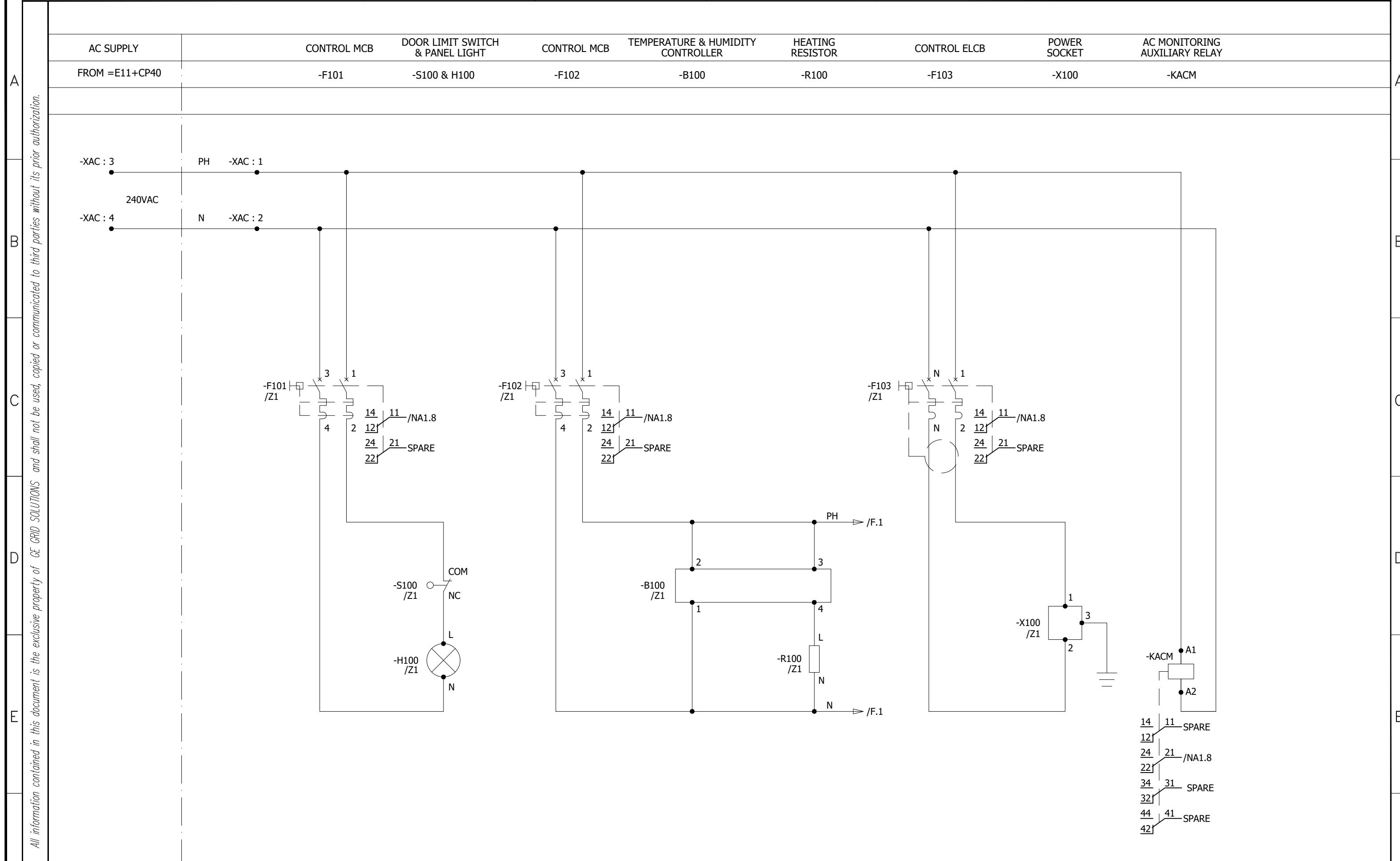
- 1 - PANEL DIMENSION: 800 x 800 x 2200mm (WxDxH)
 - 2 - COLOR : RAL 7032
 - 3 - SHEET THICKNESS : 2-2.5 mm
 - 4- PROTECTION CLASS : IP-51 (INDOOR TYPE)
 - 5 - ALL DOOR FITTED WITH 16mm EARTH STRAP & INSULATED WITH GREEN-YELLOW COLOUR.

0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-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 (=E14+CP31) PANEL VIEWS	Drawing no. P60194-E-ELC-SC-008
									Project no. P-60194
									Sheet type AD
REV.	DESCRIPTION	DATE	DRAWER						Sheet no. 06

1 2 3 4 5 6 7 8



1 2 3 4 5 6 7 8



0	AS BUILT	30.10.2018	ASJ	Manufacturer EPESOL 71-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 GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) AC SUPPLY DISTRIBUTION CIRCUIT	Drawing no. P60194-E-ELC-SC-008
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type D
									Sheet no. 08

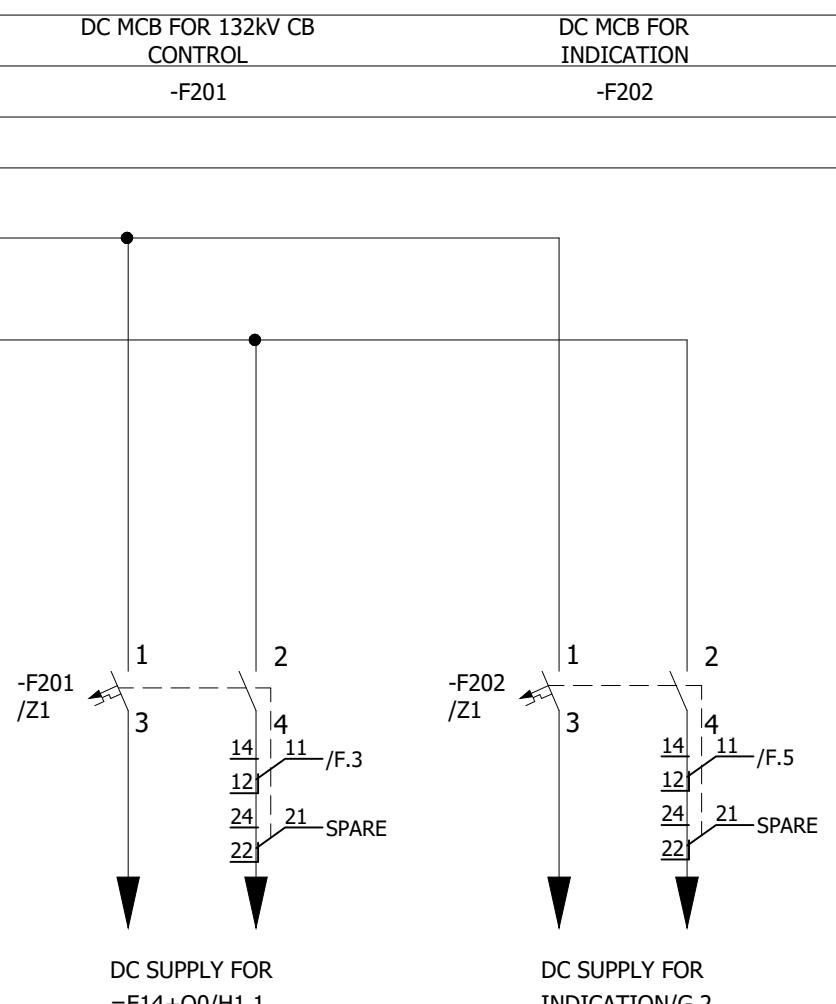
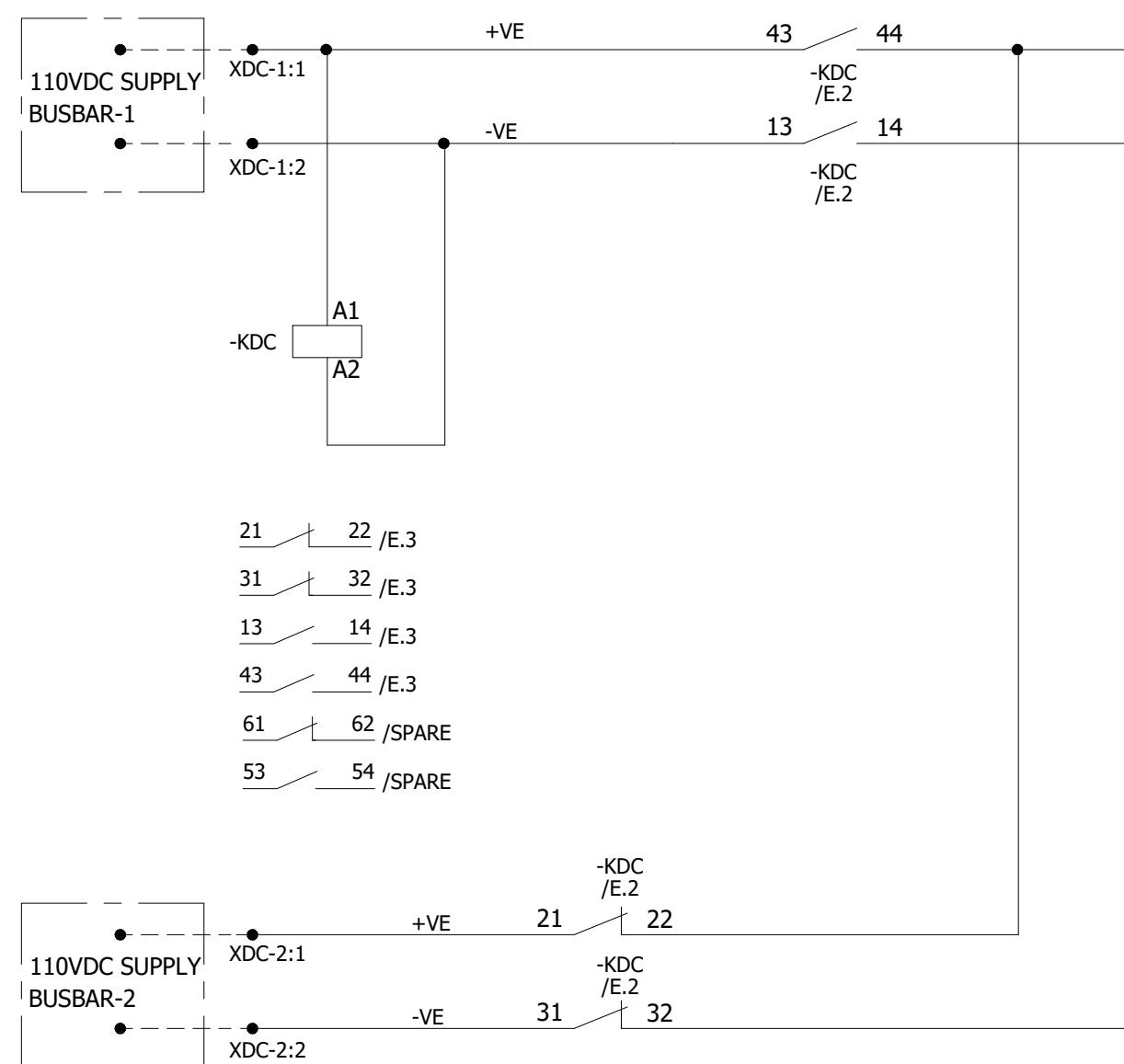
1 2 3 4 5 6 7 8

