



**Grid Solutions**  
A GE and Alstom joint venture

# 220kV/132kV GIS SUBSTATION GHAZI ROAD , LAHORE

## 132kV LINE RELAY 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.	

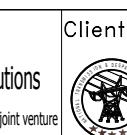
REFERENCE DRAWINGS					
SR. NO.	DRAWING TITLE				DOCUMENT NO.
1.	220kV / 132kV Metering & Protection SLD				P60194-E-SLMP-001
REVISION HISTORY					
REV	DATE	DRW. BY	CHK. BY	APR. BY	REVISION DESCRIPTION
0	20.11.2018	ASJ	MFT	NAH	AS BUILT
Scale NOT-TO-SCALE					Sheet size A3
Client					
 NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)					
Contractor					Manufacturer
 <b>Grid Solutions</b> A GE and Alstom joint venture					 <b>EPESOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan
Project					
220kV / 132kV GIS SUBSTATION GHAZI ROAD , LAHORE					
Title					
132kV LINE RELAY PANEL (=E10+RP3) SCHEMATIC DRAWINGS					
Order no			Document no		
P-60194			P60194-E-ELR-SC-002		
Sheet type		Total sheets		Sheet no	
A		26		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 B C D E F	01	A	Cover Sheet			X	X	X	X						
	02	AA	List Of Contents			X	X	X	X						
	03	AB	Symbol and Legends			X	X	X	X						
	04	AC1	Component List			X	X	X	X						
	05	AD	Panel View			X	X	X	X						
	06	AE	Bay Concept & Protection Logic			X	X	X	X						
	07	D	AC Supply Distribution Circuit			X	X	X	X						
	08	E	DC Supply Distribution Circuit			X	X	X	X						
	09	F	AC/DC Supply Failure Circuit			X	X	X	X						
	10	G	Relay Power Supply Circuit			X	X	X	X						
	11	H1	Line Differential Relay Protection CT/VT input			X	X	X	X						
	12	H2	O/C & E/F CT input			X	X	X	X						
	13	I1	Line Differential Relay input Circuit			X	X	X	X						
	14	I4	System Input Circuit			X	X	X	X						
	15	K1	Protection Trips Circuit			X	X	X	X						
	16	K11	Trips Circuit Supervision			X	X	X	X						
	17	NA1	System Alarm Circuit			X	X	X	X						
	18	NA2	System Alarm Circuit			X	X	X	X						
	19	PA2	Protection Inter Circuit			X	X	X	X						
	20	RA1	Annunciation Circuit			X	X	X	X						
	21	RA2	Event & Fault Recorder Circuit			X	X	X	X						
	22	RA3	SCADA Circuit			X	X	X	X						
	23	Z1	Component Diagram			X	X	X	X						
	24	Z2	Component Diagram			X	X	X	X						
	25	Z3	Component Diagram			X	X	X	X						
	26	Z4	Component Diagram			X	X	X	X						
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0	AS BUILT		20.11.2018	ASJ	Manufacturer	 EPESOL 7-E 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 RELAY PANEL (=E10+RP3) LIST OF CONTANTS	Drawing no. P60194-E-ELR-SC-002
	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

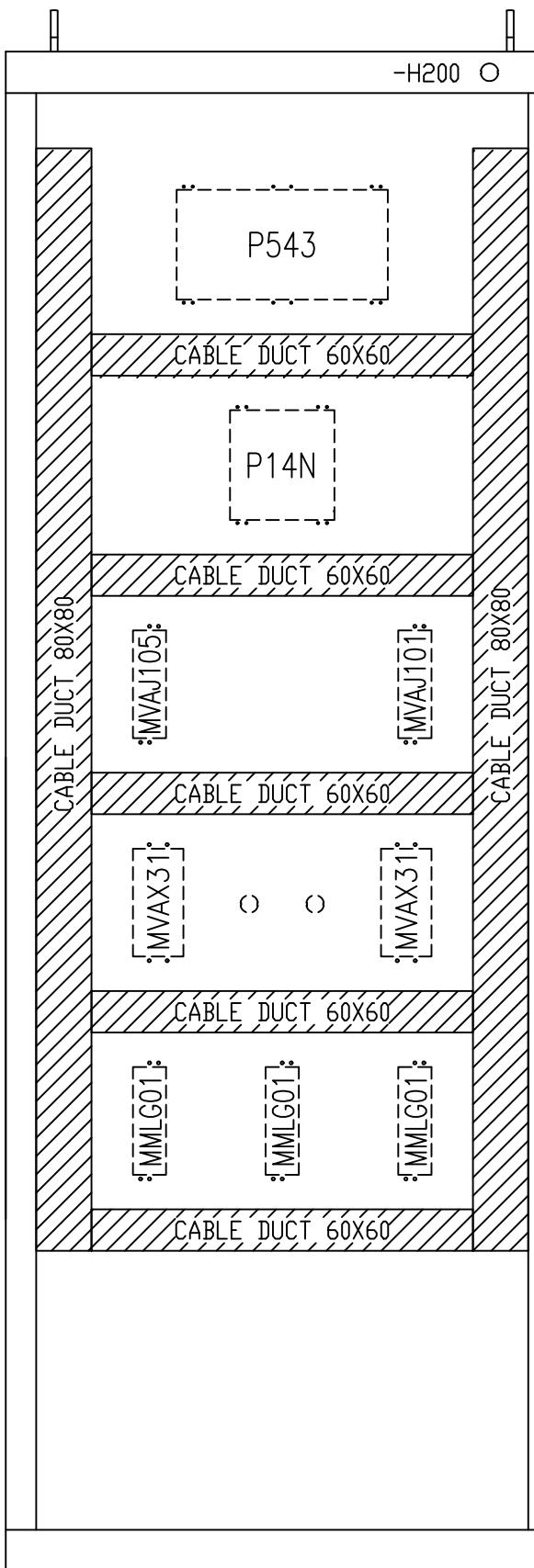
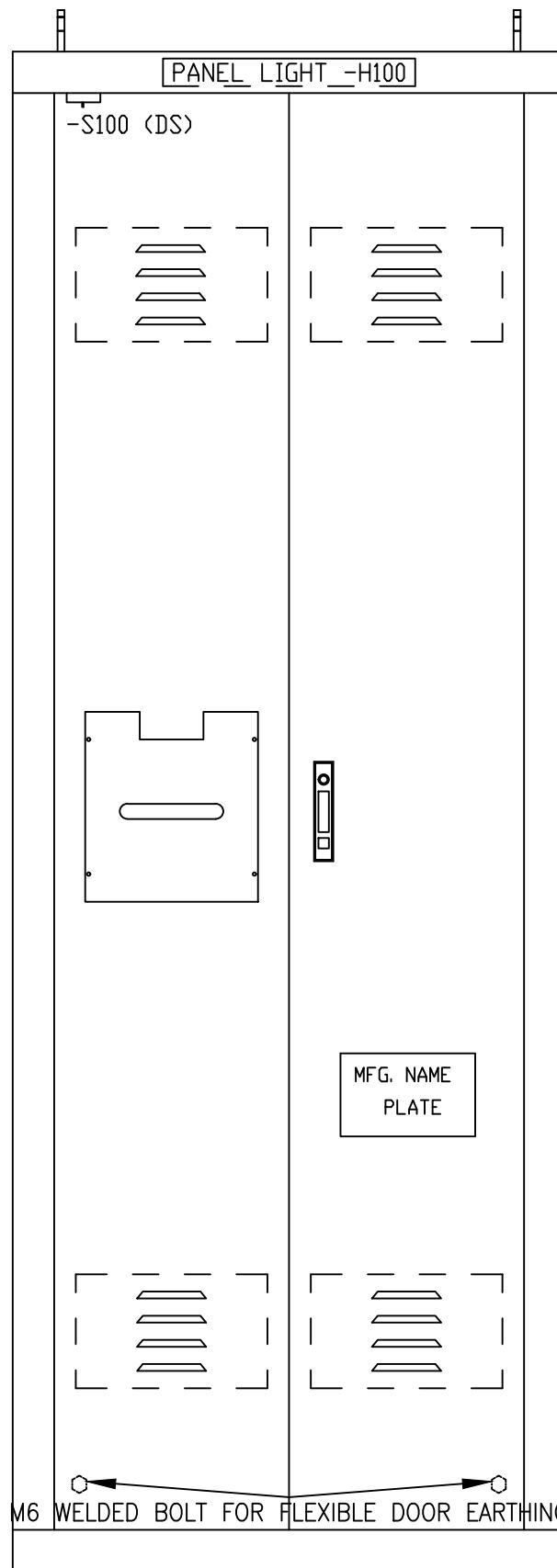
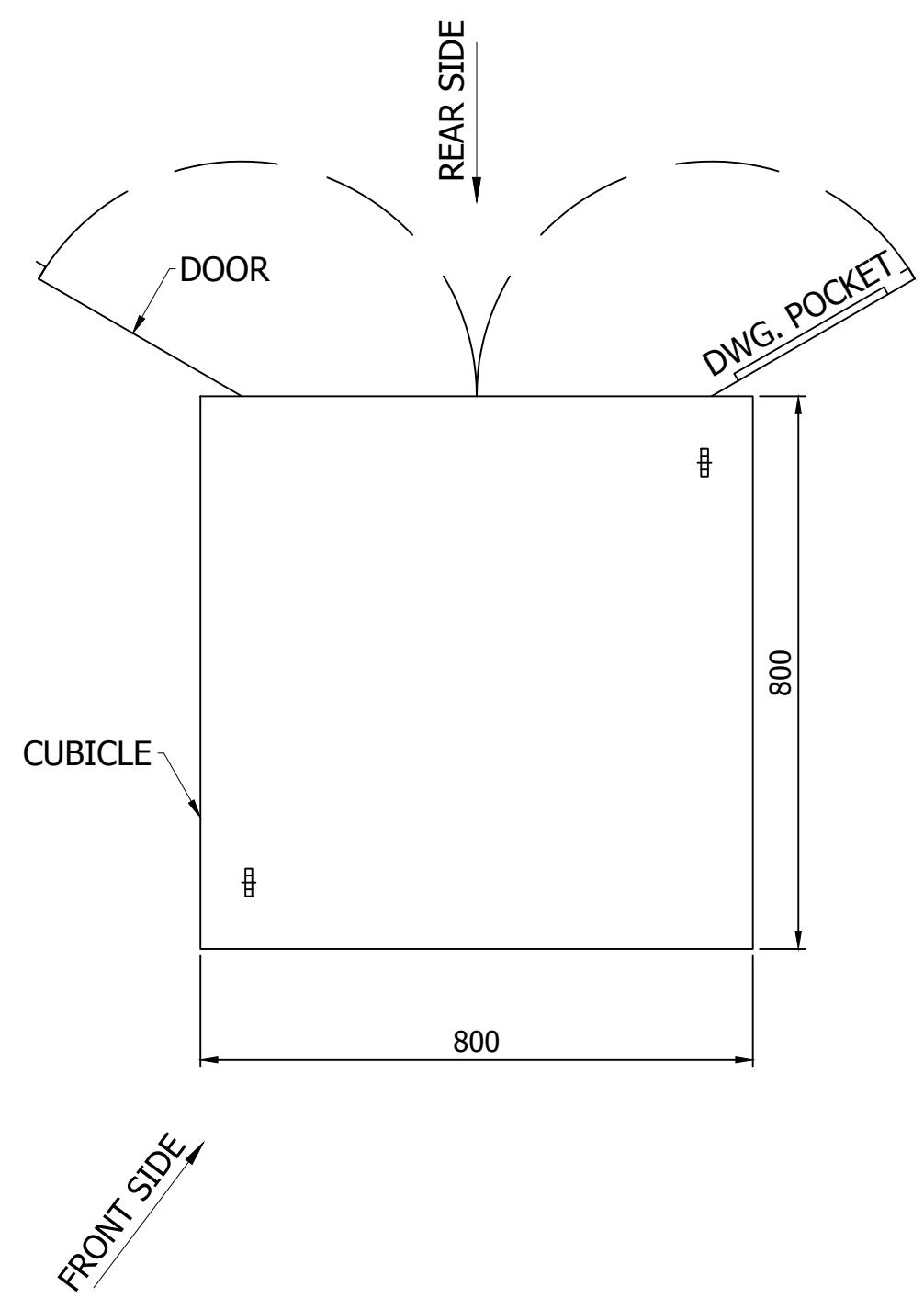
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0	AS BUILT	20.11.2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE RELAY PANEL (=E10+RP3) SYMBOLA AND LEGENDS	Drawing no. P60194-E-ELR-SC-002
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	LINE DIFFERENTIAL PROTECTION RELAY		AGILE P543, Cortec: P543-91PC7M0820M  Supply: 110-250VDC / 100-240VAC, VT + CT (100-120V:1/5A) Inputs  16 Opto Inputs, 14 Relay Outputs			-F87	GE			
	01	OVER CURRENT PROTECTION RELAY		AGILE P14N, Cortec: P14N-B16A7C570A  08 Opto Inputs, 08 Relay Outputs			-F50	GE			
	02	TRIP CIRCUIT SUPERVISION		MVAX31, Cortec: MVAX31-S1DD0754A			-F94B-C	GE			
B	04	RESISTORS		4KΩ			-R94 B/C 1-2	GE			
	02	RESISTORS		1.5KΩ			-R94 B/C 3	GE			
	03	TEST BLOCK		MMLG01, Cortec: MMLG01-R1AA9002D			-XT87A,-XT87B,XT50	GE			
C	01	TRIPPING RELAY (SELF-RESETTING)		MVAJ101, Cortec: MVAJ101-RA0802A  Supply: 110-125VDC, 8 NO + 2 NC Contacts			-F94-1	GE			
	01	LOCKOUT RELAY (HAND/ELECTRICAL RESET)		MVAJ105, Cortec: MVAJ105-RA0802A  Supply: 110-125VDC, 8 NO + 2 NC Contacts			-F86L	GE			
	02	CONTROL MCB - PANEL LIGHT & HEATER		2-Pole, Ratings: 2A, 240VAC, 6kA @ 240VAC, 2 C/O Contacts, Ord: G62C02+CAH(2)			-F101, -F102	GE			
D	01	CONTROL ELCB - PANEL SOCKET		2-Pole, Ratings: 16A, 30mA, 240VAC, 10kA @ 240VAC, 2 C/O Contacts, Ord: DM100C16/030+CAH(2)			-F103	GE			
	04	CONTROL MCB - DC DISTRIBUTION		2-Pole, Ratings: 4A, 110VDC, 10kA @ 110VDC, 2 C/O Contacts, Ord: EP102UCC04+CAH(2)			-F201, -F202, -F203, -F204	GE			
	25	AUXILIARY CONTACTOR		Coil Voltage: 110VDC, DIODE, 4 C/O Contacts, Ord: PRC4M40DCJL			-KDCM, -KQ0.ON, -KQ1.ON, -KQ2.ON, -KQ9.ON, -KZ2/3T, -KQ0.ONC, -KQ0.OFC, -KVTB1, -KRT, -KYT, -K94B, -K94C, -KBT, -KZ1T, -KPSD, -KSOTF, -KPSS, -KPSR, -K87F, -KDC1, -KAC, -K50T, -K50F, -KDC2	GE			
E	01	AUXILIARY CONTACTOR - SUPPLY CHANGEOVER		Coil Voltage: 110VDC, 3 NO + 3 NC Contacts, Ord: MCRC022ATWJ+MARN211AT			-KDCO	GE			
	02	AUXILIARY CONTACTOR		Coil Voltage: 240VAC, 4 C/O Contacts, Ord: PRC4M40ANL			-KDC, -KACM	GE			
	01	SELECTOR SWITCH - AUTORECLOSER		YS-AK-2-2-44-D, 2-Postion (IN-OUT), 110VDC, KEYLOCKABLE TYPE, KEY RELEASE ON "OUT"			-S79	YONGSUNG			
F	01	PUSH BUTTON		Black Button, Spring Return, 2-Pole, Rating 12A, 110VDC Ord: YS-AP1-2-40-B-D-W			-S50	YONGSUNG			
	01	PANEL LIGHT WITH DOOR SWITCH		240VAC @ 50Hz, 5W, with Door Limit Sw. Ord: YSP3315GW-B + YS-T8-30-5W			-H100,-S100	YONGSUNG			
	01	THREE PIN SOCKET		1N+PE, 16A, 240VAC @ 50Hz			-X100	LEAR			
G	01	PANEL HEATER		240VAC @ 50Hz, 50W			-R100	ELAB			
	01	HUMIDITY & TEMPERATURE CONTROLLER		40-90%RH, 25-50°C, 230VAC @ 50Hz			-B100	ELAB			
	01	INDICATION LAMP - DC SUPPLY FAILURE		Type: Integrated LED, Color : RED , Supply : 240VAC @ 50Hz, Ord: YS-PL-2-AL-22-R-W			-H200	YONGSUNG			
H	0	AS BUILT		20.11.2018	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 RELAY PANEL (=E10+RP3) COMPONENT LIST	Drawing no. P60194-E-ELR-SC-002
							Project no. P-60194				
	REV.	DESCRIPTION		DATE	DRAWER		Sheet type AC1				
I	1			2	3	4	5	6	7		
									8		