DC MCB FOR 132kV CB
CONTROLDC MCB FOR
INDICATION

-F201

-F202

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0	AS BUILT	30.10.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
REV.	DESCRIPTION	DATE	DRAWER	EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	132kV LINE CONTROL PANEL (=E14+CP31) DC SUPPLY DISTRIBUTION CIRCUIT	P60194-E-ELC-SC-008
									Project no. P-60194 Sheet type E Sheet no. 09

CONTROL SUPPLY

INDICATION SUPPLY

CONTROL SUPPLY CONTROL SUPPLY MCB

DC HEALTHY

INDICATION
SUPPLY MCBINDICATION
SUPPLY DC UNHEALTHYDC SUPERVISION
RELAY

TRIPPED

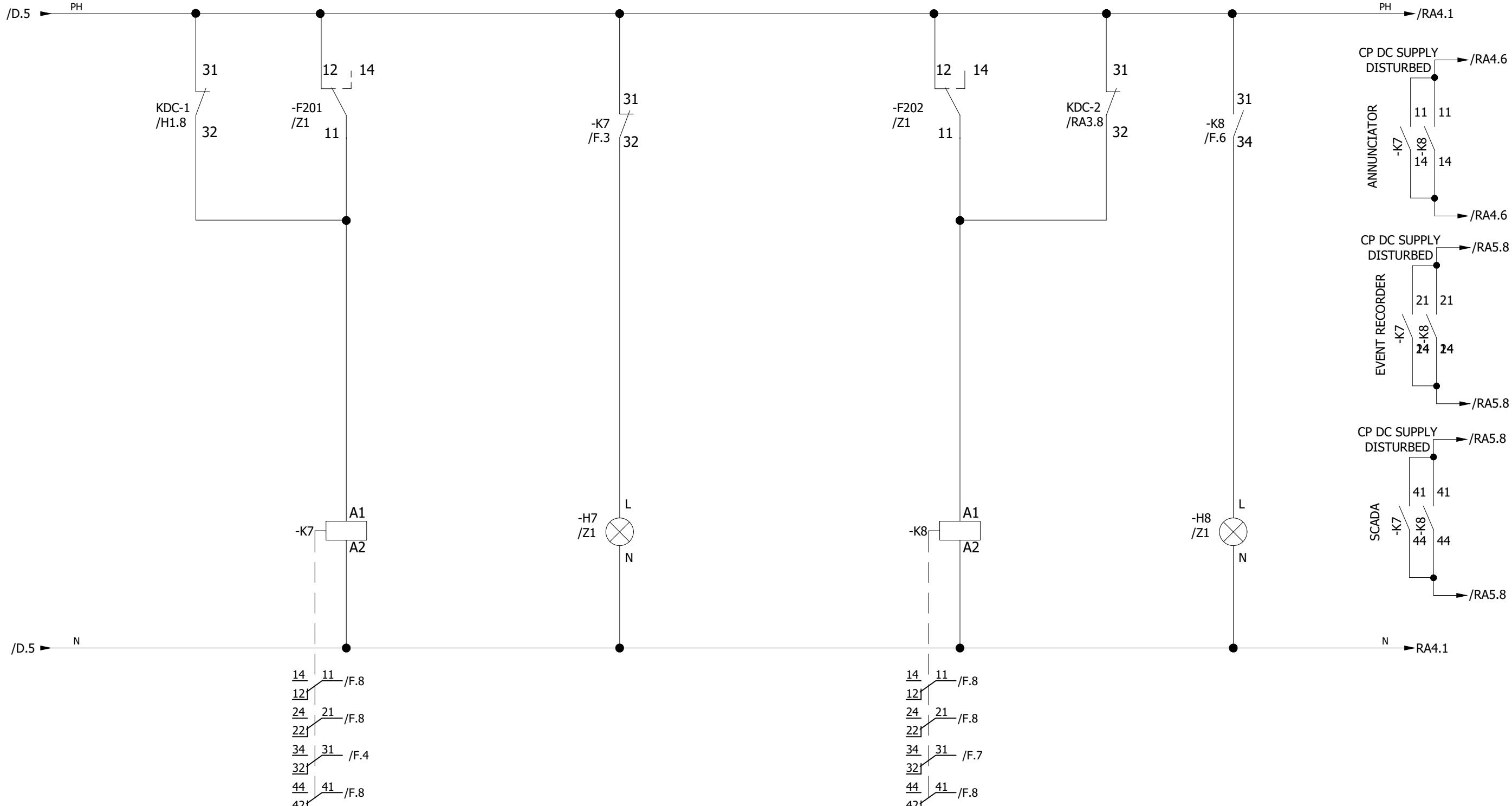
IND. LAMP

TRIPPED

DC SUPERVISION

RELAY

IND. LAMP



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A

A

B

B

C

C

D

D

E

E

F

F

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0	AS BUILT	30.10.2018	ASJ	Manufacturer EPE SOL 71-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 GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) DC SUPPLY FAILURE ALARM CIRCUIT	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type F
									Sheet no. 10

1 2 3 4 5 6 7 8

TEST BLOCK

TS

AM METERS

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

MW METER (-Q5)

WITH TRANSDUCER (-U5)

MVAR METER (-Q6)

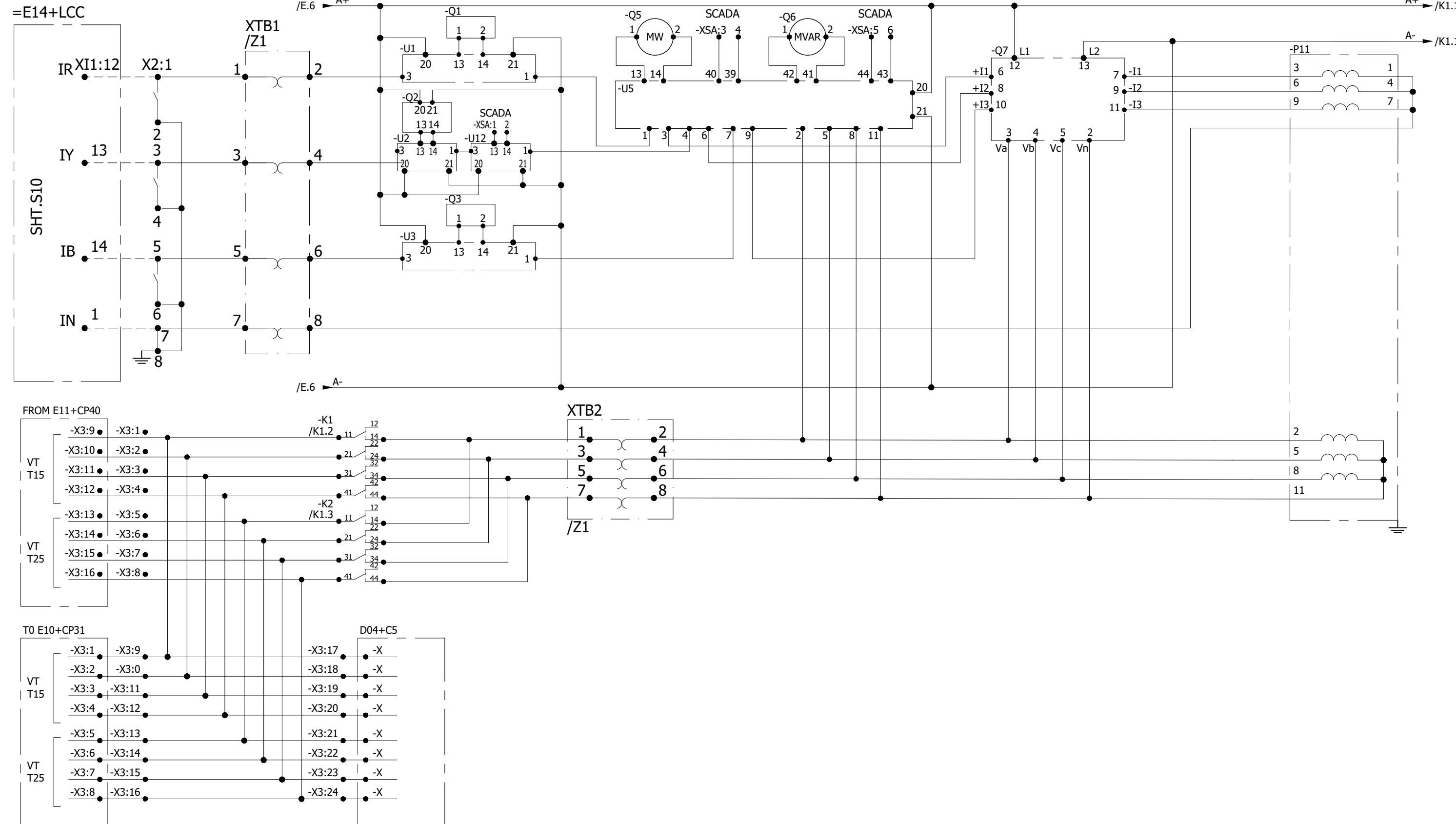
DIGITAL POWER
METER

REVENUE METER

(-Q7)

(-P11)

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0	AS BUILT	30.10.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.		
REV.	DESCRIPTION	DATE	DRAWER	EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	132kV LINE CONTROL PANEL (-E14+CP31) METERING	P60194-E-ELC-SC-008		
									Project no. P-60194	Sheet type G	Sheet no. 11