	1	2	3	4	5	6	7	8		
	QTY.	DEVICE DESCRIPTION	DEVICE SPECIFICATIONS DEVICE TYPE ; TECHNICAL DATA / SPECIFICATIONS			DEVICE DESIGNITION	MANUFACTURER			
A	12	TERMINAL BLOCKS FOR SYSTEM INPUT STATUS	CBD-4			-X8	CABUR			
	6	TERMINAL BLOCKS FOR PROTECTION INTER CIRCUIT	CBD-4			-X9	CABUR			
	4	TERMINAL BLOCKS FOR AC SUPPLY DISTRIBUTION	CBD-4			-XAC	CABUR			
B	19	TERMINAL BLOCKS FOR ANNUNCIATOR	CBD-4			-XAN	CABUR			
	2	TERMINAL BLOCKS FOR DC SUPPLY-1 DISTRIBUTION	CBD-4			-XDC1	CABUR			
	2	TERMINAL BLOCKS FOR DC SUPPLY-2 DISTRIBUTION	CBD-4			-XDC2	CABUR			
C	15	TERMINAL BLOCKS FOR EVENT RECORDER	CBD-4			-XEV	CABUR			
	3	TERMINAL BLOCKS FOR FAULT RECORDER	CBD-4			-XFR	CABUR			
	16	TERMINAL BLOCKS FOR SCADA	CBD-4			-XSC	CABUR			
D	7	TERMINAL BLOCKS FOR TRIP CIRCUIT-1	CBD-4			-XTC1	CABUR			
	7	TERMINAL BLOCKS FOR TRIP CIRCUIT-2	CBD-4			-XTC2	CABUR			
	2	TERMINAL BLOCKS FOR CONTROL	CBD-4			-X3	CABUR			
E	22	TERMINAL BLOCKS FOR LINE DIFFERENTIAL	CBD-4			-X6	CABUR			
	16	TERMINAL BLOCKS FOR CT	SCB-6			-X4	CABUR			
	16	TERMINAL BLOCKS FOR VT	SCB-6			-X4	CABUR			
F	8	TERMINAL BLOCKS FOR CT	SCB-6			-X5	CABUR			
	16	SPARE TERMINAL BLOCKS	CBD-4			-X1	CABUR			
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REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type AC1	Sheet no. 04a

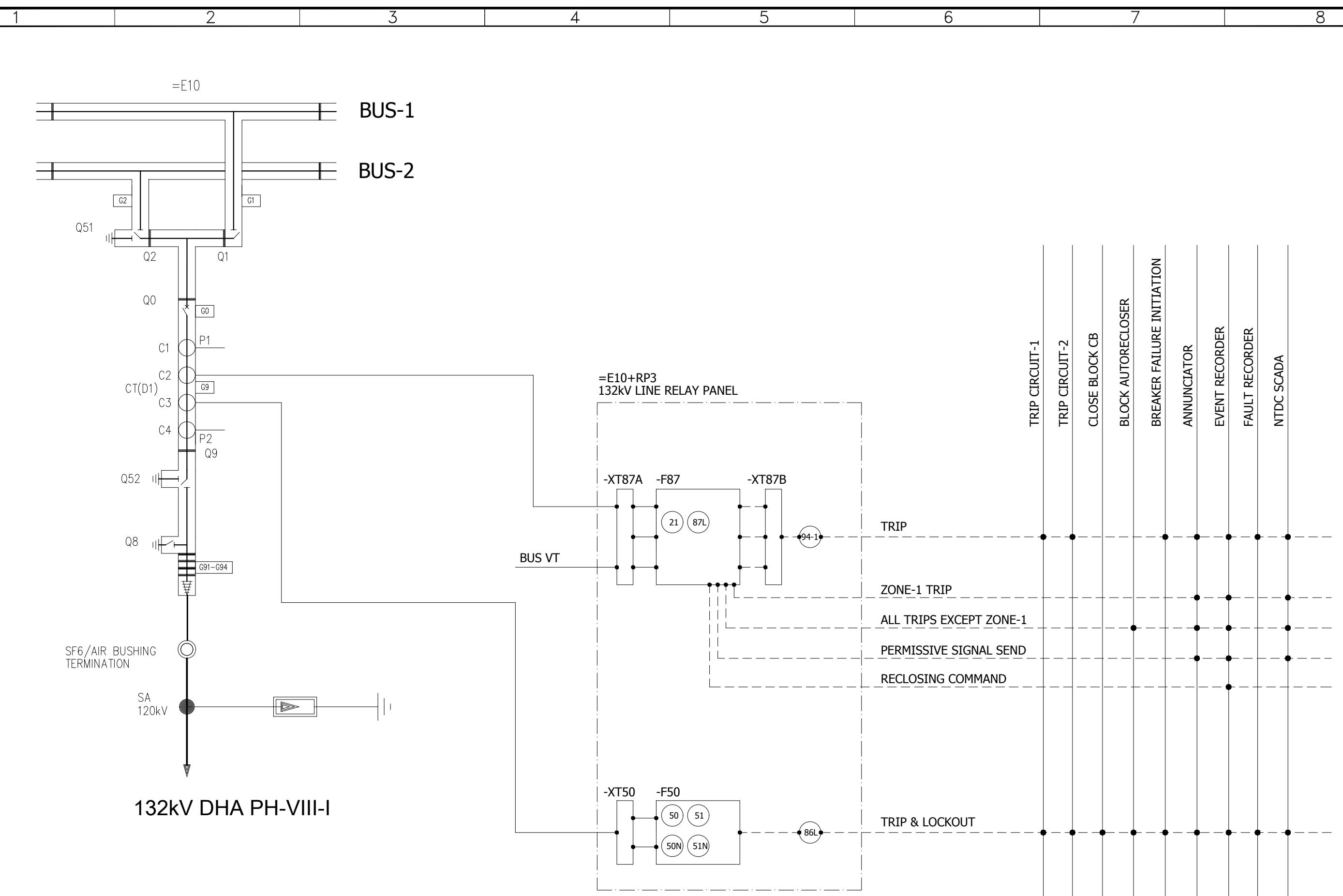


BACK VIEW WITHOUT DOORBACK VIEW WITH DOORTOP VIEW**NOTE:-**

- 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.

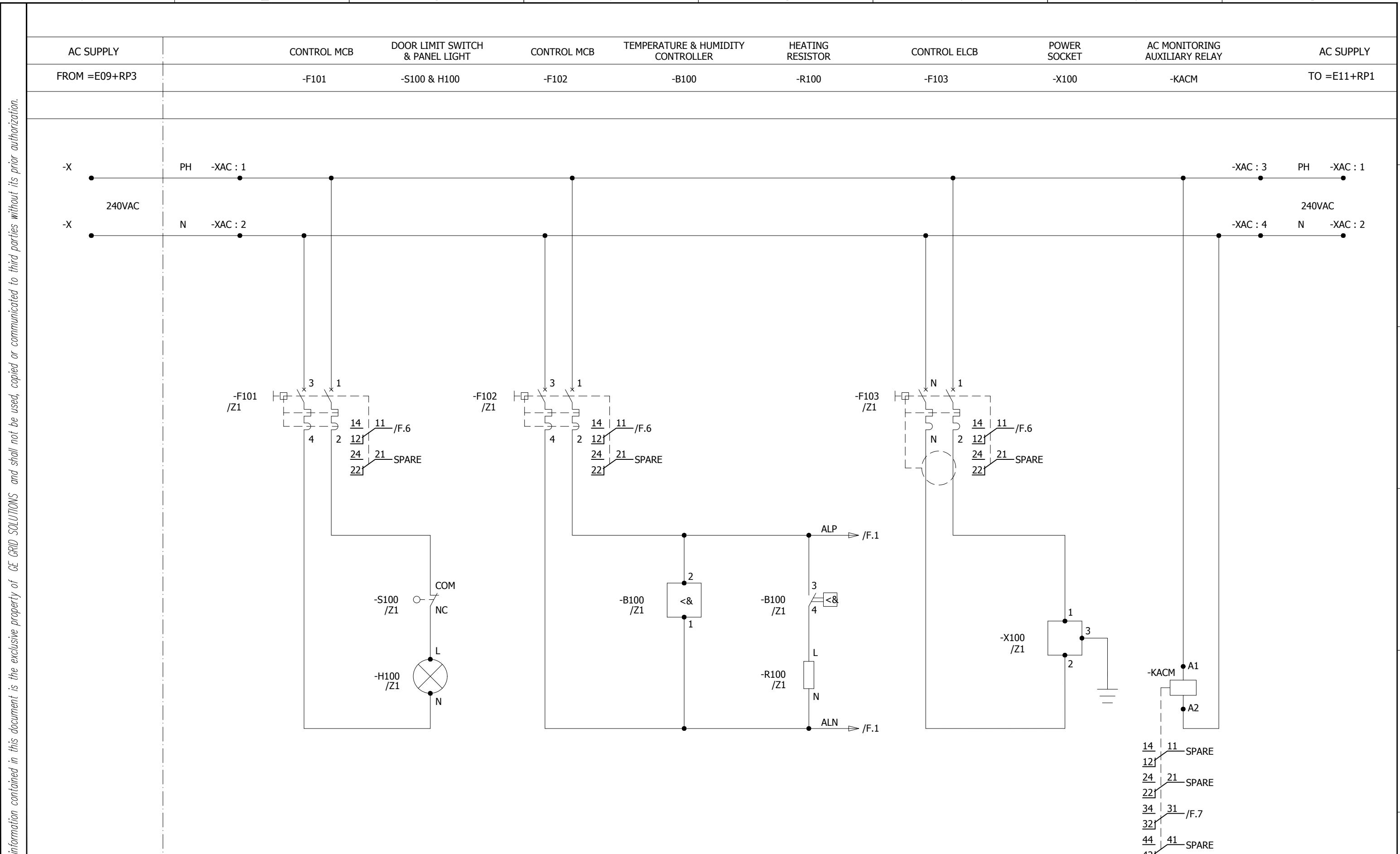
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REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194



0	AS BUILT	20.11.2018	ASJ	Manufacturer <b>E P E S O L</b> 7a-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE RELAY PANEL (=E10+RP3) BAY CONCEPT & PROTECTION LOGICS	Drawing no. P60194-E-ELR-SC-002
									Project no. P-60194
									Sheet type AE
	REV.	DESCRIPTION	DATE	DRAWER					Sheet no. 06

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0	AS BUILT	20-11-2018	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 RELAY PANEL (=E10+RP3) AC SUPPLY DISTRIBUTION	Drawing no. P60194-E-ELR-SC-007		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type D	Sheet no. 07
1	2	3	4	5	6	7	8				