1 2 3 4 5 6 7 8

1 2 3 4 5 6 7 8

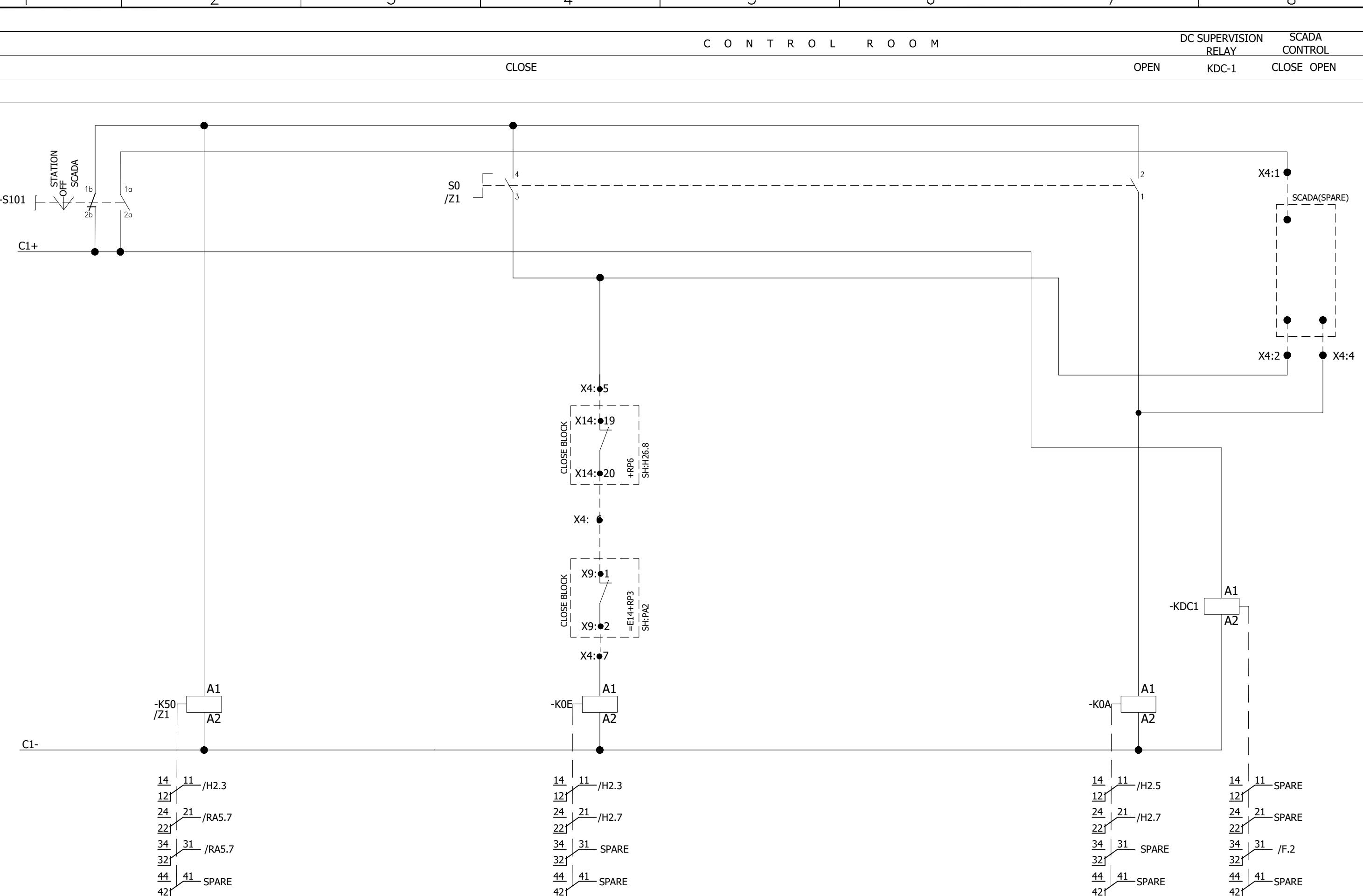
C O N T R O L R O O M

DC SUPERVISION
RELAYSCADA
CONTROL

OPEN KDC-1 CLOSE OPEN

CLOSE

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0	AS BUILT	30.10.2018	ASJ	Manufacturer EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor GE Grid Solutions A GE and Alstom joint venture	Client NTDC-WAPDA NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) CB CONTROL CIRCUIT	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type H1
									Sheet no. 12

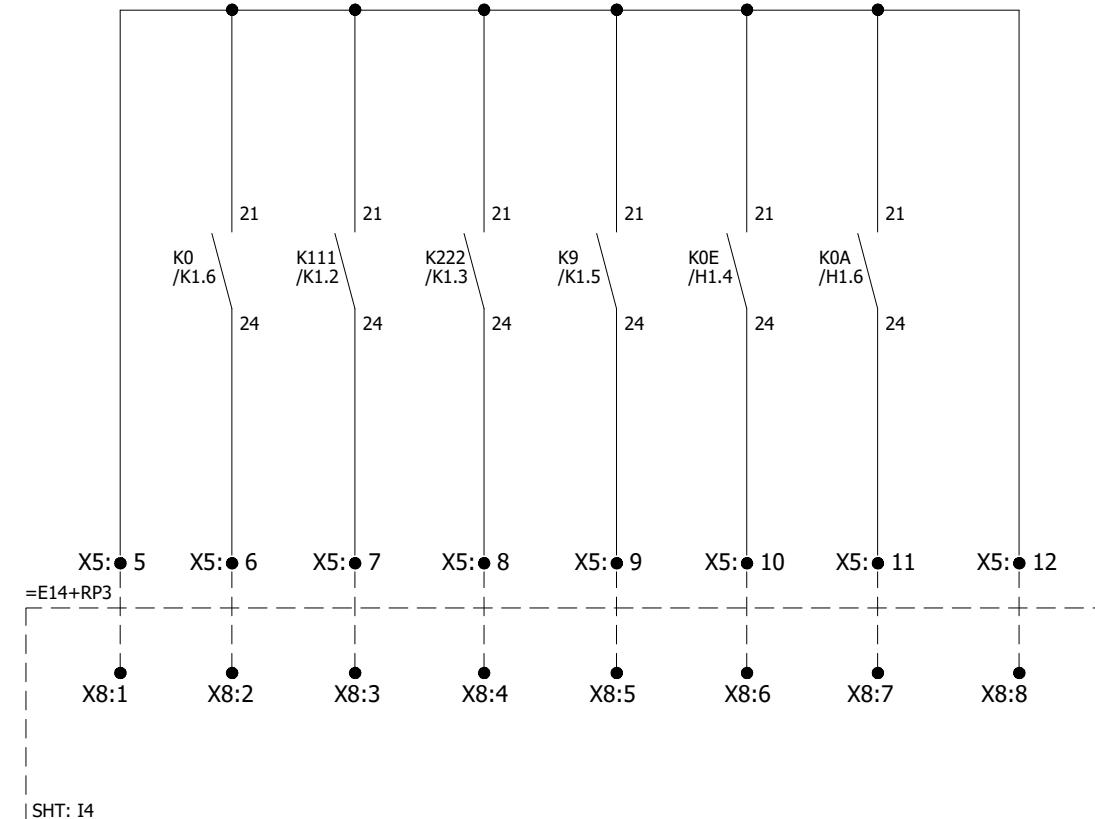
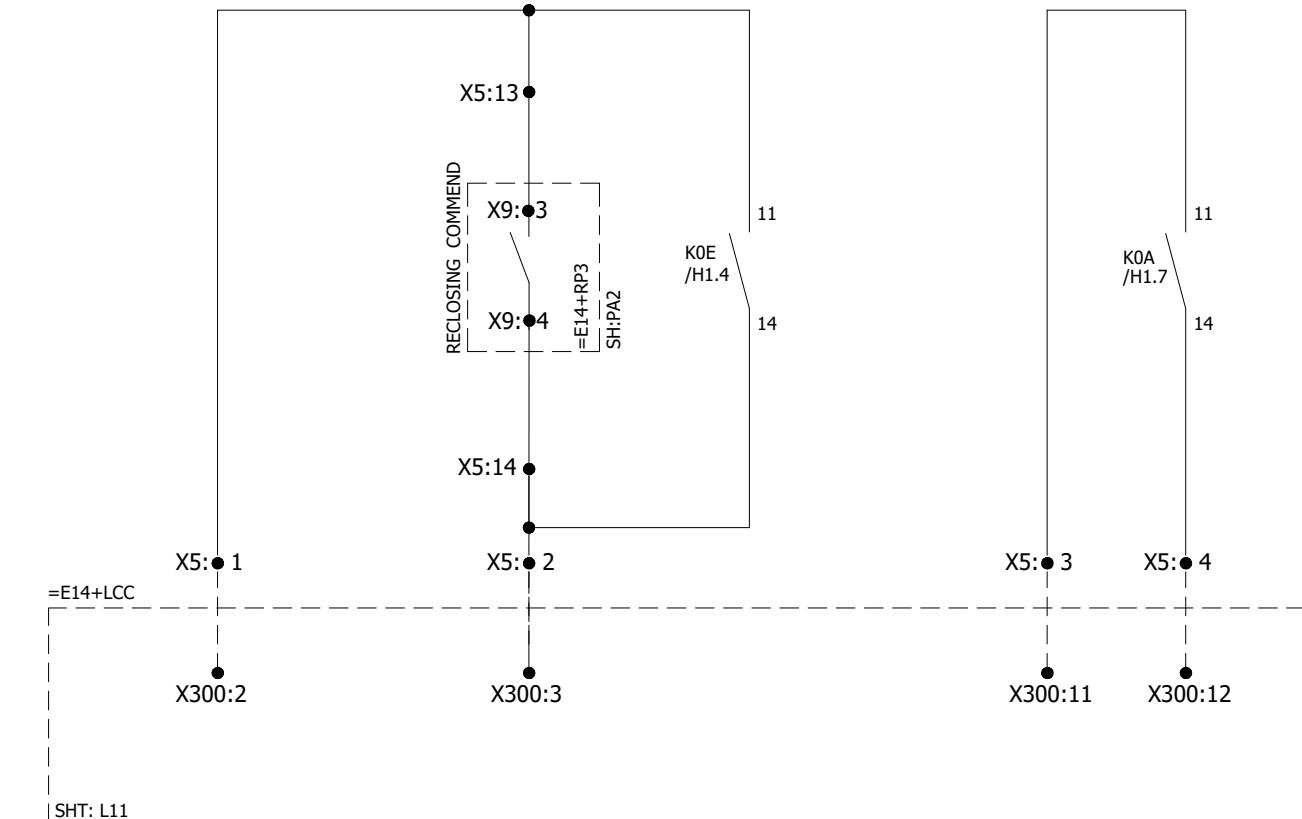
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C O N T R O L R O O M C O N T R O L

AUTORECLOSE(SPARE)

CLOSE

OPEN



CB CLOSE STATUS

Q1 CLOSE STATUS

Q2 CLOSE STATUS

Q9 CLOSE STATUS

MANUAL CLOSE INPUT FOR DISTANCE RELAY

MANUAL OPEN INPUT FOR DISTANCE RELAY

A
B
C
D
E
F

A
B
C
D
E
F

0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-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 GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) CB CONTROL CIRCUIT	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type H2
									Sheet no. 13

=E14+Q1

CLOSE

OPEN

=E14+Q2

CLOSE

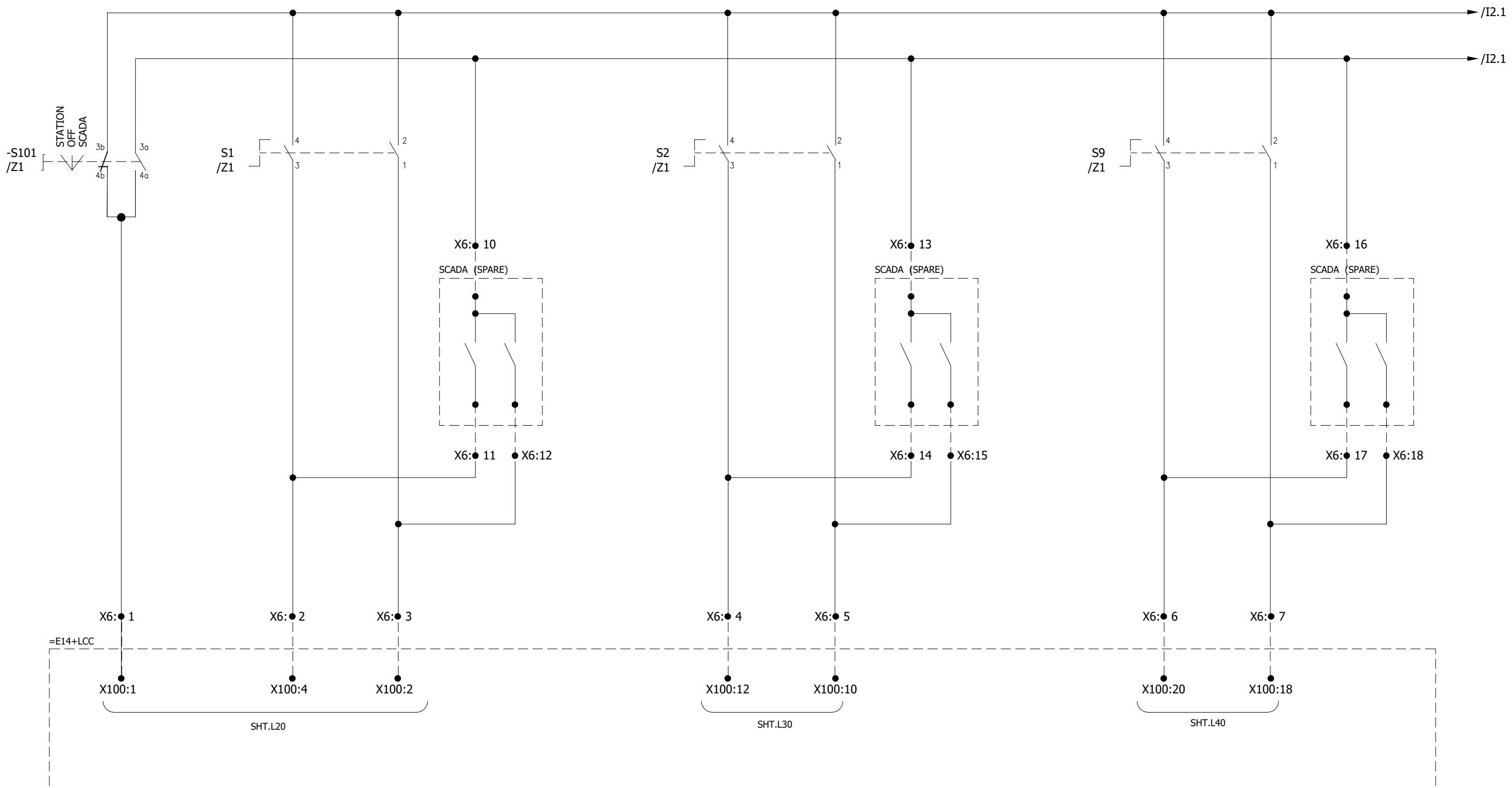
OPEN

=E14+Q9

CLOSE

OPEN

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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-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 GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) DISCONNECTOR & EARTH SWITCH CONTROL	Drawing no. P60194-E-ELC-SC-008
									Project no. P-60194
REV.	DESCRIPTION	DATE	DRAWER						Sheet type I1
									Sheet no. 14