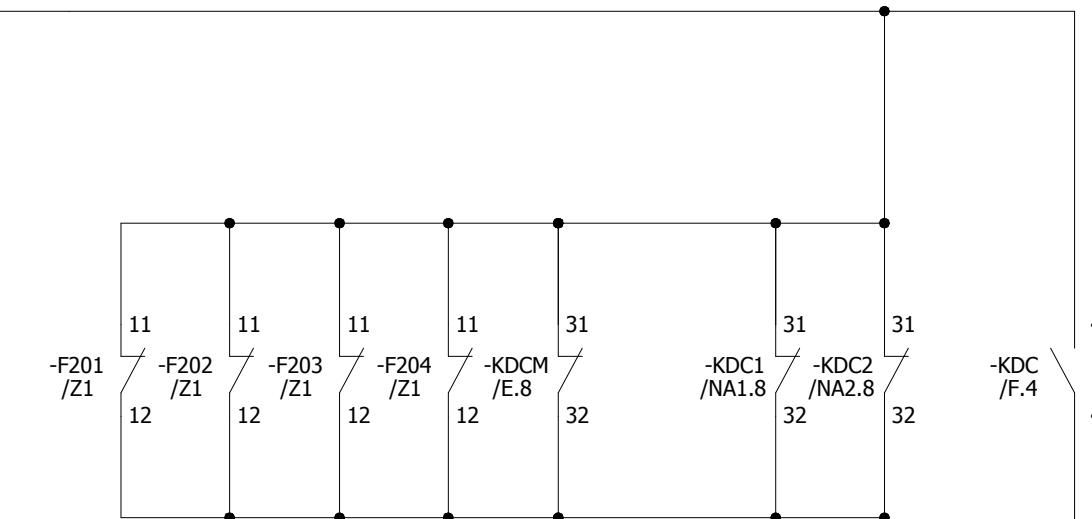
## 110V DC CIRCUIT FAULTY

## 240V AC CIRCUIT FAULTY

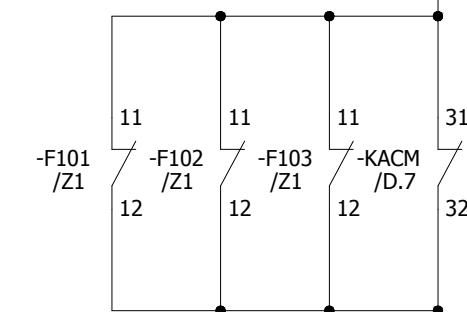
-KDC

-KAC

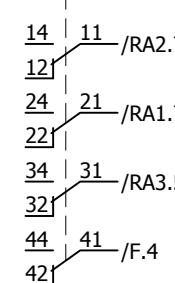
/D.5 ➤ ALP



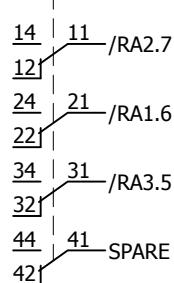
/E.7 ➤ AL+



/D.5 ➤ ALN



/E.7 ➤ AL-



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A

A

B

B

C

C

D

D

E

E

F

F

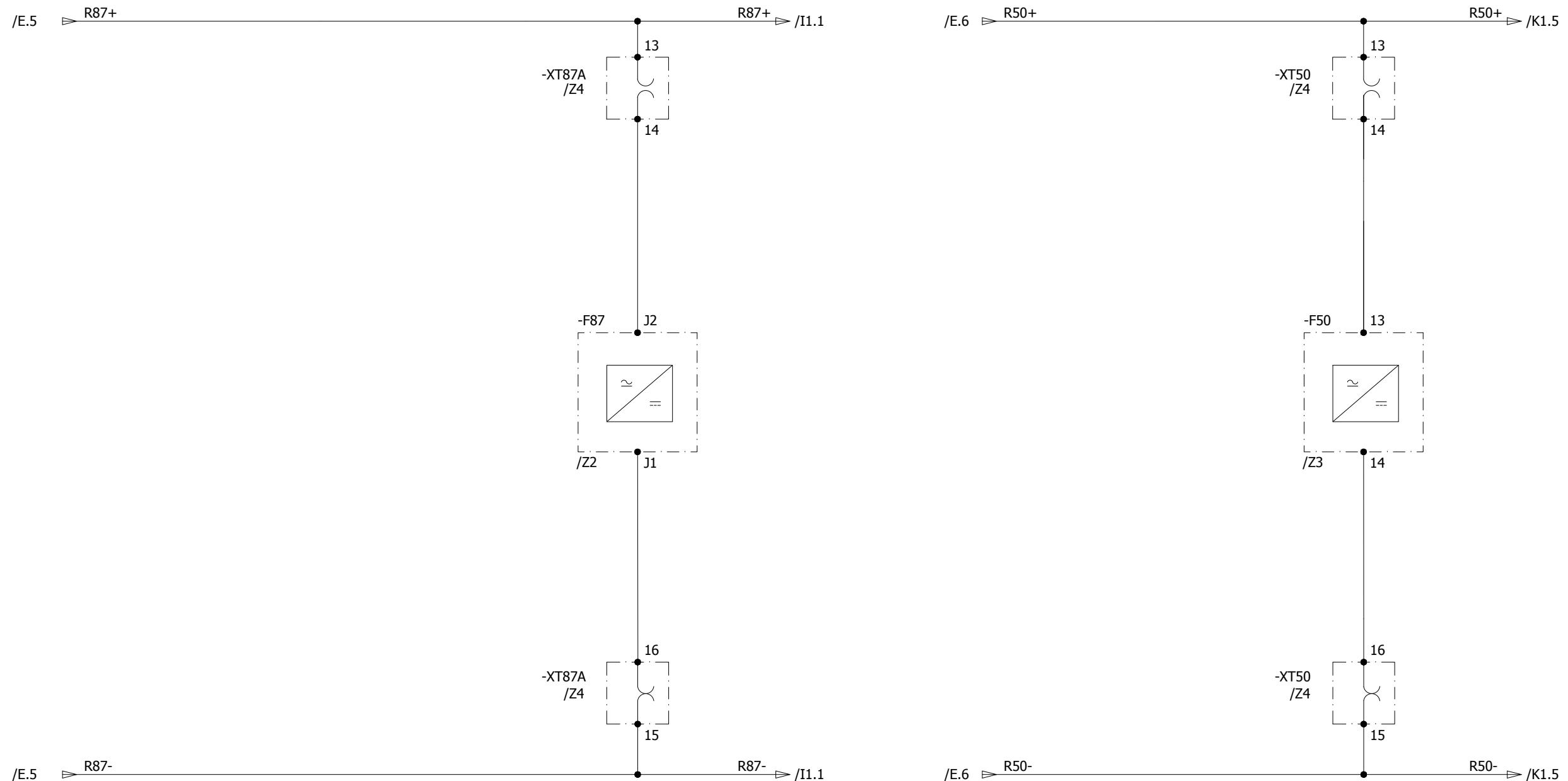
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REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type F	Sheet no. 09

## LINE DIFFERENTIAL PROTECTION

## OVERCURRENT PROTECTION

## RELAY SUPPLY

## RELAY SUPPLY



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A

A

B

B

C

C

D

D

E

E

F

F

0	AS BUILT	20-11-2018	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 RELAY PANEL (=E10+RP3) RELAY POWER SUPPLY CIRCUIT	Drawing no. P60194-E-ELR-SC-007
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type G
									Sheet no. 10

TEST BLOCK

LINE DIFFERENTIAL PROTECTION  
RELAY

-XT87A

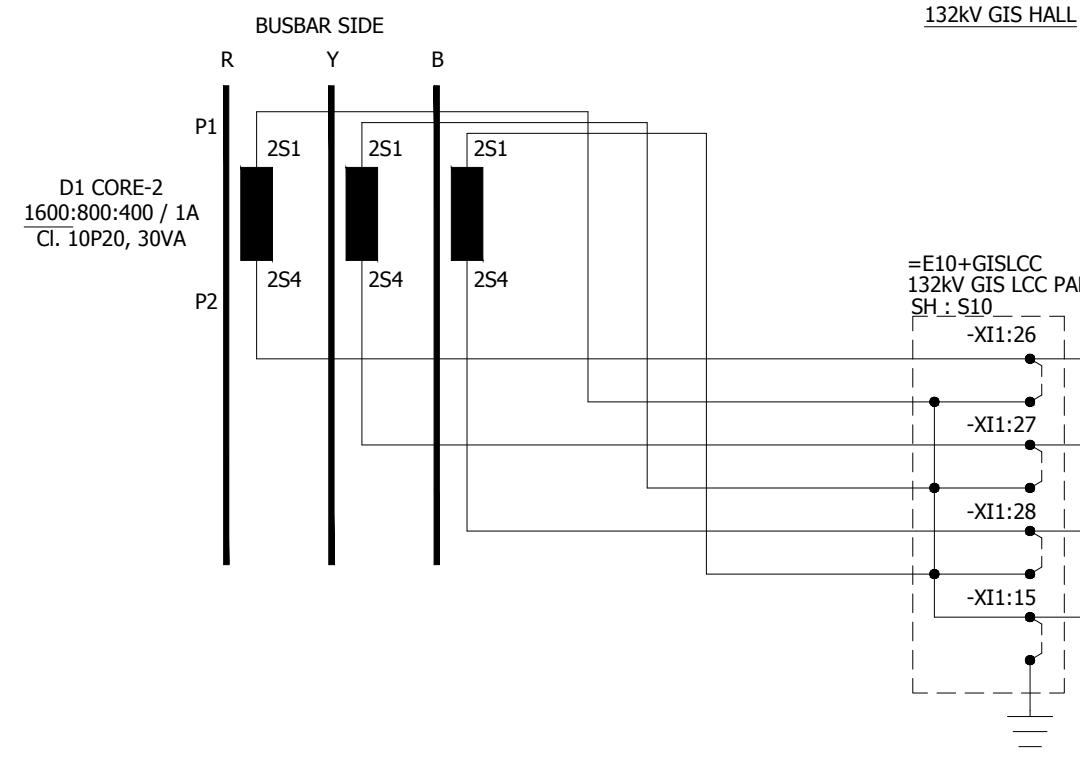
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A



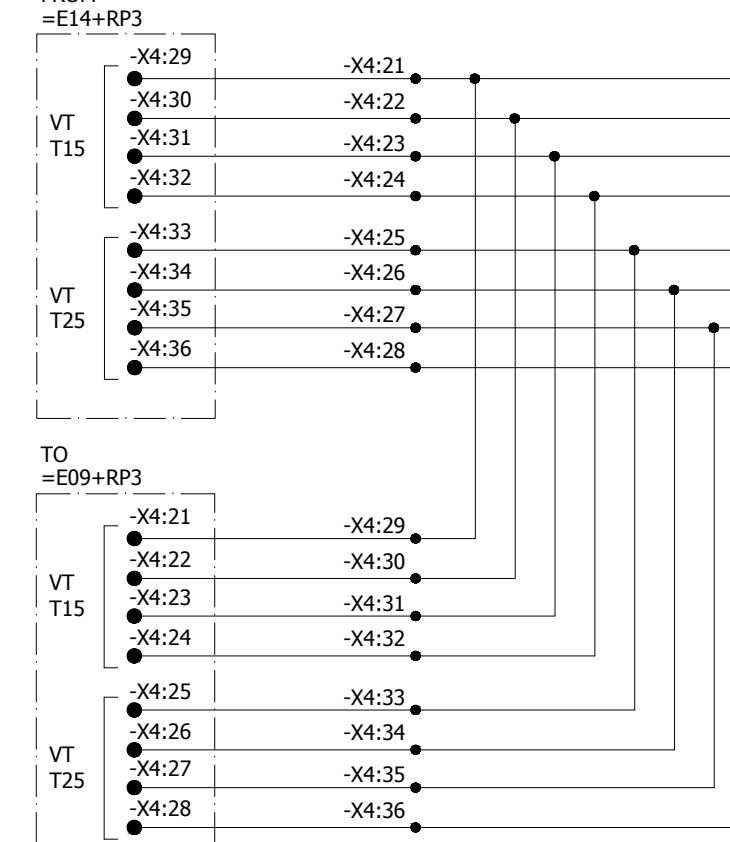
B

C

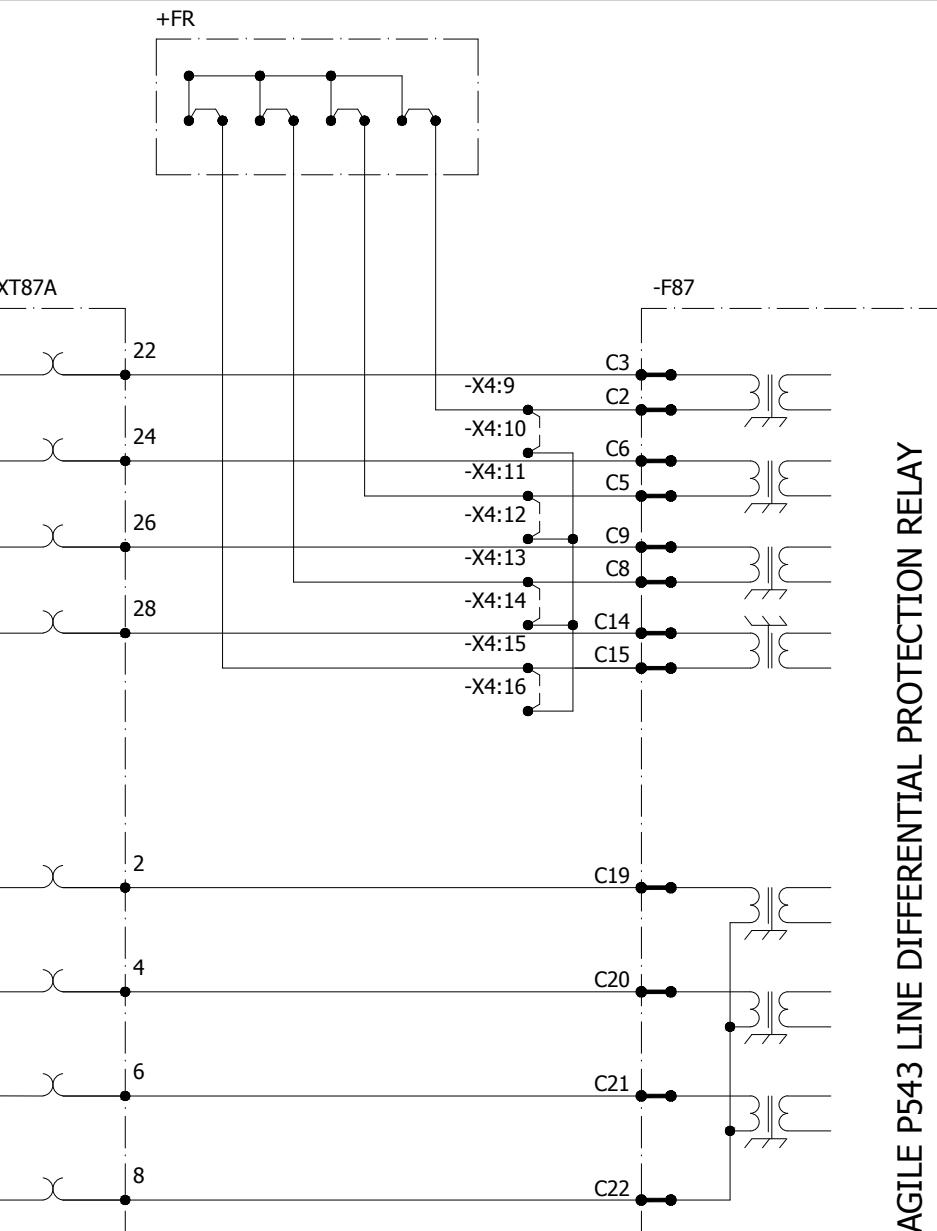
D

E

F



0	AS BUILT	20-11-2018	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 RELAY PANEL (=E10+RP3) LINE DIFFERENTIAL PROTECTION CT/VT CIRCUIT	Drawing no. P60194-E-ELR-SC-007	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type H1	Sheet no. 11