1

2

3

4

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7

8

=E14+Q51

CLOSE OPEN

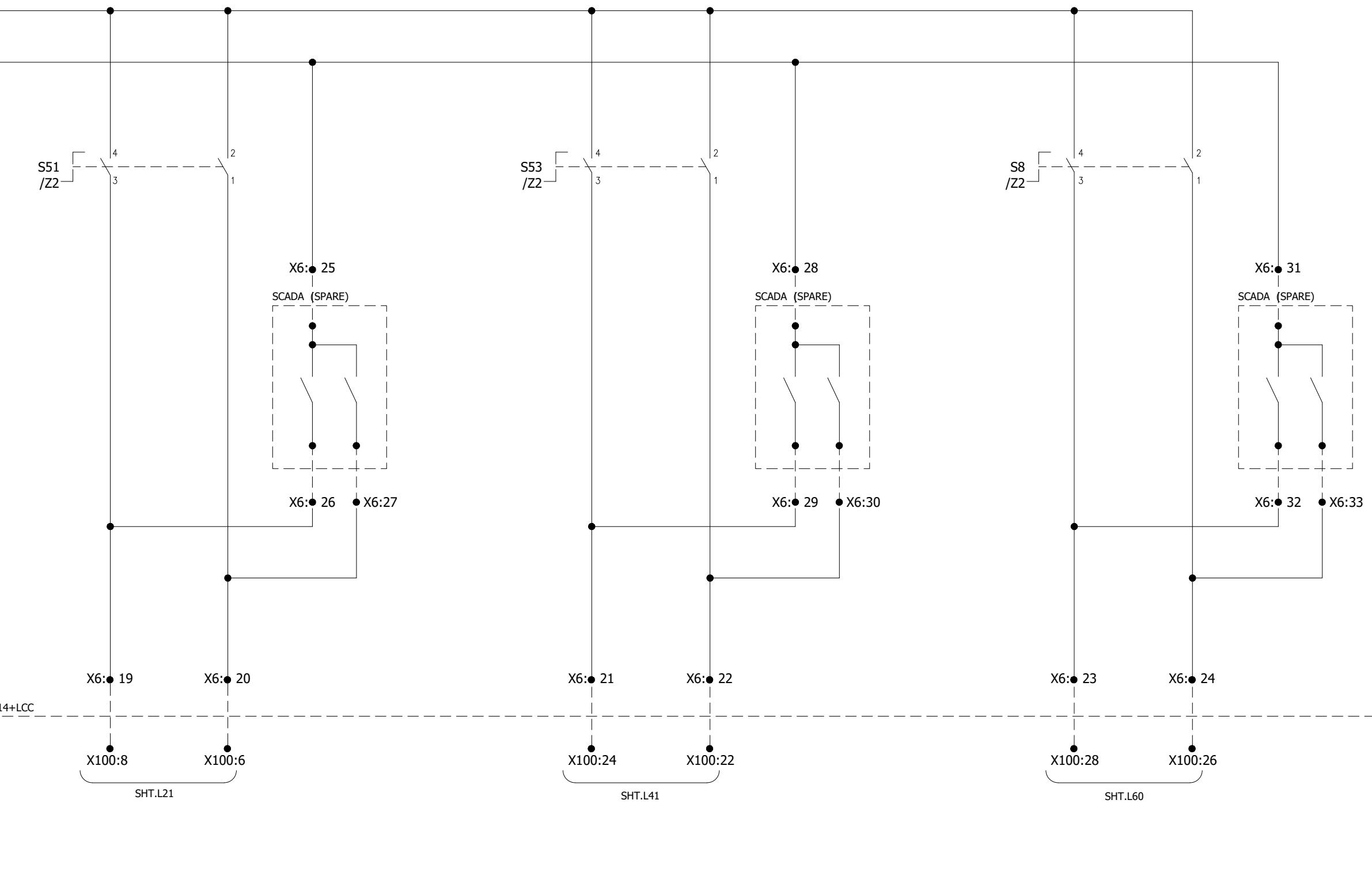
=E14+Q53

CLOSE OPEN

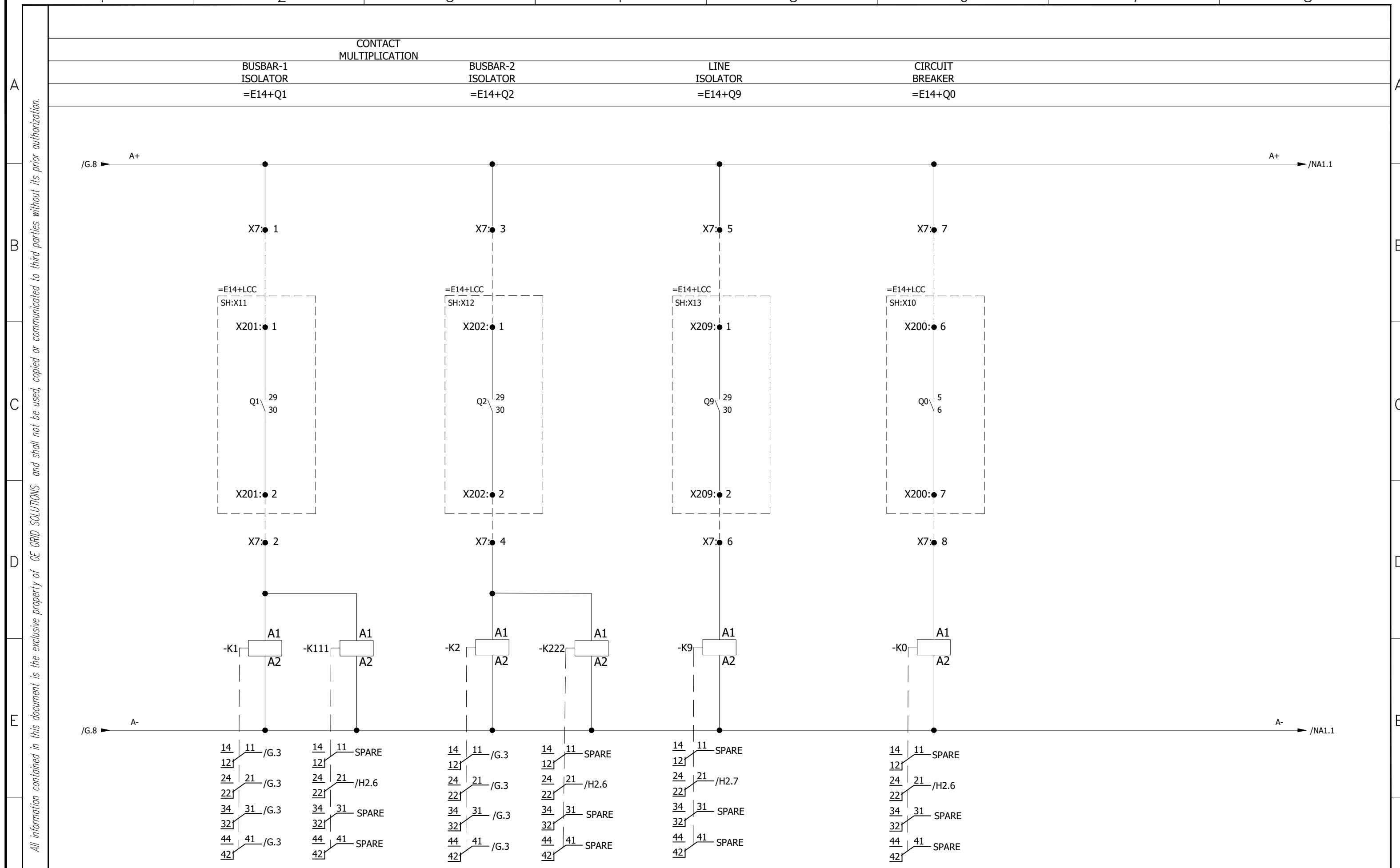
=E14+Q8

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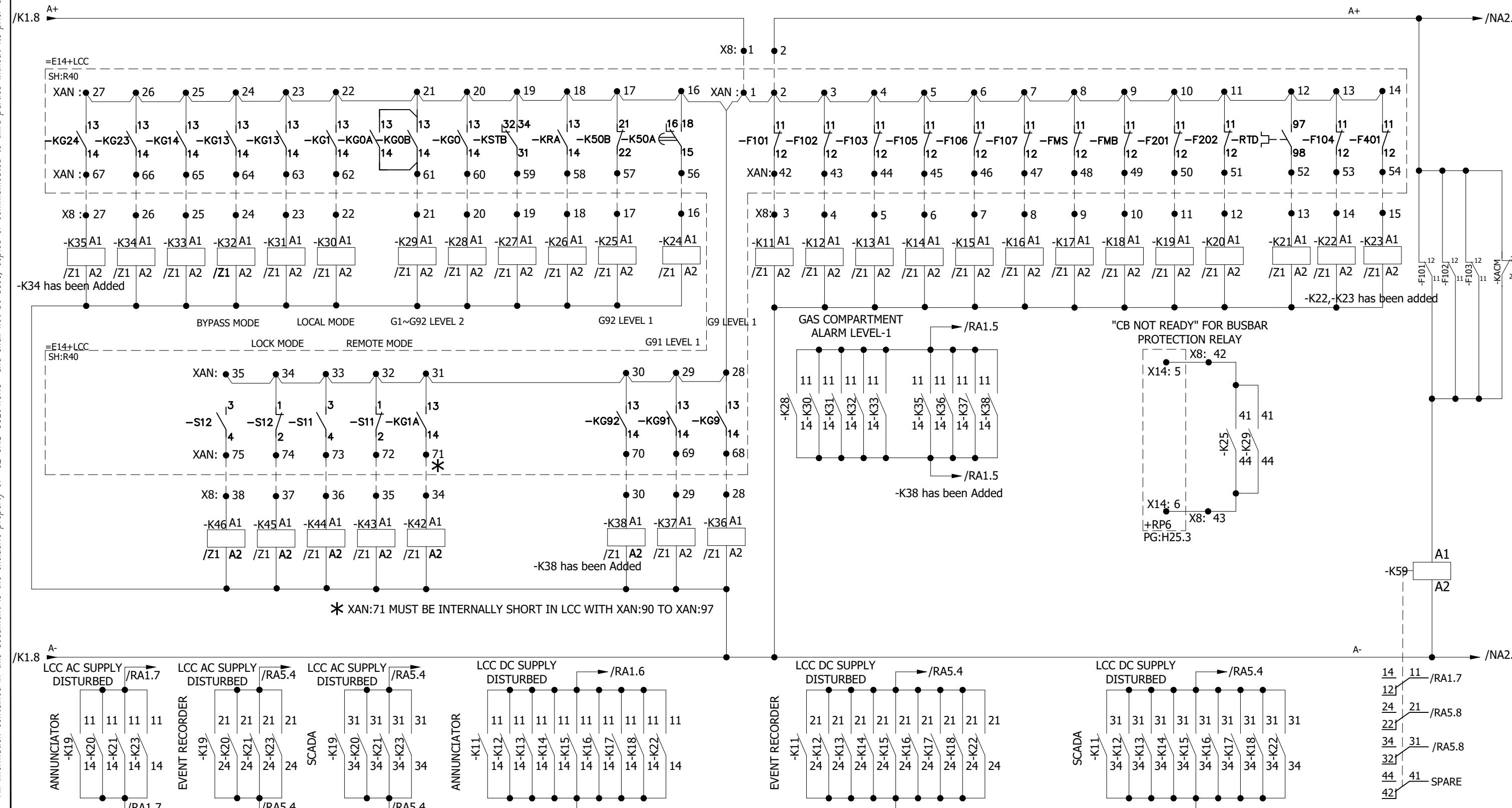


0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132KV LINE CONTROL PANEL (=E14+CP31) DISCONNECTOR & EARTH SWITCH CONTROL	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type I2
									Sheet no. 15



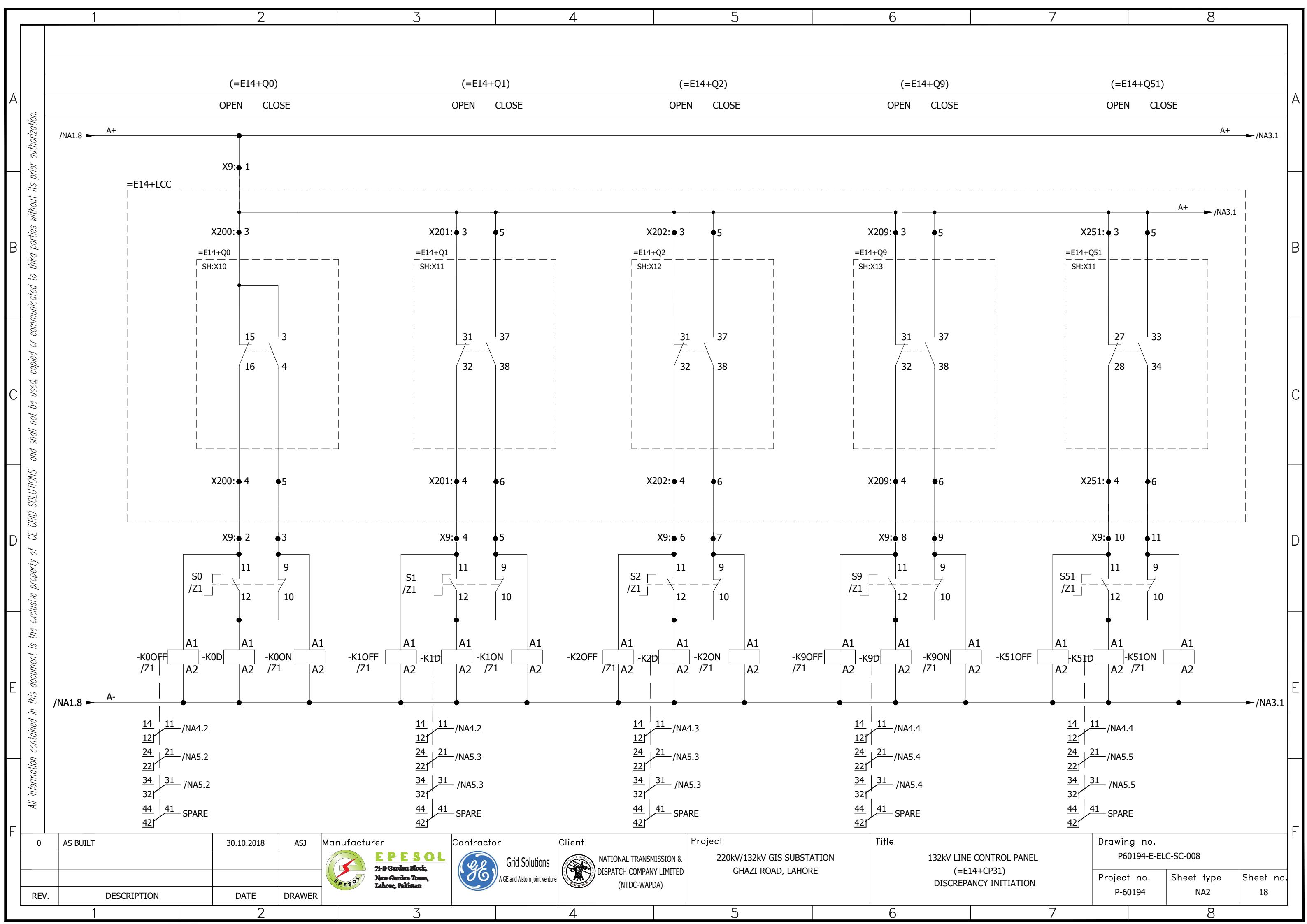
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REV.	DESCRIPTION	DATE	DRAWER	EPE SOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	132kV LINE CONTROL PANEL (=E14+CP31) CB/DISCONNECTOR CONTACT MULTIPLICATION	P60194-E-ELC-SC-008
									Project no. P-60194
									Sheet type K1 Sheet no. 16

1	2	3	4	5	6	7	8
A	CONTACT MULTIPLICATION	POSITION	LONG SPRING CHARGING TIME	CONTROL SUPPLY MCB TRIPPED	GAS MONITOR MCB TRIPPED	CB TRIPPING 1 MCB TRIPPED	LIGHTING AC SUPPLY MCB TRIPPED
G23 ALARM 1	G13 ALARM 1	G1 LEVEL 1	G0 ALARM REPEAT ABNORMAL	DS/ES/HES OPERATION TIME ABNORMAL	SPRING DISCHARGED	DS/ES/HES MOTOR SUPPLY MCB TRIPPED	CB MOTOR THERMAL OVERLOAD
G24 LEVEL 1	G14 ALARM 1	G2 LEVEL 1	G0 LOCK			ALARM SUPPLY MCB TRIPPED	AC LOOP SUPPLY MCB TRIPPED
						CB CLOSING MCB TRIPPED	PANEL'S AC SUPPLY FAIL
						CB TRIPPING 2 MCB TRIPPED	IL SUPPLY MCB TRIPPED
						CB MOTOR SUPPLY MCB TRIPPED	HEATING AC SUPPLY MCB TRIPPED



0	AS BUILT	30.10.2018	ASJ	Manufacturer	Contractor	Client	Project	Title	Drawing no.
				EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Grid Solutions A GE and Alstom joint venture	NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	132kV LINE CONTROL PANEL (=E14+CP31) ALARM MULTIPLICATION	P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194 Sheet type NA1 Sheet no. 17

1 2 3 4 5 6 7 8



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(-E14+Q53)

OPEN CLOSE

(-E14+Q8)

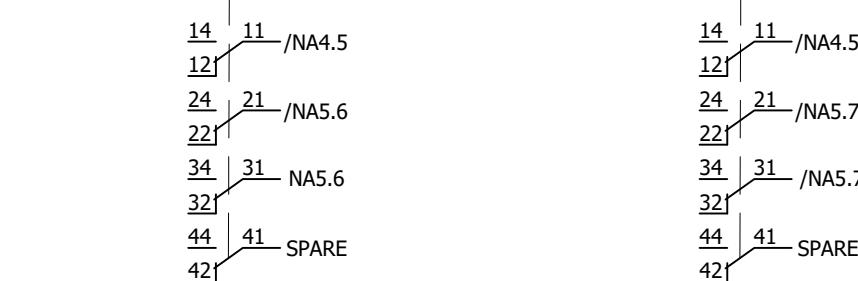
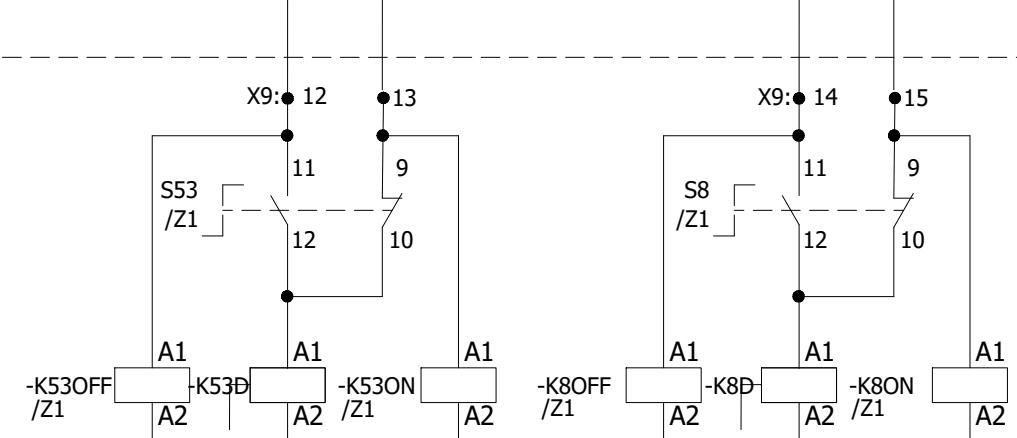
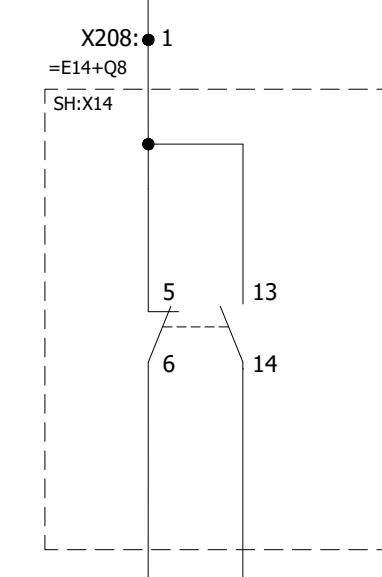
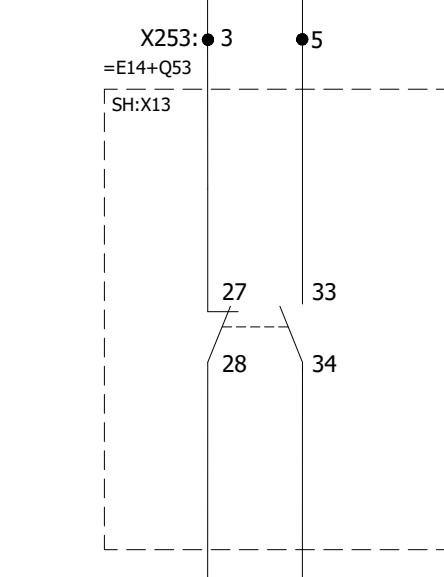
OPEN CLOSE