AGILE P543 LINE DIFFERENTIAL PROTECTION RELAY

A

C

D

E

F

TEST BLOCK

OVERCURRENT  
RELAY

-XT50

-F50

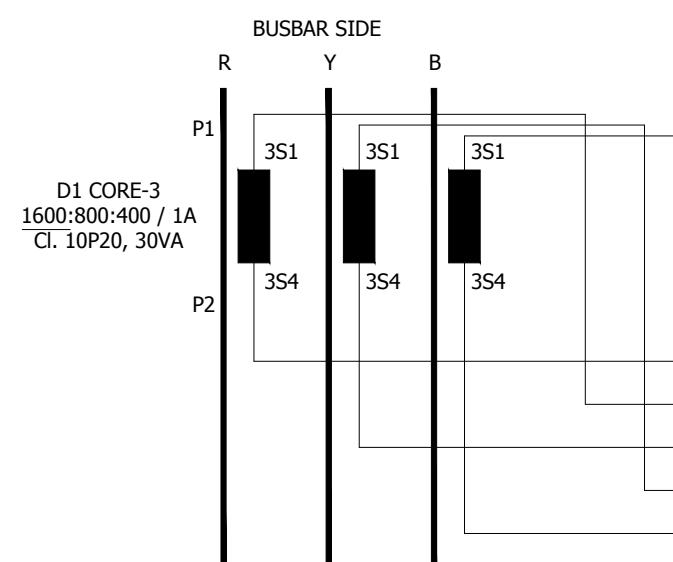
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## 132kV GIS HALL

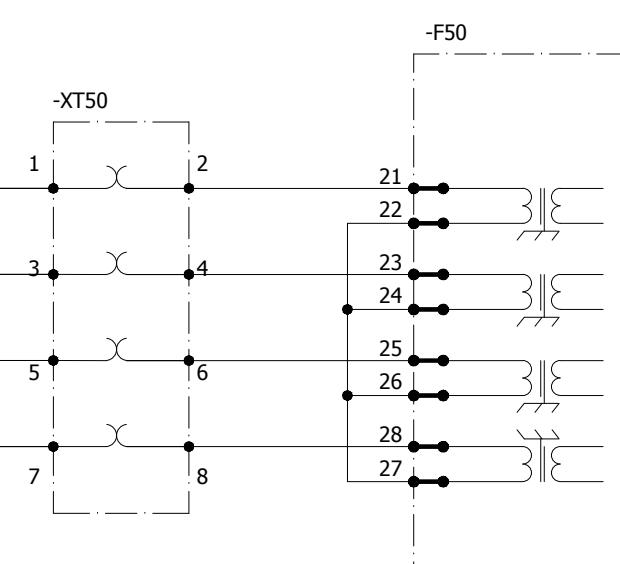
## CONTROL ROOM

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=E010+GISLCC  
132kV GIS LCC PANEL  
SH : S11  
-XI1:40  
-XI1:41  
-XI1:42  
-XI1:29

-X5:1  
-X5:2  
-X5:3  
-X5:4  
-X5:5  
-X5:6  
-X5:7  
-X5:8



A

A

B

B

C

C

D

D

E

E

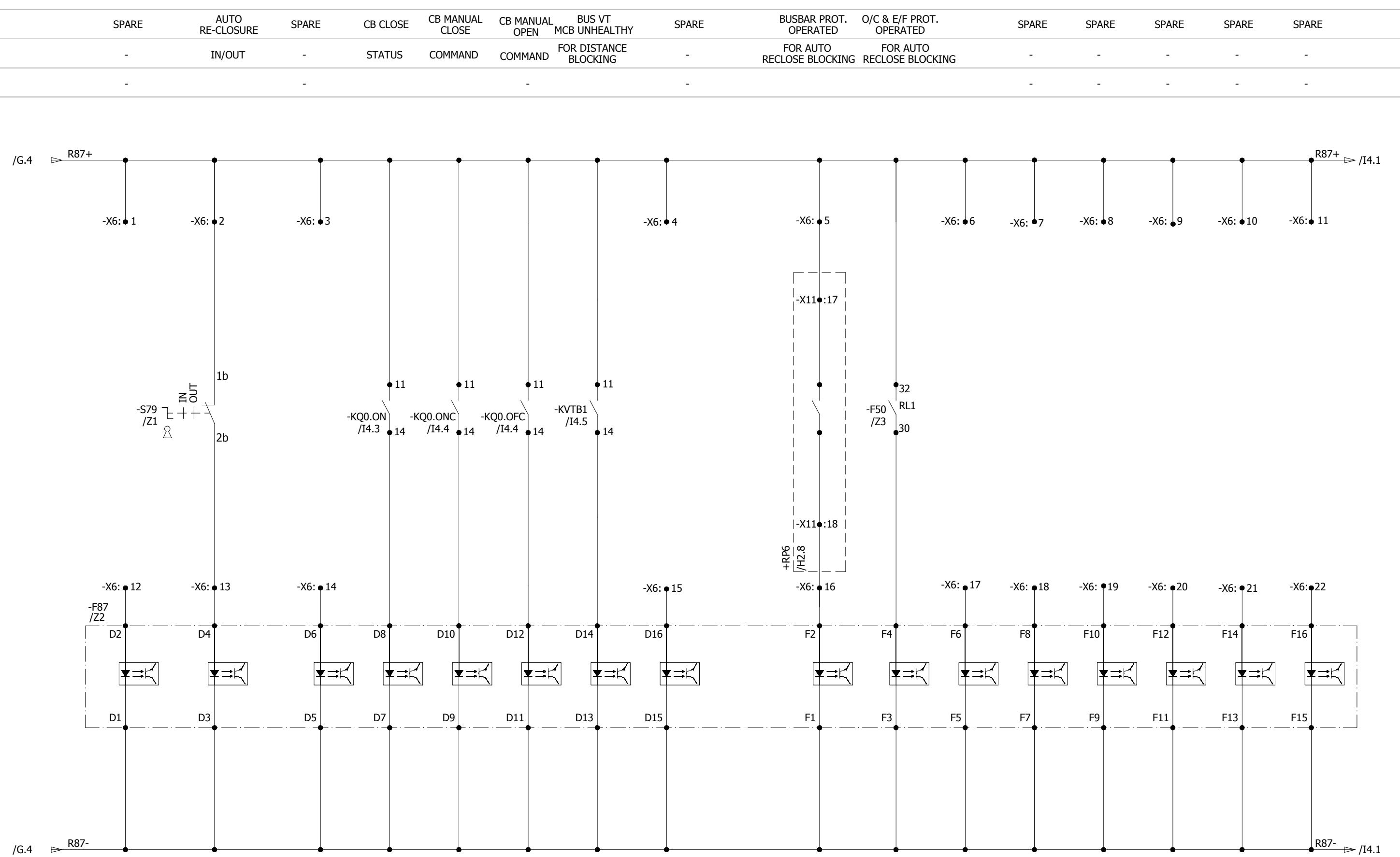
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F

0	AS BUILT	20-11-2018	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 RELAY PANEL (=E10+RP3) O/C & E/F CT INPUTS	Drawing no. P60194-E-ELR-SC-007	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type H2	Sheet no. 12

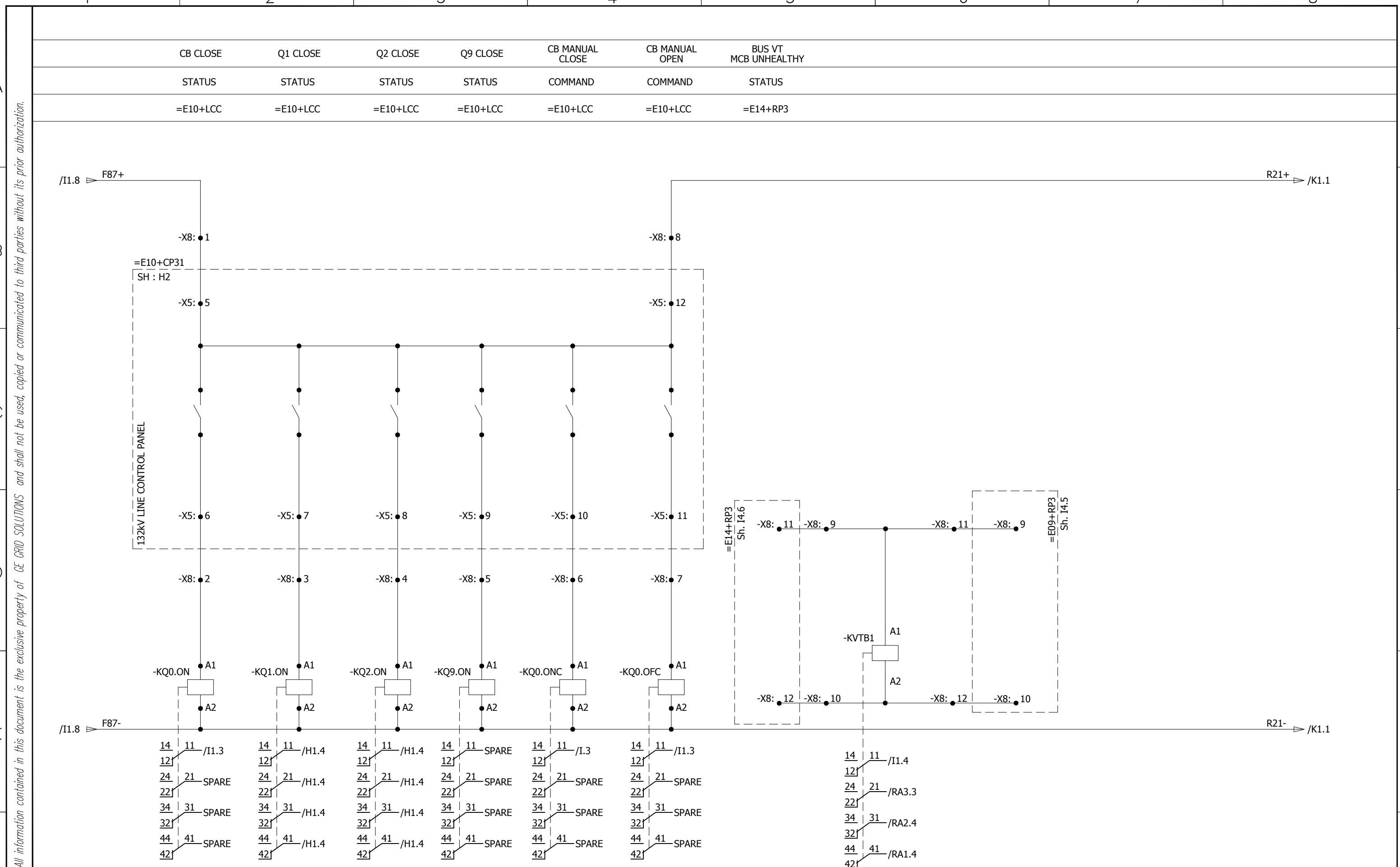
## LINE DIFFERENTIAL PROTECTION RELAY

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0	AS BUILT		20-11-2018	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 RELAY PANEL (=E10+RP3) LINE DIFFERENTIAL RELAY INPUTS	Drawing no. P60194-E-ELR-SC-007		
REV.	DESCRIPTION		DATE	DRAWER						Project no. P-60194	Sheet type I1	Sheet no. 13
1	2	3	4	5	6	7	8					

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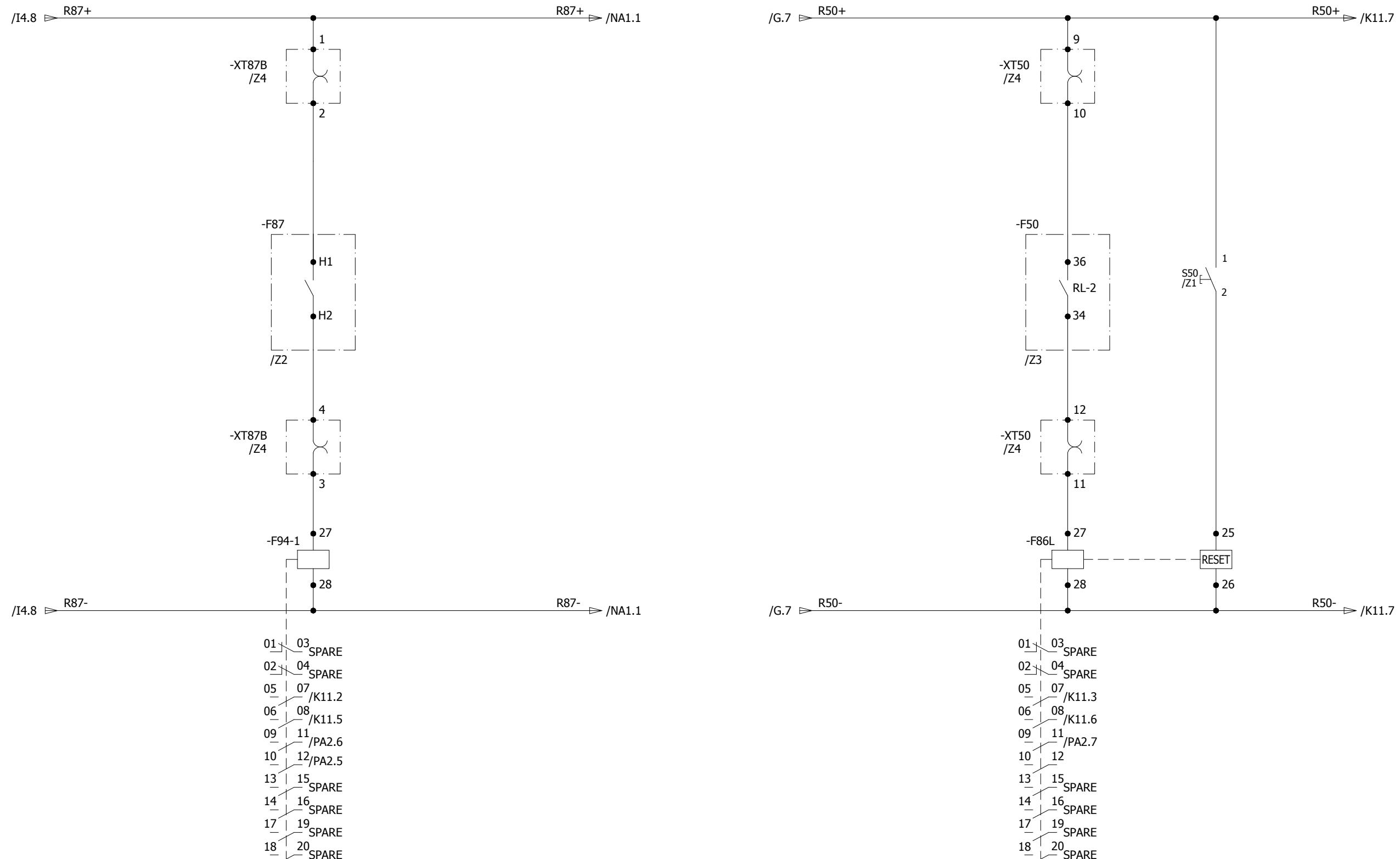


0	AS BUILT		20-11-2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE RELAY PANEL (=E10+RP3) SYSTEM INPUTS	Drawing no. P60194-E-ELR-SC-007	
REV.	DESCRIPTION		DATE	DRAWER					Project no. P-60194	Sheet type I4	Sheet no. 14
1	2	3	4	5	6	7	8				

## LINE DIFFERENTIAL PROTECTION GENERAL TRIP

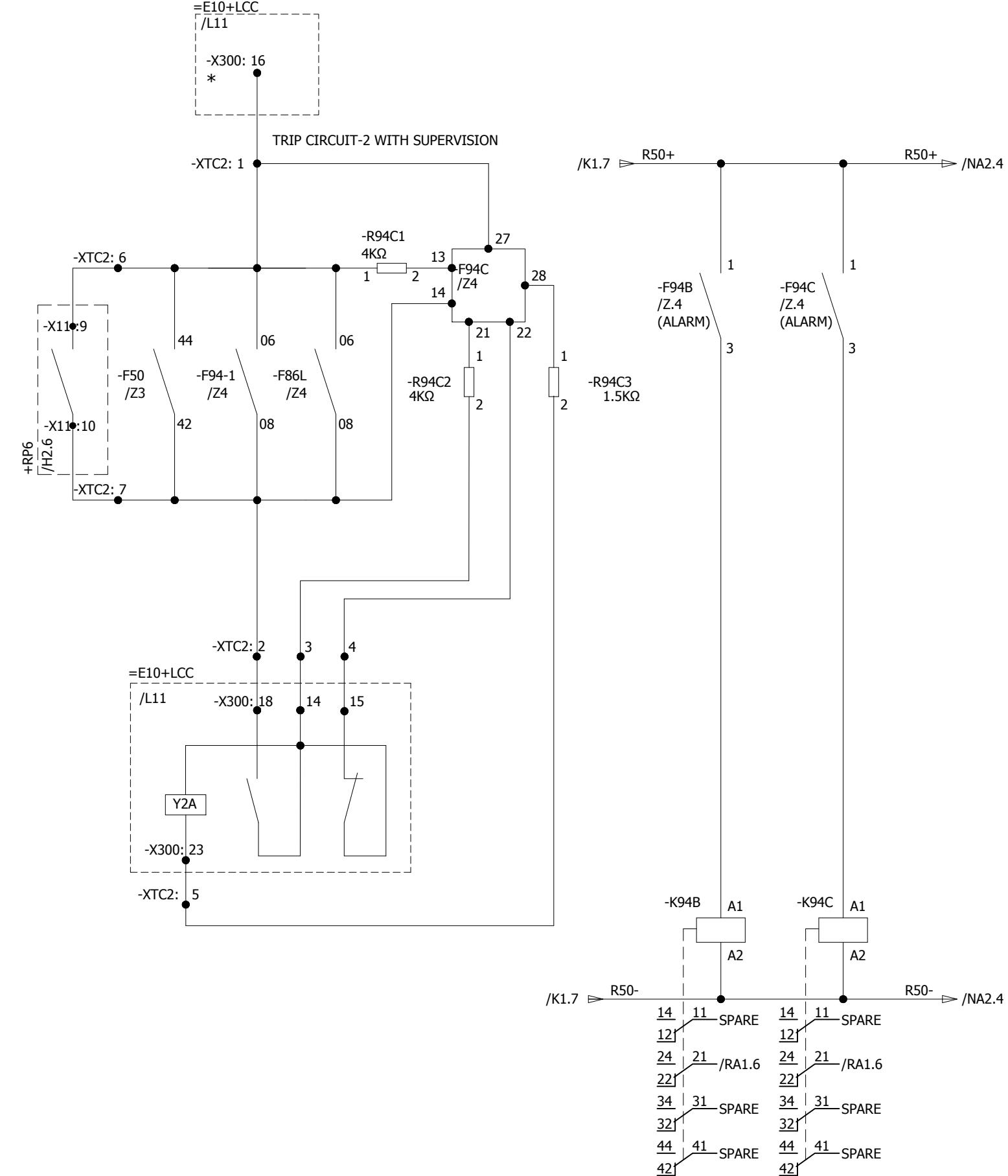
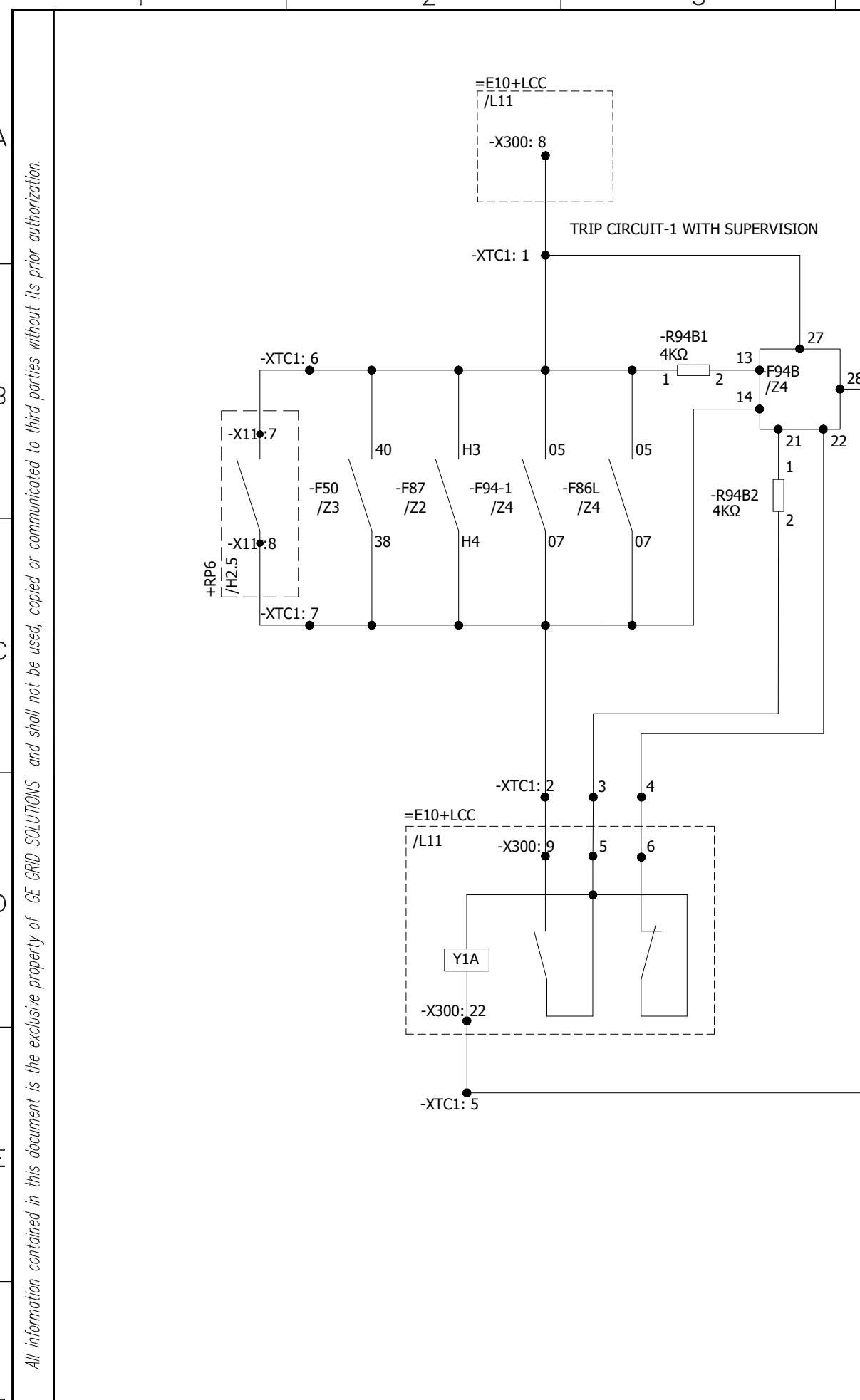
O/C &amp; E/F PROTECTION TRIP    TRIP RELAY RESET

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0	AS BUILT	20-11-2018	ASJ	Manufacturer  EPEPSOL 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 RELAY PANEL (=E10+RP3) PROTECTION TRIPS	Drawing no. P60194-E-ELR-SC-007		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type K1	Sheet no. 15
1	2	3	4	5	6	7	8				

1 2 3 4 5 6 7 8

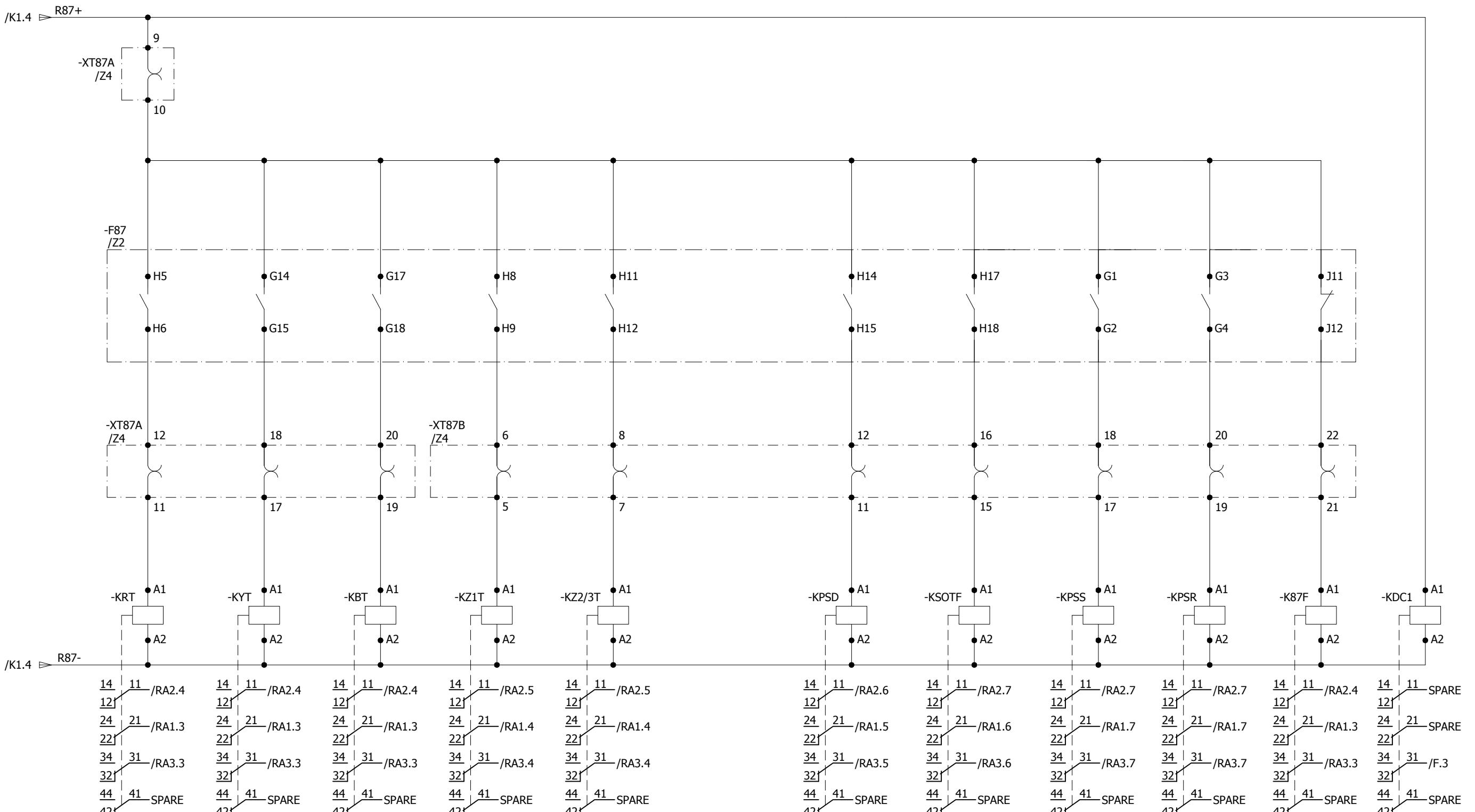


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## LINE DIFFERENTIAL PROTECTION