/NA2.8 → A+

A+ → /NA4.1

=E14+LCC

/NA2.8 → A+



/NA2.8 → A-

A- → /NA4.1

0	AS BUILT	30.10.2018	ASJ
REV.	DESCRIPTION	DATE	DRAWER

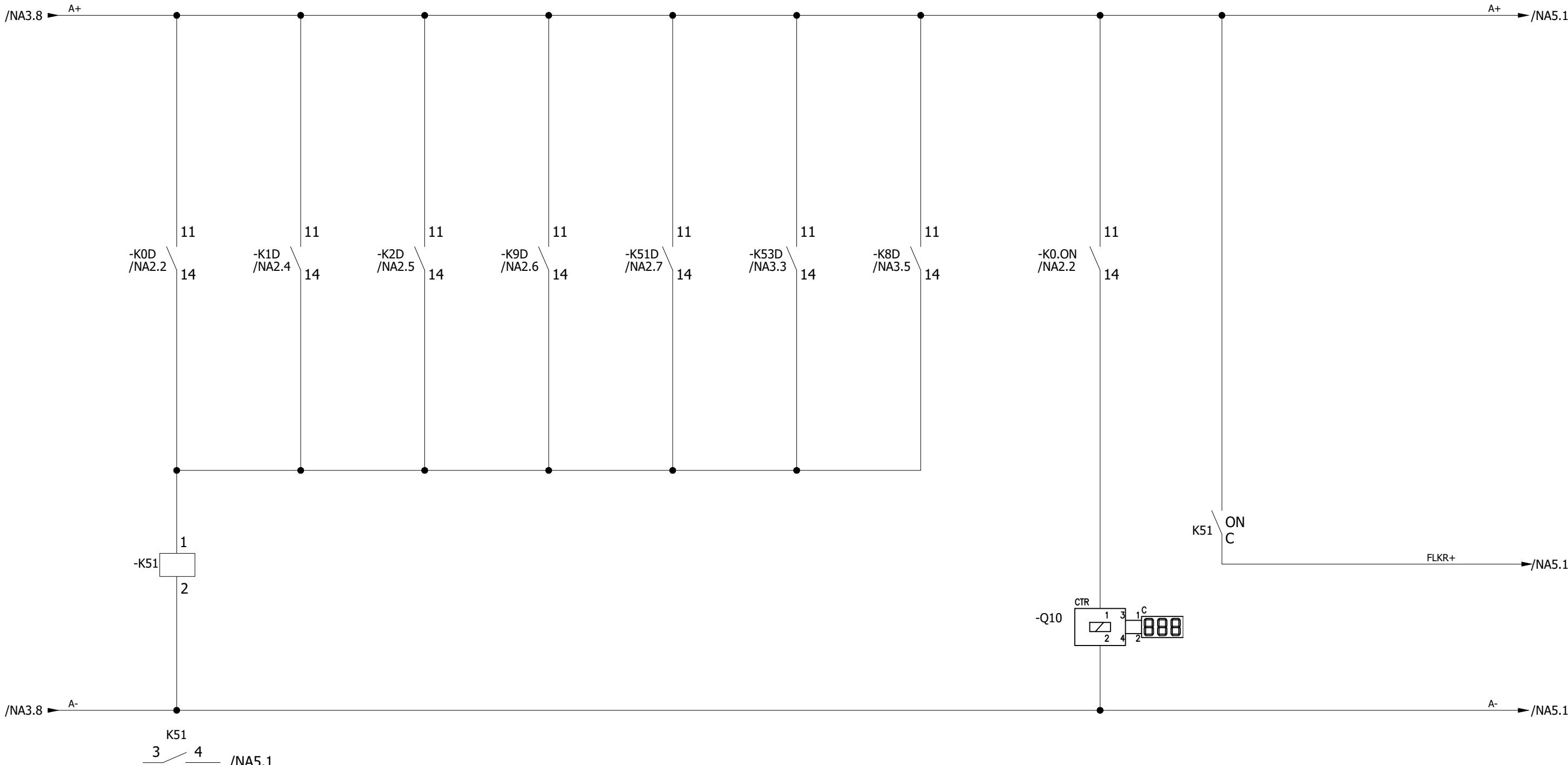
Manufacturer	Contractor	Client
 EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	 Grid Solutions A GE and Alstom joint venture	 NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)

Project	Title	Drawing no.
220KV/132KV GIS SUBSTATION	132KV LINE CONTROL PANEL (=E14+CP31) DISCREPANCY INITIATION	P60194-E-ELC-SC-008
GHAZI ROAD, LAHORE		Project no. P-60194

Sheet type	Sheet no.
NA3	19

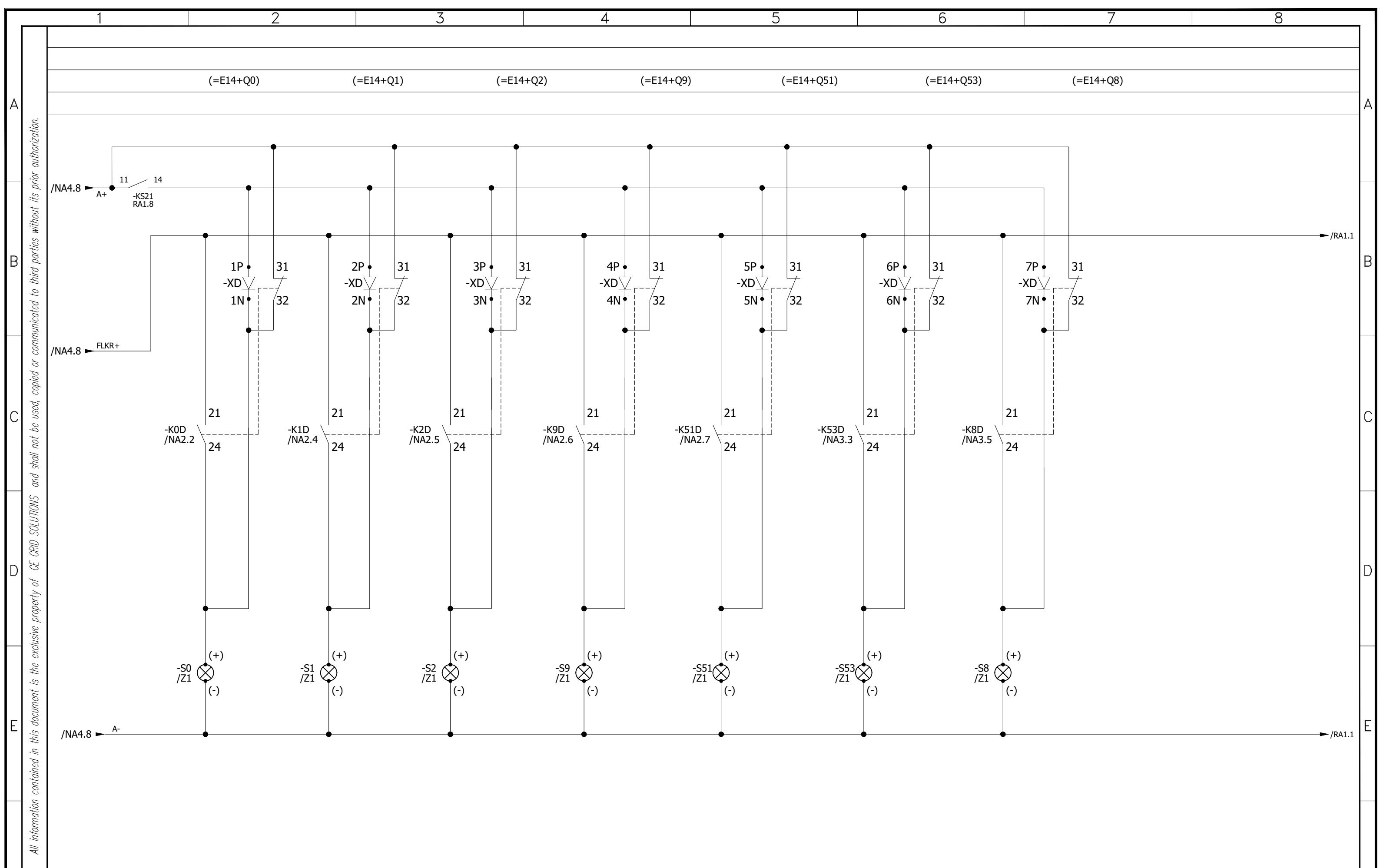
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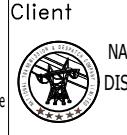
OFF/ON (=E14+Q0)	OFF/ON (=E14+Q1)	OFF/ON (=E14+Q2)	OFF/ON (=E14+Q9)	OFF/ON (=E14+Q51)	OFF/ON (=E14+Q53)	OFF/ON (=E14+Q8)	CIRCUIT BREAKER OPERATION COUNTER (-Q10)
---------------------	---------------------	---------------------	---------------------	----------------------	----------------------	---------------------	--