RED-PH TRIP      YELLOW-PH TRIP      BLUE-PH TRIP      ZONE-1 TRIP      ZONE-2 TRIP\ZONE-3 TRIP      POWER SWING DETECT      SWITCH ON TO FAULT      AUTORECLOSURE OPERATED      AUTORECLOSURE BLOCKED      LINE DIFF. RELAY FAULTY      R87+ DC SUPPLY MONITORING

+KDC1

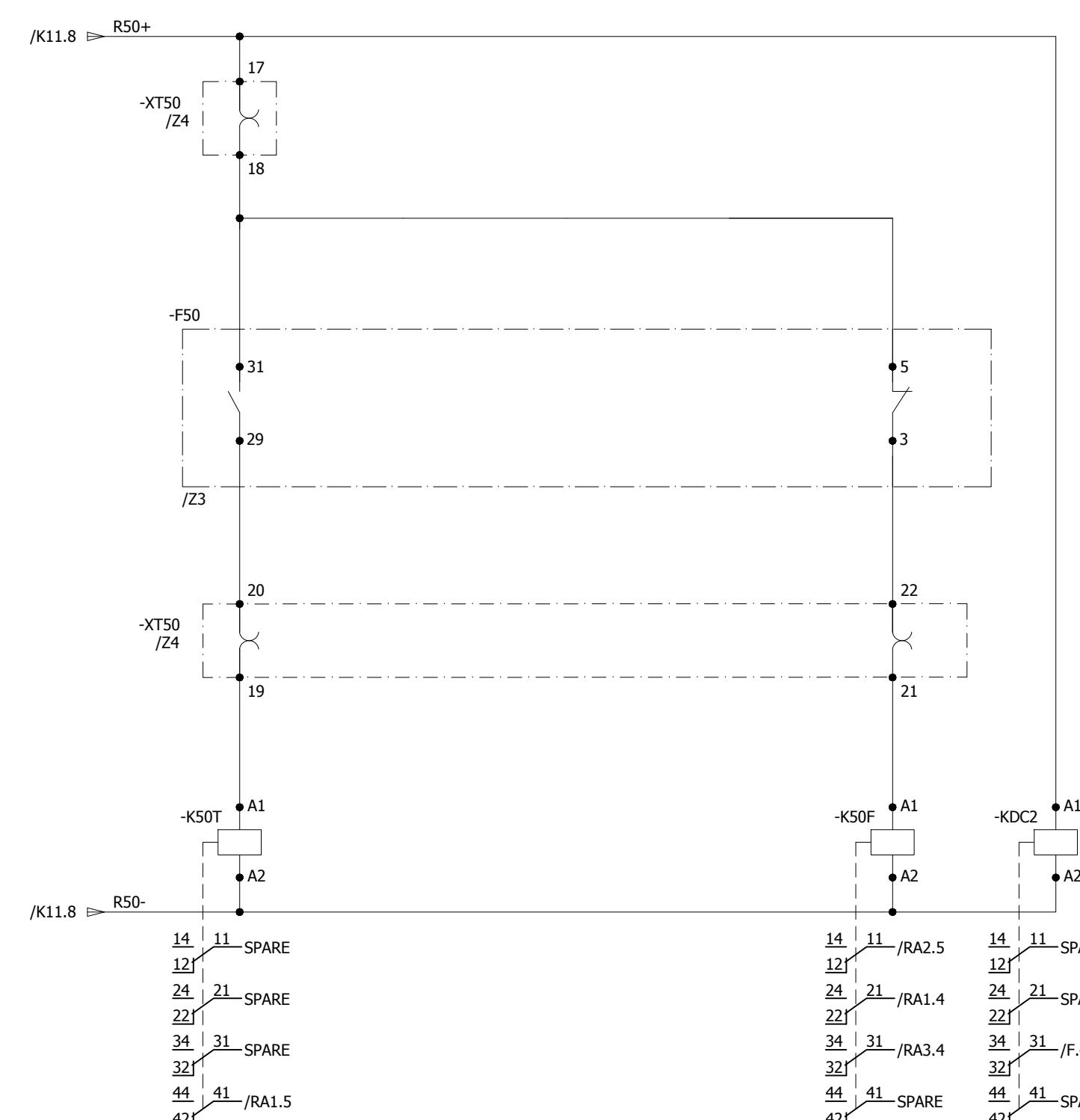


0	AS BUILT	20-11-2018	ASJ	Manufacturer  EPESOL 21-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE RELAY PANEL (=E10+RP3) SYSTEM ALARMS	Drawing no. P60194-E-ELR-SC-007	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type NA1	Sheet no. 17

O/C & E/F RELAY ALARMS  
R50+ DC SUPPLY MONITORING

O/C & E/F TRIP  
PROTECTION FAULTY +KDC2

/Z3



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0	AS BUILT	20-11-2018	ASJ	Manufacturer <b>EPE SOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE RELAY PANEL (=E10+RP3) SYSTEM ALARMS	Drawing no. P60194-E-ELR-SC-007
									Project no. P-60194 Sheet type NA2 Sheet no. 18
REV.	DESCRIPTION	DATE	DRAWER						

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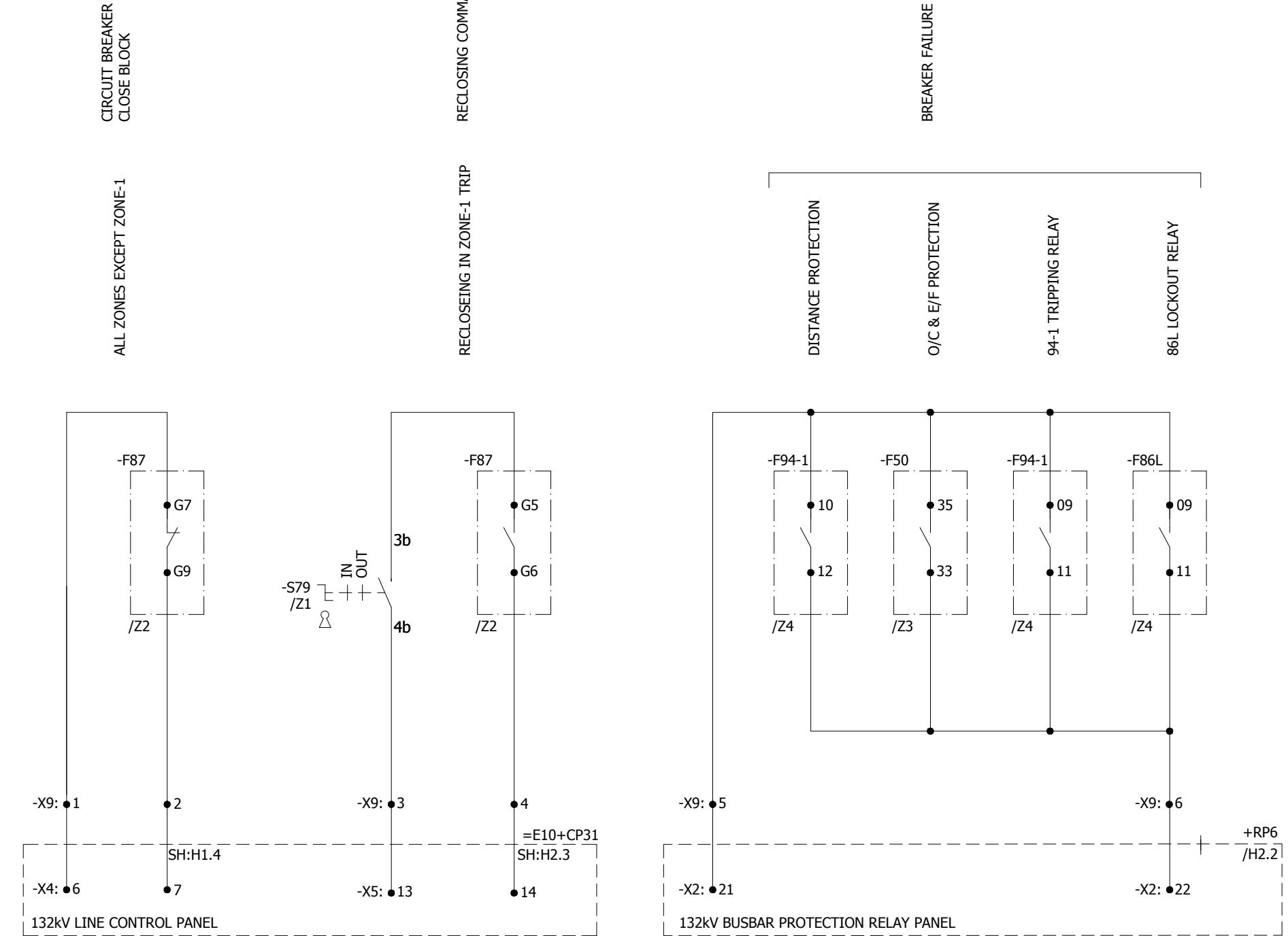
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0	AS BUILT	20-11-2018	ASJ	Manufacturer <b>EPE SOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>Grid Solutions</b> A GE and Alstom joint venture	Client <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE RELAY PANEL (=E10+RP3) PROTECTION INTER-CIRCUITS	Drawing no. P60194-E-ELR-SC-007
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type PA2
									Sheet no. 19

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A

DISTANCE PROTECTION

RED TRIP

DISTANCE PROTECTION

YELLOW POLE TRIP

DISTANCE PROTECTION

BLUE POLE TRIP

DISTANCE PROTECTION

ZONE-1 TRIP

DISTANCE PROTECTION

ZONE-2/3 TRIP

O/C &amp; E/F PROTECTION

OPERATED

POWER SWING

DETECTED

TRIP CIRCUIT-1

FAULTY

TRIP CIRCUIT-2

FAULTY

SWITCH ONTO FAULT

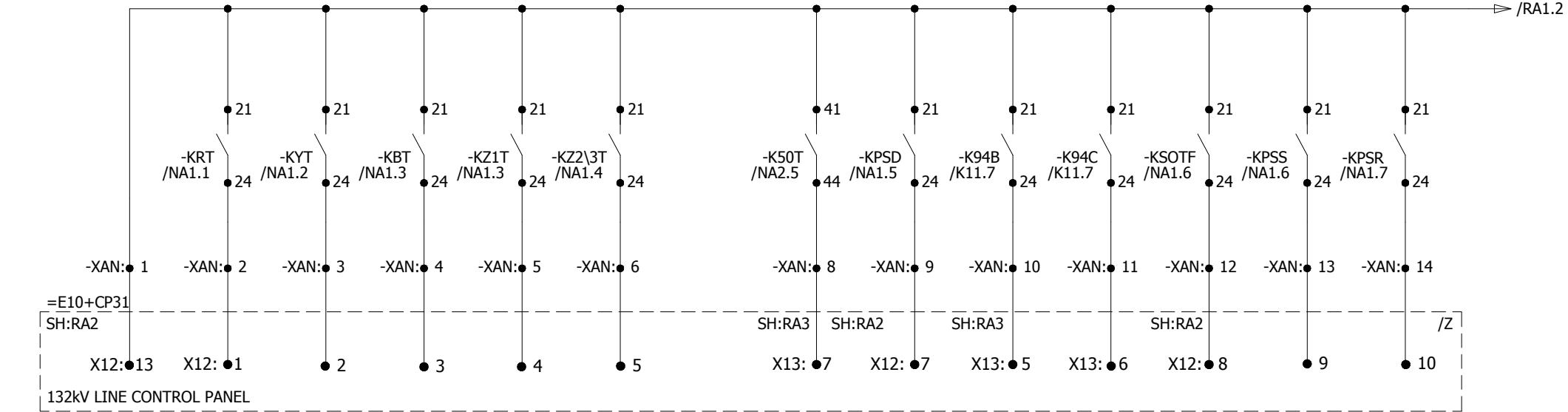
TRIP

AUTORECLOSURE

OPERATED

AUTORECLOSURE

BLOCKED



LINE DIFFERENTIAL

RELAY FAULTY

BUS VT SECONDARY CIRCUIT

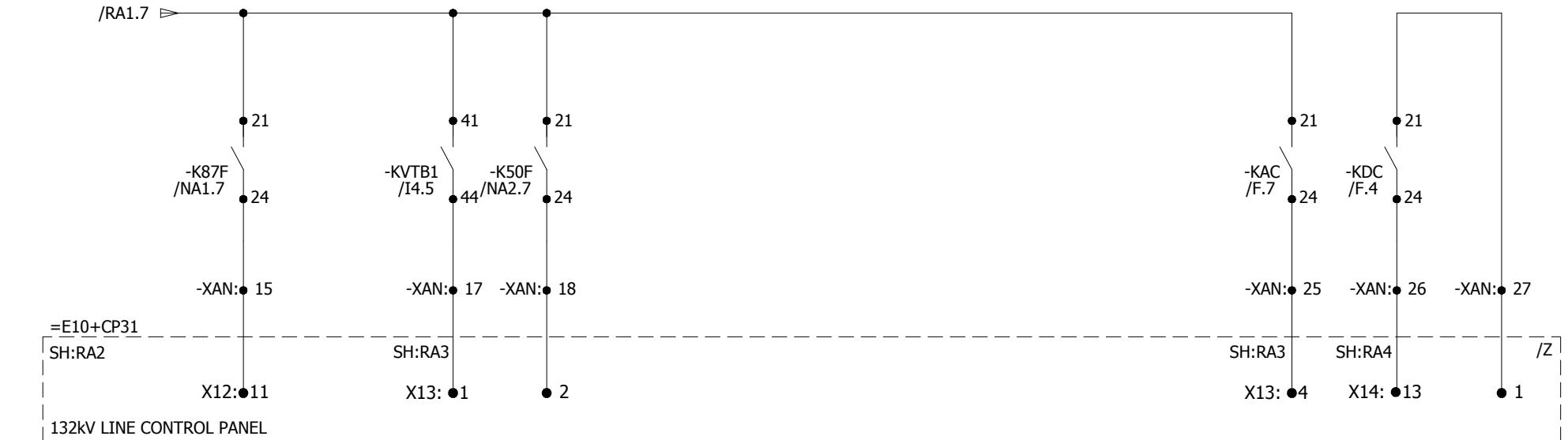
MCB UNHEALTHY

O/C &amp; E/F PROTECTION

RELAY FAULTY

LINE RELAY PANEL  
230VAC CIRCUIT/SUPPLY FAULTYLINE RELAY PANEL  
110VDC CIRCUIT/SUPPLY FAULTY

/RA1.7



0	AS BUILT	20-11-2018	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 RELAY PANEL (=E10+RP3) ANNUNCIATION CIRCUIT	Drawing no. P60194-E-ELR-SC-007	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type RA1	Sheet no. 20