0	AS BUILT		30.10.2018	ASJ	Manufacturer  EPESOL 71-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 GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) DISCREPANCY INITIATION	Drawing no. P60194-E-ELC-SC-008		
REV.	DESCRIPTION		DATE	DRAWER						Project no. P-60194	Sheet type NA4	Sheet no. 20
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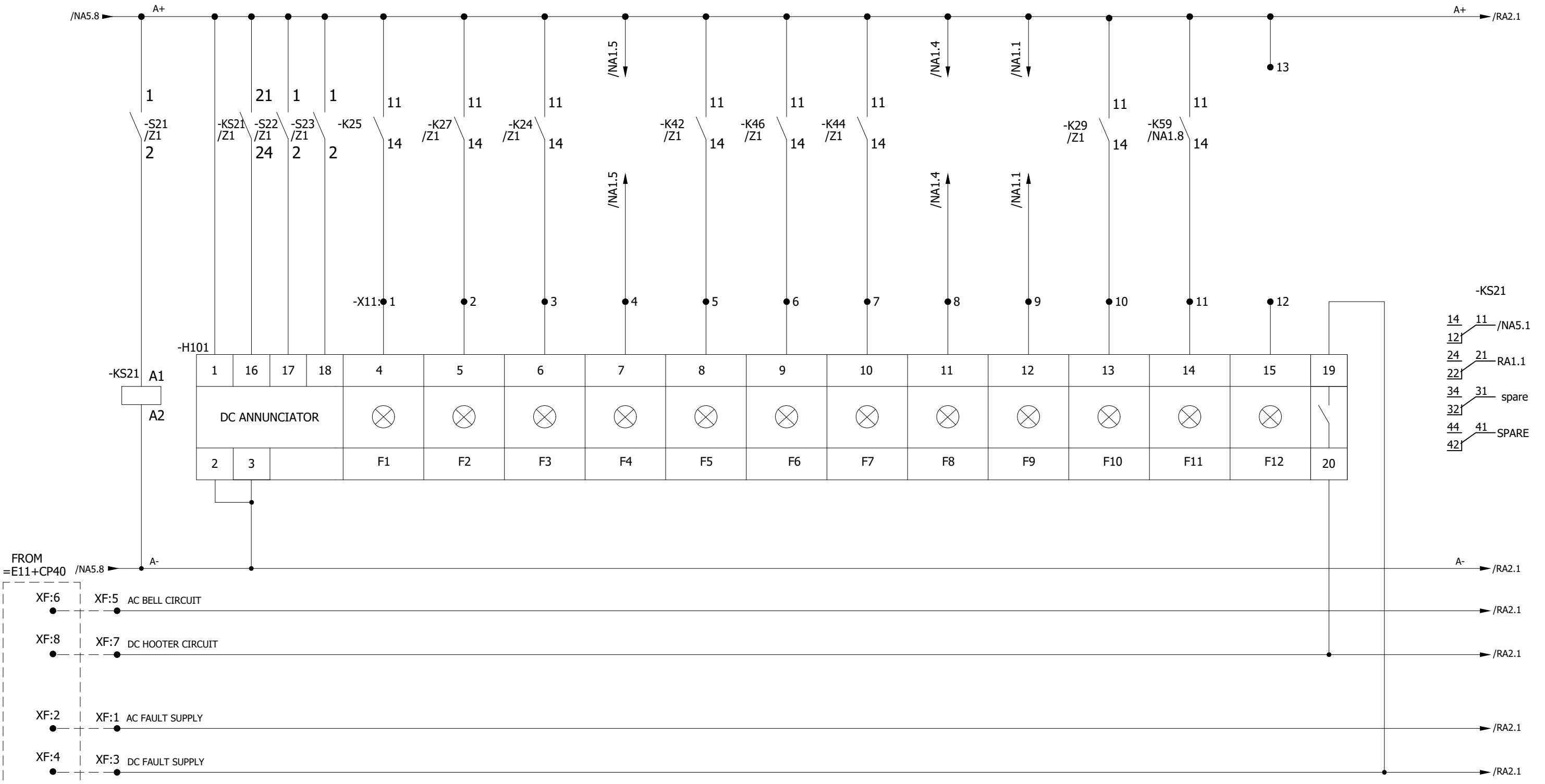
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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPE SOL 7a-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) DISCREPANCY INDICATIONS	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type NA5
									Sheet no. 21

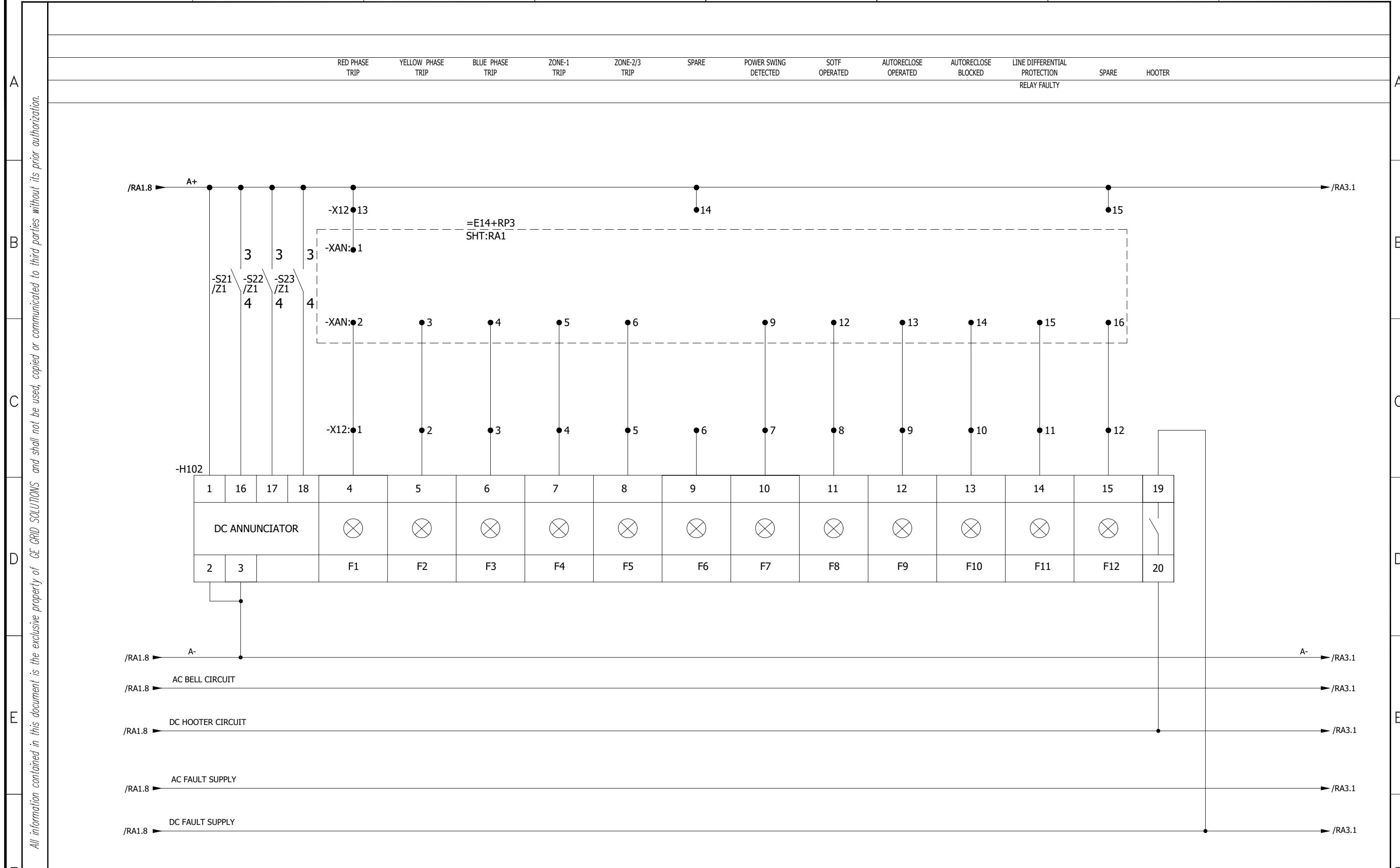
SPRING
DISCHARGED DS/ES/HES OPERATION
TIME ABNORMAL LONG SPRING
CHARGING TIME GAS COMPARTMENT
ALARM LEVEL-1 GAS COMPARTMENT
ALARM LEVEL-2 LCC BYPASS MODE
LCC LOCAL MODE DC SUPPLY DISTURBED
AC SUPPLY
DISTURBED GO LOCK CONTROL PANEL AC
SUPPLY FAILURE SPARE HOOTER

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

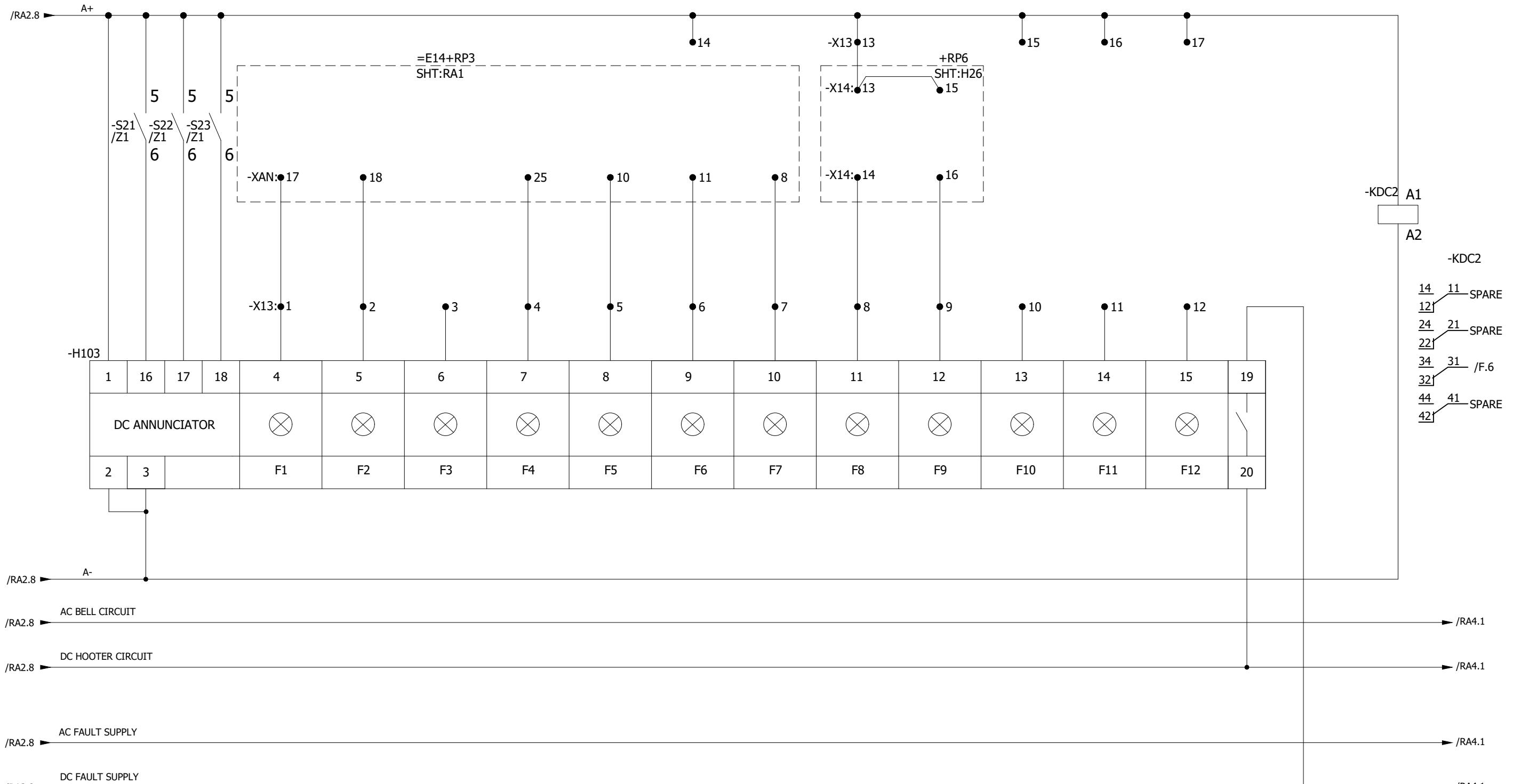
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type RA1
									Sheet no. 22



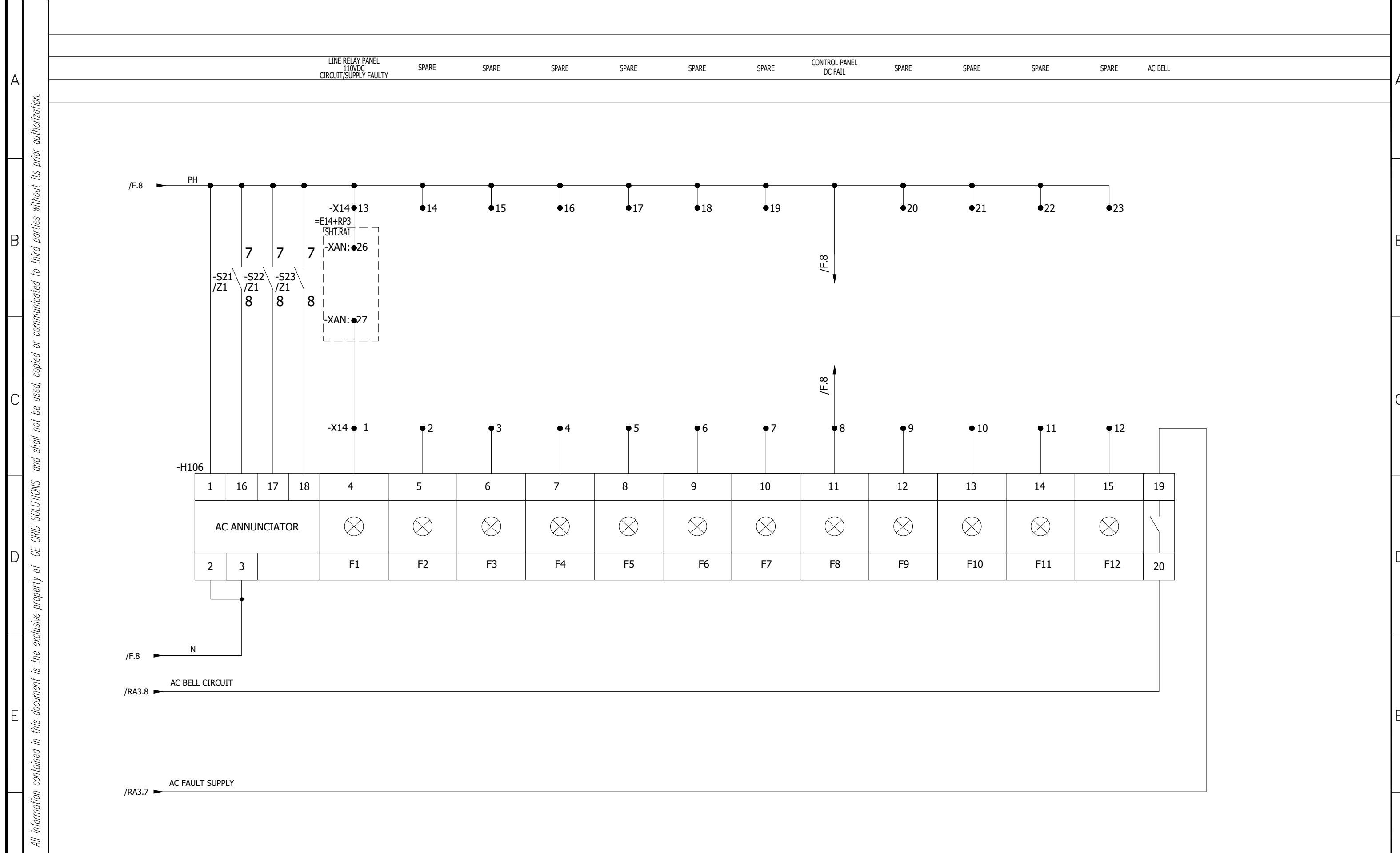
0	AS BUILT	30.10.2018	ASJ	Manufacturer E P E S O L 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor Grid Solutions A GE and Alstom joint venture	Client NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) ANNUNCIATOR-2 CIRCUIT	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type RA2
									Sheet no. 23

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

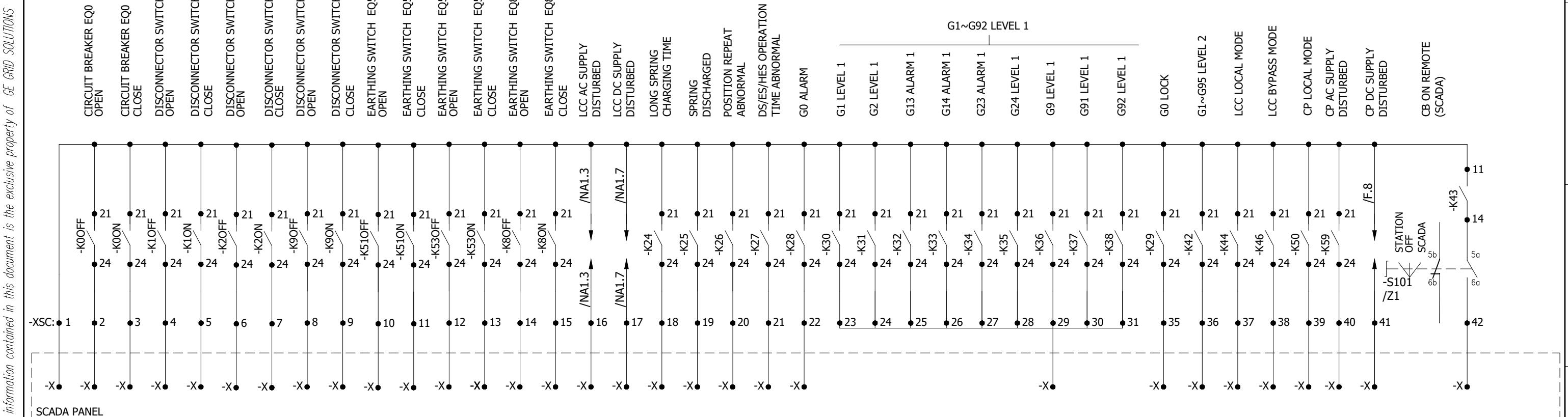
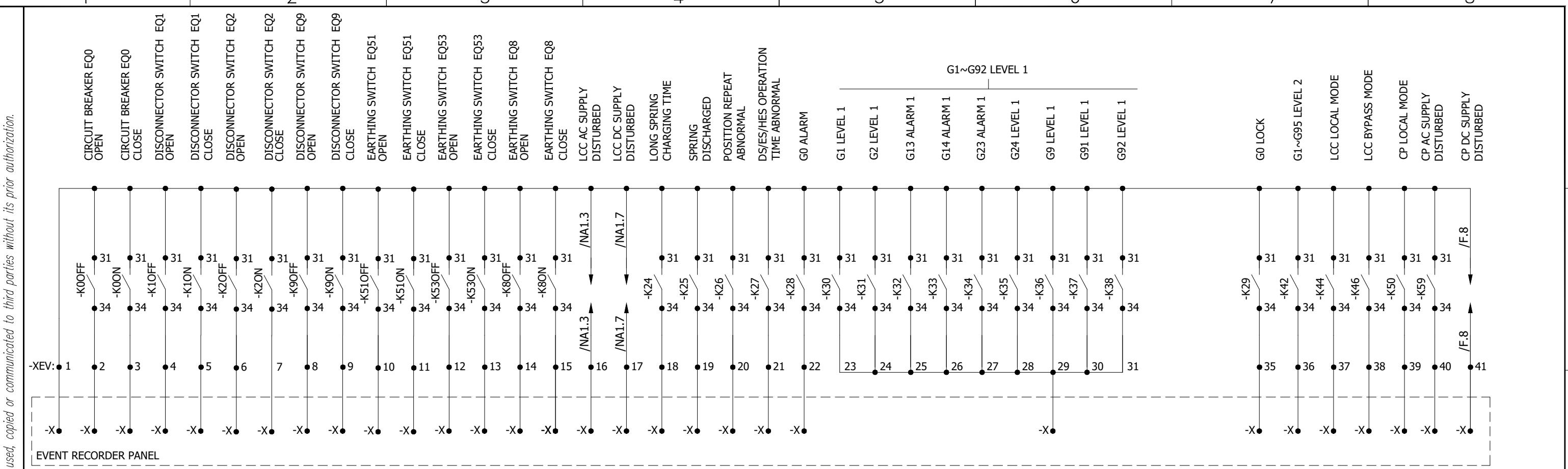
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0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) ANNUNCIATOR-3 CIRCUIT	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type RA3
									Sheet no. 24



0	AS BUILT	30.10.2018	ASJ	Manufacturer  EPESOL 71-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 GHAZI ROAD, LAHORE	Title 132kV LINE CONTROL PANEL (=E14+CP31) ANNUNCIATOR-4 CIRCUIT	Drawing no. P60194-E-ELC-SC-008
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type RA4
									Sheet no. 25



0	AS BUILT	30.10.2018	ASJ	Manufacturer  7-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  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 (=E14+CP31) SCADA & ER SIGNALS	Drawing no. P60194-E-ELC-SC-008	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type RA5	Sheet no. 26
1			2							

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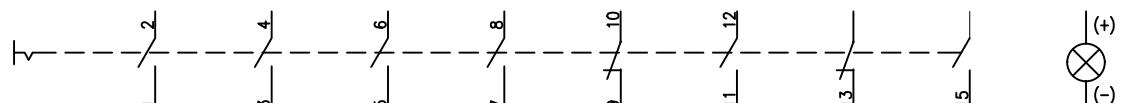
6

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8

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	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

F

F

F

1

2

3

4

5

6

7

8

A

B

C

D

E

A

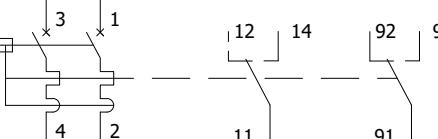
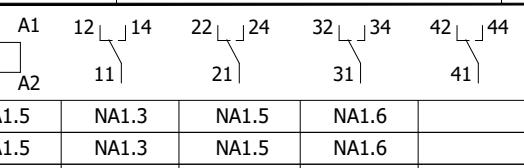
B

C

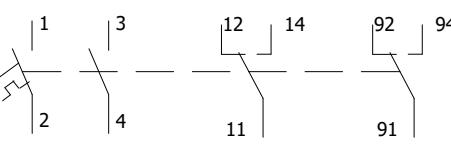
D

E

F



-F101	D.2	NA1.8	
-F102	D.4	NA1.8	
-F103	D.6	NA1.8	



-F201	E.5	F.3	
-F202	E.6	F.5	



-B100	D.4	
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COM
NC

-S100	D.3	
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1
2
3
4
5
6
7
8

-X100	D.7	
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L
N

-R100	D.5	
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+ 1
- 2
3
4

-K51	NA4.2	
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CTR	1	3	1	C	888
	2	4	2		

-Q10	NA4.6	
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-U3	1	2	3	13	14	1	21
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-U3/Q3	G.3	
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14
16

Project	132kV LINE CONTROL PANEL (=E14+CP31) COMPONENT DIAGRAM	Title	Drawing no.

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