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0	AS BUILT	20-11-2018	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 RELAY PANEL (=E10+RP3) EVENT & FAULT RECORDER CIRCUITS	Drawing no. P60194-E-ELR-SC-007	
REV.	DESCRIPTION	DATE	DRAWER					Project no. P-60194	Sheet type RA2	Sheet no. 21

DISTANCE PROTECTION  
GENERAL TRIPO/C & E/F PROTECTION  
TRIPDISTANCE PROTECTION  
RED TRIPDISTANCE PROTECTION  
YELLOW POLE TRIPDISTANCE PROTECTION  
BLUE POLE TRIPDISTANCE PROTECTION  
ZONE-1 TRIPDISTANCE PROTECTION  
ZONE-2/3 TRIPPOWER SWING  
DETECTEDSWITCH ONTO FAULT  
TRIPAUTORECLOSURE  
OPERATEDAUTORECLOSURE  
BLOCKED

/RA2.3

-F87

-Z2

-F50

-Z3

LINE DIFFERENTIAL  
RELAY FAULTBUS VT SECONDARY CIRCUIT  
MCB UNHEALTHYO/C & E/F PROTECTION  
RELAY FAULT

/RA2.8

LINE RELAY PANEL  
230VAC CIRCUIT/SUPPLY FAULTYLINE RELAY PANEL  
110VDC CIRCUIT/SUPPLY FAULTY

-XFR:• 1

-XFR:• 2

-XFR:• 3

-XEV:• 15

-XEV:• 17

-XEV:• 18

-XEV:• 25

-XEV:• 26

-X

-X

-X

-X

-X

-X

-X

-X

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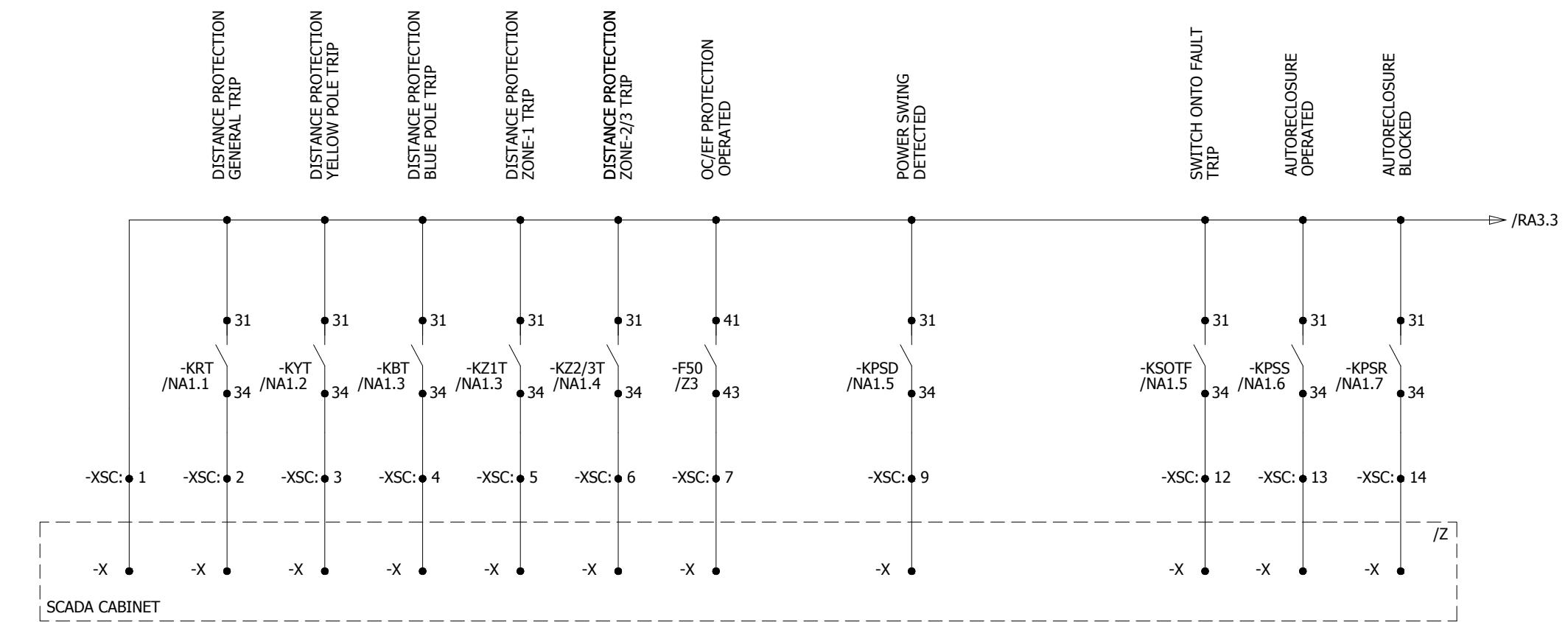
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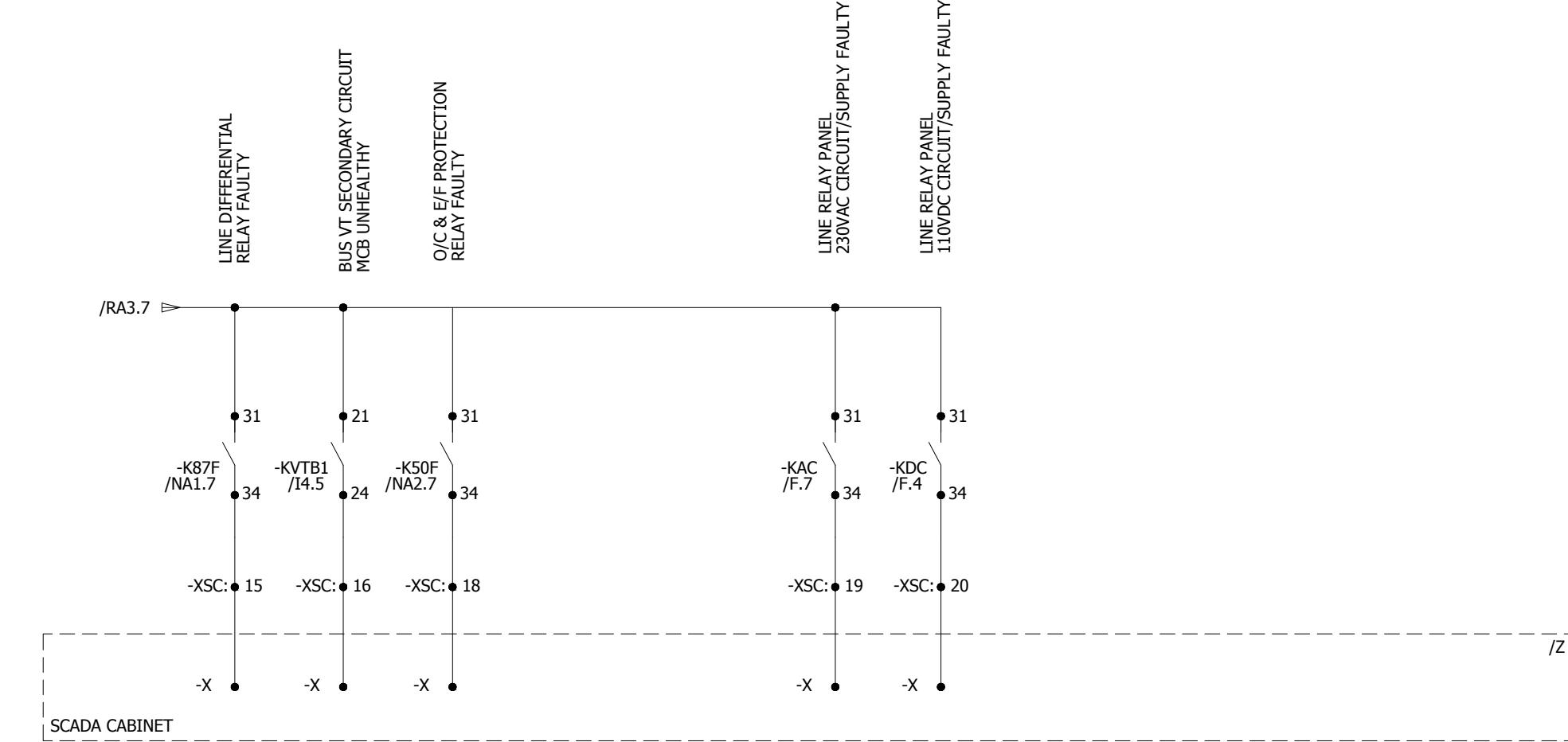
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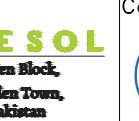
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0	AS BUILT	20-11-2018	ASJ	Manufacturer  EPESOL 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor  Grid Solutions A GE and Alstom joint venture	Client  NATIONAL TRANSMISSION & DISPATCH COMPANY LIMITED (NTDC-WAPDA)	Project 220kV/132kV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132kV LINE RELAY PANEL (=E10+RP3) SCADA CIRCUIT	Drawing no. P60194-E-ELR-SC-007		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type RA3	Sheet no. 22
1	2	3	4	5	6	7	8				

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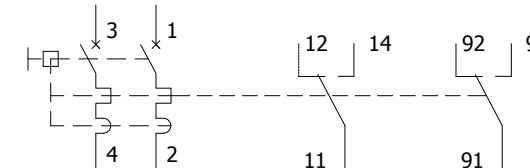
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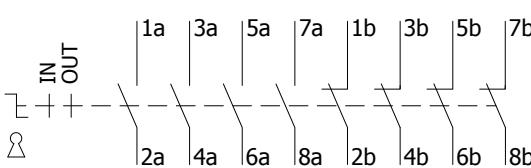
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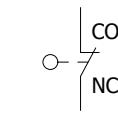
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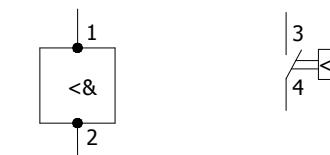
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-F102	D.4	F.6	
-F103	D.6	F.6	
-F201	E.5	F.2	
-F202	E.5	F.2	
-F203	E.6	F.2	
-F204	E.7	F.3	



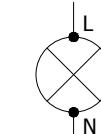
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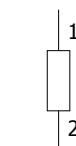
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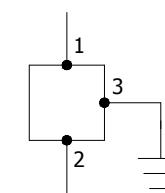
-B100	D.4	D.5
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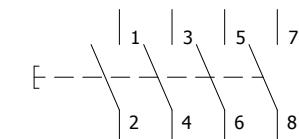
-H100	D.3
-H200	F.4



-R100	D.5
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-X100	D.7
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-S50	K1.7		
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0	AS BUILT	20.11.2018	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 RELAY PANEL (=E10+RP3) COMPONENT DIAGRAM	Drawing no. P60194-E-ELR-SC-002
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194
									Sheet type Z1
									Sheet no. 23

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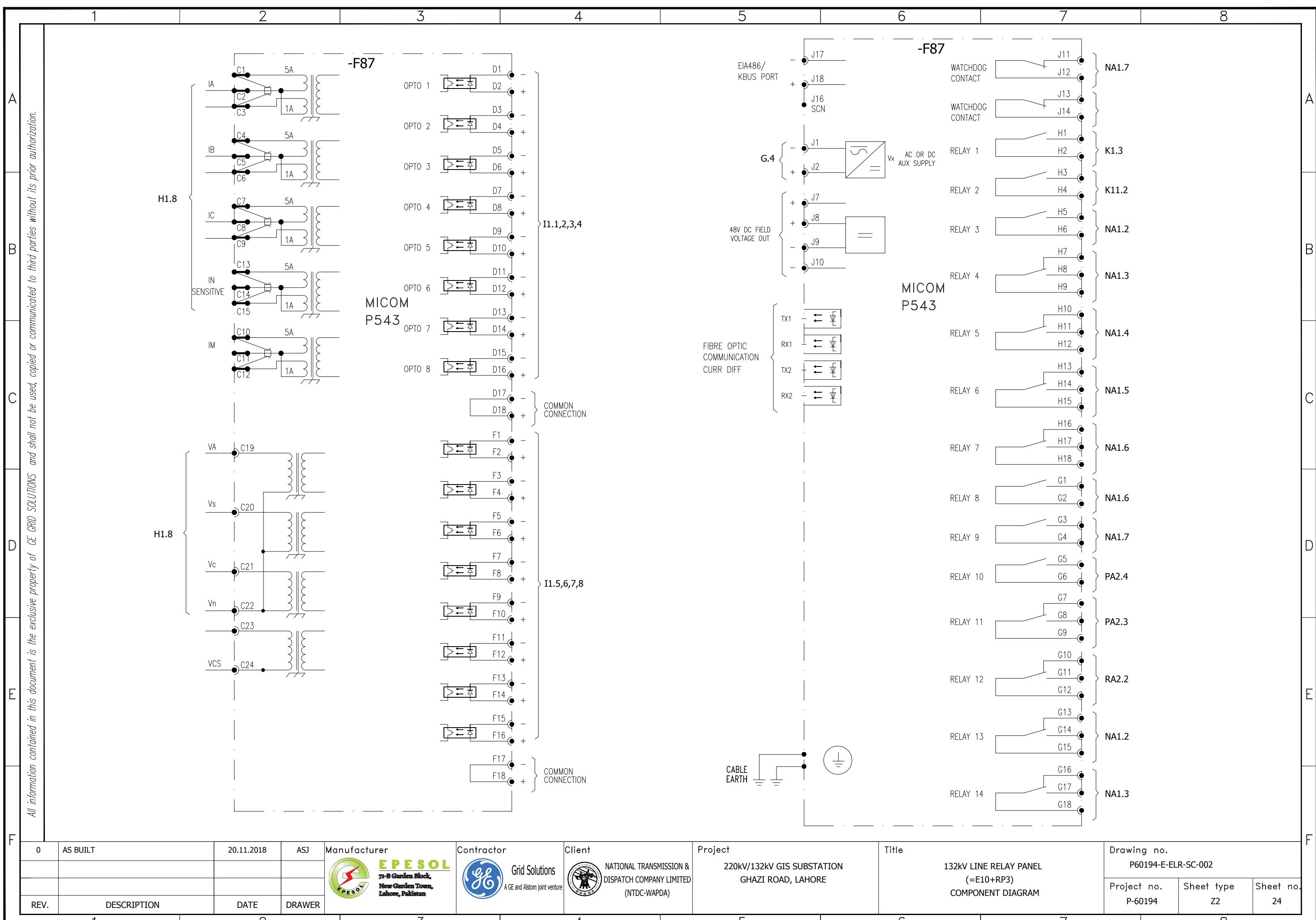
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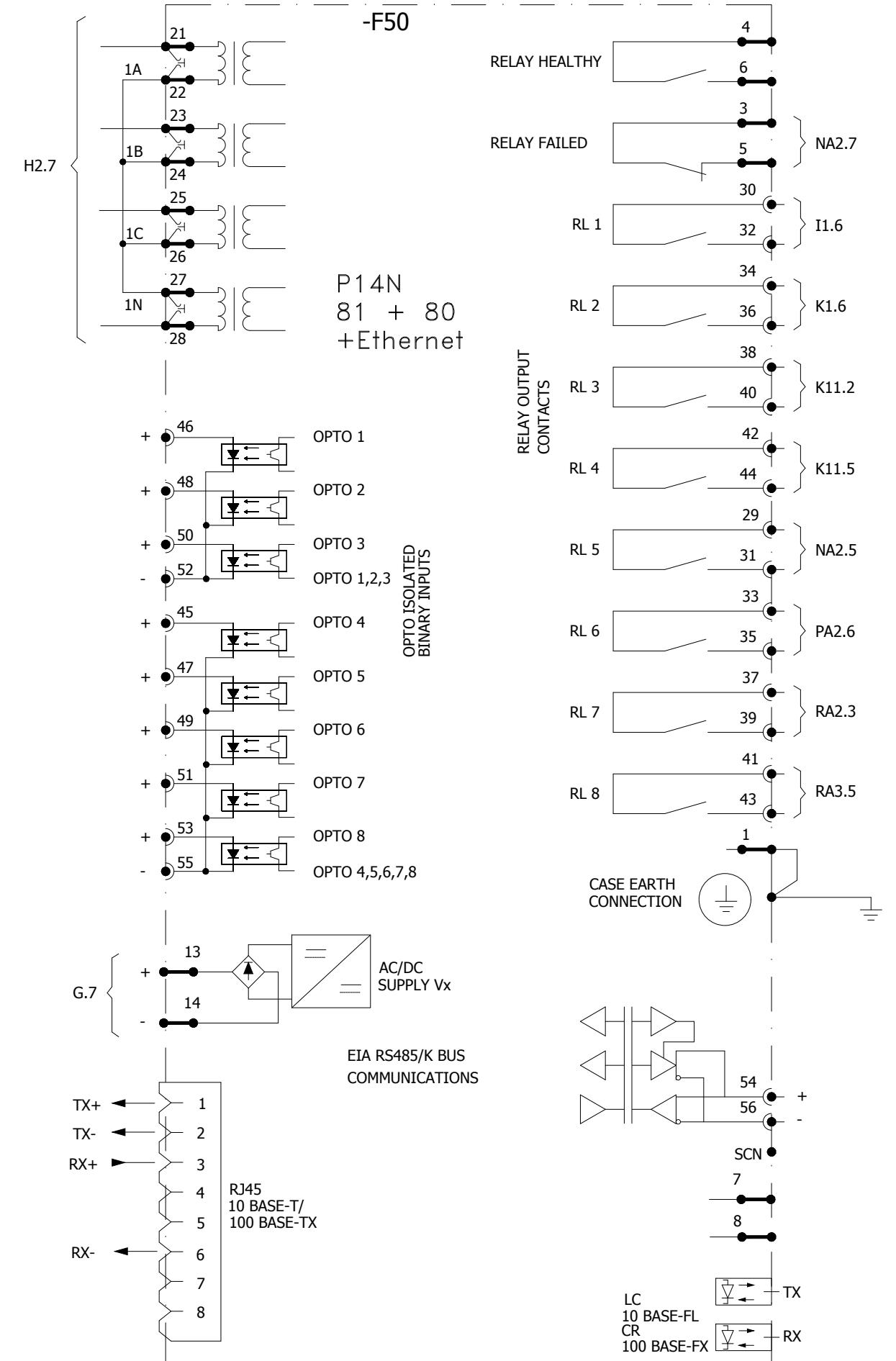
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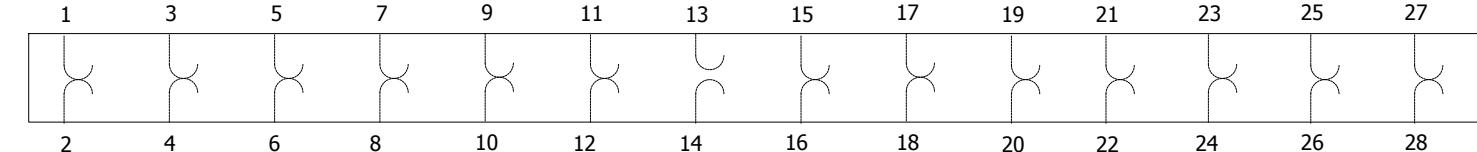
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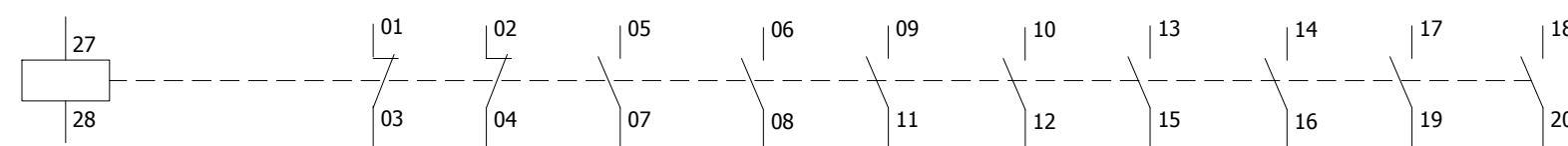


0	AS BUILT	20.11.2018	ASJ	Manufacturer <b>EPESOL</b> 71-B Garden Block, New Garden Town, Lahore, Pakistan	Contractor <b>GE</b> A GE and Alstom joint venture	Client <b>NATIONAL TRANSMISSION &amp; DISPATCH COMPANY LIMITED (NTDC-WAPDA)</b>	Project 220KV/132KV GIS SUBSTATION GHAZI ROAD, LAHORE	Title 132KV LINE RELAY PANEL (=E10+RP3) COMPONENT DIAGRAM	Drawing no. P60194-E-ELR-SC-002		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z3	Sheet no. 25

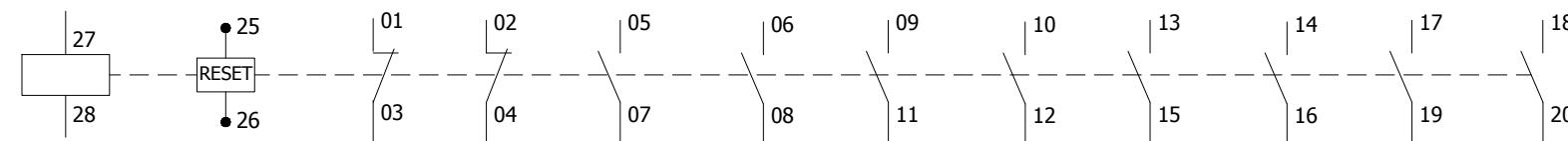
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-XT87A	H1.6		NA1.1		G.4		NA1.2,3		H1.6	
-XT87B	K1.2	NA1.4		NA1.5		NA1.6,7				
-XT50	H2.6		K1.6		G.7		NA2.5	NA2.7		

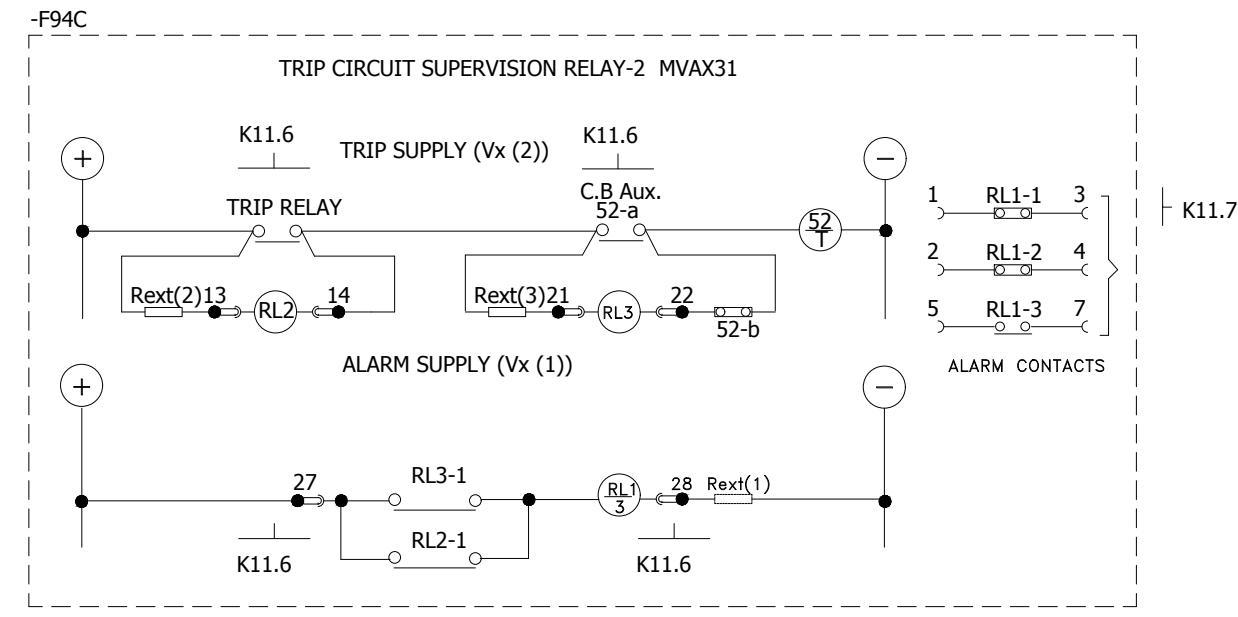
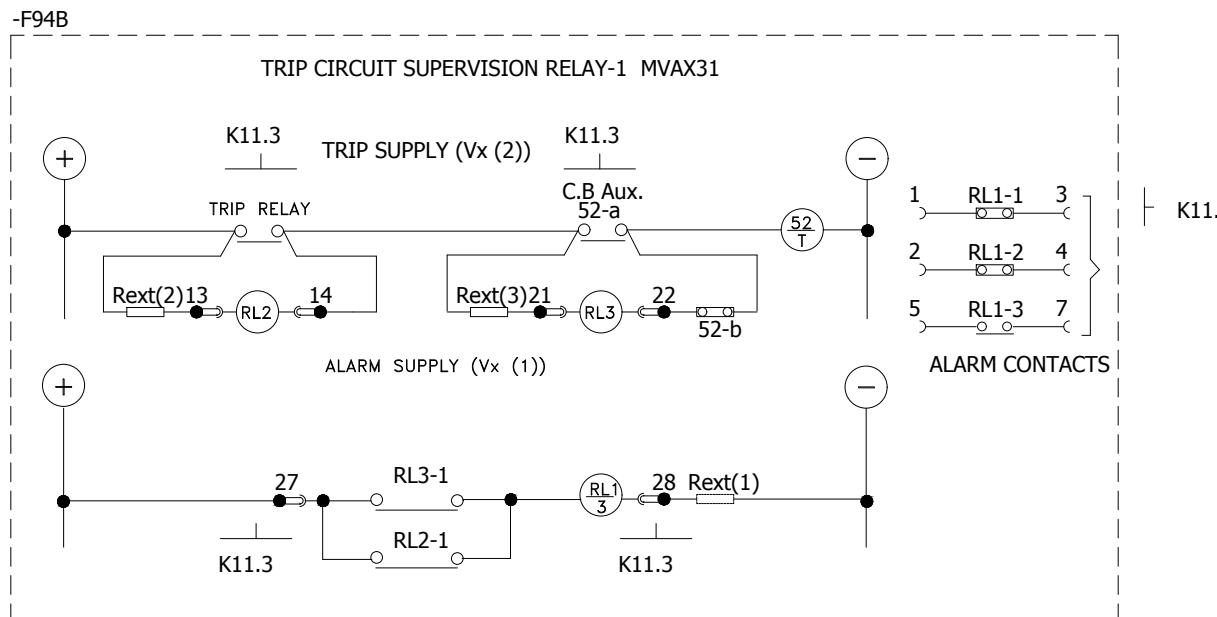


-F94-1	K1.2				K11.3	K11.5	PA2.7	PA2.5			
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-F86L	K1.6				K11.3	K11.5	PA2.7				
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-R94B1	K11.3
-R94B2	K11.3
-R94B3	K11.4
-R94C1	K11.6
-R94C2	K11.6
-R94C3	K11.7



0	AS BUILT	20.11.2018	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 RELAY PANEL (=E10+RP3) COMPONENT DIAGRAM	Drawing no. P60194-E-ELR-SC-002		
REV.	DESCRIPTION	DATE	DRAWER						Project no. P-60194	Sheet type Z4	Sheet no. 26
1		2	3	4	5	6	7	8			